SSC-352

MARINE STRUCTURAL STEEL TOUGHNESS DATA BANK

(Volume 2)



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1991

COVER #1

SSC-352 Marine Structural Steel Toughness Data Bank – Volume 2 Ship Structure Committee 1991

SPINE

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August 28, 1991

SSC-352
SR-1311

MARINE STRUCTURAL STEEL TOUGHNESS DATA BANK

A substantial amount of toughness data for commonly used marine steels is available to ship designers. The information, however, did not exist in a comprehensive database that users could access. The Ship Structure Committee recognized the need for a convenient source of materials design data and sponsored the development of the Marine Structural Steel Toughness Data Bank.

This four volume report contains data records for 10,000 tests on eleven marine steels. An abridged edition containing data extracts from all principal sections is available from the National Technical Information Service. A computer based version of the data bank is available through the developers. We trust that this information will prove to be quite useful.

A. E. HENN
Rear Admiral, U.S. Coast Guard
Chairman, Ship Structure Committee

(cover letter)

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
SSC-352 (Volume 2)		

4. Title and Subtitle	5. Report Date
Marine Structural Steel Toughness Data Bank	August 31, 1990
	6. Performing Organization Code 49641/MPDN 90-1
7. Author(s) J. G. Kaufman and Martin Prager	8. Performing Organization Report No. SR - 1311
9. Performing Organization Name and Address National Materials Property Data Network and The Materials Properties Council, 2540 Olentangy River Rd., P.O. Box 02224, Columbus, Ohio 43202	10. Work Unit No. (TRAIS)
	11. Contract or Grant No. DTCG23-86-C-20062
12. Sponsoring Agency Name and Address Ship Structure Committee U.S. Coast Guard (G-M) 2100 Second St., SW Washington, DC 20593	13. Type of Report and Period Covered Final Report
	14. Sponsoring Agency Code GM

15. Supplementary Notes
Sponsored by the Ship Structure Committee and its member agencies.

16. Abstract

The *Ship Structures Committee* has sponsored the development of a data bank covering the toughness of steels for marine applications. Effort focused on the identification and procurement of sources of data containing quantitative toughness data, and the development from those data of a well-documented computerized data bank available to a wide range of engineers and material scientists. Included were raw data from material suppliers and data from papers and technical reports published by a variety of organizations.

The principal focus was on Tensile, Charpy V notched bar impact values, fracture toughness (JIc), NDTT, and DT energies; other toughness parameters were included if available for the same lots of material. The materials include steels identified by the Project Technical Committee representing the sponsoring agencies.

About 1000 records representing approximately 10,000 tests of eleven steels are included in this prototype version of the data bank. Standard procedures now exist for efficient addition of data for other alloys and properties.

17. Key Words	18. Distribution Statement
Steel, Toughness, Charpy, Marine Applications, Data Bank	Available from: National Technical Information Service U.S. Department of Commerce Springfield, VA 22151

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	537	

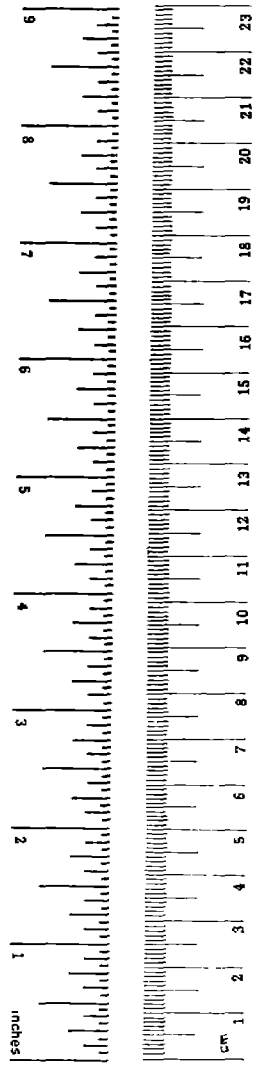
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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

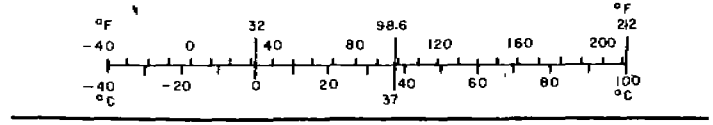
Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
	AREA			
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
	MASS (weight)			
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
	VOLUME			
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
	TEMPERATURE (exact)			
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price $2.25, SD Catalog No. C13.10:286.



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
	AREA			
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
	MASS (weight)			
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
	VOLUME			
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
	TEMPERATURE (exact)			
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



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Volume 1
ABS-B 1000
ABS-EH32 2000
ABS-EH36 2100
A36 3100

Volume 2
CG A537M 7100
A537 CL1 7300
A572 Gr50 7600
A588 8000
A710 9400

Volume 3
BS4360 Gr50D 13800

Volume 4
HY80 16500
HY100 19500

A Marine Structural Toughness Data Bank
Ship Structures Committee
Final Report

1 Introduction

Despite the substantial number of data available on the toughness of a wide variety of steels which may be used for marine applications, including several important studies by the *Ship Structures Research Committee*, there has been no comprehensive source to which one might go to readily find well-documented numeric data for the full range of materials and types of data of interest. The *Ship Structures Committee* and the *U.S. Coast Guard* recently took the steps needed to begin the establishment of such a source, with first priority given to toughness data for high strength, low alloy steels.

This handbook provides the initial compilation for the Marine Structural Toughness Data Bank, a summary of data from about 10,000 tensile and toughness tests of hundreds of samples representing eleven steels of importance for marine applications.

The result of this program is not only a source of reliable and well-documented numeric data on the toughness of steels, but also the nucleus of a system which may be expanded to include other properties of these steels and other materials which might be considered for such applications. The source will be of value to all segments of the Marine Industry, commercial and military, and to a number of other industry groups which utilize these steels, as well as to the Steel Industry itself.

Also of significant consequence, the program has been carried out in a manner and with procedures and standards compatible with those in use in the development of machine-readable databases by groups such as the *National Materials Property Data Network, Inc.* (the *MPD Network*), a network of worldwide sources of data (Refs. 1,2). This assures the opportunity for easy and direct interface and interchange of data with many other sources of numeric materials data.

As an added advantage, new searchers who might be looking for the type of data contained herein but are unaware of the Marine Structural Toughness Data Bank will be directed to it via the online version being established under the name MARTUF on the *MPD Network*. Such users also have access to many other sources of materials data. For additional information on this mode of access to the Marine Structural Toughness Data Bank, please refer to Annex I to this document.

2 Scope

The scope of this program was the development of a data bank on the toughness of steels which may be considered for marine applications such as ship hulls and drilling structures. Eleven steels of importance to the member organizations of the *Ship Structures Committee* are included. Data from a variety of types of toughness tests were included in the database, including Charpy impact, fracture toughness, nil-ductility transition, and drop-weight tear tests. The emphasis of this project was on the collection of data, not its detailed analysis, though efforts were made to assure that problems with identity of individual lots or incomplete reporting of test data were dealt with.

The Marine Toughness Data Bank was developed both in hard copy, as summarized in this document, and in machine readable form. It is available in a searchable online version on the *MPD Network* (where it is referred to as MARTUF; see Annex II and Ref 1,2). It is also available on PC disks in the original Lotus 123 format in which it was assembled from the Ship Structures Committee. It is not searchable in this format.

3 Materials Included in Marine Toughness Data Bank

The scope of materials considered for inclusion in this data bank was established by the Technical Committee representing the *Ship Structures Committee*. The original list of materials with the priorities provided is shown in Table 1. The individual priorities for the materials within group 1 are those specifically provided by the Technical Committee; priority numbers within groups 2 and 3 were assigned arbitrarily for convenient reference.

Also shown in Table 1 are alternative designations by which these materials are often identified. Their detailed material property and chemical composition requirements are presented in Table 2, with the order in which the material are presented revised to group like alloys (based upon composition and properties) together. Together these two tables illustrate several important features which had a significant bearing upon the program, viz.:

1. The specifications and properties for these materials overlap to a great extent,
2. It is difficult to be certain which materials are completely equivalent and which are significantly different, and
3. A great amount of information is required in building a database for such materials to provide users with the background necessary to assure than useful and valid comparisons are being made.

This problem has been recognized previously, especially in regard to comparisons with steels covered by foreign specifications. Early and Himes (Refs 3, 4, 5) confronted the problem and determined that in comparing specifications and individual steels themselves it is necessary to consider the composition limits, material property limits, fabrication practices and resultant microstructures, specific quality assurance requirements before drawing conclusions on this matter. They further concluded that several U.S. and foreign steels widely considered to be equivalent were indeed not so when all of these factors were considered.

It was not possible within the constraints of this program to determine without question the relative equivalence of all of the lots of materials for which data were obtained and included in this reference source. Therefore in all cases the identities given individual lots of material in this data bank are those provided by the original investigators plus those from the Unified Numbering System Guide (Ref. 6).

However it is clear from Table 2 that there are several groups of similar materials included in the Marine Toughness Data Bank, notably:

- High strength, low alloy steels A514, HY80 and HY100 containing primarily Ni, Cr, Mn and Mo;
- High strength, low alloy steel A710 and HSLA 80 containing primarily Cu, Ni, Cr and Mo;
- Medium to high strength low alloy steels A537, CG-537, A656, A737, ABS-EH36, and API 5L containing primarily Mn; and
- Medium strength low alloy steels A36, A572, A588, A633, A678, BS4360 and ABS-B and E, also containing primarily Mn.

Within each of the groups the primary alloying elements largely overlap, and their distinctiveness arises from differences in minor alloying elements and mechanical property requirements.

In the course of this work it was determined that it is appropriate to include certain "equivalent" alloys in the high priority list (making due allowance for tensile strengths, overlapping compositions, etc.). This was based in part on commercial practices.

Priority Alloy	Equivalent
HY80	A543 GrC CL1
A710 GrA	A736
ABS EH36	A737 Gr B
A514E	A517E
HY100	A543 GrC CL2
API5LX60	A572

Given the conditions above and the sources and types of data included within the scope of the search, data were placed into the data bank for the following materials:

ABS-B	A36	A710/A710-A	BS4360 Gr 50D
ABS-EH32	A572 Gr 50	HY80	CG A537M (A537 Cl 1)
ABS-EH36	A588 Gr A	HY100	

These represent 10 of the top 15 priority alloys requested by the Technical Committee, and one (A572) within the second priority set.

Alloying Identification Scheme: It was found convenient when logging the data for inclusion in the data bank to use a three-part identification scheme, in which the first three digits identify the alloy (with a direct relationship to the priority listing provided by the technical Committee); the second set of three digits identifying the specific heat; and the final two digits identifying whether the test sample was parent (base) metal, weld metal or heat-affected zone (HAZ), plus in the latter case the approximate distance of the tested HAZ area from the weld fusion line, *i.e.*, where the base of the notch or precracked tip is positioned 1, 3, 5, etc. mm from the edge of weld deposit. Thus,

XXX.YYY.ZZ

where

XXX. -Alloy Identifier, from priority code (Table 1)

YYY. -Heat Number, sequential number

ZZ -Sample Descriptor, as follows:

.01 - Base Metal
.02 - On fusion line
.03 - 1 mm into HAZ
.04 - 3 mm into HAZ
.05 - 5 mm into HAZ
.06 - 7 mm into HAZ
.07 - 9 mm into HAZ
.08 - 11 mm into HAZ
.09 - All weld metal

In recording this data for retention on the computer, every effort was made to preserve as much detail as possible about the preparation of the specimens tested. It is hoped that this will permit studies to be made of the effects of compositional materials or process variables on performance. This is required recording ingot position, welding parameters, specimen location, information about prior staining and postwelding heat treatment.

In order to maintain the individuality of material information records which differed only slightly, letters or numbers were added to the Material Codes. For example, when the top and bottom of the ingot were studied T or B was added. If severail strain-aging conditions were examined, S1, S2, etc. were noted. Multiple welds were recorded as A, B, C, D, etc.

One should be alert to those variables which may distinguish among the property records. For example, one may wish to search for deposit properties, in which case only ".09" records are of interest, or seek information about the fusion line, in which case records including ".02" (and possibly .03) will be of interest. The database offers the potential for studying differences in performance of the root pass or the last pass, or at the mid thickness, distinguishing between when it is or is not the weld root. Thus one must be careful not to mix weld data indiscriminately.

It goes without saying that distinctions between LT and TL specimens of the base metal need to be preserved. This was required as well for the weld deposit. It should be noted that L for the deposit was defined as the direction of travel. Since specimens were usually oriented perpendicular to the weld, a toughness measurement was usually described as TL in the deposit. At the fusion line and in the heat affected zone, the base metal specimens would all be transverse to the weld, but the TL orientation designated for the deposit would be switched to LT in the HAZ if the rolling direction were perpendicular to the welding direction.

It must be recognized that all position indicators and other descriptors of location relative to the fusin line or root or surface of the specimen are approximate. Nevertheless, considering all the variables provided for in the database may offer an explanation for some of the scatter in weldment performance observed. The reader should be acquainted with the data recording format if an in-depth study of materials or processing variables is intended.

4 Types of Data (Properties) Covered in the Program

The types of data sought for the data bank included the following:

- Material characterization (including actual composition, fabrication information and weld procedures, where appropriate)
- Tensile properties
- Fracture toughness, from KIc and JIc tests
- Charpy V notched bar impact values
- Nil ductility transition temperature
- Dynamic tear energy

Other types of toughness data were also sought, providing test results for at least one of the types above were also presented, and provision for a wide variety of types was made in the schema for the basic structure of the database (Table 4, described in Section V) These additional types of data included:

- Precracked Charpy impact
- Precracked Charpy slow bend
- MRL crack arrest

IC

- ESSO crack arrest
- Double TT crack arrest
- Wide plate tensile test
- Drop weight tear energy

Several other types of test data were also considered, including the Tearing Modulus, T, but the lack of standard test methods for such parameters led to their being dropped from further study. Interest was expressed in the inclusion of modulus of elasticity values at one point, but it was excluded because the types of tensile tests for which data were being input did not provide reliable measures of modulus in accordance with ASTM standards (ASTM Standard Method E 111).

In fact, during the collections of data, the vast majority of test results located and included within the data bank were from Charpy V notched bar impact tests; 643 of the 1017 records compiled contained Charpy data) Only relatively few fracture mechanics data (12 records, all JIc, and all representing HY80 and HY100) were found. The lack of fracture mechanics parameters found is undoubtedly related to the relatively tough nature of this general class of materials under conditions above their ductile-to- brittle transition temperature.

Table 3 is an "*occurrence table*" for the data bank, a matrix illustrating the various types of test records for the individual materials. The specific data associated with the various type of tests which were included in the database, and the meaning of the abbreviations are explained in Table 4, the data bank format (see Section V).

5 Format Development

The development of the overall format for the Marine Toughness Data Bank was an evolutionary process. A working format was established at the beginning of the program, covering the whole span of material characterization and test results sought, and the collection of data begun. Dr. Martin Prager, Executive Director of the *Materials Properties Council* (*MPC*), was responsible for locating, compiling and evaluating the data. Over the following six-to-twelve months, various examples arose in which more detailed description of the materials or of welding processes or of certain types of test results were required. The result was several iterations in format development, some changes involving only refinements, but others very substantive improvements in documentation of the materials or test data.

The final format established for the data bank is illustrated in Table 4; it is basically a very broad, very long spread sheet, with the material description/test data relationship being basically hierarchical in nature, and with the various segments held together in a relational fashion around the material identifier code discussed above.

Three specific things were considered in establishing the data format: (1) the description and characterization of the materials for which data are shown in the system, (2) the data elements for the individual tests, and (3) the styles of presentation of the data when accessed following its compilation and inclusion in the database.

Considerable attention was given to the need to have adequate background on the materials so that comparisons of performance characteristics may be made reliably. The impact of such considerations is the inclusion of much more information than is likely to be desired by most users most of the time. However the result is the ability to track down a great amount of additional detail

for those situations where it may be necessary to ensure that comparisons are meaningful. Examples include the elemental composition of individual lots, the fabrication histories of the individual lots, and the procedures used in producing the welded samples.

A major advantage of the particular format in Table 5 is its essential consistency with those of other databases being built by *MPC* and *MPD Network* for steels for other applications, notably the STEELTUF database (7). Utilization of such a format, even with substantial modification, assures the ability to expand, combine and/or compare readily with these other sources.

Compilation of Data: In order to maximize the efficiency and consistency of compilation of data for this data bank, standard data collection formats were developed. The format used for this purpose in the current program is presented in Table 5.

6 Sources of Data

The sources of data used in building the data bank included:

- Raw test results from ABS
- Raw rest results from material suppliers
- Individual test results from papers and technical reports published by:
  - ASTM Special Technical Publications and Journals
  - Materials Properties Council
  - Naval Research laboratories
  - Welding Research Council
  - Electric Power Research Institute
  - Ship Structures Committees
  - American Welding Society
  - Nippon Kokan
  - United Kingdom Atomic Energy Association
  - American Society of Mechanical Engineers
  - Universities

7 Procedures Employed in Building the Data Bank

The following basic steps were employed in building the MARTUF database:

1. Identification and procurement of data sources.
2. Review of document and completion of data compilation formats.
3. Transcription of data from source to *LOTUS 1-2-3* tabular format from information on compilation formats.
4. Development of a mapping program, and loading of file from *LOTUS 1-2-3* tabular format to a main-frame machine-readable database.

5. Mapping of the machine-readable form to print hardcopy handbook quality compilations.

The machine-readable version of the data bank was built and maintained at Stanford University in the *SPIRES* database management system (dbms). This software was developed at Stanford for library management and bibliographic search and retrieval purposes.

Preparation of the hardcopy database was accomplished under subcontract to Mr. William L. Anderson, of Elements Research, Inc., 2850 Middlefield Rd. #126, Palo Alto, CA 94306. The document was typeset in TEX and PostScript.[1]

8 Summary

The *Ship Structures Committee* has sponsored the development of a data bank covering the toughness of steels for marine applications. Effort focused on the identification and procurement of sources of data containing quantitative toughness data, and the development from those data of a well-documented computerized data bank available to a wide range of engineers and material scientists. Included were raw data from material suppliers and data from papers and technical reports published by a variety of organizations.

The principal focus was on Tensile, Charpy V notched bar impact values, fracture toughness (JIc), NDTT, and DT energies; other toughness parameters were included if available for the same lots of material. The materials include steels identified by the Project Technical Committee representing the sponsoring agencies.

About 1000 records representing approximately 10,000 tests of eleven steels are included in this prototype version of the data bank. Standard procedures now exist for efficient addition of data for other alloys and properties.

9 References in the Report

1. J. G. Kaufman, "*Sources and Standards for Computerized Materials Property Data and Intelligent Knowledge Systems*", Engineering with Computers, ASME, Vol. 4, pp 75-85, 1988, New York, NY.

2. J. G. Kaufman, "*The National Materials Property Data Network, Inc. - A Cooperative Approach to a Critical National Resource*", Proceedings of the First International Symposium on Computerization of Material Property Data, November, 1987, Philadelphia, PA.

3. NBSIR 82-2481, "*Analysis of Foreign and Domestic Material Specifications for Ships Components*", U.S Dept. of Commerce, National Bureau of Standards, October 1981 (Issued April, 1982), Washington, DC.

4. NBSIR 83-2692, "*Evaluation Criteria for Comparing Domestic and Foreign Material Specifications*", U.S. Dept of Commerce, National Bureau of Standards, March, 1983 (issued May, 1983), Washington, DC.

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TEX is a trademark of the American Mathematical Society.
PostScript is a trademark of Adobe Systems Incorporation.

5. H. Himes and J. G. Early, "*Evaluation Criteria for Comparison of Foreign and Domestic Material Specifications*", Journal of Testing and Evaluation, May, 1983, ASTM, Philadelphia, PA.

6. "*Metals and Alloys in the Unified Numbering System*", SAE HS J1086, ASTM DS-56C, Fourth Edition, April, 1986.

7. Grattidge *et al*, "*Materials Information for Science and Technology (MIST): Project Overview*", NBS Special Publication 726, U.S. Dept of Commerce, National Bureau of Standards, November, 1986.

TABLE 1

MARINE STRUCTURAL TOUGHNESS DATA BANK

COMMON NAME	ASTM SPEC	UNS NUMBER	PRIORITY
HY80	A543 Gr C(1)	K31820	1-1
A710-A	A710 Gr A	K20747	1-2
CG A537M	A537 Cl 1	K12437	1-3
ABS-B	A131 Gr B	K02102	1-4
API 5L Gr X70	-	-	1-5
HSLA 80	-	-	1-6
ABS-EH36	A131 Gr EH36	K11852	1-7
A514E	A514 Gr E	K21604	1-8
A36	A36	-	1-9
BS 4360 Gr 50D	-	-	1-10
HY100	-	K32045	1-11
A588-81 Gr A	A588 GR A	K11430	1-12
A588 Gr B	A588 Gr B	K12043	1-12
A588 Gr C	A588 Gr C	K11538	1-12
A537-A	A537 Gr A	K02400	1-13
API 5L Gr X60	-	-	1-14
A656-70	A656 Gr 70	K11804	1-15
A572 Gr 50	A572 Gr 50	-	2-1
A678 Gr D	A678 Gr D	-	2-2
DIN 17100 St 52.3	-	-	2-3
JIS G3016	-	-	2-4
ABS-E	A131 Gr E	K01801	2-5
ABS DH36	A131 Gr DH36	-	2-6
A514A	A514 Gr A	K11856	3-1
A514F	A514 Gr F	K11576	3-2
A514P	A514 Gr P	K21650	3-3
A537-1	A537 Cl 1	K12437	3-4
A537-2	A537 Cl 2	K12437	3-5
A588	A588	K12040	3-6
A588-71 Gr F	A588 Gr F	K11541	3-7
ABS-CS	A131 Gr CS	K01601	3-8
ABS-DS	A131 Gr DS	K01601	3-9
ABS-AH32	A131 Gr AH32	K11846	3-10
ABS-EH32	A131 Gr EH32	K11846	3-11

Priorities:	1-1,2 etc	Technical Committee Priority 1 List
	2	Technical Committee Priority 2 List
	3	Other Grades of Alloys in Priority 1 List

Table 2 - Comparisons of Tensile Property and Composition Limits For Some Steels of Interest For Marine Applications

ALLOY DESIGNATIONS	SPECIFIED MINIMUM UTS ksi	SPECIFIED MINIMUM YS or YP ksi	SPECIFIED COMPOSITION, element, per cent C Max.	C Min.	Mn Max.	Mn Min.	P Max.	S Max.	Si Max.	Si Min.	Ni Max.	Ni Min.	Cr Max.	Cr Min.	Mo Max.	Mo Min.
A514 Gr E	100	90	0.20	0.12	0.70	0.40	0.035	0.040	0.20	-	-	-	2.00	1.40	0.60	0.40
A517 Gr E	115	100	0.20	0.12	0.70	0.40	0.035	0.040	0.35	0.20			2.00	1.40	0.60	0.40
A543 Type C Class 2	115	100	0.23	-	0.40	-	0.020	0.020	0.40	0.20	3.25	2.25	1.80	1.20	0.60	0.45
HY-100		100	0.20	-	0.40	0.10	0.025	0.025	0.35	0.15	3.50	2.25	1.80	1.00	0.60	0.20
HY-80		80	0.18	-	0.40	0.10	0.025	0.025	0.35	0.15	3.25	2.00	1.50	1.00	0.60	0.20
A543 Type C Class 1	105	85	0.23	-	0.40	-	0.020	0.020	0.40	0.20	3.25	2.25	1.80	1.20	0.60	0.45
A710 Gr A Class 2	72	65	0.07	-	0.70	0.40	0.025	0.025	0.40	-	1.00	0.70	0.90	0.60	0.25	0.15
A710 Gr A Class 3	85	75	0.07	-	0.70	0.40	0.025	0.025	0.40	-	1.00	0.70	0.90	0.60	0.25	0.15
HSLA 80 (MIL-S-24645)		80	0.07	-	0.70	0.40	0.025	0.010	0.70	-	1.00	0.70	0.90	0.60	0.25	0.15
CG-537M			0.16	-	1.50	0.90	0.035	0.040	0.35	0.15	0.25	-	0.25	-	0.08	-
A537/A537M Class 1	70	50	0.24	-	1.35	0.70	0.035	0.040	0.50	0.15	0.25	-	0.25	-	0.08	-
A537/A537M Class 2	80	60	0.24	-	1.35	0.70	0.035	0.040	0.50	0.15	0.25	-	0.25	-	0.08	-
ABS EH36	71	51	0.18	-	1.60	0.90	0.040	0.040	0.50	0.10	0.40	-	0.25	-	0.08	-
A737 Gr C	80	60	0.22	-	1.50	1.15	0.035	0.030	0.50	0.15	-	-	-	-	-	-
A656 Gr 70	80	70	0.18	-	1.65	-	0.025	0.035	0.35	-	-	-	-	-	0.35	-
API 5L Gr X60					1.60	-	0.040	0.050			0.50	-				
API 5L Gr X70			0.15	-	1.60								-	-		
A36	58	36	0.25	-	1.20	0.80	0.040	0.050	-	-	-	-	-	-		
BS4360 Gr 50D			0.15	-	1.35	0.80	0.040	0.050	0.30	0.15	0.50	0.25	0.50	0.30	-	-
A588 Gr C	70	50	0.15	-	1.35	0.80	0.040	0.050	0.30	0.15	0.50	0.25	0.50	0.30	-	-
MS-B/ABS Gr B	58	34	0.21	-	1.10	0.80	0.040	0.040	0.35	-	-	-	-	-	-	-
A572 Gr 50 Type 1	65	50	0.23	-	1.65	-	0.040	0.050	0.40	-	-	-	-	-	-	-
A633 Gr A	63	42	0.18	-	1.35	1.00	0.040	0.050	0.50	0.15	-	-	-	-	-	-
A678 Gr C	90	70	0.22	-	1.60	1.00	0.040	0.050	0.50	0.20	-	-	-	-	-	-
ABS E	58	34	0.18	-	1.35	0.70	0.040	0.040	0.35	0.10	-	-	-	-	-	-

ALLOY DESIGNATIONS	SPECIFIED MINIMUM UTS ksi	SPECIFIED MINIMUM YS or YP ksi	SPECIFIED COMPOSITION, element, per cent Cu Max.	Cu Min.	V Max.	V Min.	Cb(Nb) Max.	Cb(Nb) Min.	Ti Max.	Ti Min.	B Max.	B Min.	Al Min.	N Max.	Mi
A514 Gr E	100	90			-	-	-	-	0.10	0.04	0.005	0.0015	-	-	
A517 Gr E	115	100	0.40	0.20	-	-	-	-	0.10	0.04	0.01	0.00	-	-	
A543 Type C Class 2	115	100	-	-	0.03	-	-	-	-	-	-	-	-		
HY-100		100	0.25	-	-	-	-	-	-	-	-	-	-	-	
HY-80		80	0.25	-	-	-	-	-	-	-	-	-	-	-	
A543 Type C Class 1	105	85	-	-	0.03	-	-	-	-	-	-	-	-		
A710 Gr A Class 2	72	65	1.30	1.00	-	-	0.02	-	-	-	-	-	-	-	
A710 Gr A Class 3	85	75	1.30	1.00	-	-	0.02	-	-	-	-	-	-		
HSLA 80 (MIL-S-24645)		80	1.30	1.00											
CG-537M			0.35	-	-	-	-	-	-	-	-	-	-	-	
A537/A537M Class 1	70	50	0.35	-	-	-	-	-	-	-	-	-	-	-	
A537/A537M Class 2	80	60	0.35	-	-	-	-	-	-	-	-	-	-	-	
ABS EH36	71	51	0.35	-	0.10	-	0.05	-	-	-	-	-	-	-	
A737 Gr C	80	60	-	-	0.11	0.04	0.05	-	-	-	-	-	-	0.030	
A656 Gr 70	80	70	-	-	-	-	0.07	0.020	-	-	-	-	0.02	0.030	0.(
API 5L Gr X60					0.02	-	0.05	-	-	-	-	-	-	-	
API 5L Gr X70					0.10	-	0.05	-	-	-	-	-	-	-	
A36	58	36													
BS4360 Gr 50D			0.50	0.20	0.10	0.01	-	-	-	-	-	-	-	-	
A588 Gr C	70	50	0.50	0.20	0.10	0.01	-	-	-	-	-	-	-	-	
MS-B/ABS Gr B	58	34	-	-	-	-	-	-	-	-	-	-	-	-	
A572 Gr 50 Type 1	65	50	-	0.20	-	-	0.05	0.005	-	-	-	-	-	-	
A633 Gr A	63	42	-	-	-	-	0.05	-	-	-	-	-	-	-	
A678 Gr C	90	70	-	0.20	-	-	-	-	-	-	-	-	-	-	
ABS E	58	34	-	-	-	-	-	-	-	-	-	-	-	-	

Note: Where composition or tensile properties vary with thickness, values are for 1-in. plate

10 Annex I: Summary and Directory of Data Sheets

Summary and General Introduction

Table A - List of Alloys and Directory for Data Bank

Table B - Explanation of Material Codes

Table C - List of Abbreviations and Symbols in Data Tables

Table D - List Abbreviations for Data References

10.1 Summary and General Description of Marine Toughness Data Bank

The Marine Toughness Data Bank is a compilation of raw, individual test data for steels of interest to the marine industry. The data are organized in the attached pages by alloy and where possible by grade of the alloy. Data for individual lots of material are collected together, with a cover page providing the background identification, composition, fabricating history, and, in the case of welds, the weld procedures. Also included on the initial cover page for each individual lot are the tensile properties whenever those were available. Following the tensile properties are one or more of the following types of test results:

- Tensile tests per ASTM Method E 8
- Charpy V-notched bar impact (CVN) tests per ASTM Method E 23
- Fracture toughness (J-integral, JIc) tests per ASTM Method E 813
- Nil-ductility-transition temperature (NDTT) tests per ASTM Method E 208
- Dynamic tear (DT) tests per ASTM Method E 604
- Drop weight tear test per ASTM Method E 436

over a range (more than two) temperatures, the data are plotted as a function of temperature on uniform sized plots so that data from may be readily compared from lot to lot and alloy to alloy.

In general, the data are presented in the original units systems (SI - International Standard, or Engineering) in which they were reported. However, once again to facilitate comparisons, all plots are presented to uniform scales with both sets of units present. There were a few cases in which older metric unit systems were utilized, and in these cases, the values are converted to the SI system for presentation.

The information on the following pages will provide additional assistance in interpreting certain of the abbreviations and codes used in compiling the data.

10.2 Table A - List of Alloys and Directory for Data Bank

Alloy Designation	Material Code (See Table B)	Page Number
ABS-B	004	1000
ABS-EH32	032	2000
ABS-EH36	007	2100
A36	009	3100
CG A537M	003	7100
A537 CL1	003	7300
A572 Gr 50	016	7600
A588	012	8000
A710	002	9400
BS4360 Gr 50D	010	13800
HY80	001	16600
HY100	009	19500

10.3 Table B - Explanation of Material Codes

In logging the data for inclusion in the Marine Toughness Data Bank, a three-part identification scheme was used, in which:

- the first three digits identify the alloy;
- the second set of three digits identify the specific heat; and
- the final two digits identify whether the test sample was parent (base) metal, weld metal or heat-affected zone (HAZ), plus in the latter case the approximate distance of the HAZ from the weld line. In the case of welds, it was often useful to add one or more letters to document some other welding variable such as a postweld thermal treatment.

Thus, the complete material code for unwelded materials would be of the following form:

XXX.YYY.01

Where:

XXX. -Alloy Identifier, from priority code (Table 1)

YYY. -Heat Number, sequential number

And for a welded material it would be of this form:

XXX.YYY.ZZWWW

where

XXX. -Alloy Identifier, from priority code (Table 1)

YYY. -Heat Number, sequential number

ZZ -Sample Descriptor, as follows:

- .01 - Base Metal
- .02 - On fusion line
- .03 - 1 mm into HAZ
- .04 - 3 mm into HAZ
- .05 - 5 mm into HAZ
- .06 - 7 mm into HAZ
- .07 - 9 mm into HAZ
- .08 - 11 mm into HAZ
- .09 - All weld metal

WWW -Weld descriptors

- A - As welded
- S - Stress relieved after welding

In either case (parent/base material or weld), one or more numbers may follow these codes (without any space) indicating different pieces or minor variations in treatments, which may be deduced by looking at the detailed composition, fabrication or welding history.

10.4 Table C - Symbols and Abbreviations Used in Data Bank

Abbreviations for Heat Treatment and Final Processing:

A	Austenitized
B	Brine quenched
C	Cold rolled
D	Double normalized
F	Hot rolled
G	Hot forged
K	Aged
N	Normalized
P	Thermo-mechanical process
R	Continuous rolled
Q	Quenched
S	Stress-relieved
T	Tempered
W	Welded

Abbreviations for Alloying Elements:

C	Carbon	Mn	Manganese
P	Phosphorus	S	Sulfur
Si	Silicon	Cr	Chromium
Ni	Nickel	Mo	Molybdenum
V	Vanadium	Cu	Copper
Cb	Columbium	Ti	Titanium
B	Boron	Al	Aluminum
N	Nitrogen		

Abbreviations for Welding Procedures:

Weld type:	SAW	Submerged arc weld
	SMAW	Shielded metal arc weld
	TSAW	Tandem shielded submerged arc weld
	ESW	Electroslag weld
	NGESW	Narrow gap electroslag weld
Weld position:	IG	Downhand
	1G	Downhand
	2G	Horizontal
	3G	Vertical
	4G	Overhead

Abbreviations for Location of Test Sample:

T	Top	B	Bottom

Abbreviations for Specimen Orientation:

For tensile specimens:

L	Longitudinal
T	Long Transverse
S	Short Transverse

For all other specimens: two letter codes are used, with the first letter indicating the direction normal to the fracture plane; and the second letter indicating the expected direction of crack growth on the fracture plane.

The letters are:

L	Longitudinal
T	Long transverse
S	Short transverse

The common combinations are:

L-T,	L-S
T-L,	T-S
S-L,	S-T

Abbreviations for Table Column Headings:

Break?	Did specimen fracture completely?
CODIc	Critical COD
CODi	Initial COD
CVN Energy	Charpy V Energy
Crack lgth	Crack Length
Curve	Curve Shape
DT Energy	Dynamic Tear Energy
E	Tensile Modulus
Filler	Filler Alloy
Frac Apear	Appearance
Fracture?	Did Specimen Fracture?
Gage Lngth	Gage Length
Inv Basis	Reason for Invalid
Is Valid?	Valid KIc?
JI	Initial JI
Jmax	Maximum J, Jmax
Lat Expans	Lateral Expansion
Load Rate	Loading Rate
Load Type	Loading Type
NDTT	Nil Ductility Transition Temperature
Notch Prep	Notch Preparation
Orien	Orientation
RA	Reduction in Area
Shear	Shear Fracture
Spec Thick	Specimen Thickness
Spec Type	Specimen Type
Split?	Did Specimen Split?
Std Method	Standard Method Designation
Std Year	Year Standard Issued
TYP	Tensile Yield Point
TYS	Tensile Yield Strength
TYS Offset	Tensile Strength Offset
Tear Mod	Tearing Modulus
Test Temp	Test Temperature
UTS	Tensile Strength
Uniform El	Uniform Elongation

10.5 Table D - List Abbreviations for Data Source References:

004-2 — "*Approval Testing of Ship Steel Grades A, B, D and E, Produced via the Continuous Slab Caster Process*," Australian Iron and Steel Property Ltd., 1980

007-1 — Kobe Steel Reports on "*Quantitative Examination for Approval of Higher Strength Hull Structural Steel Plate Quench and Temper Type*," to ABS, Kobe Steel Ltd., Kakogawa Plant, 1972

007-4 — Sumitomo Test Report on "*Approval of Higher Strength Hull Steel Plates Rolled from Contiguously Cast Slab*" to ABS, Sumitomo Metal Industries Ltd., Kashima Steel Works, November 1972

1010 — Lukens Steel Company, Data Report Project 1010

1211 — Lukens Steel Company, Data Report Project 1211

3200 — Lukens Steel Company, Data Report Project 3200

3201 — Lukens Steel Company, Data Report Project 3201

3202 — Lukens Steel Company, Data Report Project 3202

3400 — Lukens Steel Company, Data Report Project 3400

3530 — Lukens Steel Company, Data Report Project 3530

ARMCO-MPC — ARMCO Steel Data Submitted for MPC Survey

KONKOL-1 — Konkol, P. J., Effects of Long-Time Post Weld Heat Treatment on the Properties of Constructional Steels, WRC Bulletin 330, January 1988

METZ/MPC-13 — Metz, P. O., "*Toughness of C-Mn Structural Steels*," in Fracture Toughness of Wrought and Cast Steels, ASME Publication MPC-13, 1980

RP1120 — Lukens Steel Company, Data Report Project RP1120

S-1971 — "*Sumitomo Metal Industries Approval Test Report of Hull and Steel Plates Rolled from Continuously Cast Slab, Grades A, R, B, C, D and E*," Sumitomo Metal Industries Ltd., Wakayama Steel Works, April 15, 1971

SH-01 — Properties of Normalized Steel Plates (Equivalent to BS4360 Gr. 50D) with Z Properties, Sumitomo Heavy Industries

SSC276 — Francis, P. H., Cook, T. S. and Nagy, A., Fracture Behavior Characterization of Ship Steels and Weldments, SSC-276, Final Report on Project SR-1224 (Fracture Criteria), Ship Structures Committee, U. S. Coast Guard Headquarters, 1978

USN-1 — U. S. Navy First Article Qualification Processing Information for Indicated Heat

USN 4/7 — U. S. Navy Technical Report, MPC Archival Record 4/7

USN 5/7 — U. S. Navy Technical Report, MPC Archival Record 5/7

USN 5/9 — U. S. Navy Technical Report, MPC Archival Record 5/9

USN 6/9 — U. S. Navy Technical Report, MPC Archival Record 6/9

USN 7/9 — U. S. Navy Technical Report, MPC Archival Record 7/9

USN 8/9 — U. S. Navy Technical Report, MPC Archival Record 8/9

USN 9/9 — U. S. Navy Technical Report, MPC Archival Record 9/9

WELLMAN-WRC — Wellman, G. W. *et al*, "*Specimen Thickness Effects for Elastic Plastic CTOD Fracture Specimens of an A36 Steel*," WRC Bulletin 328, Nov. 1987

WJ 3/87 — "*Welded HY-80 Steel for Australian Warships*," Welding Journal 66(3), March 1987, pp. 33-44

WJ 7/87 — Rodgers, K. J. and Lochhead, J. C., "*Self-Shielded Flux Cored Arc Welding - The Route to Good Fracture Toughness*," Welding Journal 66(7), July 1987, pp. 49-59

11 Annex II: Martuf on MPD Network

As noted in the body of this document, a machine-readable and searchable version of the Marine Structural Toughness Data Bank, known as MARTUF, has been developed and is accessible via the National Materials Property Data Network (*MPD Network*) on *STN International*. For more information, contact:

J. G. Kaufman, President
National Materials Property Data Network, Inc.
2540 Olentangy River Road
Columbus, Ohio 43202

12 Annex III: Data Collection Formats

The following pages contain formats used during the collection of data for the Marine Toughness Data Bank.

FORMATS.TXT

For File Use only
Entered into _____.WK1
lines_____to_____
Date_____19___

Information included: Wld, Ten, FT, CV, NDT, DWT, DT, MRL
WORKSHEETS FOR U. S. COAST GUARD DATABASE (based on marindbs: 12/30/87)
FRACTURE PROPERTIES OF STEELS FOR MARINE APPLICATIONS
BACKGROUND

0-1 Material Code __ __ __ . __ __ __ . __ __
*0-1a Common material name _____
0-1b UNS desig. _____ ___n.r. ___n.a. ___n.y.
0-1c ASTM specification no. _____ ___n.r. ___n.a. ___n.y.
0-1d AISI desig. _____ ___n.r. ___n.a. ___n.y.
0-1e Military spec. _____ ___n.r. ___n.a. ___n.y.
0-1f Other designation _____ ___n.r. ___n.a. ___n.y.
0-2a Base Metal ___WM-Wrought metal ___CM-Cast metal ___WJ-Welded joint only
*0-2b Basic Form ___P-Plate ___A-Angle ___C-Channel ___W-Web of shape
___T-Pipe ___B-Bar ___S-Shape ___F-Flange of shape
___ n.r. ___ n.a. ___ n.y.
*0-3 Thickness _____mm _____in. ___See_____
___n.r. ___n.a. ___n.y.
0-4 Composition type ___ S-refer to specification
___ N-nominal (not measured)
___ A-actual;
0-4aa Composition Position __T-Top,__B-Bottom,__L-Ladle, __W-Weld
___ n.r. ___ n.a. ___ n.y.
0-4a-o Actual Composition ___ See _____
0-4p Composition Comments _____
0-5 Total Processing __ __ __ __ __ __ __ __ __ __
(Choose letters to indicate steps and order of treatment)

___ A-austenitized	___ N-normalized
___ B-brine quenched from A	___ P-thermo-mechanical process
___ C-cold working	___ R-continuous rolled
___ D-double normalized	___ Q-quenched
___ F-hot rolled	___ S-stress relieved
___ G-hot forged	___ T-tempered
___ K-aged	___ W-welded

___n.r. ___n.a. ___n.y.
*0-6 Producer's Heat Lot Number _____
___n.r. ___n.a. ___n.y. ___See_____
0-7 Producer (name of producing company) ___n.r. ___n.a. ___n.y.
_____
0-7a Year of production _____ ___n.r. ___n.a. ___n.y.
0-8 Additional information ? _____
0-9 Source of data/laboratory _____
___n.r. ___n.a. ___n.y.
*0-10 Source of data/reference _____
___n.r. ___n.a. ___n.y.
0-11 Melting practice _____ ___n.r. ___n.a. ___n.y.
0-12 Ingot position ___top ___middle ___bottom___cont. cast. ___n.r. ___n.a. ___n.y.
0-13 Killing _____ ___n.r. ___n.a. ___n.y.
0-14 Process temp. ____degC ____degF ____degK
___n.r. ___n.a. ___n.y. ___See_____
0-15 Process time ____hr ___n.r. ___n.a. ___n.y. ___See_____
0-16 Rolling conditions ____ % reduction, total ___n.r. ___n.a. ___n.y.
*0-17 Final processing steps (use one or two letters) _____

___ A-austenitized	___ N-normalized
___ B-brine quenched from A	___ P-thermo-mechanical process
___ C-cold working	___ R-continuous rolled
___ D-double normalized	___ Q-quenched
___ F-hot rolled	___ S-stress relieved
___ G-hot forged	___ T-tempered
___ K-aged	___ W-welded

0-18 Final heat treat temp. ___degC ___degF ___degK
___n.r. ___n.a. ___n.y. ___See_____
0-19 Final heat treat time ____hr ___n.r. ___n.a. ___n.y. ___See_____
0-20 Cold work strain _____% ___n.r. ___n.a. ___n.y. ___See_____
0-21 S/R or Aging temp. ____degC ____degF ____degK ___See_____
___n.r. ___n.a. ___n.y.
0-22 S/R or Aging time ___hr ___n.r. ___n.a. ___n.y. ___See_____
0-23 Location _____

W-0 Material Key _____

W-1 Weld Code __ __ __ . __ __ __ . ___

W-2 Welding Process

___SAW ___NGGMA ___GMA ___ESW
___SMA ___NGSAW ___GTA ___EBW
___FCA ___TSAW ___PAW ___n.r. ___n.y.

W-3 Base Metal Thickness ___mm ___in ___n.r. ___n.a. ___n.y.

W-4 Welding Position _____ ___n.r. ___n.a. ___n.y.

W-5 Preheat temp. ____degC ____degF ___degK __n.r. __n.a. __n.y.

W-6 Gap ___mm ___in __n.r. __n.a. __n.y.

W-7 Interpass temp. ____degC ____degF ___degK __n.r. __n.a. __n.y.

W-8 Number of passes _____ ___n.r. ___n.a. ___n.y.

W-9 Welding filler, Spec. and Grade _____
___n.r. ___n.a. ___n.y.

W-10 Welding Filler Trade Name _____

W-11 Carbon content _____ ___n.r. ___n.a. ___n.y.

W-12 Filler size ____mm ____in ___n.r. ___n.a. ___n.y.

W-13 Shielding Gas __A __He ___M-mixed ___n.r. ___n.a. ___n.y.

W-14 Voltage _____volts ___n.r. ___n.a. ___n.y.

W-15 Amperage_____amps ___n.r. ___n.a. ___n.y.

W-16 Polarity _____

W-17 Travel Speed _____in/min _____mm/min ___n.r. ___n.a. ___n.y.

W-18 Heat Input/pass ____KJoules/mm____KJoules/in ___n.r. ___n.a. ___n.y.

W-19 Joint Prep. __V __U __K ___S.B. __D.V. ___D.U. ___N.G.
___n.r. ___n.a. ___n.y.

W-20 Number of sides welded __1 __2 ___n.r. ___n.a. ___n.y.

W-21 Welded Specimen Codes

Location relative to weld: (See below)

___ 09-Weld Metal
___ 02-Fusion Line
___ 03-1mm HAZ
___ 04-3mm HAZ
___ 05-5mm HAZ
___ 06-7mm HAZ
___ 07-9mm HAZ
___ 08-11mm HAZ
___ 10-Transverse Section Test (All Zones)
___ 11-50%WM-50%HAZ

W-22 Location relative to surface: (See below)

___ F-Final surface
___ R-Back surface (root)
___ M-Mid thickness (not root)
___ C-Mid thickness (root)
___ B-Back surface (not root)
___ N-Full cross section
____n.r. ___n.a. ___n.y.

W-23 Postweld heat treat.temp (See below) ___degC ___degF ___degK
__n.r. __n.a. __n.y.

W-24 Post-weld heat treatment time ____hr (See below)
__n.r. __n.a. __n.y.

W-25 Flux type _____

W-26 Flux Trade Name _____

W-27 Is actual weld deposit reported in 0-4? ___Yes ___No ___n.y.

W-0 Material Key Code (See total number below)

W-0 MATERIAL KEY CODE	W-21 Loc/Weld	W-22 Location	W-23 PWHT Temp	W-24 PWHT Time
_ _ _-_ _ _-_ _ _	_ _	_____	_____deg___	_____hr.
_ _ _-_ _ _-_ _ _	_ _	_____	_____deg___	_____hr.
_ _ _-_ _ _-_ _ _	_ _	_____	_____deg___	_____hr.
_ _ _-_ _ _-_ _ _	_ _	_____	_____deg___	_____hr.
_ _ _-_ _ _-_ _ _	_ _	_____	_____deg___	_____hr.
_ _ _-_ _ _-_ _ _	_ _	_____	_____deg___	_____hr.
_ _ _-_ _ _-_ _ _	_ _	_____	_____deg___	_____hr.
_ _ _-_ _ _-_ _ _	_ _	_____	_____deg___	_____hr.
_ _ _-_ _ _-_ _ _	_ _	_____	_____deg___	_____hr.
_ _ _-_ _ _-_ _ _	_ _	_____	_____deg___	_____hr.
_ _ _-_ _ _-_ _ _	_ _	_____	_____deg___	_____hr.
_ _ _-_ _ _-_ _ _	_ _	_____	_____deg___	_____hr.
_ _ _-_ _ _-_ _ _	_ _	_____	_____deg___	_____hr.
_ _ _-_ _ _-_ _ _	_ _	_____	_____deg___	_____hr.
_ _ _-_ _ _-_ _ _	_ _	_____	_____deg___	_____hr.

1-0 Material Key _____

1-1 Type of test-tension

1-2 Test sample position __n.r. __n.a. __n.y. __See_____
___Surface, 0/4T ___Quarter-thickness, 1/4T
___3/8 thickness ___Mid thickness,1/2T
___Opposite surface, 1T ___Third quarter thickness, 3/4T

*1-3 Orientation of specimen __n.r. __n.a. __n.y. __See_____
__L (longitudinal) __T (long transverse) __S (short transverse)

1-4 Type of specimen __n.r. __n.a. __n.y. __See_____
___Cylindrical ___Rectangular ___Full-section

1-5 Specimen diameter or thickness ___mm ___in __See_____
__n.r. __n.a. __n.y.

1-6 Gage length _____ mm ___in __See_____
__n.r. __n.a. __n.y.

1-7 Rate of application of stress __MPa/sec __Ksi/sec __in/in/sec
__n.r. __n.a. __n.y. __See_____

*1-8 Test temp. ___degC ___degF __degK __See_____
__n.r. __n.a. __n.y.

*1-9 Tensile strength __MPa __Ksi __See_____
__n.r. __n.a. __n.y.

1-10 Offset % for TYS measurement _____ % __See_____
__n.r. __n.a. __n.y.

*1-11 Tensile yield strength ___MPa ___Ksi __See_____
__n.r. __n.a. __n.y.

1-12 Tensile yield point ___MPa ___Ksi __See_____
__n.r. __n.a. __n.y.

1-13 Uniform elongation _____% __See_____
__n.r. __n.a. __n.y.

1-14 Total elongation _____% __See_____
__n.r. __n.a. __n.y.

1-15 Reduction of area _____% __See_____
__n.r. __n.a. __n.y.

1-16 Modulus of elasticity _____MPa*10**6 ___Ksi, etc __See_____
__n.r. __n.a. __n.y.

1-17 Standard __ASTM_____ or __other standard_____
__n.r. __n.a. __n.y.

1-18 Year of issue of test standard 19____ __See_____
__n.r. __n.a. __n.y.

2-0 Material Key _____

*2-1 Type of test (fracture toughness)

2-2 Position of specimen __n.r. __n.a. __n.y. __See_____
____Full-thickness
____Surface, 0/4T ____Quarter-thickness, 1/4T
____3/8 thickness ____Mid thickness,1/2T
____Opposite surface, 1T ____Third quarter thickness, 3/4T

*2-3 Orientation of specimen ____See_____
___ L-T ___ L-S ___ L-C ___ L-R ___ T-L
___ T-S ___ S-L ___ S-T ___ C-L ___ C-R
___ R-C ___ n.r. ___ n.a. ___ n.y.

*2-4 Type of specimen __n.r. __n.a. __n.y. __See_____
___Compact ___Side-grooved compact ___Bend
___Deep notch bend ___DCB ___WOL

*2-5 Thickness of specimen ____mm ___in __See_____
__n.r. __n.a. __n.y.

2-6 Initial crack length, average ____mm ___in __See_____
__n.r. __n.a. __n.y.

2-6a a/W ____ __See_____ __n.r. __n.a. __n.y.

2-7 Type of loading __Slow __Intermediate __High Rate
__n.r. __n.a. __n.y. __See_____

2-8 (Kdot) Rate of loading _____ __See_____
__n.r. __n.a. __n.y.

*2-9 Test temperature ___degC ___degF ___degK ___RT (20C)
__See_____ __n.r. __n.a. __n.y.

*2-10 KQ _____ __n.r. __n.a. __n.y. __See_____

2-11 KIc _____ __n.r. __n.a. __n.y. __See_____

*2-12 Valid measure of KIc? ___yes ___no __See_____
__n.r. __n.a. __n.y.

*2-13 If invalid, reason __See _____
___(T)thickness ____(CL)crack length ____(FP)fatigue precrack
__n.r. __n.a. __n.y.

2-14 JIC ___units_____ __See_____
__n.r. __n.a. __n.y.

2-15 Reported stress intensity factor from JIc __units_____MPa*m**0.5
__n.r. __n.a. __n.y. __See_____

2-16 Method of JIC Calculation __n.r. __n.a. __n.y. __See_____
___per Stand. __modified Stand. ___other:_____

2-17 Initiation crack opening displacement ___mm ___in ___See_____
__n.r. __n.a. __n.y.

2-18 Critical CTOD ___mm ___in ___See_____
__n.r. __n.a. __n.y.

2-18a Is Critical CTOD ___c-cleavage ___u-cleavage preceded by tearing ___m-fibrous

2-19 Initiation J value __units_____ __See_____
__n.r. __n.a. __n.y.

2-20 Maximum J value __units_____ ___See_____
__n.r. __n.a. __n.y.

2-20a No. of J specimens ____ __See _____ __n.r. __n.a. __n.y.

2-21 Tearing modulus __units_____ ___See_____
__n.r. __n.a. __n.y.

2-22 Standard __ASTM_____ or __other standard:_____
__n.r. __n.a. __n.y.

2-23 Year of issue of test standard 19____ __See_____
__n.r. __n.a. __n.y.

3-0 Material Key _____

*3-1 Type of test: ___CVN-Charpy V notched bar impact
___PCV-Precracked Charpy V notched bar impact

3-2 Position of specimen __n.r. __n.a. __n.y. __See_____
____Surface, 0/4T ____Quarter-thickness, 1/4T
____3/8 thickness,3/8T ____Mid thickness,1/2T
____Opposite surface,1T ____Third quarter thickness, 3/4T

*3-3 Type of specimen __See_____
__Full: full-width Charpy V ___1/2W: One-half width Charpy V
___2W: Twice-width Charpy V ___1/4W: One-quarter width Charpy V

*3-4 Orientation of specimen ____See_____
___ L-T ___ T-L ___ L-C ___ L-R ___ L-S
___ T-S ___ S-L ___ S-T ___ C-L ___ C-R
___ R-C ___ n.r. ___ n.a. ___ n.y.

*3-5 Test temperature ___degC ___degF ___degK ___RT(20C)
__n.r. __n.a. __n.y. __See_____

3-6 Total energy to fracture _____J _____Ft-Lb __See_____

3-7 Lateral expansion _____mm _____mils __See_____
__n.r. __n.a. __n.y.

3-8 Shear fracture ____% Brittle fracture ____% __See_____
__n.r. __n.a. __n.y.

3-9 Did specimen fracture completely ___yes ___no ___assumed
__n.r. __n.a. __n.y. __See_____

3-10 Did specimen exhibit splitting ___yes ___no __See_____
__n.r. __n.a. __n.y.

3-11 Standard __ASTM_____ or __other standard_____
__n.r. __n.a. __n.y.

3-12 Year of issue of test standard 19_____ __See_____
__n.r. __n.a. __n.y.

4-0 Material Key _____

4-1 Type of test: MRL Crack arrest

4-2 Position of specimen __n.r. __n.a. __n.y. __See_____
____Surface, 0/4T ____Quarter-thickness, 1/4T
____3/8 thickness ____Mid thickness, 1/2T
____Opposite surface, 1T ____Third quarter thickness, 3/4T

4-3 Type of specimen ____ DCB
__n.r. __n.a. __n.y. __See_____

4-4 Thickness of specimen ____mm ___in __See_____
__n.r. __n.a. __n.y.

4-5 Orientation of specimen ____See_____
___ L-T ___ L-S ___ L-C ___ L-R ___ T-L
___ T-S ___ S-L ___ S-T ___ C-L ___ C-R
___ R-C ___ n.r. ___ n.a. ___ n.y.

4-6 Test temperature ___degC ___degF ___degK ___RT(20C)
__n.r. __n.a. __n.y. __See_____

4-7 Rate of loading __Slow __Intermediate __High __See_____
__n.r. __n.a. __n.y.

4-8 KQ __n.r. __n.a. __n.y. __See_____

4-9 Valid measure of KIC ___yes ___ no __See_____
__n.r. __n.a. __n.y.

4-10 Reason for invalidity __thickness __See_____
__n.r. __n.a. __n.y.

4-11 Crack arrest stress intensity _____ __See_____
__n.r. __n.a. __n.y.

4-12 Standard __ASTM_____ or __other standard_____
__n.r. __n.a. __n.y.

4-13 Year of issue of test standard 19_____ __See_____
__n.r. __n.a. __n.y.

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13 Data Presentations for Marine Materials

Data presentations of all marine materials begin on page 1000. A brief table of contents is:

ABS-B 1000
ABS-EH32 2000
ABS-EH36 2100
A36 3100
CG A537M 7100
A537 CL1 7300
A572 Gr50 7600
A588 8000
A710 9400
BS4360 Gr50D 13800
HY80 16500
HY100 19500

On each report, background information and material properties are grouped into categories: *Description*, *Composition*, *Fabrication History*, *Weld*, and *Property Measurements*. Constant information is not repeated, but a note refers the reader to a previous page. Material property plots show both SI and traditional engineering units. A complete index appears at the end on page I (roman numerial). All nonnumeric values are indexed twice: as "*value variable*" and as "*variable, value*".

Material CG A537M

Description

Material Code	003.001.01	Material Name	CG A537M
UNS	*	Other Designation	Grade B
Type	Wrought Metal	Form	Plate
Thickness	1.058 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	SSC-276		

Composition

C	0.15 %	Mn	1.20 %
P	0.01 %	S	0.021 %
Si	0.40 %	Cr	0.23 %
Ni	0.13 %	Mo	0.04 %
V	*	Cu	0.08 %
Cb	*	Ti	*
B	*	Al	0.03 %
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,T	Producer	Armco
Year Produced	*	Addl Info	*
Source	SWRI	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	Q,T
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	Round	Specimen Thickness	0.25 in
Gage Length	1.0 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	E 8
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
L	Room	82	61.8	*	29.7	73.9

* - not reported

Material CG A537M

Description

Material Code	003.001.01	Material Name	CG A537M
UNS	*	Other Designation	Grade B
Type	Wrought Metal	Form	Plate
Thickness	1.058 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	SSC-276		

Composition See Page 7100.1

Fabrication History See Page 7100.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	E 23
Standard Year	*		

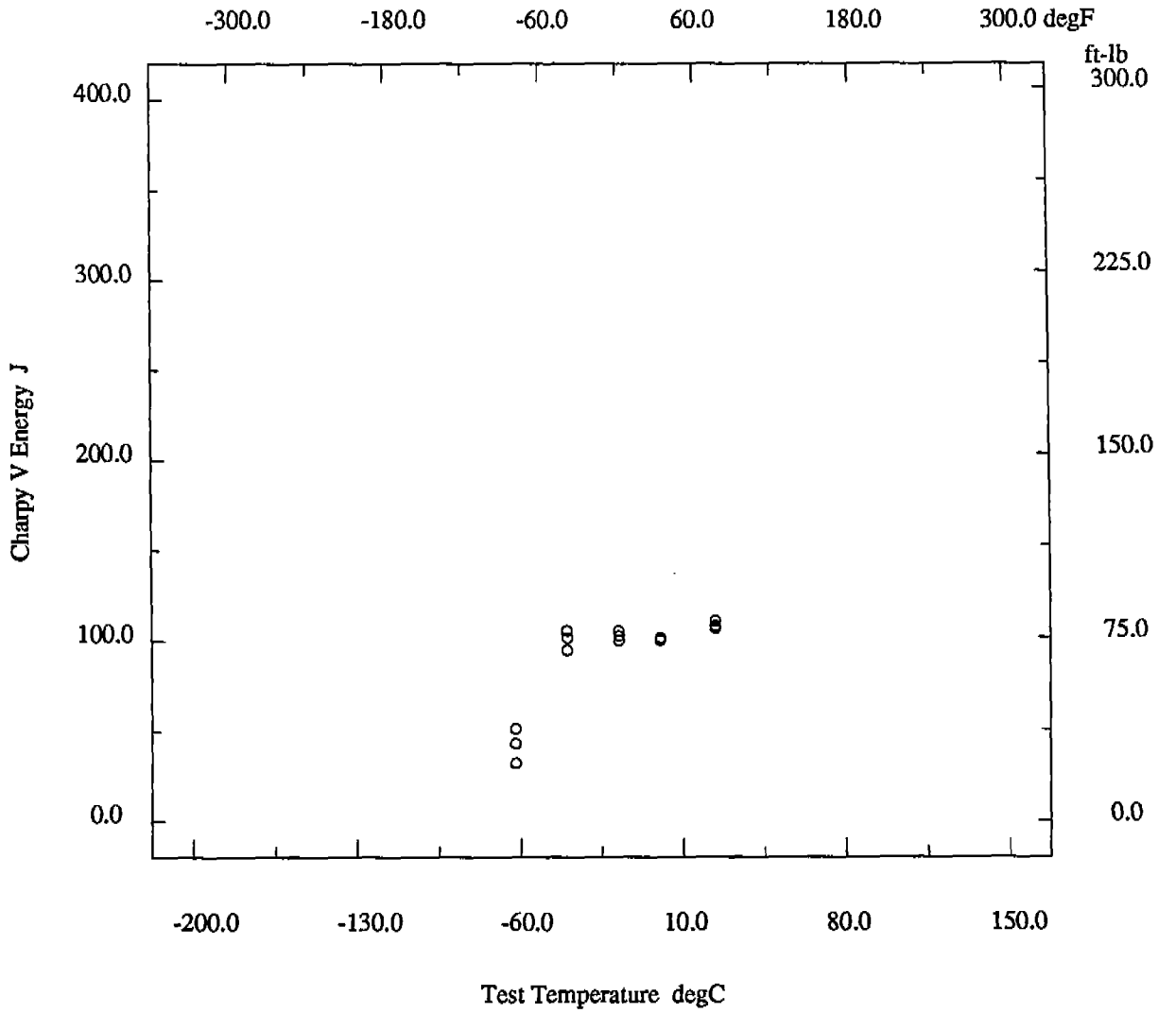
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-80	24	0.039	45
L-T °	-80	32	0.041	34
L-T °	-80	38	0.026	32
L-T °	-40	70	0.069	100
L-T °	-40	75	0.058	62
L-T °	-40	78	0.071	100
L-T °	0	74	0.071	100
L-T °	0	76	0.067	100
L-T °	0	78	0.064	100
L-T °	32	74	0.067	100
L-T °	32	74	0.071	100
L-T °	32	75	0.065	100
L-T °	75	79	0.066	100
L-T °	75	80	0.075	100
L-T °	75	82	0.065	100

* - not reported

Material CG A537M

Description

Material Code	003.001.01	Material Name	CG A537M
UNS	*	Other Designation	Grade B
Type	Wrought Metal	Form	Plate
Thickness	1.058 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	SSC-276		



* - not reported

Material CG A537M

Description

Material Code	003.001.01	Material Name	CG A537M
UNS	*	Other Designation	Grade B
Type	Wrought Metal	Form	Plate
Thickness	1.058 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	SSC-276		

Composition See Page 7100.1

Fabrication History See Page 7100.1

Property Measurements

Test Type	Nil Ductilty Transition	Position	0/4T
Specimen Type	P-3	Filler Alloy	Hardex-N
Passes	*	Standard Method	E 208
Standard Year	*		

Orien	Test Temp degF	Break?	NDTT
L	-90	Yes	No
L	-80	No	No
L	-80	Yes	No
L	-70	No	No
L	-70	Yes	Yes
L	-60	No	No

* - not reported

Material CG A537M

Description

Material Code	003.001.01	Material Name	CG A537M
UNS	*	Other Designation	Grade B
Type	Wrought Metal	Form	Plate
Thickness	1.058 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	SSC-276		

Composition

See Page 7100.1

Fabrication History

See Page 7100.1

Property Measurements

Test Type	Dynamic Tear	Position	0/4T
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	5/8 in	Loading Rate	*
Appearance	*	Standard Method	E 604
Standard Year	1976		

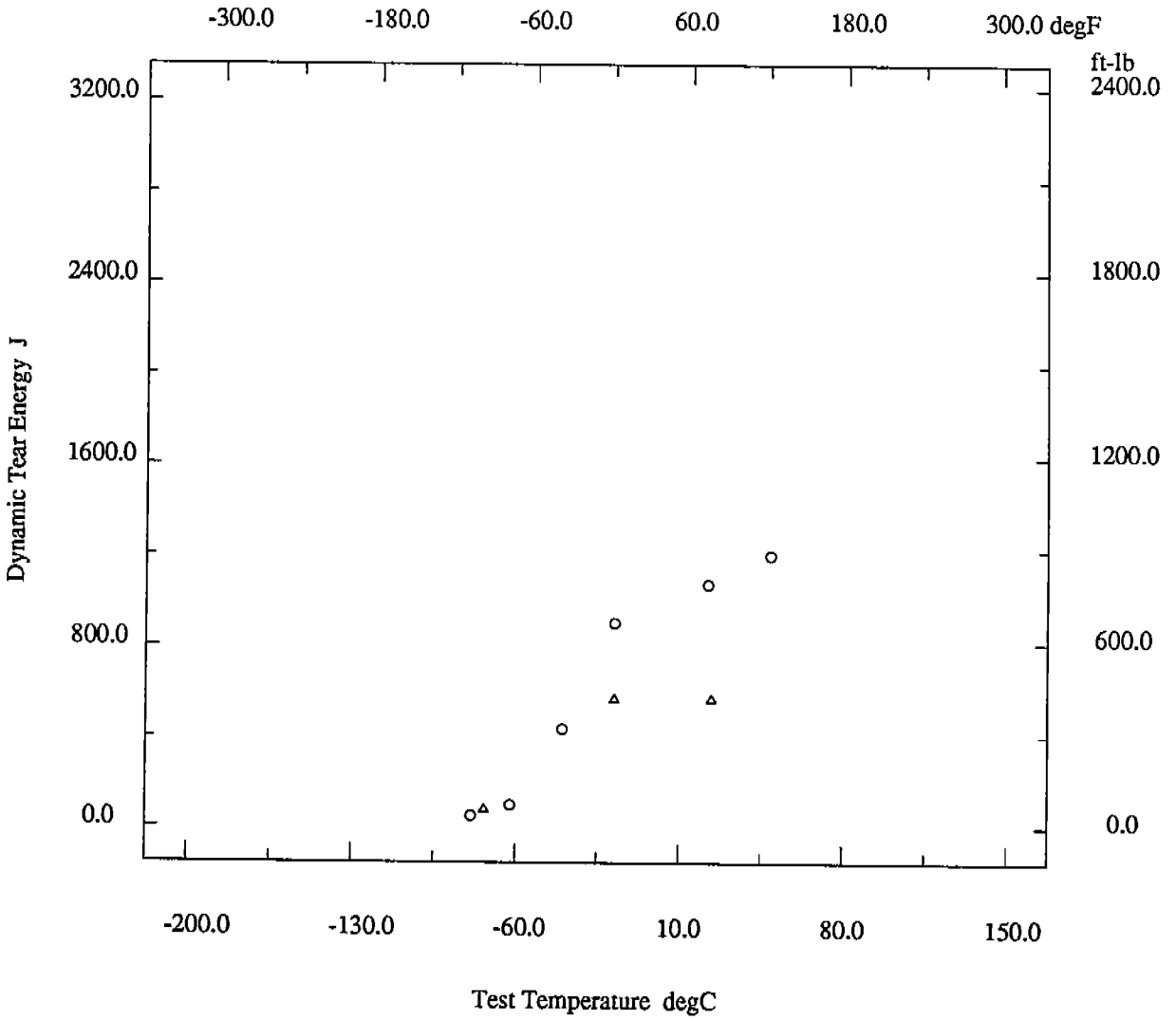
Orien	Test Temp degF	DT Energy ft-lb
L-T ○	-110	35
L-T ○	-80	70
L-T ○	-40	320
L-T ○	0	665
L-T ○	72	790
L-T ○	120	885
T-L △	-100	55
T-L △	0	420
T-L △	75	420

* - not reported

Material CG A537M

Description

Material Code	003.001.01	Material Name	CG A537M
UNS	*	Other Designation	Grade B
Type	Wrought Metal	Form	Plate
Thickness	1.058 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	SSC-276		



* - not reported

Material CG A537M

Description

Material Code	003.002.01	Material Name	CG A537M
UNS	*	Other Designation	Grade B
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	*		

Composition

C	0.17 %	Mn	1.32 %
P	0.01 %	S	0.019 %
Si	0.33 %	Cr	0.21 %
Ni	0.25 %	Mo	0.06 %
V	*	Cu	0.14 %
Cb	*	Ti	*
B	*	Al	0.02 %
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,T	Producer	Armco
Year Produced	*	Addl Info	None
Source	SWRI	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	Q,T
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	Round	Specimen Thickness	0.250 in
Gage Length	1.00 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	E 8
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
L	Room	89.6	69.0	*	22.7	68.7

* - not reported

Material CG A537M

Description

Material Code	003.002.01	Material Name	CG A537M
UNS	*	Other Designation	Grade B
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	*		

Composition See Page 7200.1

Fabrication History See Page 7200.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Did Specimen Fracture?	*
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

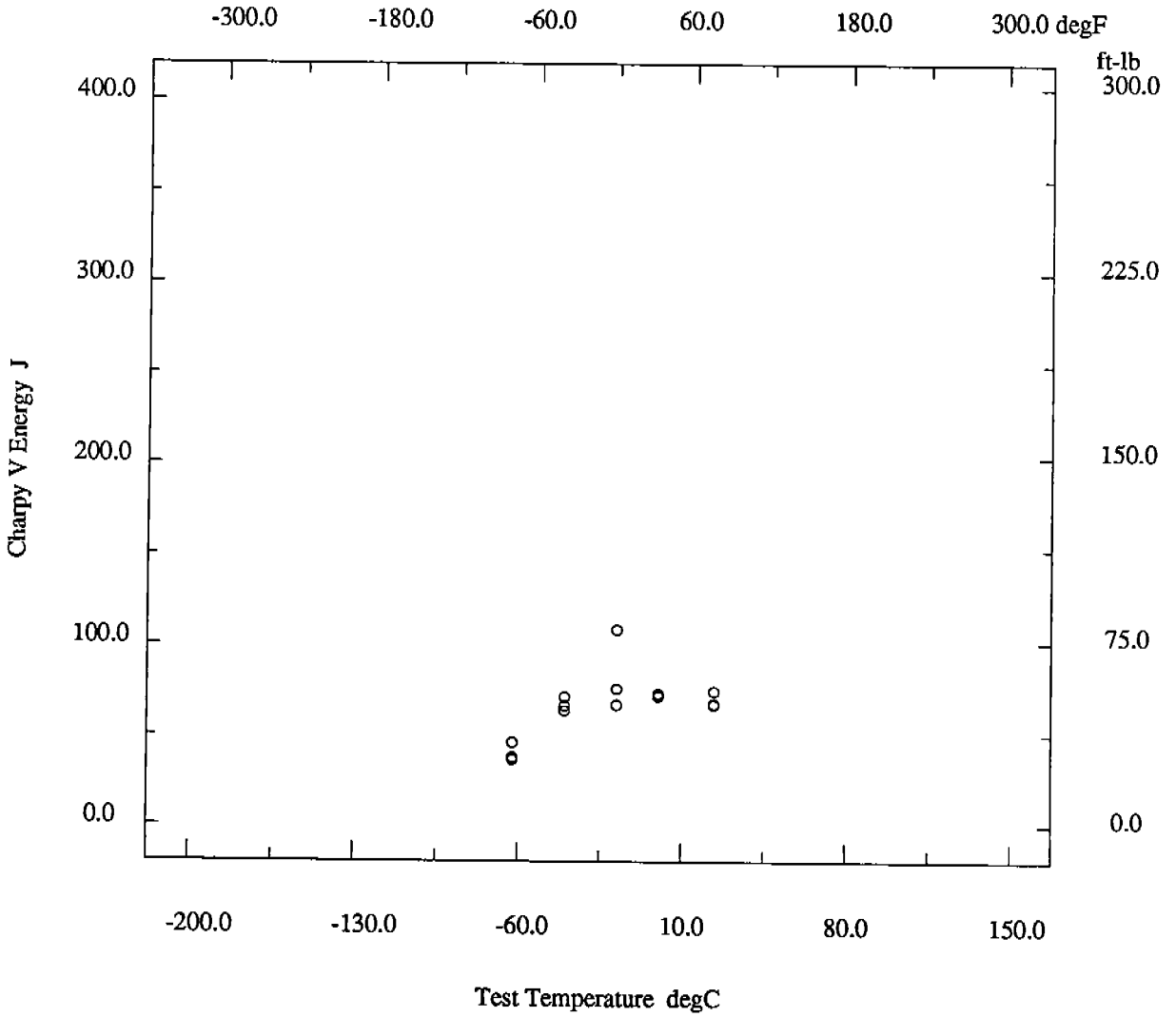
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-80	27.0	0.025	46
L-T °	-80	28.0	0.028	51
L-T °	-80	34.0	0.033	61
L-T °	-40	47.0	0.041	85
L-T °	-40	49.0	0.045	100
L-T °	-40	52.5	0.048	100
L-T °	0	49.5	0.048	100
L-T °	0	56.0	0.048	100
L-T °	0	80.0	0.064	100
L-T °	32	53.0	0.047	100
L-T °	32	53.0	0.049	100
L-T °	32	54.0	0.051	100
L-T °	75	49.5	0.049	100
L-T °	75	50.0	0.050	100
L-T °	75	55.0	0.051	100

* - not reported

Material CG A537M

Description

Material Code	003.002.01	Material Name	CG A537M
UNS	*	Other Designation	Grade B
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	*		



* - not reported

Material CG A537M

Description

Material Code	003.002.01	Material Name	CG A537M
UNS	*	Other Designation	Grade B
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	*		

Composition

See Page 7200.1

Fabrication History

See Page 7200.1

Property Measurements

Test Type	Nil Ductilty Transition	Position	0/4T
Specimen Type	P-3	Filler Alloy	Hardex-N
Passes	*	Standard Method	E 208
Standard Year	*		

Orien	Test Temp degF	Break?	NDTT
L	-90	Yes	No
L	-80	No	No
L	-80	Yes	No
L	-70	Yes	Yes
L	-60	No	No

* - not reported

Material CG A537M

Description

Material Code	003.002.01	Material Name	CG A537M
UNS	*	Other Designation	Grade B
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	*		

Composition

See Page 7200.1

Fabrication History

See Page 7200.1

Property Measurements

Test Type	Dynamic Tear	Position	0/4T
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	5/8 in	Loading Rate	*
Appearance	*	Standard Method	E 604
Standard Year	1976		

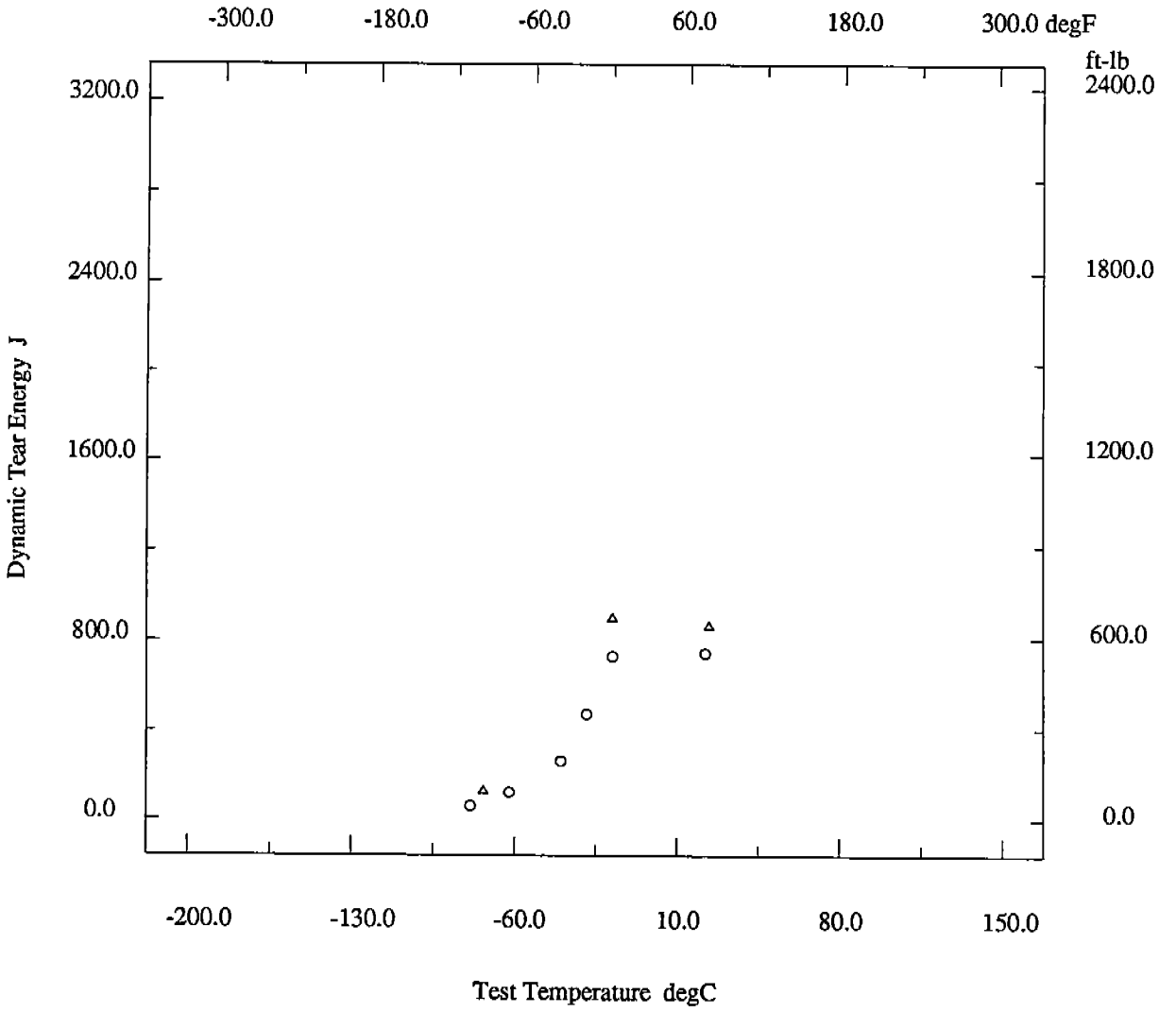
Orien	Test Temp degF	DT Energy ft-lb
L-T ○	-110	45
L-T ○	-80	90
L-T ○	-40	195
L-T ○	-20	350
L-T ○	0	540
L-T ○	72	550
T-L △	-100	95
T-L △	0	665
T-L △	75	640

* - not reported

Material CG A537M

Description

Material Code	003.002.01	Material Name	CG A537M
UNS	*	Other Designation	Grade B
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	*		



* - not reported

Material CG A537M

Description

Material Code	003.002.09	Material Name	CG A537M
UNS	*	Other Designation	Grade B
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	*		

Composition

See Page 7200.1

Fabrication History

See Page 7200.1

Weld

Weld Code	003.002.09	Weld Type	SAW
Base Metal Thickness	1.0 in	Welding Position	Downhand
Preheat Temperature	150 degF	Metal Gap	0 in
Interpass Temperature	300 degF	Passes	*
Filler Specification	*	Filler Name	Armco W18
Filler Carbon Content	*	Filler Metal Size	5/32 in
Shielding Gas	*	Voltage	30 volts
Amperage	475 amps	Polarity	DCRP
Travel Speed	18 in/min	Heat Input/Pass	50 KJ/in
Joint Preparation	Double V-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	1/4T
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Linc 860
Weld Composition Reported?	No		

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	Round	Specimen Thickness	0.250 in
Gage Length	1.25 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	E 8
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
L	Room	71.1	86.6	*	16.2	61.2

* - not reported

Material CG A537M

Description

Material Code	003.002.09.1	Material Name	CG A537M
UNS	*	Other Designation	Grade B
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	*		

Composition

See Page 7200.1

Fabrication History

See Page 7200.1

Weld

Weld Code	003.002.09.1	Weld Type	SAW
Base Metal Thickness	1.0 in	Welding Position	Downhand
Preheat Temperature	150 degF	Metal Gap	0 in
Interpass Temperature	300 degF	Passes	*
Filler Specification	*	Filler Name	Armco W18
Filler Carbon Content	*	Filler Metal Size	5/32 in
Shielding Gas	*	Voltage	30 volts
Amperage	475 amps	Polarity	DCRP
Travel Speed	18 in/min	Heat Input/Pass	50 KJ/in
Joint Preparation	Double V-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	1/4T
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Linc 860
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	*	Did Specimen Split?	*
Standard Method	*	Standard Year	*

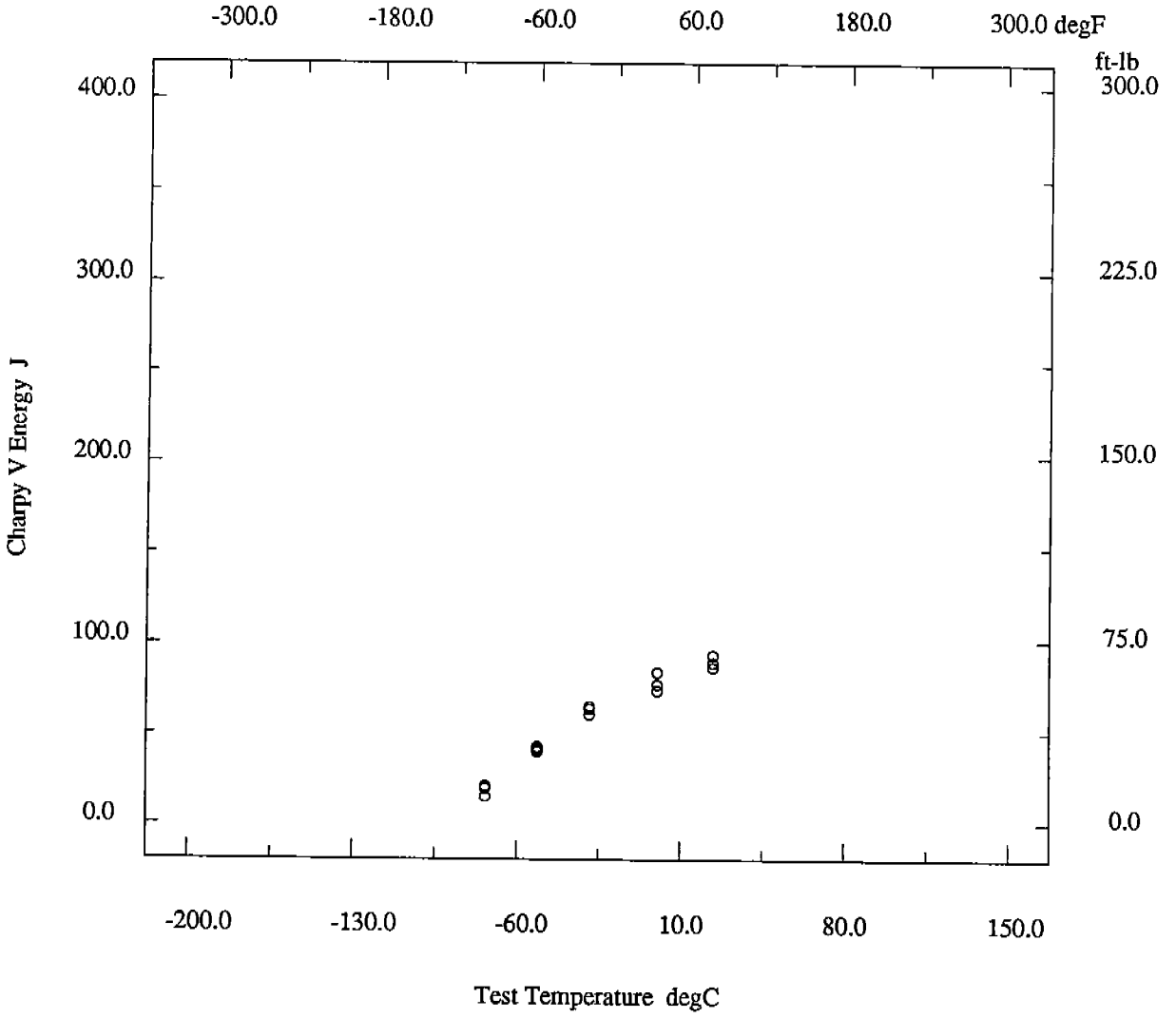
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T o	-100	11.0	0.013
L-T o	-100	14.5	0.015
L-T o	-100	15.5	0.017
L-T o	-60	29.5	0.031
L-T o	-60	30.5	0.031
L-T o	-60	31.5	0.033
L-T o	-20	44.5	0.043
L-T o	-20	47.0	0.045
L-T o	-20	48.0	0.045
L-T o	32	54.5	0.052
L-T o	32	57.0	0.057
L-T o	32	62.0	0.047
L-T o	75	64.0	0.063
L-T o	75	66.0	0.066
L-T o	75	69.0	0.067

* - not reported

Material CG A537M

Description

Material Code	003.002.09.1	Material Name	CG A537M
UNS	*	Other Designation	Grade B
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	*		



* - not reported

Material CG A537M

Description

Material Code	003.002.09.1	Material Name	CG A537M
UNS	*	Other Designation	Grade B
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	*		

Composition See Page 7200.1

Fabrication History See Page 7200.1

Weld See Page 7200.8

Property Measurements

Test Type	Nil Ductilty Transition	Position	0/4T
Specimen Type	P-3	Filler Alloy	Hardex-N
Passes	*	Standard Method	E 208
Standard Year	*		

Orien	Test Temp degF	Break?	NDTT
L	-100	No	No
L	-100	No	No
L	-60	No	No

* - not reported

Material CG A537M

Description

Material Code	003.002.09.1	Material Name	CG A537M
UNS	*	Other Designation	Grade B
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	*		

Composition

See Page 7200.1

Fabrication History

See Page 7200.1

Weld

See Page 7200.8

Property Measurements

Test Type	Dynamic Tear	Position	0/4T
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	5/8 in	Loading Rate	*
Appearance	*	Standard Method	E 604
Standard Year	1976		

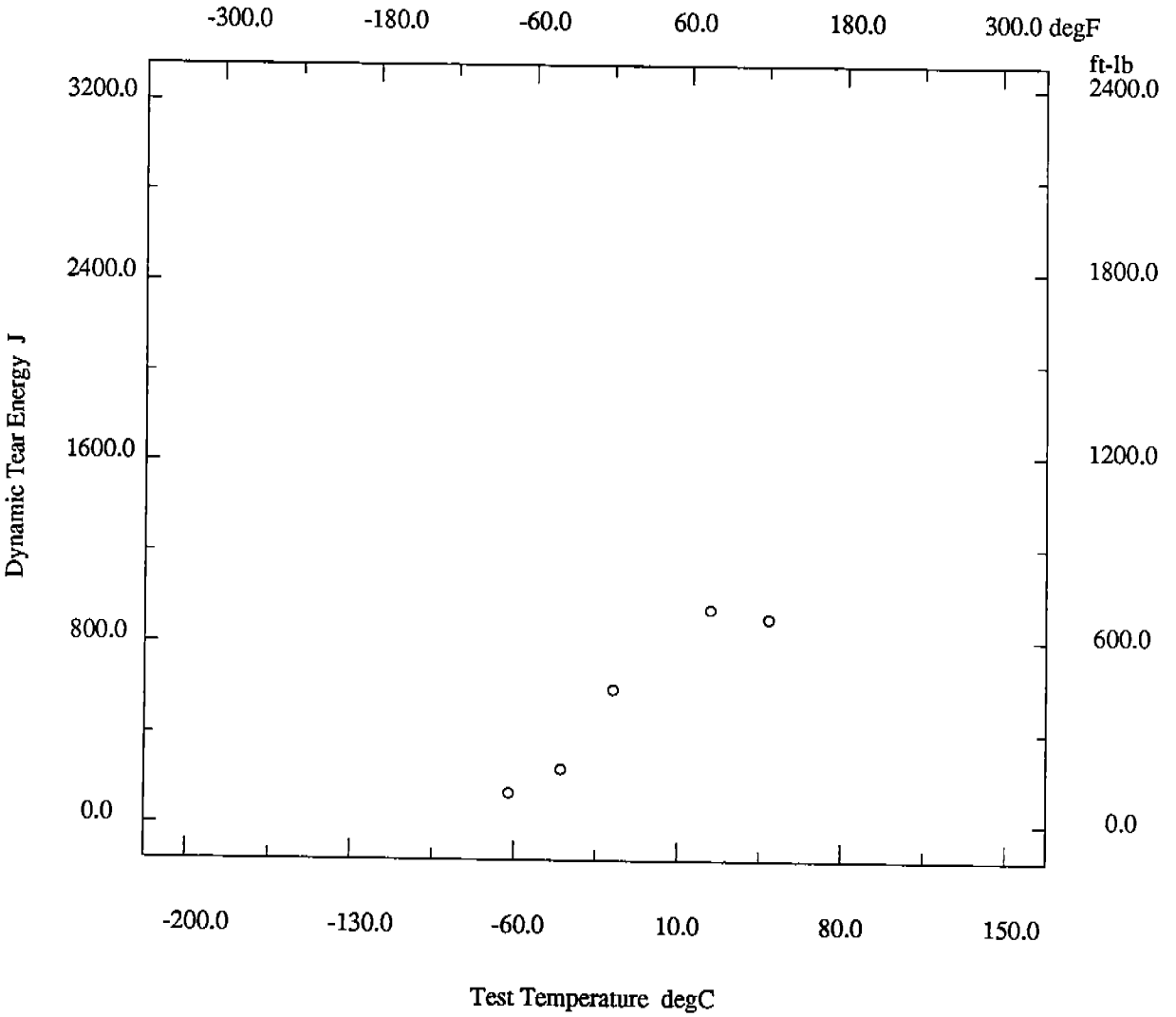
Orien	Test Temp degF	DT Energy ft-lb
T-L ○	-80	100
T-L ○	-40	180
T-L ○	0	440
T-L ○	75	700
T-L ○	120	670

* - not reported

Material CG A537M

Description

Material Code	003.002.09.1	Material Name	CG A537M
UNS	*	Other Designation	Grade B
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	*		



* - not reported

Material CG A537M

Description

Material Code	003.002.03.1	Material Name	CG A537M
UNS	*	Other Designation	Grade B
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	*		

Composition

See Page 7200.1

Fabrication History

See Page 7200.1

Weld

Weld Code	003.002.03.1	Weld Type	SAW
Base Metal Thickness	1.0 in	Welding Position	Downhand
Preheat Temperature	150 degF	Metal Gap	0 in
Interpass Temperature	300 degF	Passes	*
Filler Specification	*	Filler Name	Armco W18
Filler Carbon Content	*	Filler Metal Size	5/32 in
Shielding Gas	*	Voltage	30 volts
Amperage	475 amps	Polarity	DCRP
Travel Speed	18 in/min	Heat Input/Pass	50 KJ/in
Joint Preparation	Double V-Groove	Number of Sides	2
Location wrt Weld	1mm in HAZ	Location wrt Surface	1/4T
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Linc 860
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	*	Did Specimen Split?	*
Standard Method	*	Standard Year	*

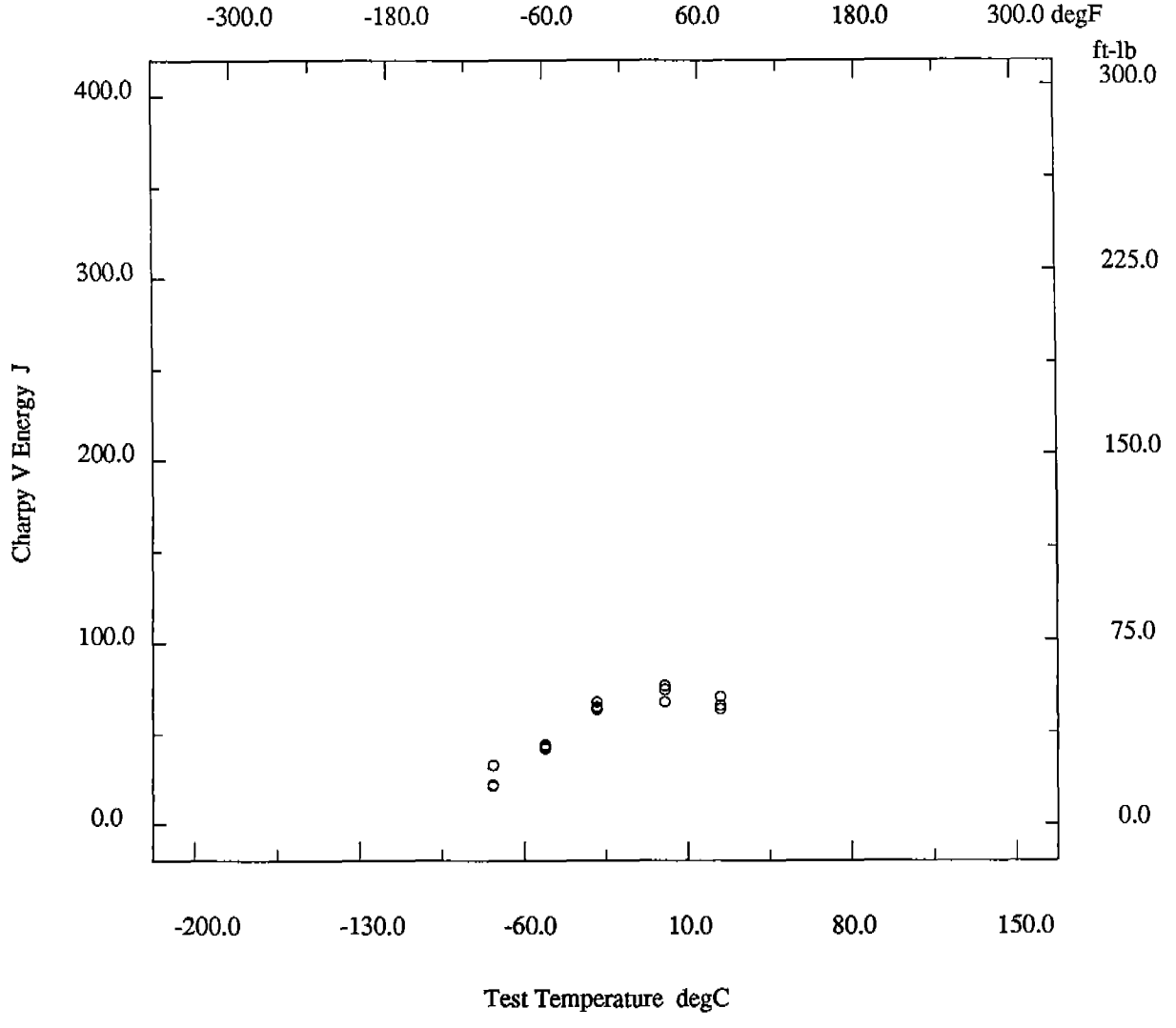
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T °	-100	15.5	0.014
L-T °	-100	16.0	0.016
L-T °	-100	24.0	0.023
L-T °	-60	31.0	0.029
L-T °	-60	31.5	0.031
L-T °	-60	32.5	0.032
L-T °	-20	47.0	0.044
L-T °	-20	48.0	0.045
L-T °	-20	50.0	0.046
L-T °	32	50.0	0.049
L-T °	32	55.0	0.051
L-T °	32	56.5	0.052
L-T °	75	47.0	0.047
L-T °	75	48.5	0.050
L-T °	75	52.0	0.052

* - not reported

Material CG A537M

Description

Material Code	003.002.03.1	Material Name	CG A537M
UNS	*	Other Designation	Grade B
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	*		



* - not reported

Material CG A537M

Description

Material Code	003.002.03.1	Material Name	CG A537M
UNS	*	Other Designation	Grade B
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	*		

Composition See Page 7200.1

Fabrication History See Page 7200.1

Weld See Page 7200.13

Property Measurements

Test Type	Dynamic Tear	Position	0/4T
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	5/8 in	Loading Rate	*
Appearance	*	Standard Method	E 604
Standard Year	1976		

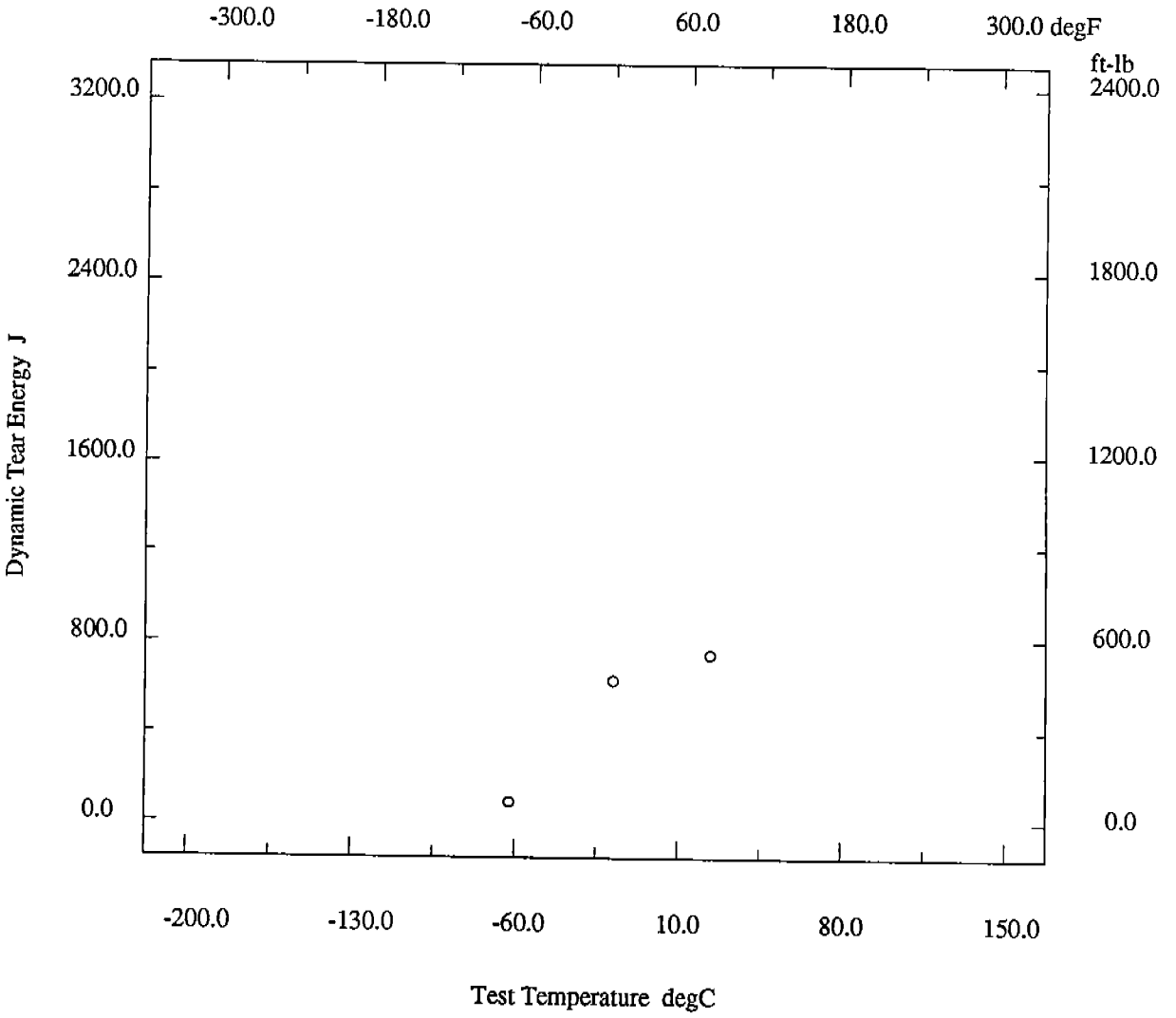
Orien	Test Temp degF	DT Energy ft-lb
L-T °	-80	65
L-T °	0	465
L-T °	75	550

* - not reported

Material CG A537M

Description

Material Code	003.002.03.1	Material Name	CG A537M
UNS	*	Other Designation	Grade B
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	*		



* - not reported

Material A537 CL1

Description

Material Code	003.003.01	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	D3791-2B
Reference	LR3201		

Composition

C	0.20 %	Mn	1.28 %
P	*	S	0.021 %
Si	*	Cr	*
Ni	*	Mo	0.07 %
V	*	Cu	*
Cb	*	Ti	*
B	*	Al	0.038 %
N	*	Other Components	None %

Fabrication History

Heat Treatment	N	Producer	Lukens
Year Produced	1978	Addl Info	*
Source	Lukens	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	N
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	Cylindrical	Specimen Thickness	0.252 in
Gage Length	1.0 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
L	80	83.7	54.2	54.2	27.8	63.1
L	80	84.2	52.4	53.6	28.0	62.2
T	80	84.2	55.9	62.0	27.3	61.7
T	80	84.2	56.3	61.2	28.5	63.6

* - not reported

Material A537 CL1

Description

Material Code	003.003.01	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	D3791-2B
Reference	LR3201		

Composition See Page 7300.1

Fabrication History See Page 7300.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Standard Method	*	Standard Year	*

Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %	Split?
L-T ○	-180	5	3	0	*
L-T ○	-160	7	5	0	*
L-T ○	-140	8	5	0	*
L-T ○	-120	12	9	0	*
L-T ○	-100	24	19	10	*
L-T ○	-80	26	23	17	*
L-T ○	-70	27	25	19	*
L-T ○	-60	38	33	27	*
L-T ○	-50	36	34	33	*
L-T ○	-40	41	37	44	*
L-T ○	-30	54	48	47	*
L-T ○	-20	54	47	52	*
L-T ○	-10	54	51	65	*
L-T ○	0	68	57	72	*
L-T ○	10	80	72	100	Yes
L-T ○	20	80	70	100	*
L-T ○	40	81	72	100	Yes
L-T ○	60	86	74	100	*
L-T ○	74	85	76	100	Yes
L-T ○	100	81	70	100	Yes
T-L △	-180	4	3	0	*
T-L △	-160	7	5	0	*
T-L △	-140	10	6	0	*
T-L △	-120	12	10	0	*
T-L △	-100	13	13	6	*
T-L △	-80	16	15	11	*
T-L △	-70	19	20	15	*
T-L △	-60	23	23	27	*
T-L △	-50	21	23	30	*
T-L △	-40	23	26	40	*
T-L △	-30	27	29	47	*
T-L △	-20	33	34	60	*
T-L △	-10	34	36	52	*
T-L △	0	38	38	66	*
T-L △	10	41	41	75	Yes

(continued)

* - not reported

Material A537 CL1

(continued)

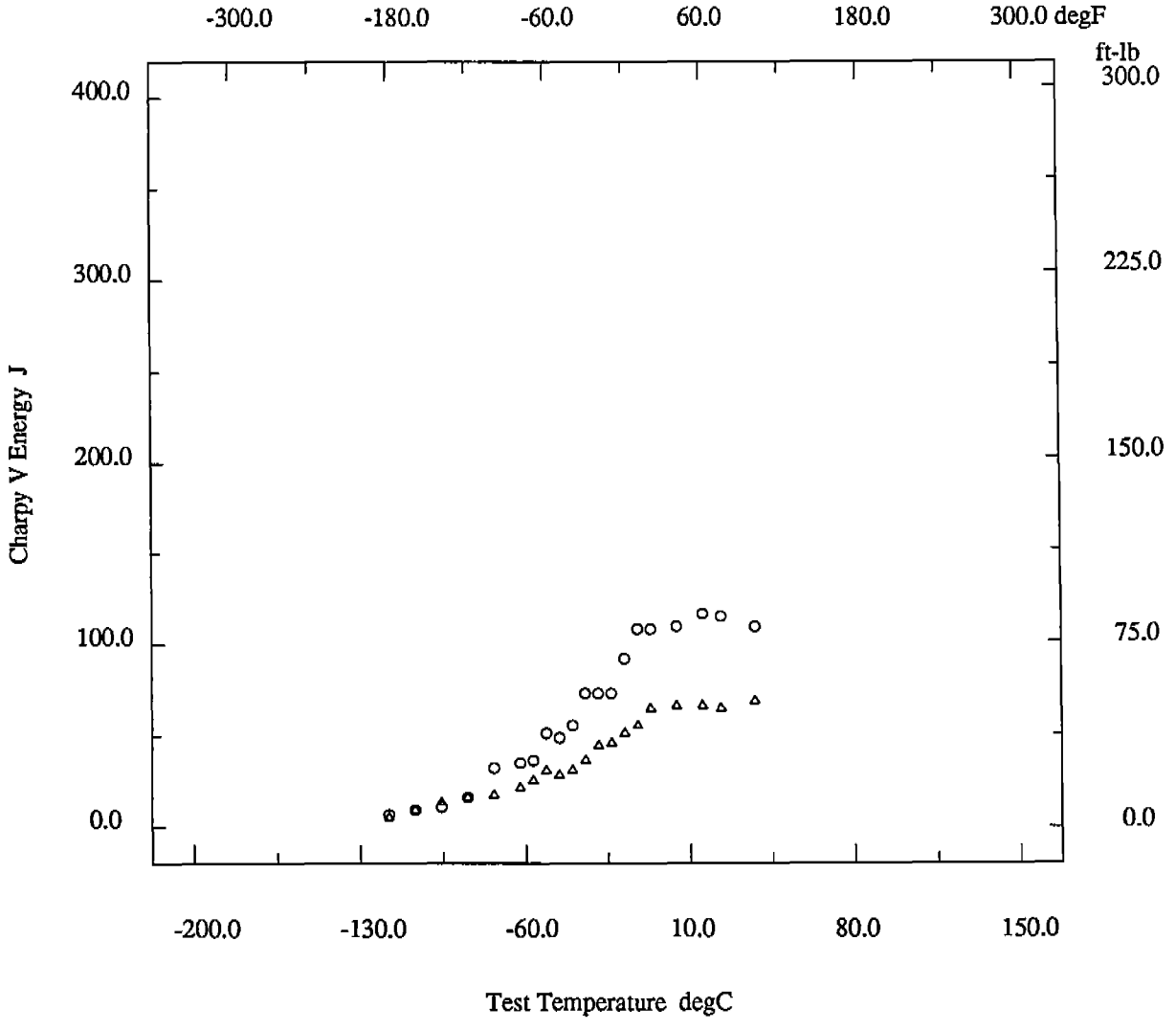
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %	Split?
T-L Δ	20	48	50	95	*
T-L Δ	40	49	49	99	*
T-L Δ	60	49	52	100	*
T-L Δ	74	48	49	100	*
T-L Δ	100	51	51	100	*

* - not reported

Material A537 CL1

Description

Material Code	003.003.01	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	D3791-2B
Reference	LR3201		



* - not reported

Material A537 CL1

Description

Material Code	003.003.01	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	D3791-2B
Reference	LR3201		

Composition See Page 7300.1

Fabrication History See Page 7300.1

Property Measurements

Test Type	Dynamic Tear	Position	1/2T
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Standard Method	*	Standard Year	*

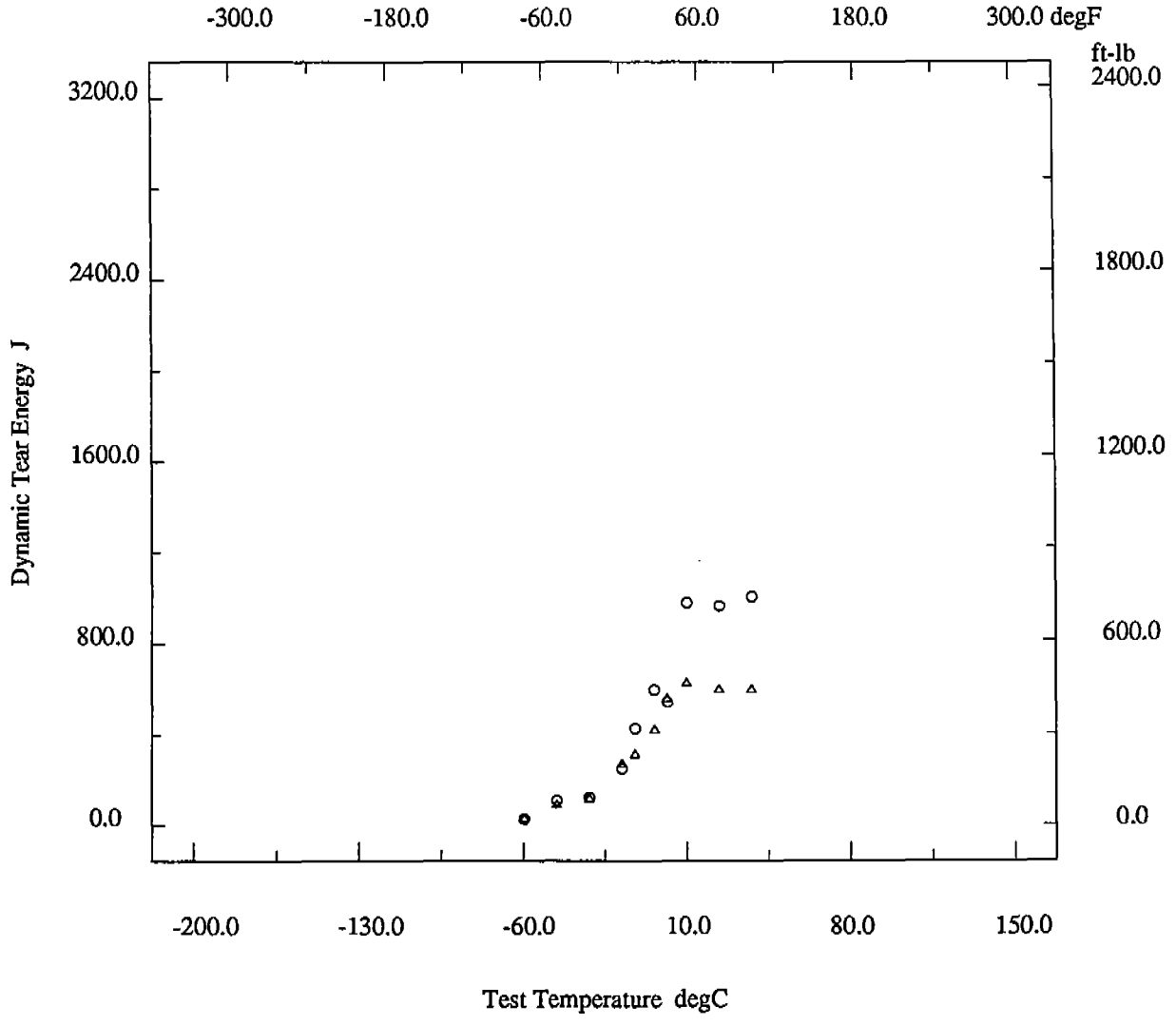
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
L-T ○	-75	20	10
L-T ○	-50	80	17
L-T ○	-25	90	27
L-T ○	0	185	45
L-T ○	10	315	52
L-T ○	25	440	71
L-T ○	35	400	63
L-T ○	50	720	98
L-T ○	75	710	100
L-T ○	100	740	100
T-L △	-75	20	10
T-L △	-50	65	20
T-L △	-25	85	25
T-L △	0	200	53
T-L △	10	230	55
T-L △	25	310	74
T-L △	35	410	95
T-L △	50	460	98
T-L △	75	440	100
T-L △	100	440	100

* - not reported

Material A537 CL1

Description

Material Code	003.003.01	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	D3791-2B
Reference	LR3201		



* - not reported

Material A537 CL1

Description

Material Code	013.004.010A	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

C	0.18 %	Mn	1.15 %
P	0.008 %	S	0.02 %
Si	0.29 %	Cr	0.09 %
Ni	0.22 %	Mo	0.04 %
V	<0.002 %	Cu	0.26 %
Cb	<0.005 %	Ti	*
B	*	Al	0.019 %
N	0.011 %	Other Components	None %

Fabrication History

Heat Treatment	*	Producer	US Steel
Year Produced	*	Addl Info	*
Source	US Steel	Melting Practice	*
Ingot Position	*	Killing Process	Si-Al
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	N
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	Cylindrical	Specimen Thickness	0.357 in
Gage Length	1.4 in	Loading Rate	*
Tensile Strength Offset	0.2 %	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
*	Room	79.6	55.4	*	31.6	66.4

* - not reported

Material A537 CL1

Description

Material Code	013.004.02AW	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

See Page 7400.1

Fabrication History

See Page 7400.1

Weld

Weld Code	013.004.02AW	Weld Type	SMA
Base Metal Thickness	1 in	Welding Position	Downhand IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	350 degF	Passes	15
Filler Specification	E8018-C3	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

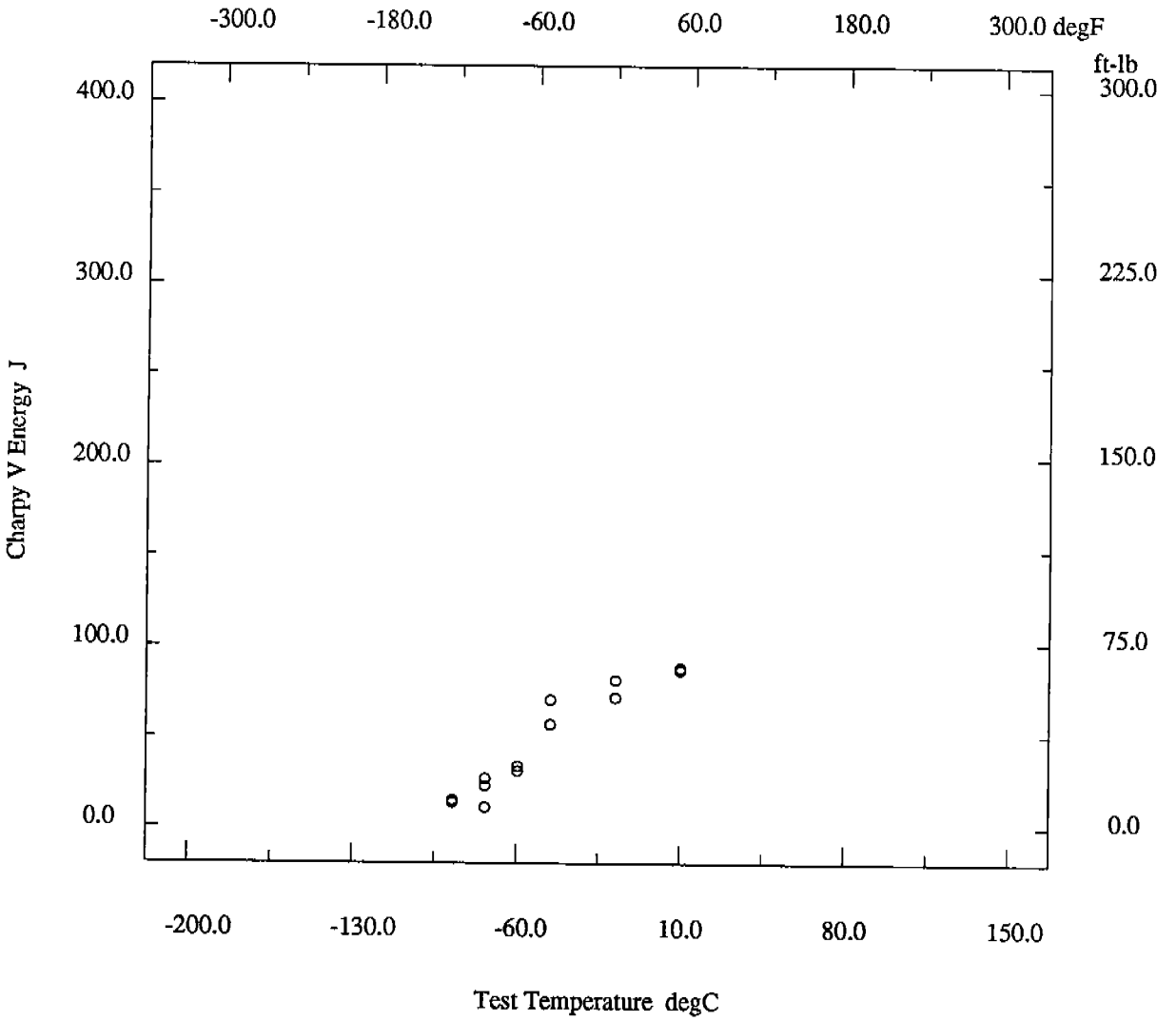
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-125	10	6	20
L-T °	-125	11	8	25
L-T °	-100	17	13	35
L-T °	-100	20	14	30
L-T °	-100	8	6	25
L-T °	-75	23	17	45
L-T °	-75	25	20	50
L-T °	-50	42	34	80
L-T °	-50	52	39	75
L-T °	0	53	46	85
L-T °	0	60	48	90
L-T °	50	64	55	100
L-T °	50	65	58	100

* - not reported

Material A537 CL1

Description

Material Code	013.004.02AW	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A537 CL1

Description

Material Code	013.004.02AS1	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

See Page 7400.1

Fabrication History

See Page 7400.1

Weld

Weld Code	013.004.02AS1	Weld Type	SMA
Base Metal Thickness	1 in	Welding Position	Downhand IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	350 degF	Passes	15
Filler Specification	E8018-C3	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	1100 degF	Post-Weld Heat Time	1 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

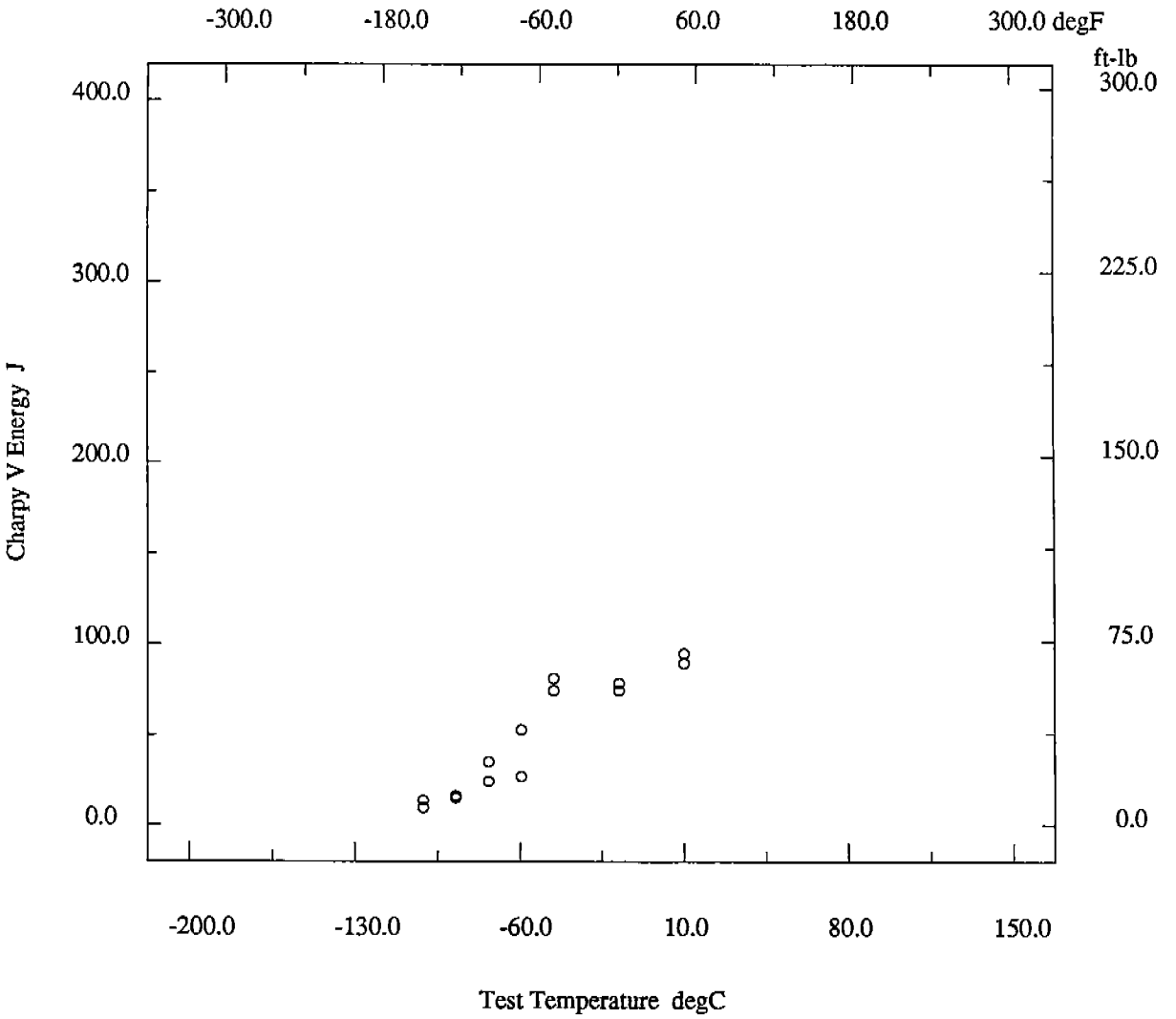
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-150	10	5	25
L-T °	-150	7	4	20
L-T °	-125	11	8	30
L-T °	-125	12	9	20
L-T °	-100	18	10	40
L-T °	-100	26	20	35
L-T °	-75	20	17	35
L-T °	-75	39	33	75
L-T °	-50	55	42	85
L-T °	-50	60	58	100
L-T °	0	55	59	95
L-T °	0	58	58	100
L-T °	50	66	58	100
L-T °	50	70	54	98

* - not reported

Material A537 CL1

Description

Material Code	013.004.02AS1	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A537 CL1

Description

Material Code	013.004.02AS2	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

See Page 7400.1

Fabrication History

See Page 7400.1

Weld

Weld Code	013.004.02AS2	Weld Type	SMA
Base Metal Thickness	1 in	Welding Position	Downhand IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	350 degF	Passes	15
Filler Specification	E8018-C3	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	1100 degF	Post-Weld Heat Time	5 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

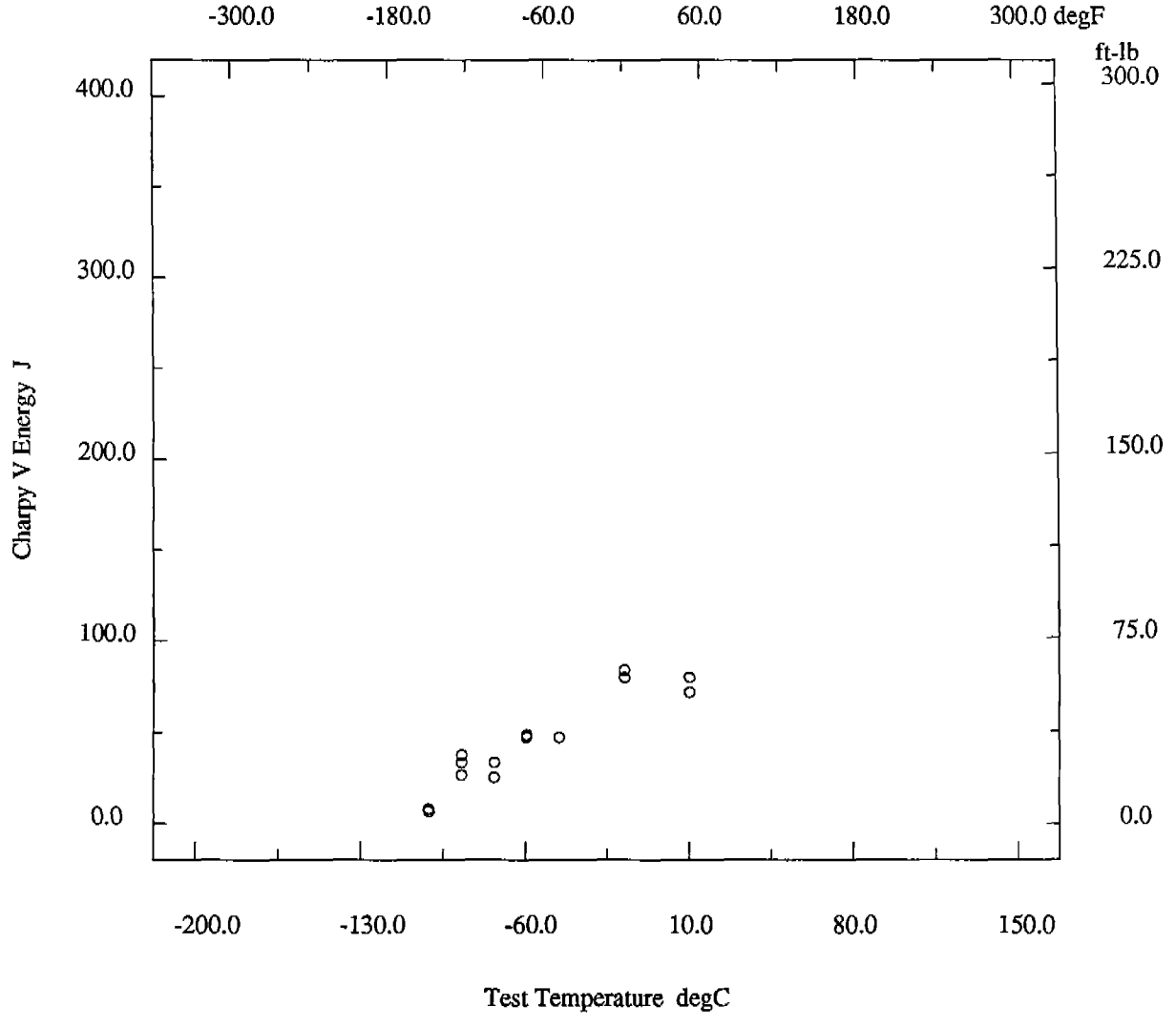
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-150	5	3	15
L-T °	-150	6	4	20
L-T °	-125	20	16	20
L-T °	-125	25	22	65
L-T °	-125	28	22	35
L-T °	-100	19	14	45
L-T °	-100	25	24	75
L-T °	-75	35	27	70
L-T °	-75	36	33	70
L-T °	-50	35	29	65
L-T °	-50	35	33	70
L-T °	0	59	59	100
L-T °	0	62	59	100
L-T °	50	53	49	100
L-T °	50	59	56	99

* - not reported

Material A537 CL1

Description

Material Code	013.004.02AS2	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A537 CL1

Description

Material Code	013.004.02AS3	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

See Page 7400.1

Fabrication History

See Page 7400.1

Weld

Weld Code	013.004.02AS3	Weld Type	SMA
Base Metal Thickness	1 in	Welding Position	Downhand IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	350 degF	Passes	15
Filler Specification	E8018-C3	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	1200 degF	Post-Weld Heat Time	1 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

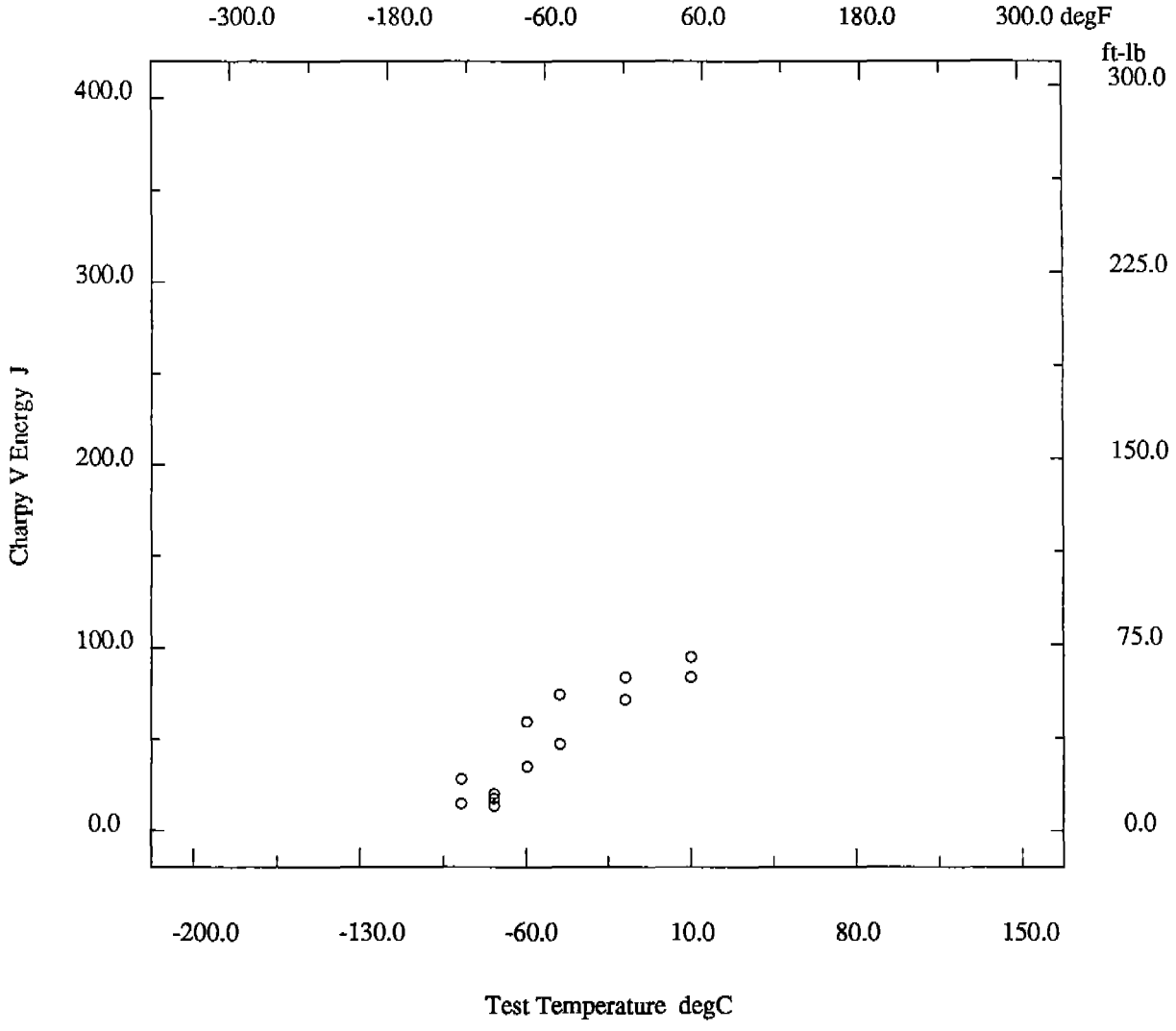
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-125	11	9	25
L-T °	-125	21	19	35
L-T °	-125	21	20	30
L-T °	-100	10	9	25
L-T °	-100	13	14	25
L-T °	-100	15	16	25
L-T °	-75	26	25	70
L-T °	-75	44	40	70
L-T °	-50	35	36	70
L-T °	-50	55	52	80
L-T °	0	53	54	98
L-T °	0	62	58	100
L-T °	50	62	54	100
L-T °	50	70	68	100

* - not reported

Material A537 CL1

Description

Material Code	013.004.02AS3	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A537 CL1

Description

Material Code	013.004.02AS4	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

See Page 7400.1

Fabrication History

See Page 7400.1

Weld

Weld Code	013.004.02AS4	Weld Type	SMA
Base Metal Thickness	1 in	Welding Position	Downhand IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	350 degF	Passes	15
Filler Specification	E8018-C3	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	1200 degF	Post-Weld Heat Time	5 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

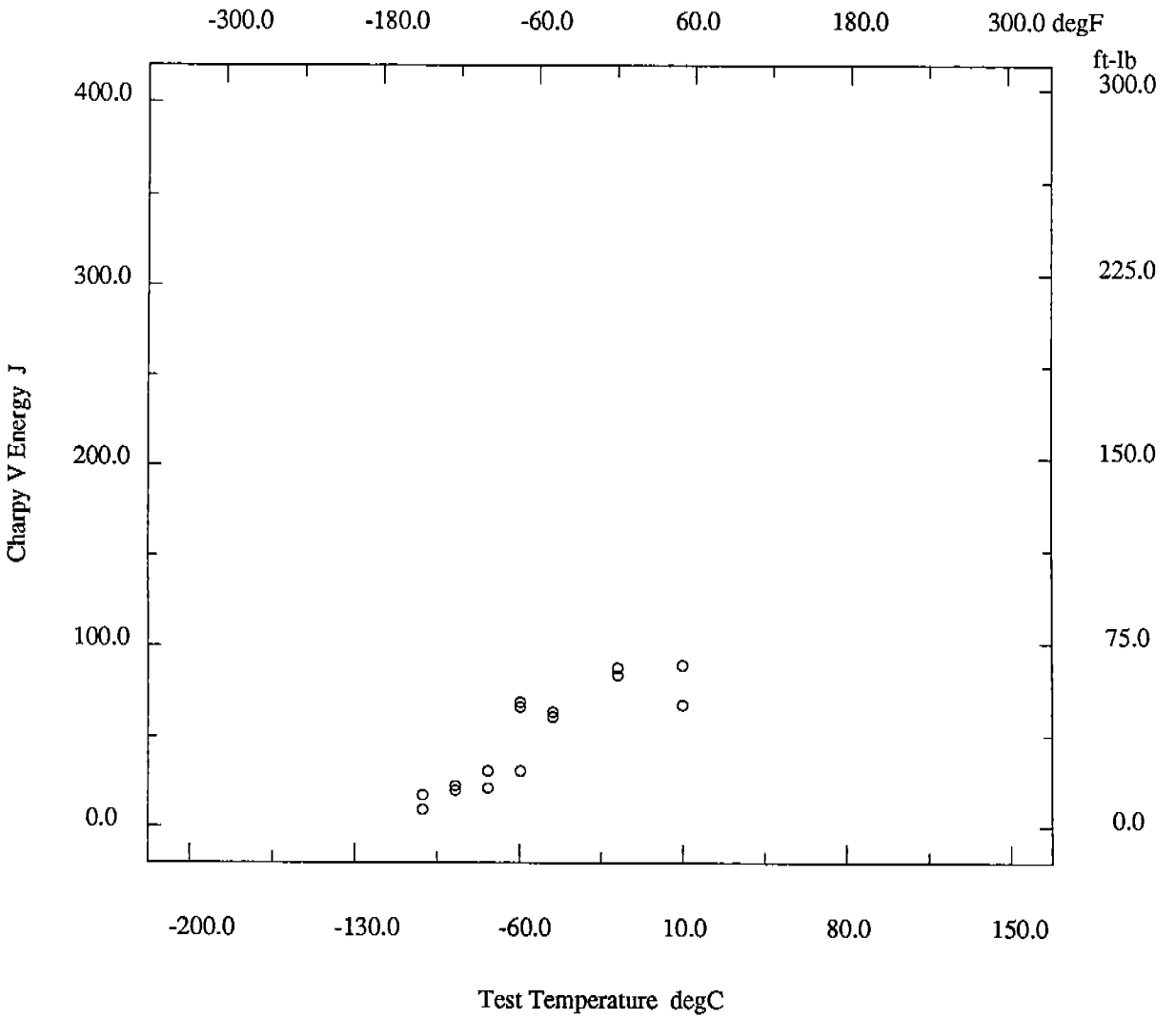
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-150	13	14	15
L-T °	-150	7	6	5
L-T °	-125	15	18	40
L-T °	-125	17	22	25
L-T °	-100	16	22	45
L-T °	-100	23	27	40
L-T °	-75	23	26	45
L-T °	-75	49	37	70
L-T °	-75	51	48	100
L-T °	-50	45	44	80
L-T °	-50	47	44	75
L-T °	0	62	59	100
L-T °	0	65	60	100
L-T °	50	50	49	100
L-T °	50	66	59	100

* - not reported

Material A537 CL1

Description

Material Code	013.004.02AS4	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A537 CL1

Description

Material Code	013.004.09BA	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

C	0.18 %	Mn	1.15 %
P	0.008 %	S	0.02 %
Si	0.29 %	Cr	0.09 %
Ni	0.22 %	Mo	0.04 %
V	<0.002 %	Cu	0.26 %
Cb	<0.005 %	Ti	*
B	*	Al	0.019 %
N	0.011 %	Other Components	None %

Fabrication History

Heat Treatment	*	Producer	US Steel
Year Produced	*	Addl Info	*
Source	US Steel	Melting Practice	*
Ingot Position	*	Killing Process	Si-Al
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	N
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Weld

Weld Code	013.004.09BA	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	Downhand IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	350 degF	Passes	8
Filler Specification	EF2-F2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	74 KJ/in
Joint Preparation	V Groove	Number of Sides	1
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	F96	Flux Name	*
Weld Composition Reported?	No		

(continued)

* - not reported

Material A537 CL1

(continued)

Property Measurements

Test Type ..... Charpy V Impact
Specimen Type ..... Full
Did Specimen Split? ..... *
Standard Year ..... *
Position 3/4T
Did Specimen Fracture? ..... Assumed
Standard Method ..... *

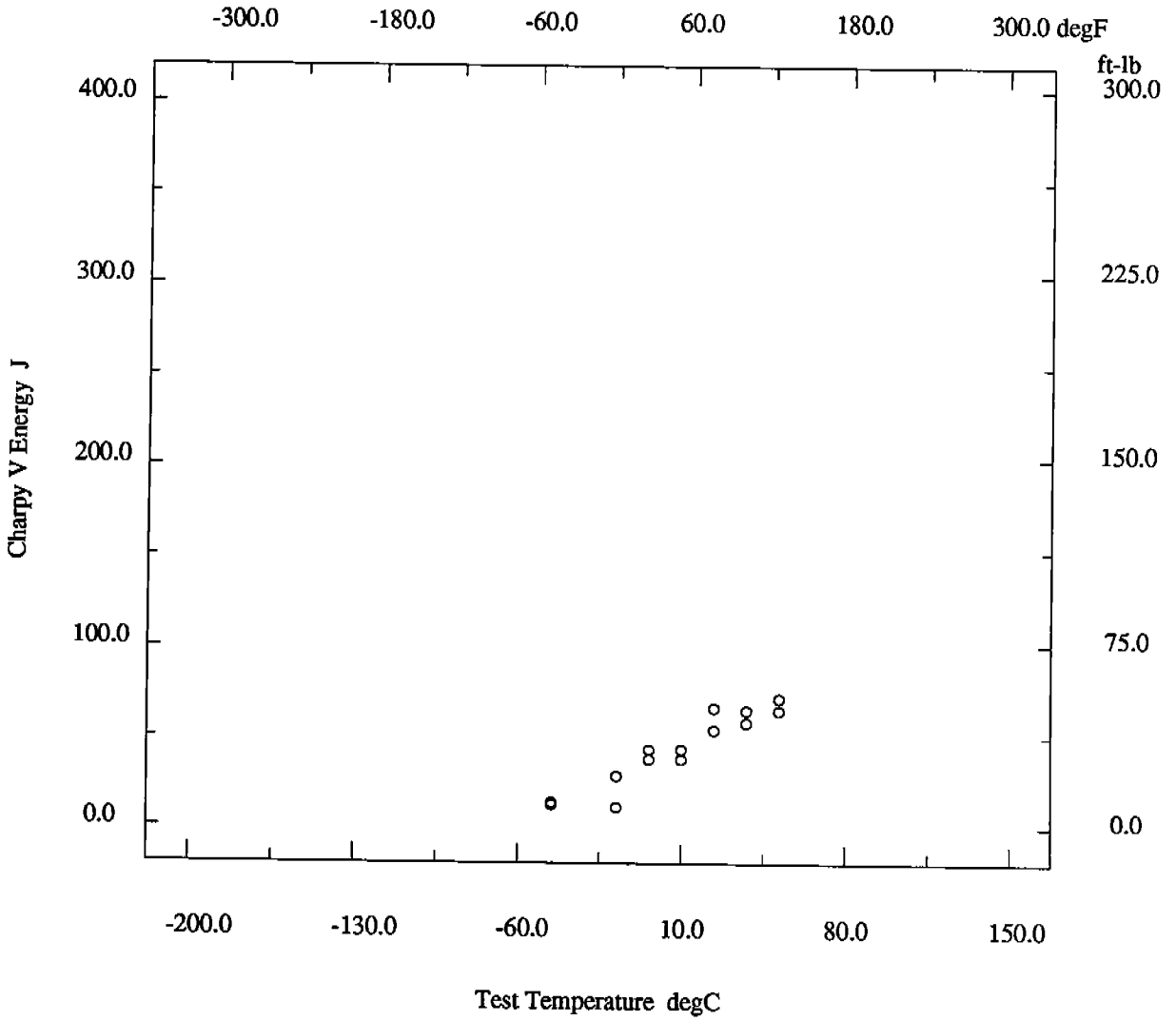
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
T-L o	-50	10	5	10
T-L o	-50	9	5	10
T-L o	0	21	18	15
T-L o	0	8	7	10
T-L o	25	28	19	25
T-L o	25	32	25	30
T-L o	50	28	44	35
T-L o	50	32	40	35
T-L o	75	40	33	50
T-L o	75	49	40	70
T-L o	100	43	41	60
T-L o	100	48	46	85
T-L o	125	48	42	70
T-L o	125	53	48	80

* - not reported

Material A537 CL1

Description

Material Code	013.004.09BA	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A537 CL1

Description

Material Code	013.004.02BA	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 7500.1

Fabrication History See Page 7500.1

Weld

Weld Code	013.004.02BA	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	Downhand IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	350 degF	Passes	8
Filler Specification	EF2-F2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	74 KJ/in
Joint Preparation	V Groove	Number of Sides	1
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	F96	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

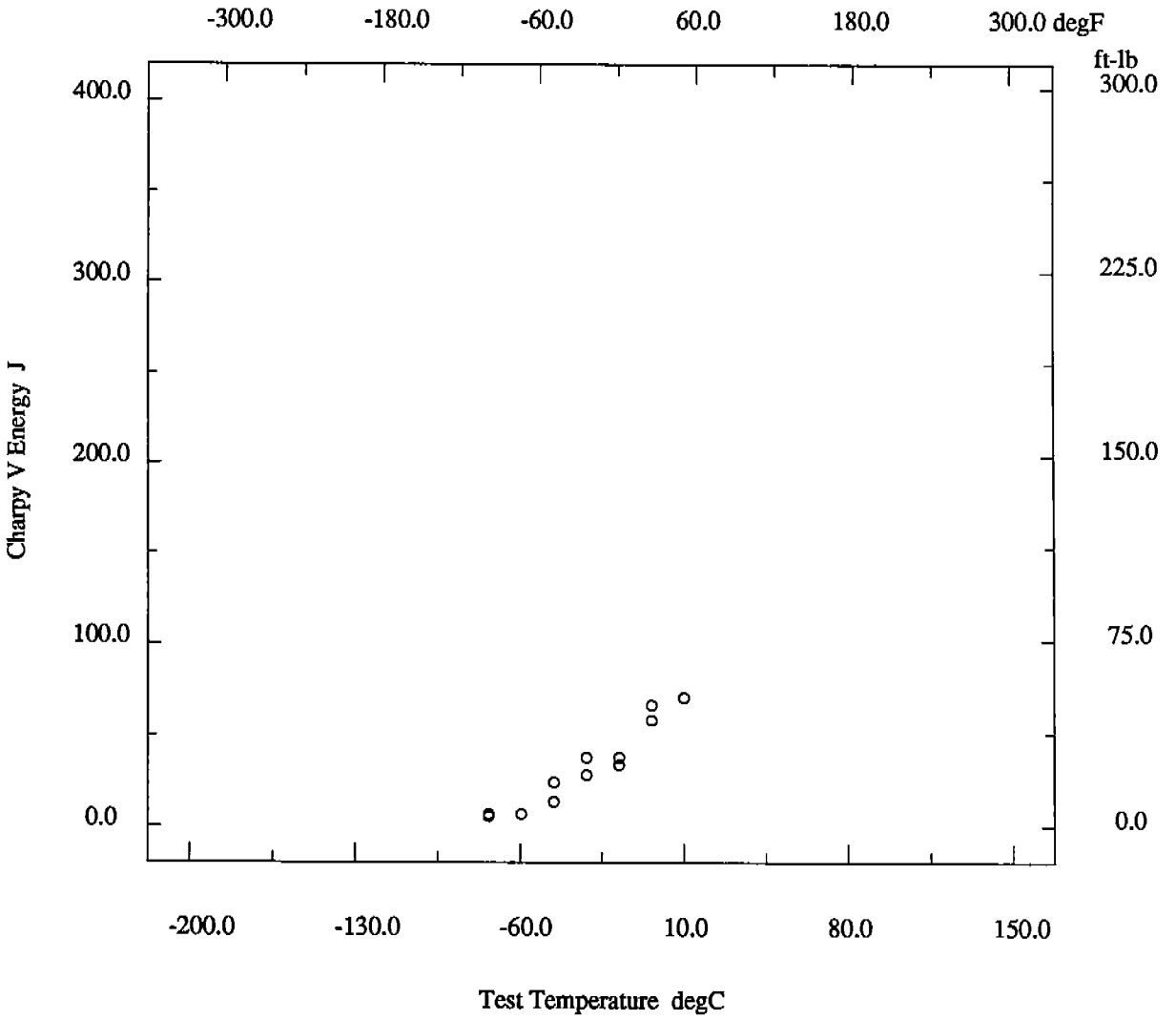
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
T-L °	-100	4	1	5
T-L °	-100	5	4	5
T-L °	-75	5	0	5
T-L °	-75	5	1	5
T-L °	-50	10	6	10
T-L °	-50	18	12	15
T-L °	-25	21	16	15
T-L °	-25	28	18	25
T-L °	0	25	28	35
T-L °	0	28	23	30
T-L °	25	43	35	90
T-L °	25	49	41	90
T-L °	50	52	38	100
T-L °	50	52	44	100

* - not reported

Material A537 CL1

Description

Material Code	013.004.02BA	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A537 CL1

Description

Material Code	013.004.09BS1	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

See Page 7500.1

Fabrication History

See Page 7500.1

Weld

Weld Code	013.004.09BS1	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	Downhand IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	350 degF	Passes	8
Filler Specification	EF2-F2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	74 KJ/in
Joint Preparation	V Groove	Number of Sides	1
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1100 degF	Post-Weld Heat Time	1 hr
Flux Type	F96	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

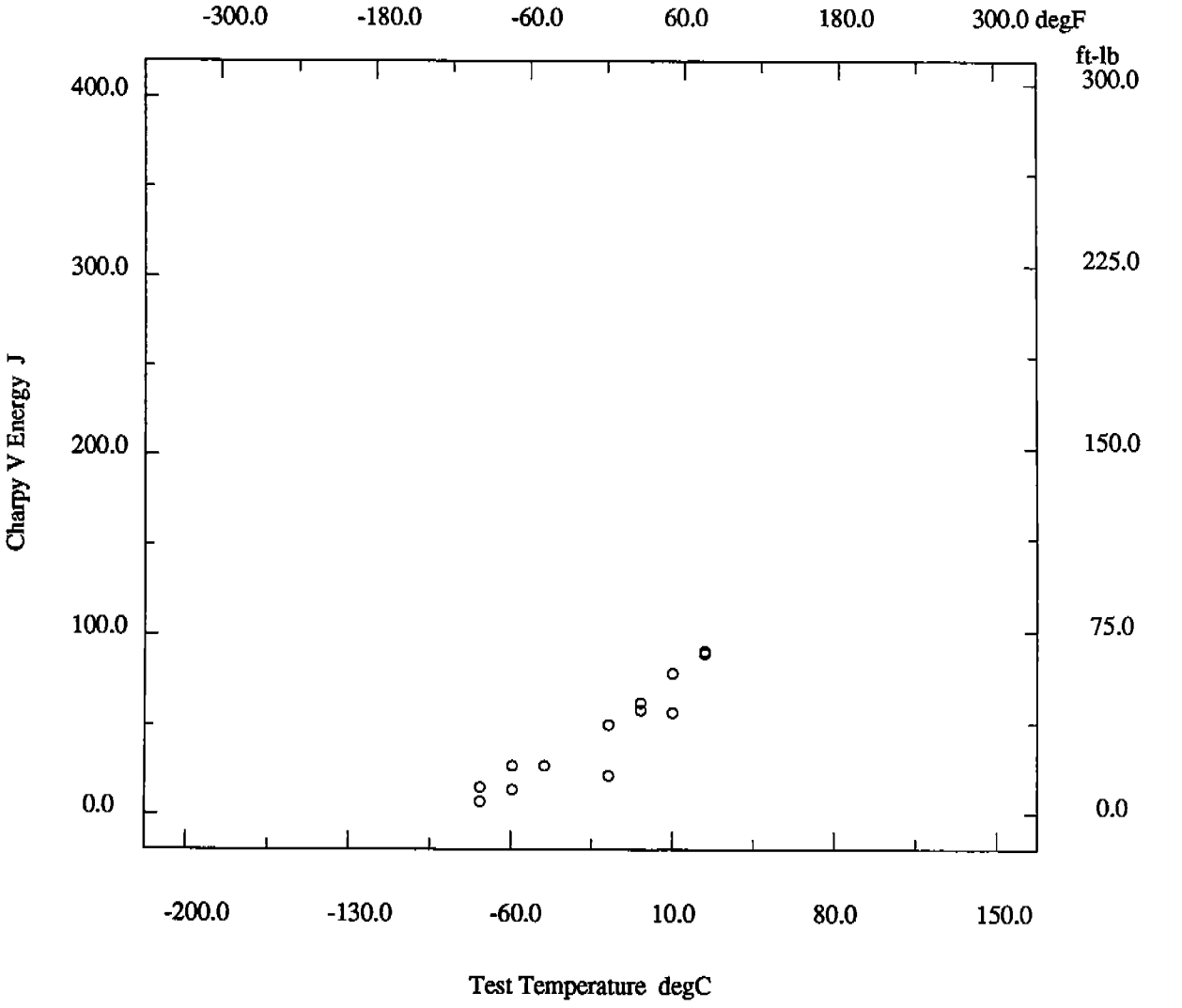
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
T-L o	-100	11	4	5
T-L o	-100	5	2	5
T-L o	-75	10	6	5
T-L o	-75	20	11	10
T-L o	-50	20	12	20
T-L o	-50	20	14	15
T-L o	0	16	16	30
T-L o	0	37	23	35
T-L o	25	43	36	40
T-L o	25	46	28	45
T-L o	50	42	48	55
T-L o	50	58	51	70
T-L o	75	66	55	45
T-L o	75	67	56	90

* - not reported

Material A537 CL1

Description

Material Code	013.004.09BS1	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A537 CL1

Description

Material Code	013.004.09BS2	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

See Page 7500.1

Fabrication History

See Page 7500.1

Weld

Weld Code	013.004.09BS2	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	Downhand IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	350 degF	Passes	8
Filler Specification	EF2-F2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	74 KJ/in
Joint Preparation	V Groove	Number of Sides	1
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1100 degF	Post-Weld Heat Time	5 hr
Flux Type	F96	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

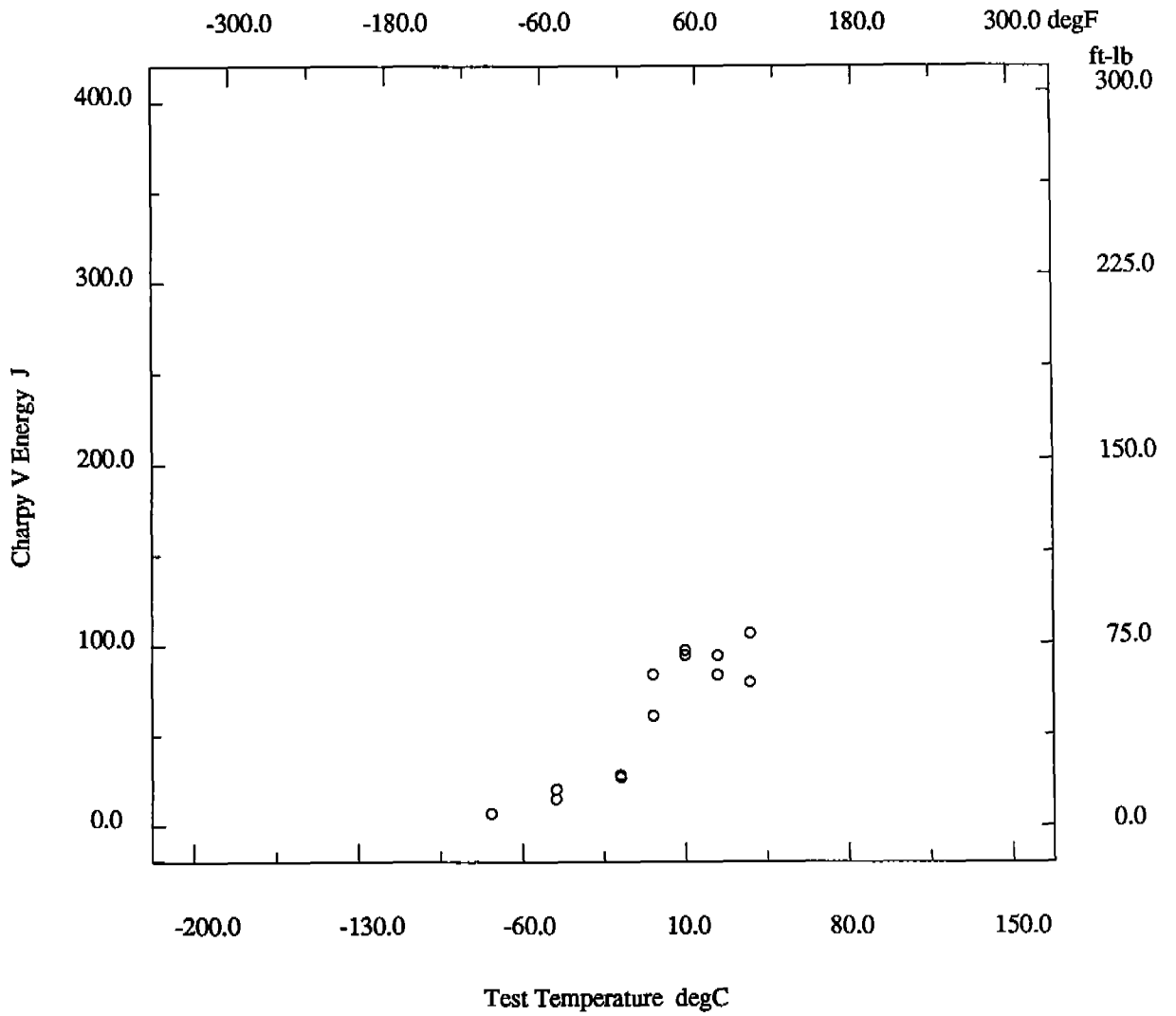
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
T-L ○	-100	5	0	5
T-L ○	-100	5	1	5
T-L ○	-50	11	10	20
T-L ○	-50	15	9	15
T-L ○	0	20	15	30
T-L ○	0	21	15	30
T-L ○	25	45	36	55
T-L ○	25	62	46	60
T-L ○	50	70	51	80
T-L ○	50	72	50	85
T-L ○	75	62	51	85
T-L ○	75	70	59	90
T-L ○	100	59	57	90
T-L ○	100	79	70	95

* - not reported

Material A537 CL1

Description

Material Code	013.004.09BS2	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A537 CL1

Description

Material Code	013.004.02BS2	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

See Page 7500.1

Fabrication History

See Page 7500.1

Weld

Weld Code	013.004.02BS2	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	Downhand IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	350 degF	Passes	8
Filler Specification	EF2-F2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	74 KJ/in
Joint Preparation	V Groove	Number of Sides	1
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1100 degF	Post-Weld Heat Time	5 hr
Flux Type	F96	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

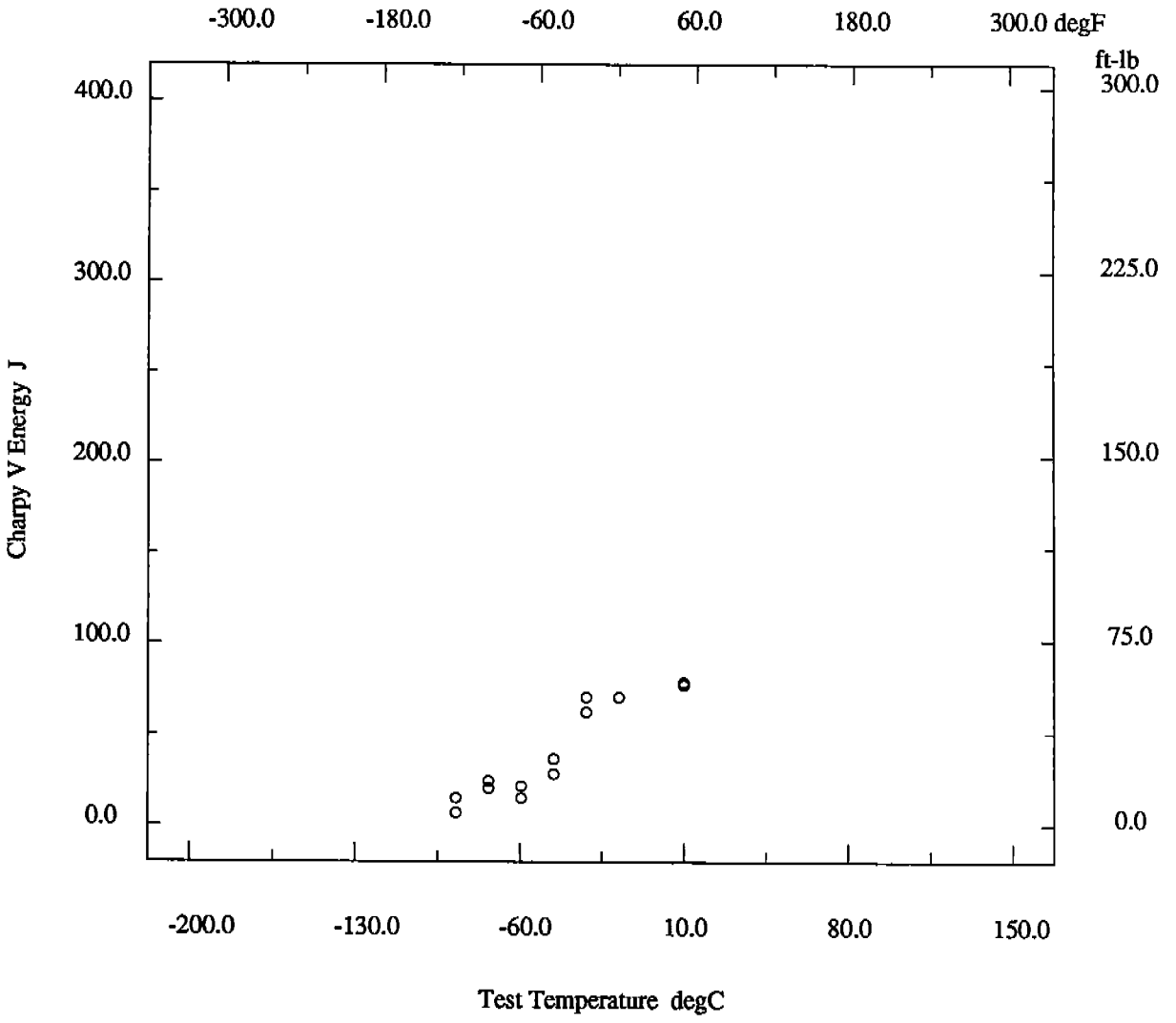
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
T-L °	-125	11	8	15
T-L °	-125	5	2	5
T-L °	-100	15	10	15
T-L °	-100	18	9	10
T-L °	-75	11	5	15
T-L °	-75	16	8	15
T-L °	-50	21	15	30
T-L °	-50	27	23	35
T-L °	-25	46	38	90
T-L °	-25	52	41	100
T-L °	0	52	40	98
T-L °	0	52	46	95
T-L °	50	57	50	100
T-L °	50	58	51	100

* - not reported

Material A537 CL1

Description

Material Code	013.004.02BS2	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A537 CL1

Description

Material Code	013.004.09BS3	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 7500.1

Fabrication History See Page 7500.1

Weld

Weld Code	013.004.09BS3	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	Downhand IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	350 degF	Passes	8
Filler Specification	EF2-F2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	74 KJ/in
Joint Preparation	V Groove	Number of Sides	1
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1200 degF	Post-Weld Heat Time	1 hr
Flux Type	F96	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

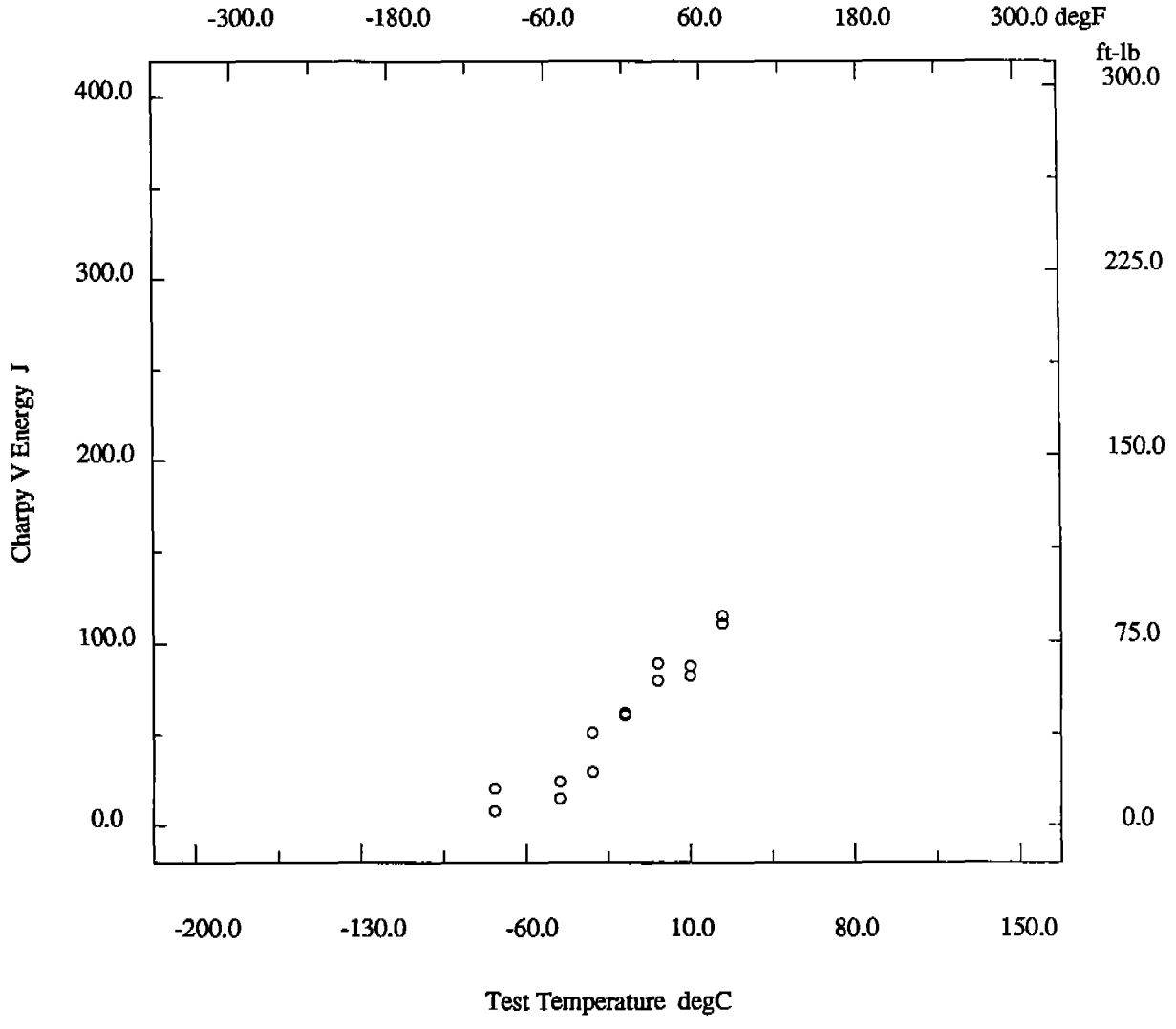
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
T-L o	-100	15	6	10
T-L o	-100	6	2	10
T-L o	-50	11	10	30
T-L o	-50	18	13	35
T-L o	-25	22	17	25
T-L o	-25	38	28	35
T-L o	0	45	34	45
T-L o	0	46	35	45
T-L o	25	59	44	55
T-L o	25	66	50	75
T-L o	50	61	50	70
T-L o	50	65	53	75
T-L o	75	82	66	95
T-L o	75	85	69	95

* - not reported

Material A537 CL1

Description

Material Code	013.004.09BS3	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A537 CL1

Description

Material Code	013.004.02BS3	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 7500.1

Fabrication History See Page 7500.1

Weld

Weld Code	013.004.02BS3	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	Downhand IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	350 degF	Passes	8
Filler Specification	EF2-F2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	74 KJ/in
Joint Preparation	V Groove	Number of Sides	1
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1200 degF	Post-Weld Heat Time	1 hr
Flux Type	F96	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

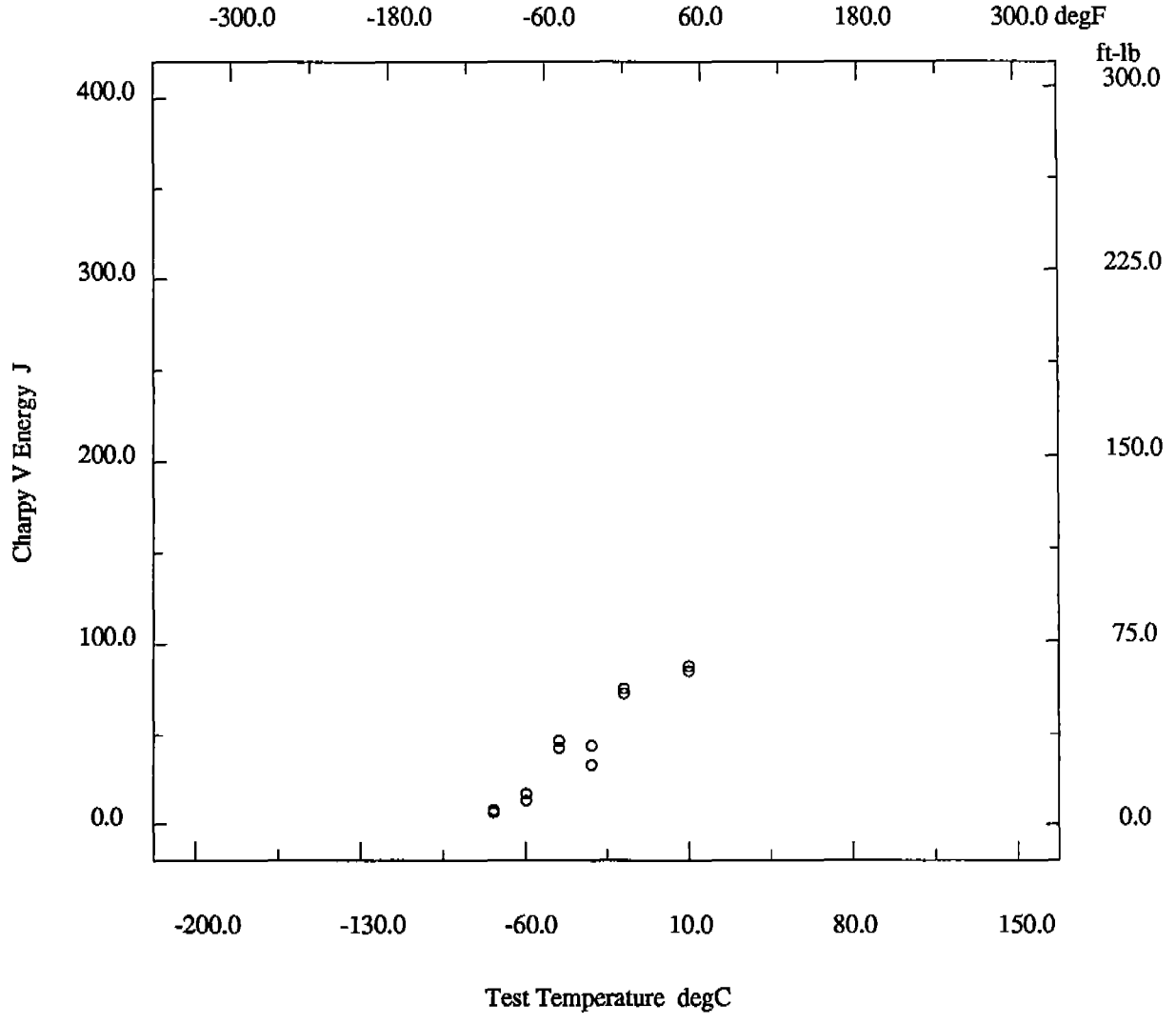
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
T-L °	-100	5	0	5
T-L °	-100	6	1	5
T-L °	-75	10	4	10
T-L °	-75	13	9	15
T-L °	-50	32	23	65
T-L °	-50	35	25	80
T-L °	-25	25	25	45
T-L °	-25	33	17	50
T-L °	0	54	45	95
T-L °	0	56	45	95
T-L °	50	63	44	100
T-L °	50	65	50	100

* - not reported

Material A537 CL1

Description

Material Code	013.004.02BS3	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A537 CL1

Description

Material Code	013.004.09BS4	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 7500.1

Fabrication History See Page 7500.1

Weld

Weld Code	013.004.09BS4	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	Downhand IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	350 degF	Passes	8
Filler Specification	EF2-F2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	74 KJ/in
Joint Preparation	V Groove	Number of Sides	1
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1200 degF	Post-Weld Heat Time	5 hr
Flux Type	F96	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

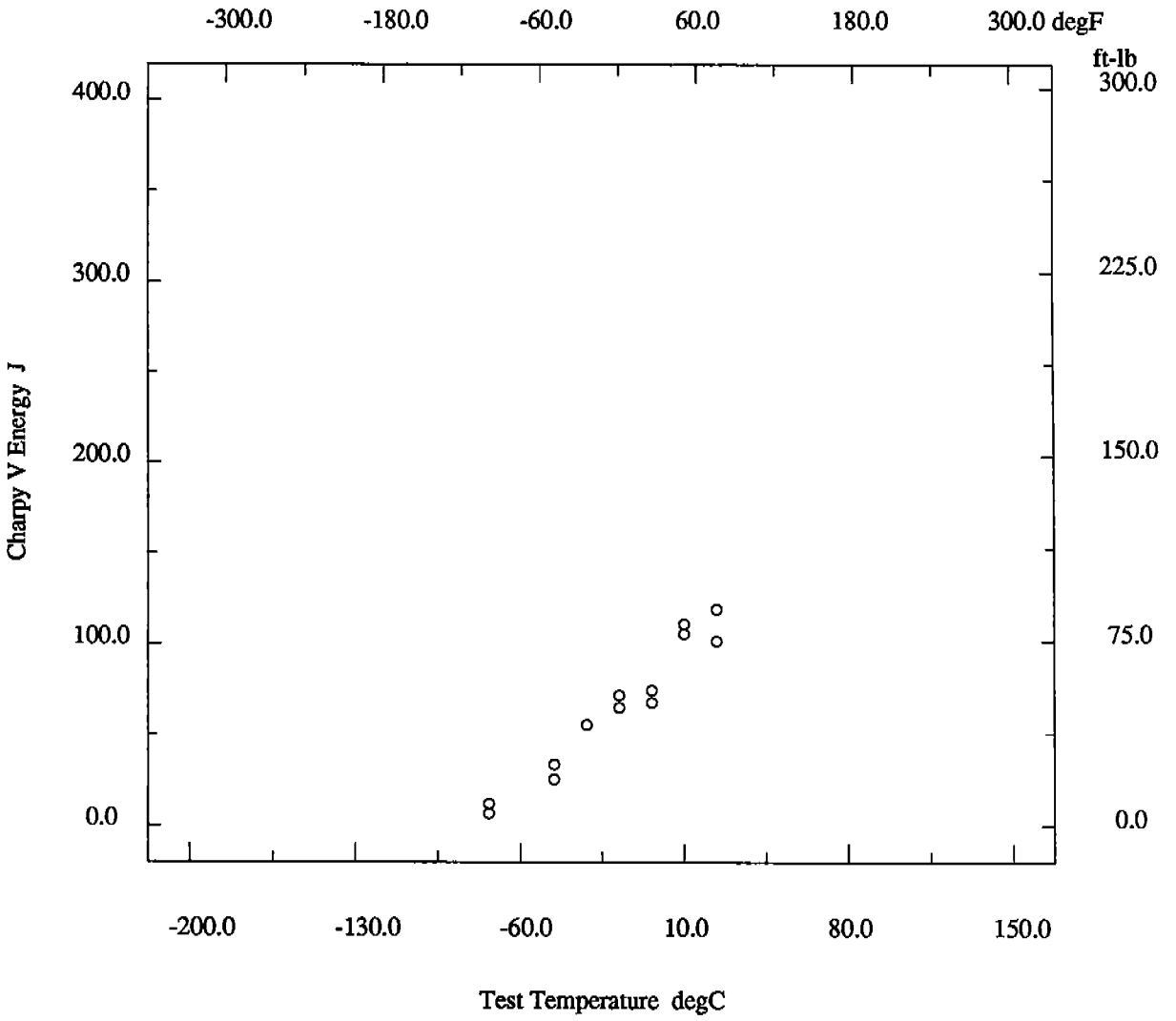
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
T-L °	-100	5	4	5
T-L °	-100	9	4	5
T-L °	-50	19	15	20
T-L °	-50	25	18	20
T-L °	-25	41	28	35
T-L °	-25	41	31	35
T-L °	0	48	40	40
T-L °	0	53	44	35
T-L °	25	50	40	40
T-L °	25	55	42	45
T-L °	50	78	48	70
T-L °	50	82	48	75
T-L °	75	75	64	85
T-L °	75	88	34	90

* - not reported

Material A537 CL1

Description

Material Code	013.004.09BS4	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A537 CL1

Description

Material Code	013.004.02BS4	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 7500.1

Fabrication History See Page 7500.1

Weld

Weld Code	013.004.02BS4	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	Downhand IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	350 degF	Passes	8
Filler Specification	EF2-F2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	74 KJ/in
Joint Preparation	V Groove	Number of Sides	1
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1200 degF	Post-Weld Heat Time	5 hr
Flux Type	F96	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

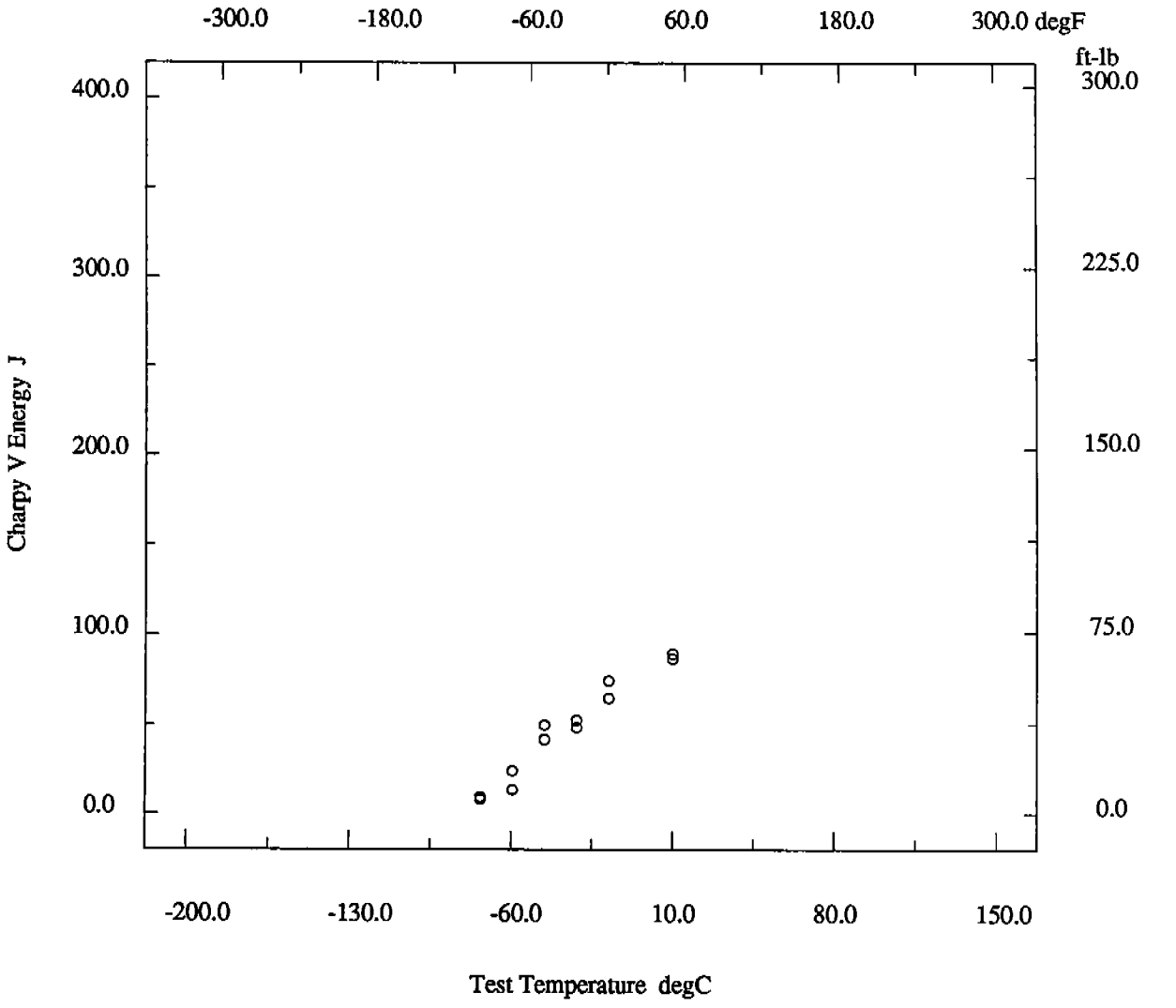
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
T-L °	-100	6	1	5
T-L °	-100	7	2	5
T-L °	-75	10	8	10
T-L °	-75	18	16	15
T-L °	-50	31	21	45
T-L °	-50	37	28	65
T-L °	-25	36	33	50
T-L °	-25	39	30	80
T-L °	0	48	42	85
T-L °	0	55	43	90
T-L °	50	64	62	100
T-L °	50	66	65	100

* - not reported

Material A537 CL1

Description

Material Code	013.004.02BS4	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A537 CL1

Description

Material Code	013.004.09BS2	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

See Page 7500.1

Fabrication History

See Page 7500.1

Weld

Weld Code	013.004.09BS2	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	Downhand IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	350 degF	Passes	8
Filler Specification	EF2-F2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	74 KJ/in
Joint Preparation	V Groove	Number of Sides	1
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1100 degF	Post-Weld Heat Time	5 hr
Flux Type	F96	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

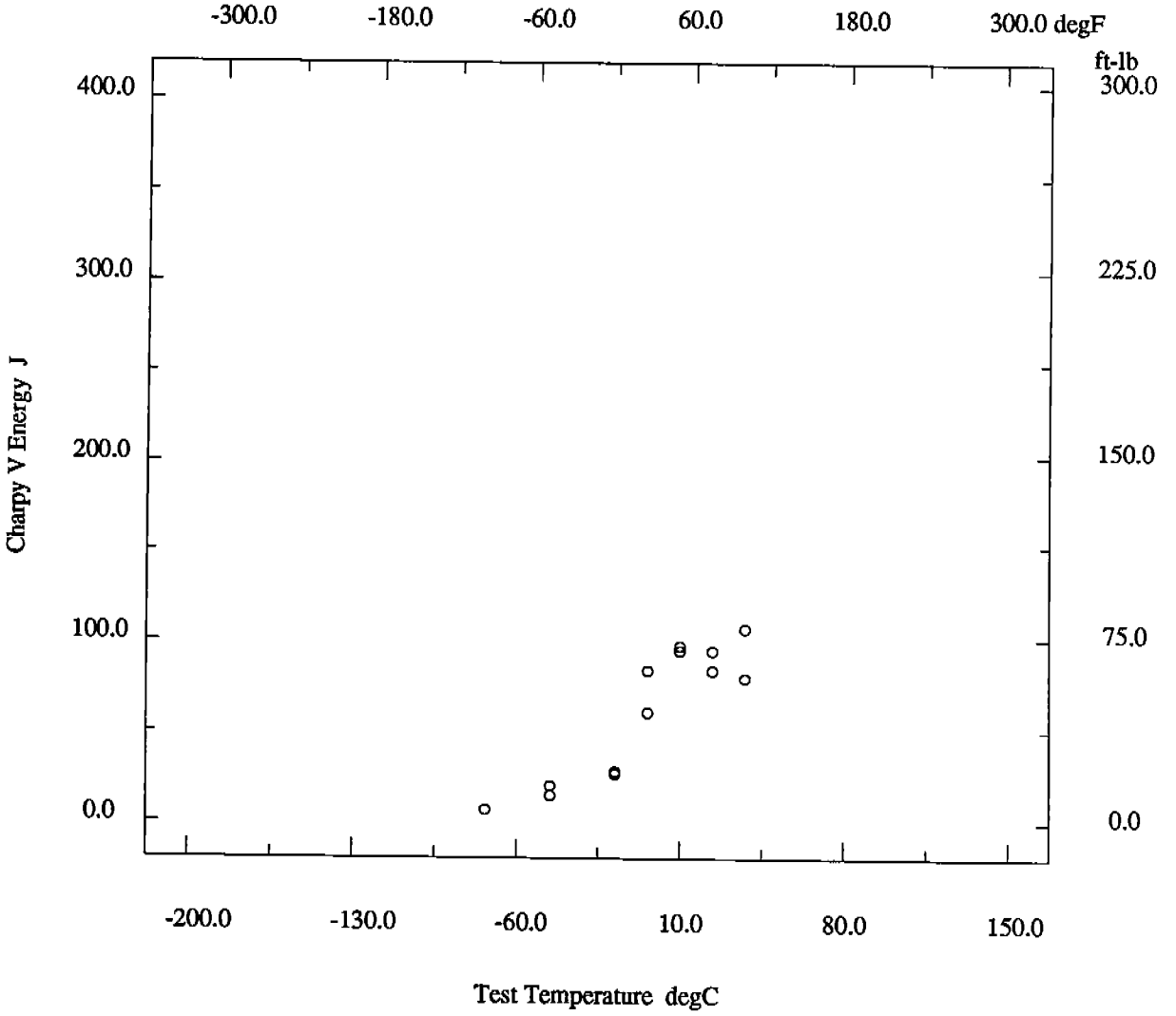
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
T-L °	-100	5	0	5
T-L °	-100	5	1	5
T-L °	-50	11	10	20
T-L °	-50	15	9	15
T-L °	0	20	15	30
T-L °	0	21	15	30
T-L °	25	45	36	55
T-L °	25	62	46	60
T-L °	50	70	51	80
T-L °	50	72	50	85
T-L °	75	62	51	85
T-L °	75	70	59	90
T-L °	100	59	57	90
T-L °	100	79	70	95

* - not reported

Material A537 CL1

Description

Material Code	013.004.09BS2	Material Name	A537 CL1
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A572 Gr50

Description

Material Code	016.001.010A	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

C	0.20 %	Mn	1.24 %
P	0.004 %	S	0.024 %
Si	0.02 %	Cr	0.02 %
Ni	0.04 %	Mo	0.01 %
V	0.089 %	Cu	0.04 %
Cb	<0.005 %	Ti	*
B	*	Al	<0.002 %
N	0.005 %	Other Components	*

Fabrication History

Heat Treatment	*	Producer	US Steel
Year Produced	*	Addl Info	*
Source	US Steel	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	A,R
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	Cylindrical	Specimen Thickness	0.357 in
Gage Length	1.4 in	Loading Rate	*
Tensile Strength Offset	0.2 %	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
L	Room	87.9	58.7	*	26.9	66

* - not reported

Material A572 Gr50

Description

Material Code	016.001.09AA	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 7600.1

Fabrication History See Page 7600.1

Weld

Weld Code	016.001.09AA	Weld Type	SMA
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	350 degF	Passes	16
Filler Specification	E7018	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

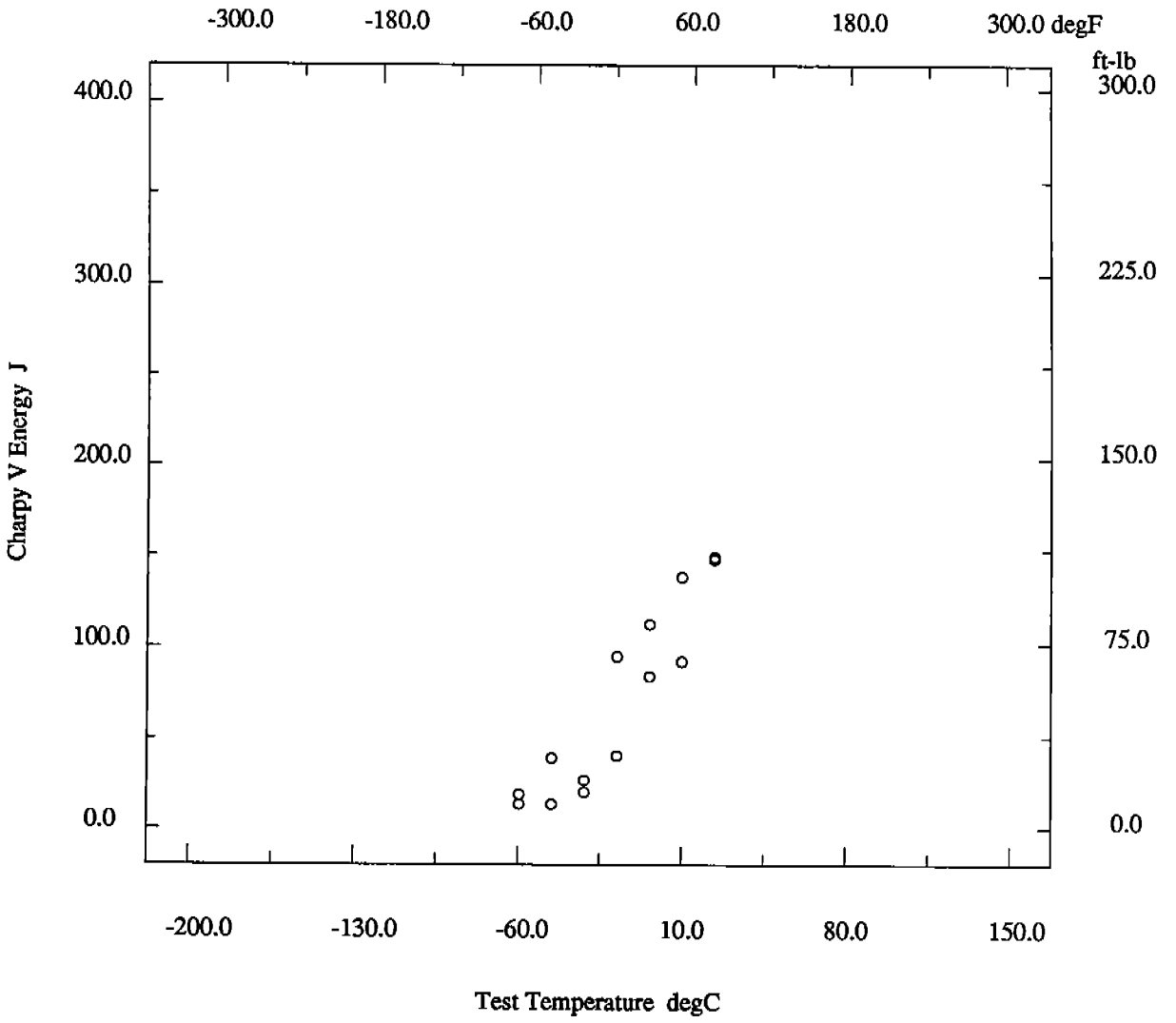
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-75	10	11	10
L-T °	-75	14	11	10
L-T °	-50	10	12	15
L-T °	-50	29	23	10
L-T °	-25	15	19	30
L-T °	-25	20	23	30
L-T °	0	30	30	40
L-T °	0	70	58	40
L-T °	25	62	56	50
L-T °	25	83	70	60
L-T °	50	102	82	75
L-T °	50	68	58	60
L-T °	75	109	93	90
L-T °	75	110	89	80

* - not reported

Material A572 Gr50

Description

Material Code	016.001.09AA	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A572 Gr50

Description

Material Code	016.001.02AA	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 7600.1

Fabrication History See Page 7600.1

Weld

Weld Code	016.001.02AA	Weld Type	SMA
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	350 degF	Passes	16
Filler Specification	E7018	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

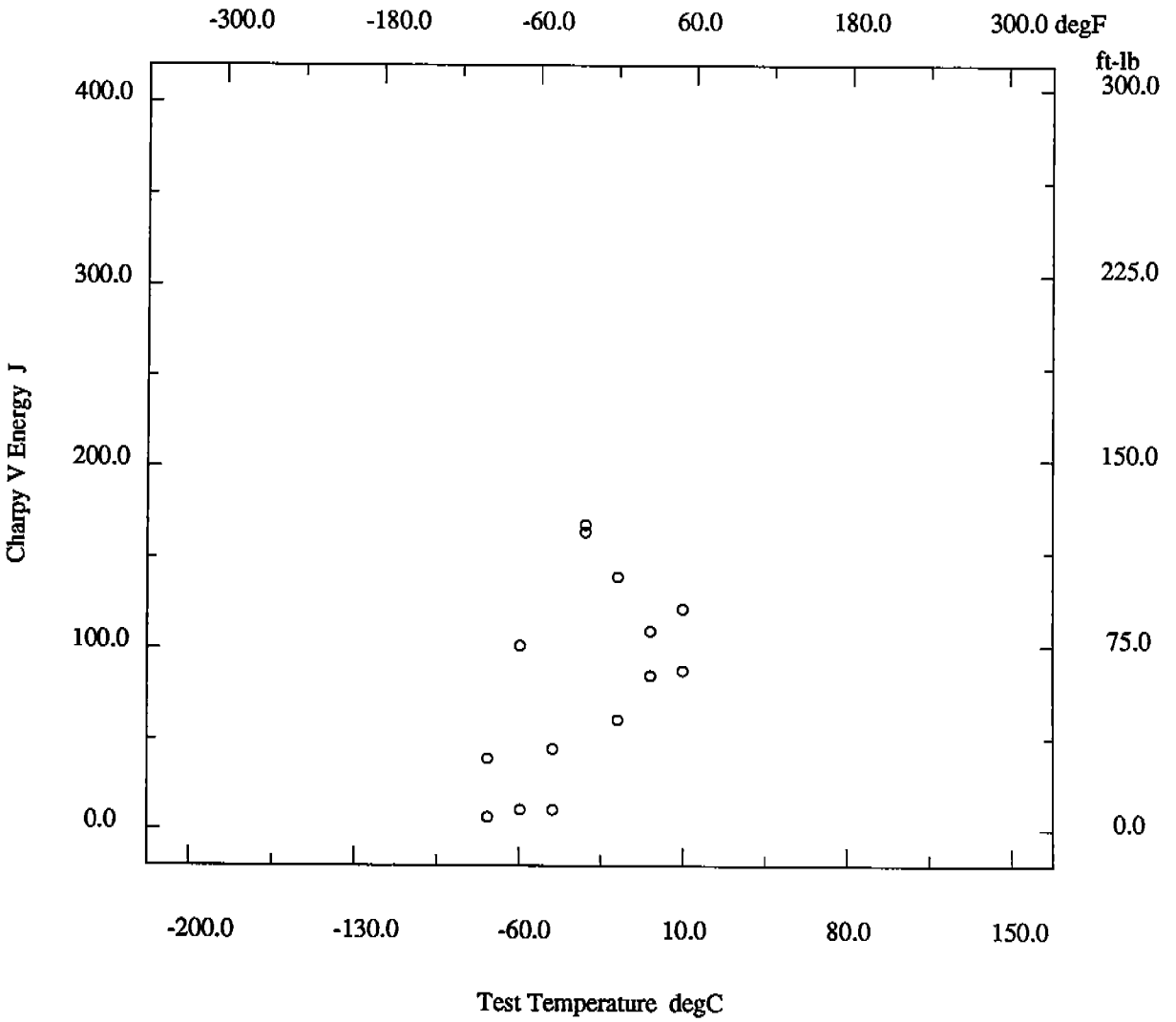
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-100	29	18	20
L-T °	-100	5	3	10
L-T °	-75	75	46	30
L-T °	-75	8	7	10
L-T °	-50	33	25	30
L-T °	-50	8	10	15
L-T °	-25	121	75	40
L-T °	-25	124	80	50
L-T °	0	103	79	65
L-T °	0	45	39	55
L-T °	25	63	54	50
L-T °	25	81	65	75
L-T °	50	65	51	60
L-T °	50	90	73	90

* - not reported

Material A572 Gr50

Description

Material Code	016.001.02AA	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A572 Gr50

Description

Material Code	016.001.09AS1	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 7600.1

Fabrication History See Page 7600.1

Weld

Weld Code	016.001.09AS1	Weld Type	SMA
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	350 degF	Passes	16
Filler Specification	E7018	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	1100 degF	Post-Weld Heat Time	1 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

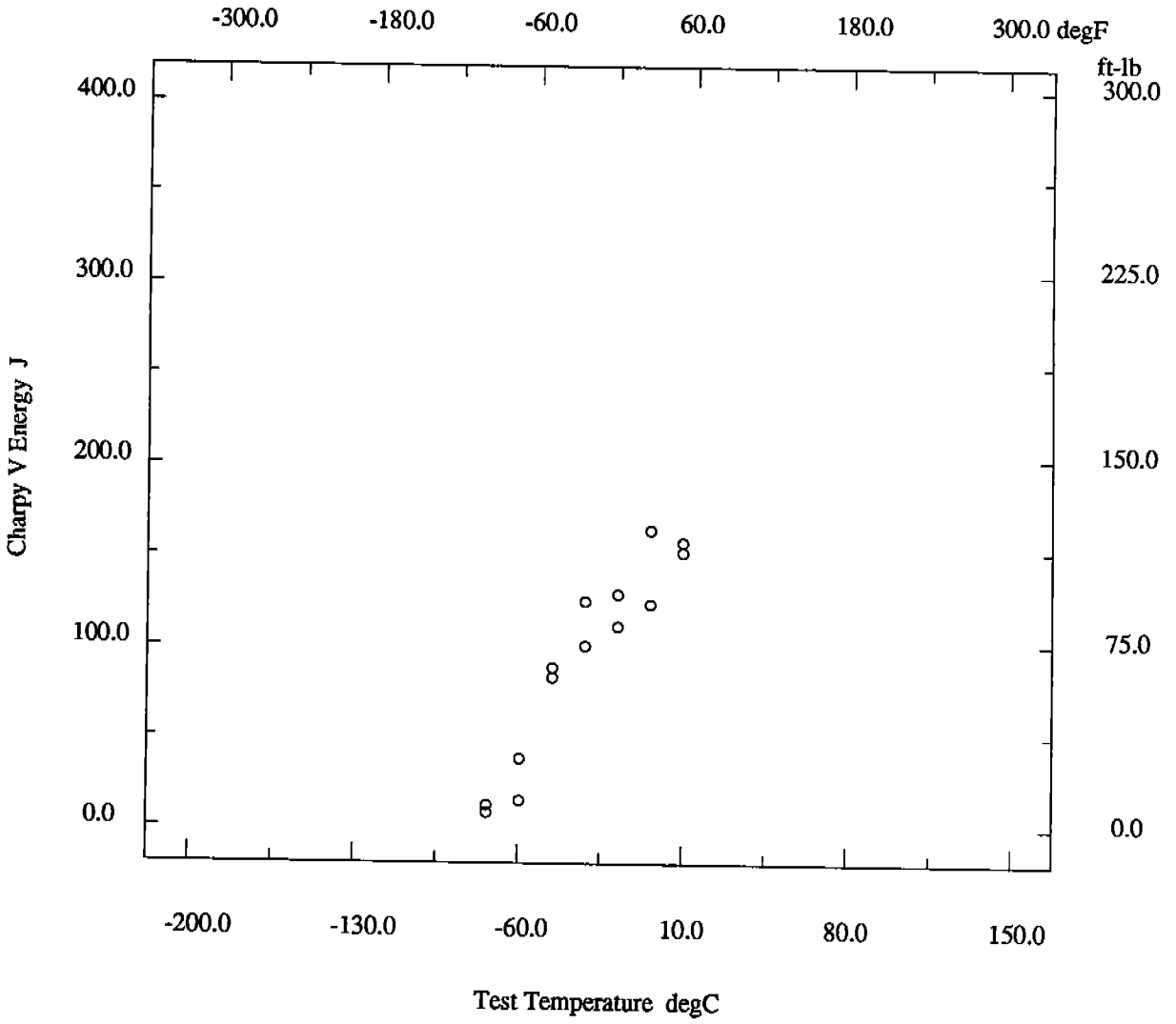
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-100	6	6	10
L-T °	-100	9	10	10
L-T °	-75	11	11	10
L-T °	-75	28	24	15
L-T °	-50	61	54	30
L-T °	-50	65	54	30
L-T °	-25	74	66	40
L-T °	-25	92	87	50
L-T °	0	82	67	60
L-T °	0	95	88	65
L-T °	25	121	90	70
L-T °	25	91	76	70
L-T °	50	112	92	85
L-T °	50	116	96	90

* - not reported

Material A572 Gr50

Description

Material Code	016.001.09AS1	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A572 Gr50

Description

Material Code	016.001.02AS1	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 7600.1

Fabrication History See Page 7600.1

Weld

Weld Code	016.001.02AS1	Weld Type	SMA
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	350 degF	Passes	16
Filler Specification	E7018	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	1100 degF	Post-Weld Heat Time	1 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

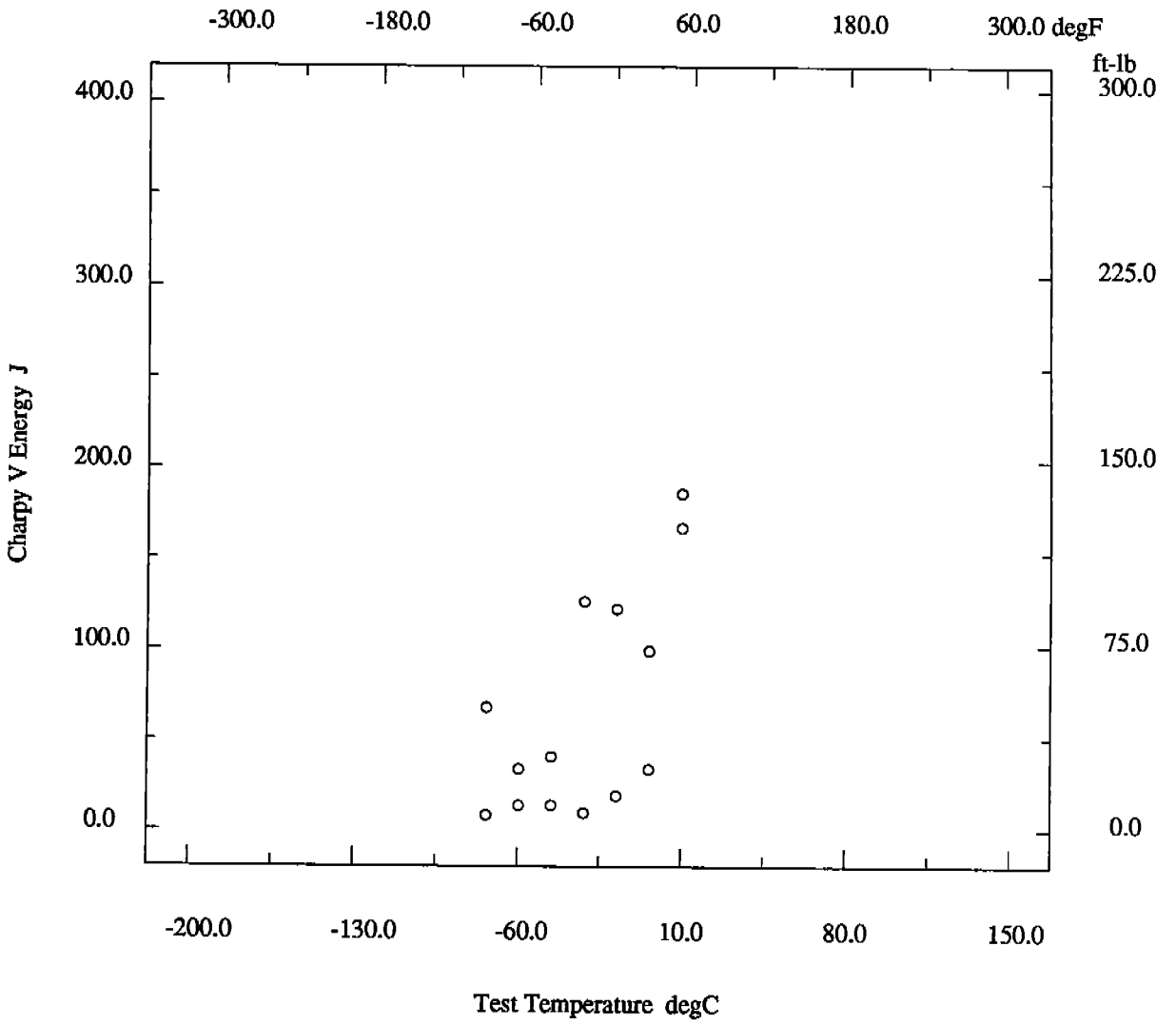
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-100	50	33	30
L-T °	-100	6	4	10
L-T °	-75	10	7	10
L-T °	-75	25	16	30
L-T °	-50	10	13	30
L-T °	-50	30	26	20
L-T °	-25	7	9	20
L-T °	-25	93	66	40
L-T °	0	14	13	25
L-T °	0	90	63	50
L-T °	25	25	20	20
L-T °	25	73	57	60
L-T °	50	123	92	98
L-T °	50	137	88	98

* - not reported

Material A572 Gr50

Description

Material Code	016.001.02AS1	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A572 Gr50

Description

Material Code	016.001.09AS2	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 7600.1

Fabrication History See Page 7600.1

Weld

Weld Code	016.001.09AS2	Weld Type	SMA
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	350 degF	Passes	16
Filler Specification	E7018	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	1100 degF	Post-Weld Heat Time	5 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

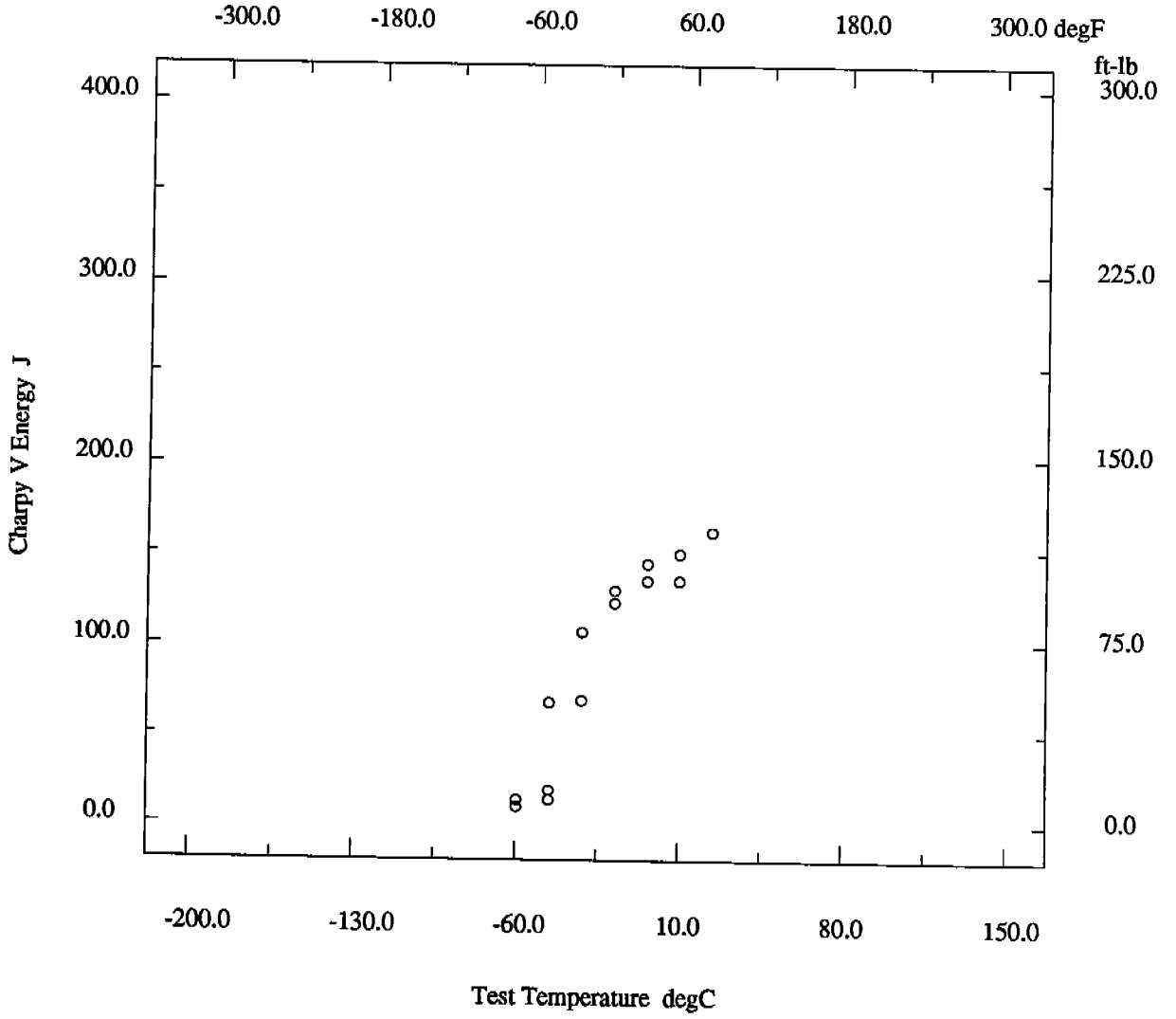
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-75	10	12	15
L-T °	-75	7	13	10
L-T °	-50	10	19	15
L-T °	-50	14	17	20
L-T °	-50	50	42	25
L-T °	-25	51	49	80
L-T °	-25	79	67	65
L-T °	0	91	75	65
L-T °	0	96	81	60
L-T °	25	100	82	70
L-T °	25	107	80	65
L-T °	50	100	87	80
L-T °	50	111	92	80
L-T °	75	120	94	100

* - not reported

Material A572 Gr50

Description

Material Code	016.001.09AS2	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A572 Gr50

Description

Material Code	016.001.02AS2	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 7600.1

Fabrication History See Page 7600.1

Weld

Weld Code	016.001.02AS2	Weld Type	SMA
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	350 degF	Passes	16
Filler Specification	E7018	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	1100 degF	Post-Weld Heat Time	5 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

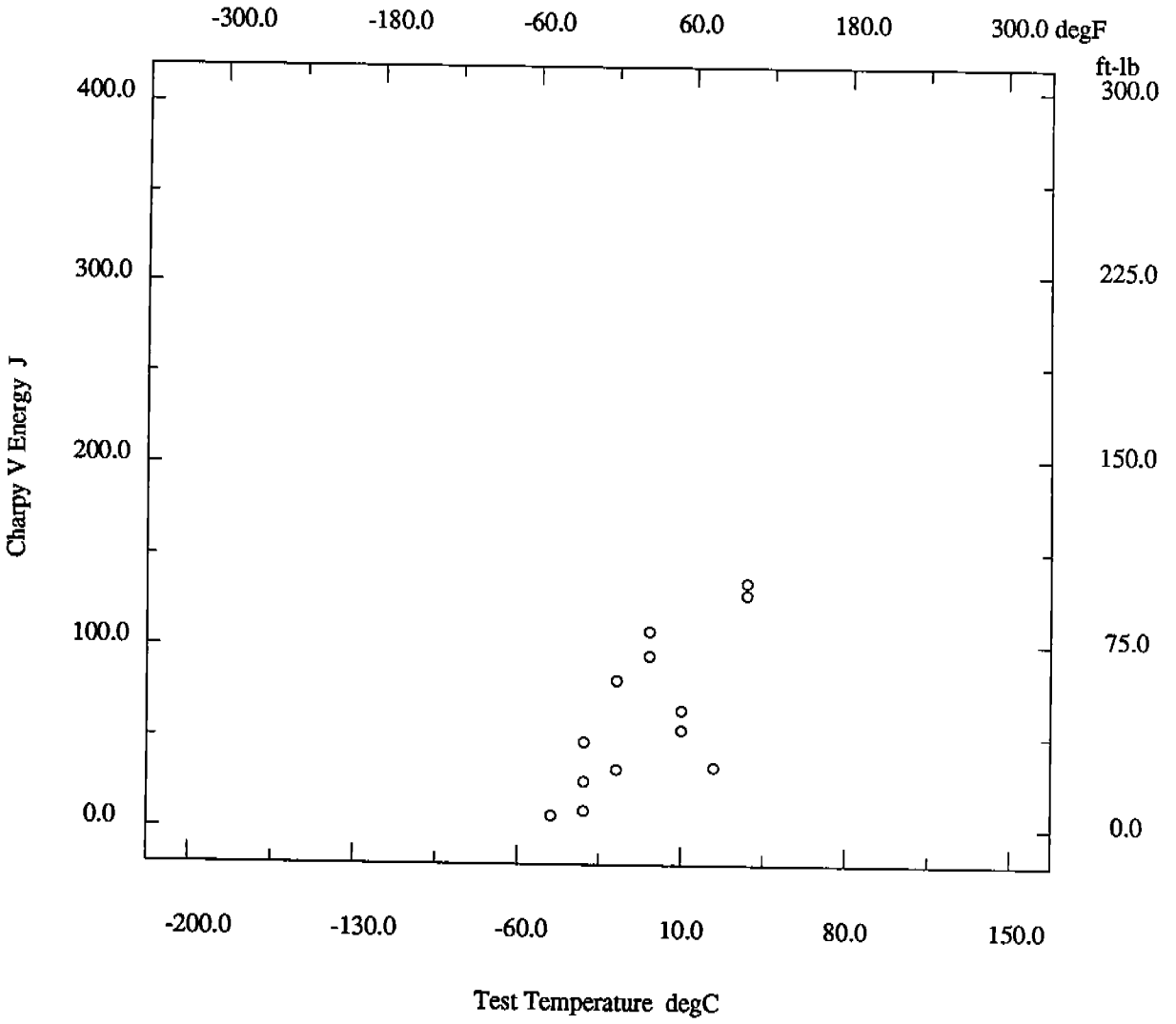
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T o	-50	5	4	5
L-T o	-50	5	7	10
L-T o	-25	19	22	35
L-T o	-25	35	35	55
L-T o	-25	7	10	25
L-T o	0	24	25	60
L-T o	0	60	47	45
L-T o	25	70	55	40
L-T o	25	80	57	35
L-T o	50	40	38	65
L-T o	50	48	49	70
L-T o	75	25	29	40
L-T o	100	100	72	90
L-T o	100	95	68	90

* - not reported

Material A572 Gr50

Description

Material Code	016.001.02AS2	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A572 Gr50

Description

Material Code	016.001.09AS3	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

See Page 7600.1

Fabrication History

See Page 7600.1

Weld

Weld Code	016.001.09AS3	Weld Type	SMA
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	350 degF	Passes	16
Filler Specification	E7018	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	1200 degF	Post-Weld Heat Time	1 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

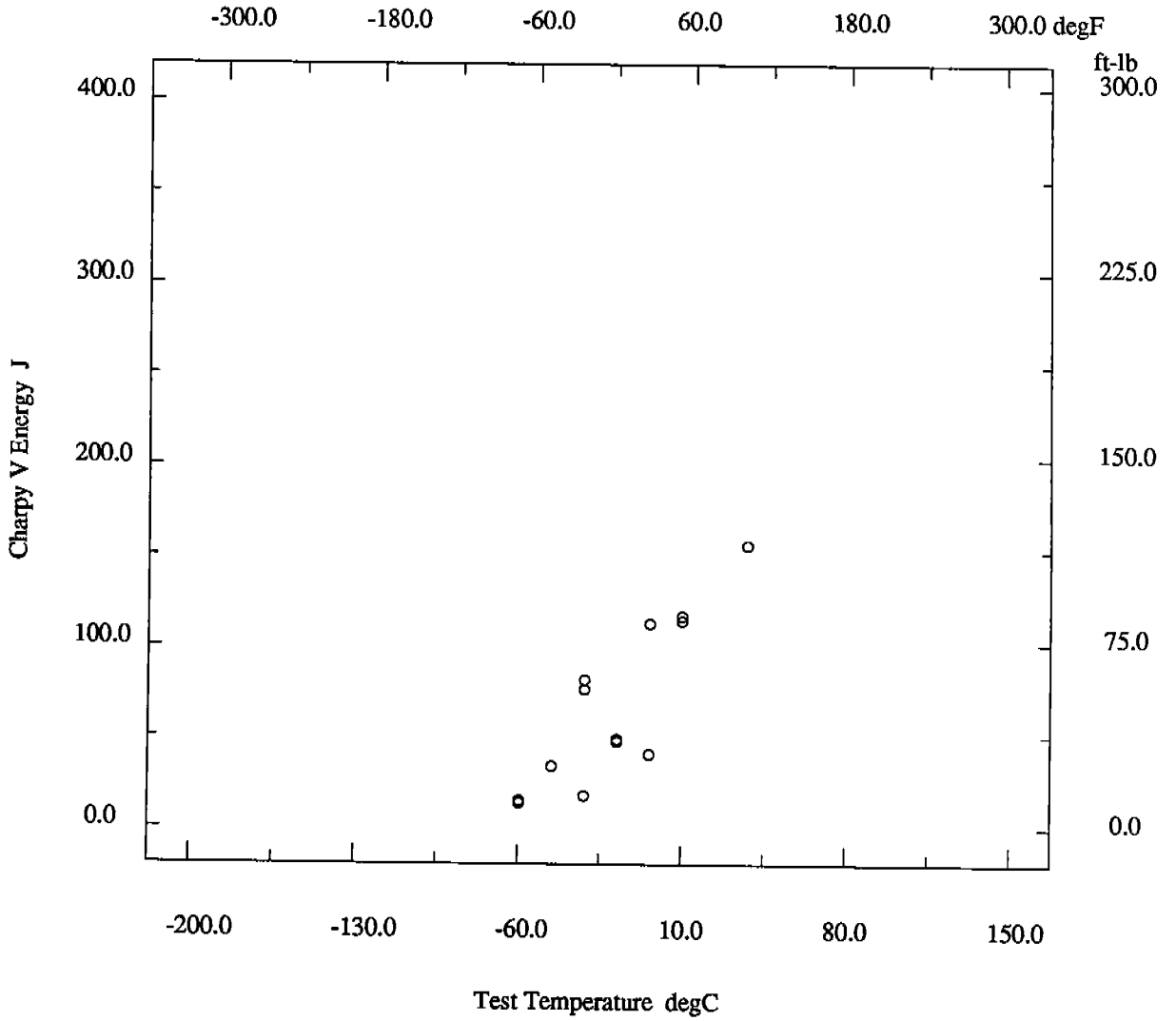
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-75	10	6	5
L-T °	-75	11	9	10
L-T °	-50	25	22	20
L-T °	-50	25	24	20
L-T °	-25	13	22	15
L-T °	-25	56	48	30
L-T °	-25	60	54	35
L-T °	0	35	40	40
L-T °	0	36	39	40
L-T °	25	30	35	45
L-T °	25	83	69	60
L-T °	50	84	68	60
L-T °	50	86	75	65
L-T °	100	115	93	100

* - not reported

Material A572 Gr50

Description

Material Code	016.001.09AS3	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A572 Gr50

Description

Material Code	016.001.02AS3	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 7600.1

Fabrication History See Page 7600.1

Weld

Weld Code	016.001.02AS3	Weld Type	SMA
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	350 degF	Passes	16
Filler Specification	E7018	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	1200 degF	Post-Weld Heat Time	1 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

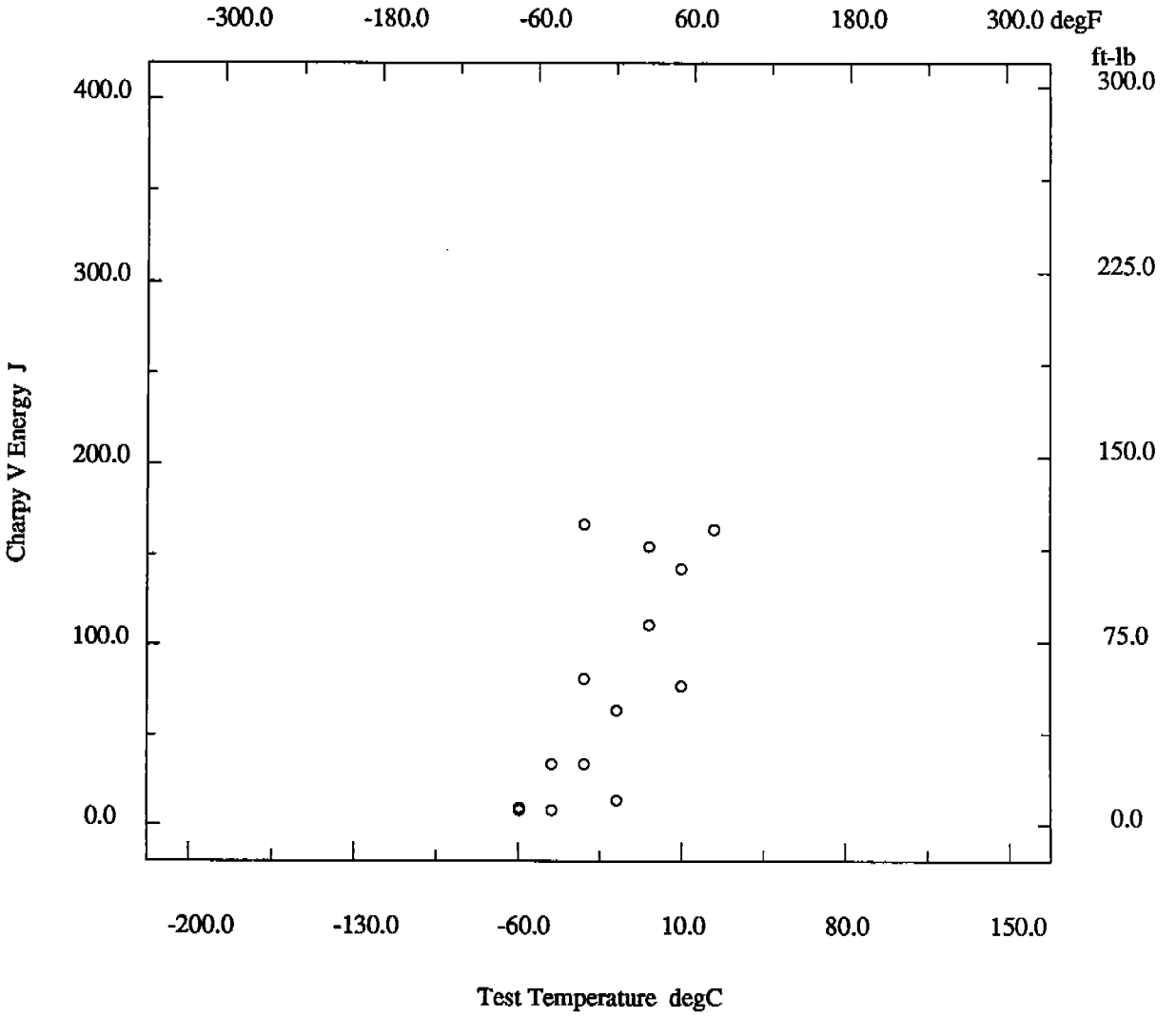
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-75	6	14	10
L-T °	-75	7	6	10
L-T °	-50	25	19	20
L-T °	-50	6	5	10
L-T °	-25	123	73	65
L-T °	-25	25	17	20
L-T °	-25	60	39	40
L-T °	0	10	12	20
L-T °	0	47	36	40
L-T °	25	114	79	40
L-T °	25	82	53	45
L-T °	50	105	61	65
L-T °	50	57	42	60
L-T °	75	121	76	70

* - not reported

Material A572 Gr50

Description

Material Code	016.001.02AS3	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A572 Gr50

Description

Material Code	016.001.09AS4	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 7600.1

Fabrication History See Page 7600.1

Weld

Weld Code	016.001.09AS4	Weld Type	SMA
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	350 degF	Passes	16
Filler Specification	E7018	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	1200 degF	Post-Weld Heat Time	5 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

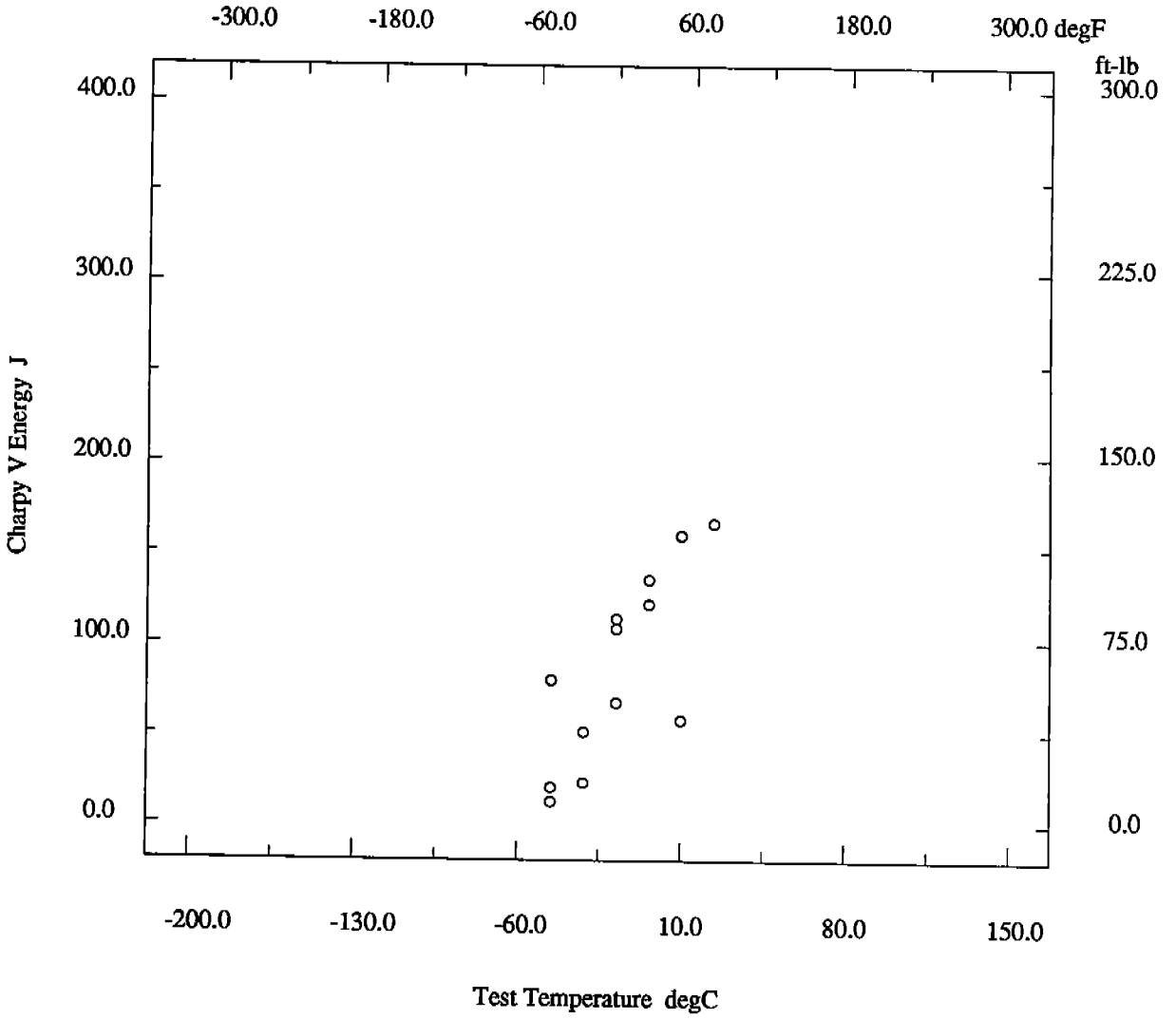
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-50	15	15	15
L-T °	-50	59	49	35
L-T °	-50	9	13	15
L-T °	-25	17	22	45
L-T °	-25	38	36	35
L-T °	0	50	53	45
L-T °	0	80	64	65
L-T °	0	84	69	65
L-T °	25	100	78	60
L-T °	25	90	74	60
L-T °	50	118	95	75
L-T °	50	43	46	55
L-T °	75	123	86	80

* - not reported

Material A572 Gr50

Description

Material Code	016.001.09AS4	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A572 Gr50

Description

Material Code	016.001.02AS4	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 7600.1

Fabrication History See Page 7600.1

Weld

Weld Code	016.001.02AS4	Weld Type	SMA
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	350 degF	Passes	16
Filler Specification	E7018	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	1200 degF	Post-Weld Heat Time	5 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

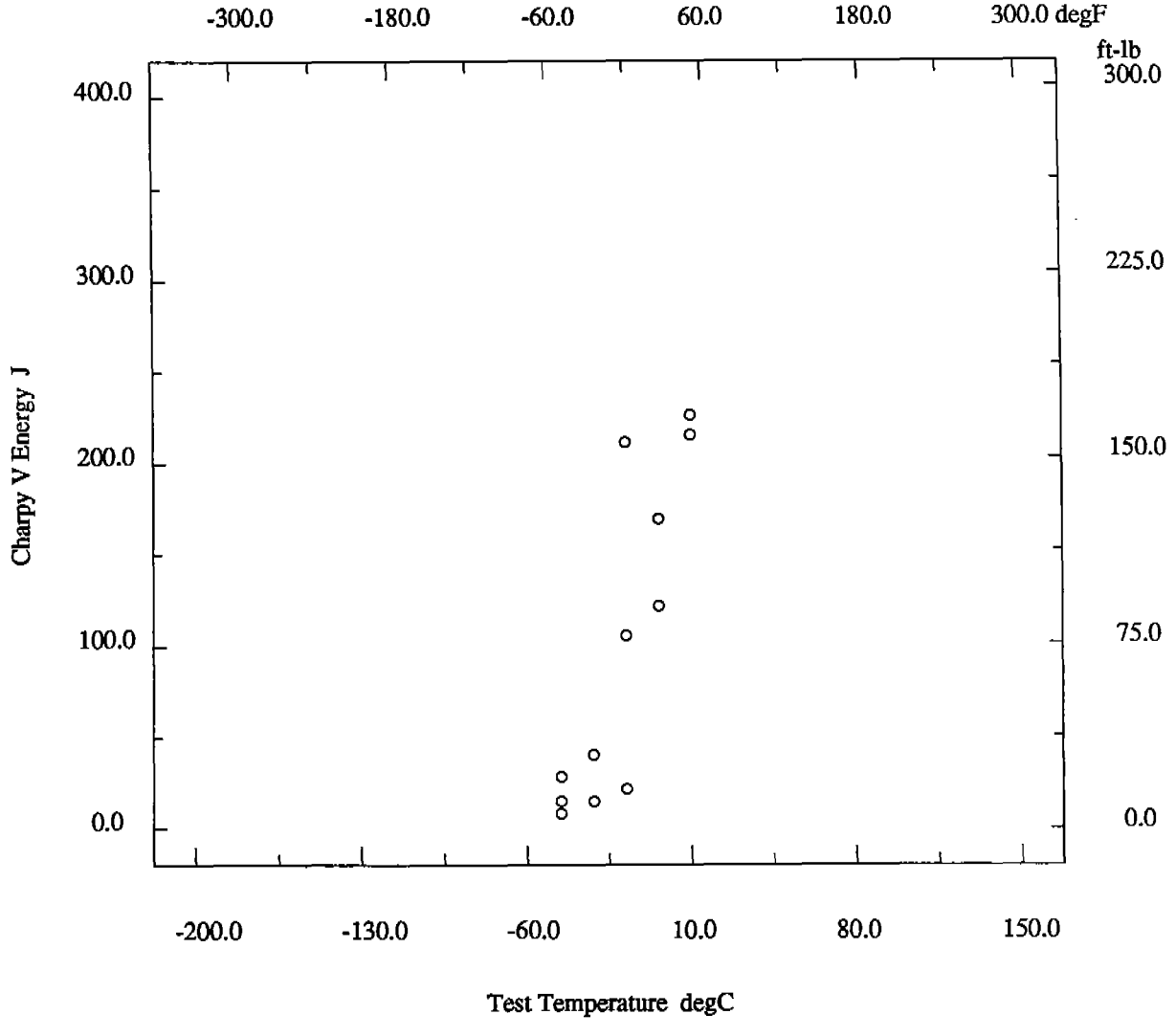
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-50	11	8	10
L-T °	-50	21	14	15
L-T °	-50	6	8	10
L-T °	-25	11	10	40
L-T °	-25	30	28	35
L-T °	0	156	90	100
L-T °	0	16	15	25
L-T °	0	78	55	70
L-T °	25	125	72	80
L-T °	25	90	61	60
L-T °	50	159	98	100
L-T °	50	167	86	100

* - not reported

Material A572 Gr50

Description

Material Code	016.001.02AS4	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A572 Gr50

Description

Material Code	016.001.09BA	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

C	0.20 %	Mn	1.24 %
P	0.004 %	S	0.024 %
Si	0.02 %	Cr	0.02 %
Ni	0.04 %	Mo	0.01 %
V	0.089 %	Cu	0.04 %
Cb	<0.005 %	Ti	*
B	*	Al	<0.002 %
N	0.005 %	Other Components	*

Fabrication History

Heat Treatment	*	Producer	US Steel
Year Produced	*	Addl Info	*
Source	US Steel	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	A,R
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Weld

Weld Code	016.001.09BA	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	5/16 in
Interpass Temperature	350 degF	Passes	9
Filler Specification	E70-EA2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	75 KJ/in
Joint Preparation	V Groove	Number of Sides	1
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

(continued)

* - not reported

Material A572 Gr50

(continued)

Property Measurements

Test Type ..... Charpy V Impact
Specimen Type ..... Full
Did Specimen Split? ..... *
Standard Year ..... *
Position 3/4T
Did Specimen Fracture? ..... Assumed
Standard Method ..... *

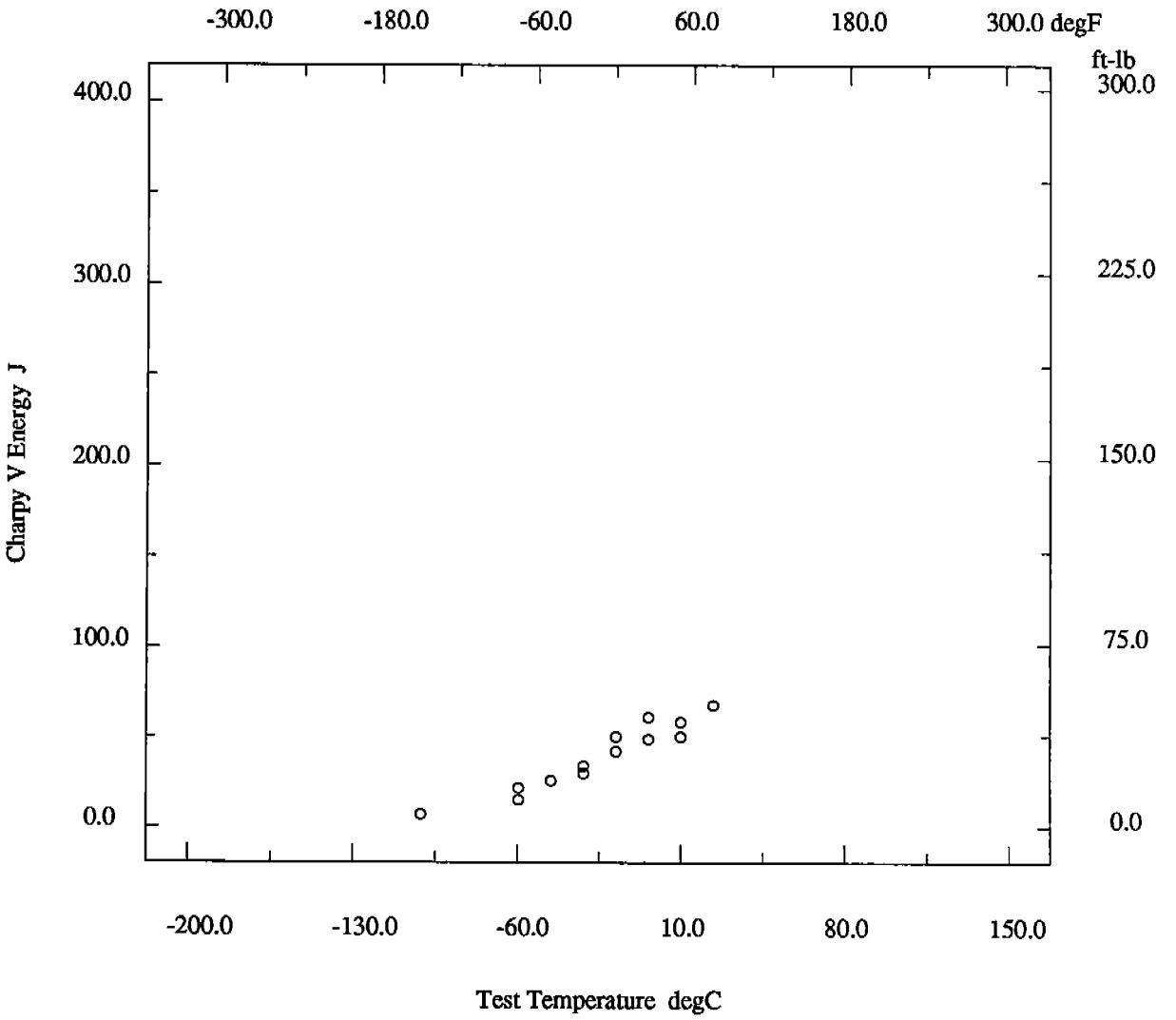
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T o	-150	5	3	5
L-T o	-150	5	6	5
L-T o	-75	11	8	5
L-T o	-75	16	17	5
L-T o	-50	19	14	15
L-T o	-50	19	15	5
L-T o	-25	22	16	10
L-T o	-25	25	20	10
L-T o	0	31	28	30
L-T o	0	37	35	30
L-T o	25	36	33	36
L-T o	25	45	43	50
L-T o	50	37	50	60
L-T o	50	43	44	50
L-T o	75	50	49	70

* - not reported

Material A572 Gr50

Description

Material Code	016.001.09BA	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A572 Gr50

Description

Material Code	016.001.02BA	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 7700.1

Fabrication History See Page 7700.1

Weld

Weld Code	016.001.02BA	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	5/16 in
Interpass Temperature	350 degF	Passes	9
Filler Specification	E70-EA2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	75 KJ/in
Joint Preparation	V Groove	Number of Sides	1
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

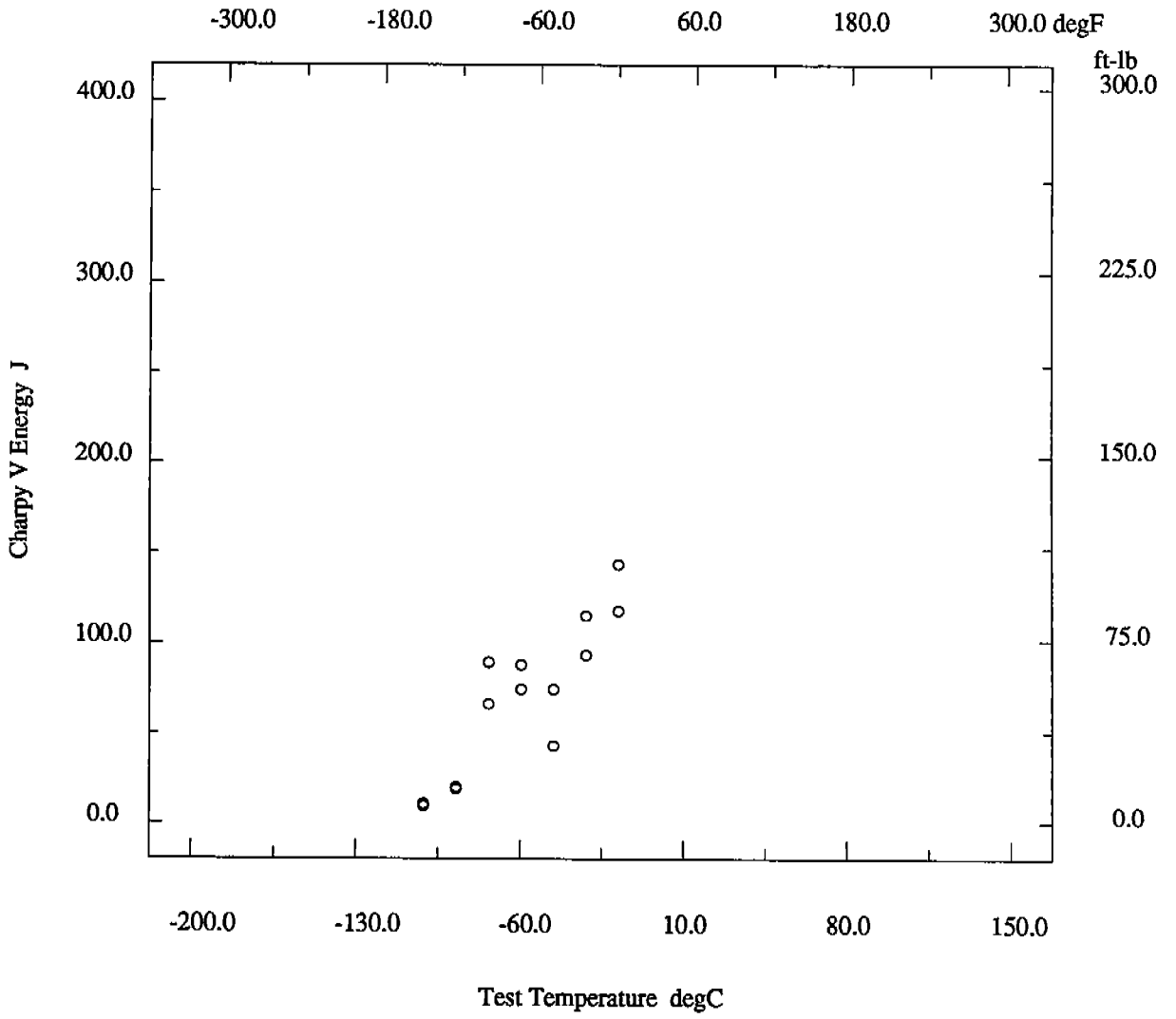
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-150	7	10	5
L-T °	-150	8	3	5
L-T °	-125	14	7	10
L-T °	-125	15	8	10
L-T °	-100	49	32	30
L-T °	-100	66	40	35
L-T °	-75	55	39	35
L-T °	-75	65	45	35
L-T °	-50	32	23	20
L-T °	-50	55	39	30
L-T °	-25	69	47	40
L-T °	-25	85	62	50
L-T °	0	106	74	80
L-T °	0	87	66	75

* - not reported

Material A572 Gr50

Description

Material Code	016.001.02BA	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A572 Gr50

Description

Material Code	016.001.09BS1	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

See Page 7700.1

Fabrication History

See Page 7700.1

Weld

Weld Code	016.001.09BS1	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	5/16 in
Interpass Temperature	350 degF	Passes	9
Filler Specification	E70-EA2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	75 KJ/in
Joint Preparation	V Groove	Number of Sides	1
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1100 degF	Post-Weld Heat Time	1 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

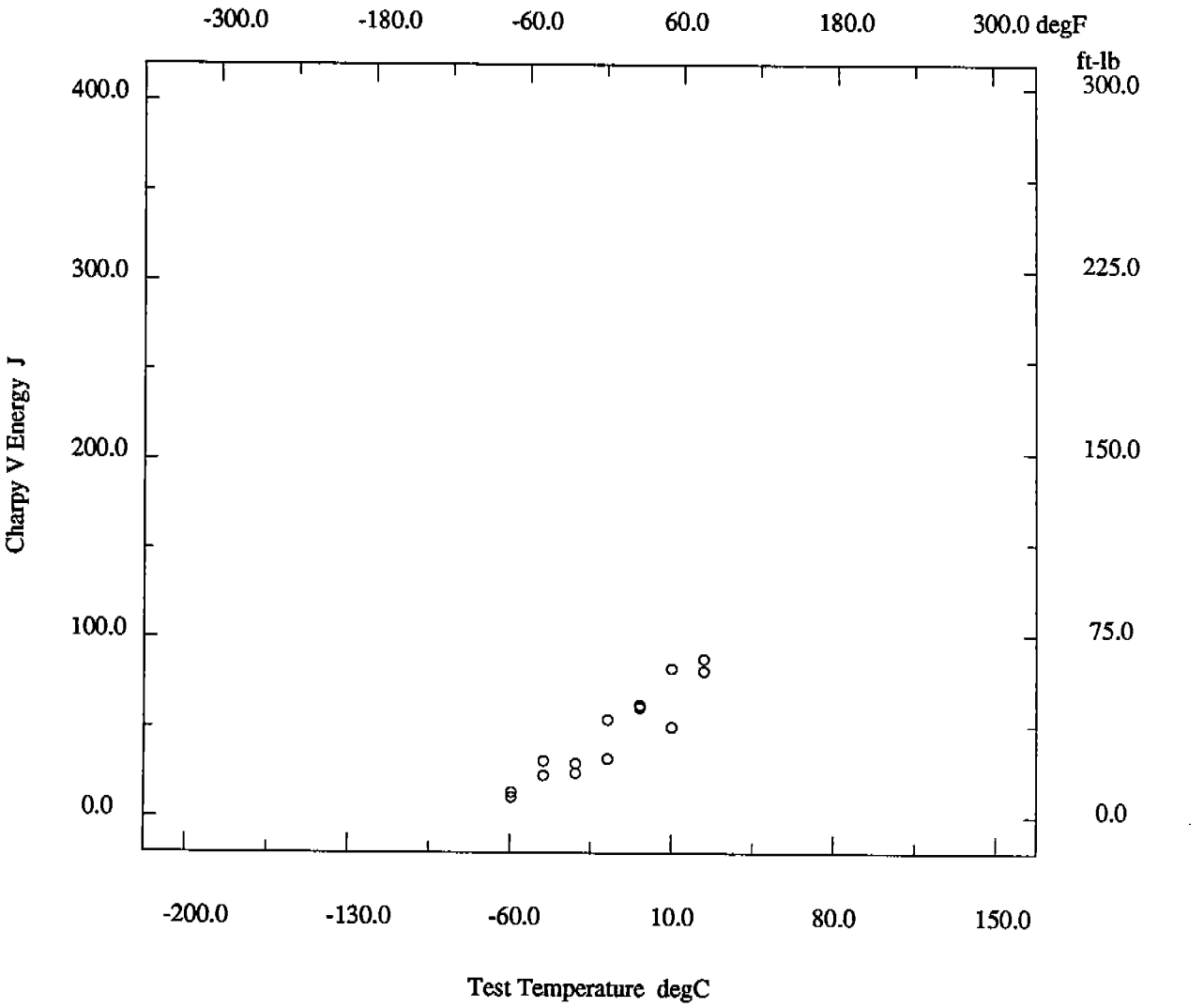
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-75	10	8	10
L-T °	-75	8	6	5
L-T °	-50	17	13	20
L-T °	-50	23	18	20
L-T °	-25	18	17	35
L-T °	-25	22	24	30
L-T °	0	24	24	20
L-T °	0	40	36	25
L-T °	25	45	45	35
L-T °	25	46	44	40
L-T °	50	37	37	40
L-T °	50	61	58	65
L-T °	75	60	61	75
L-T °	75	65	63	65

* - not reported

Material A572 Gr50

Description

Material Code	016.001.09BS1	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A572 Gr50

Description

Material Code	016.001.02BS1	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

See Page 7700.1

Fabrication History

See Page 7700.1

Weld

Weld Code	016.001.02BS1	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	5/16 in
Interpass Temperature	350 degF	Passes	9
Filler Specification	E70-EA2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	75 KJ/in
Joint Preparation	V Groove	Number of Sides	1
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1100 degF	Post-Weld Heat Time	1 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

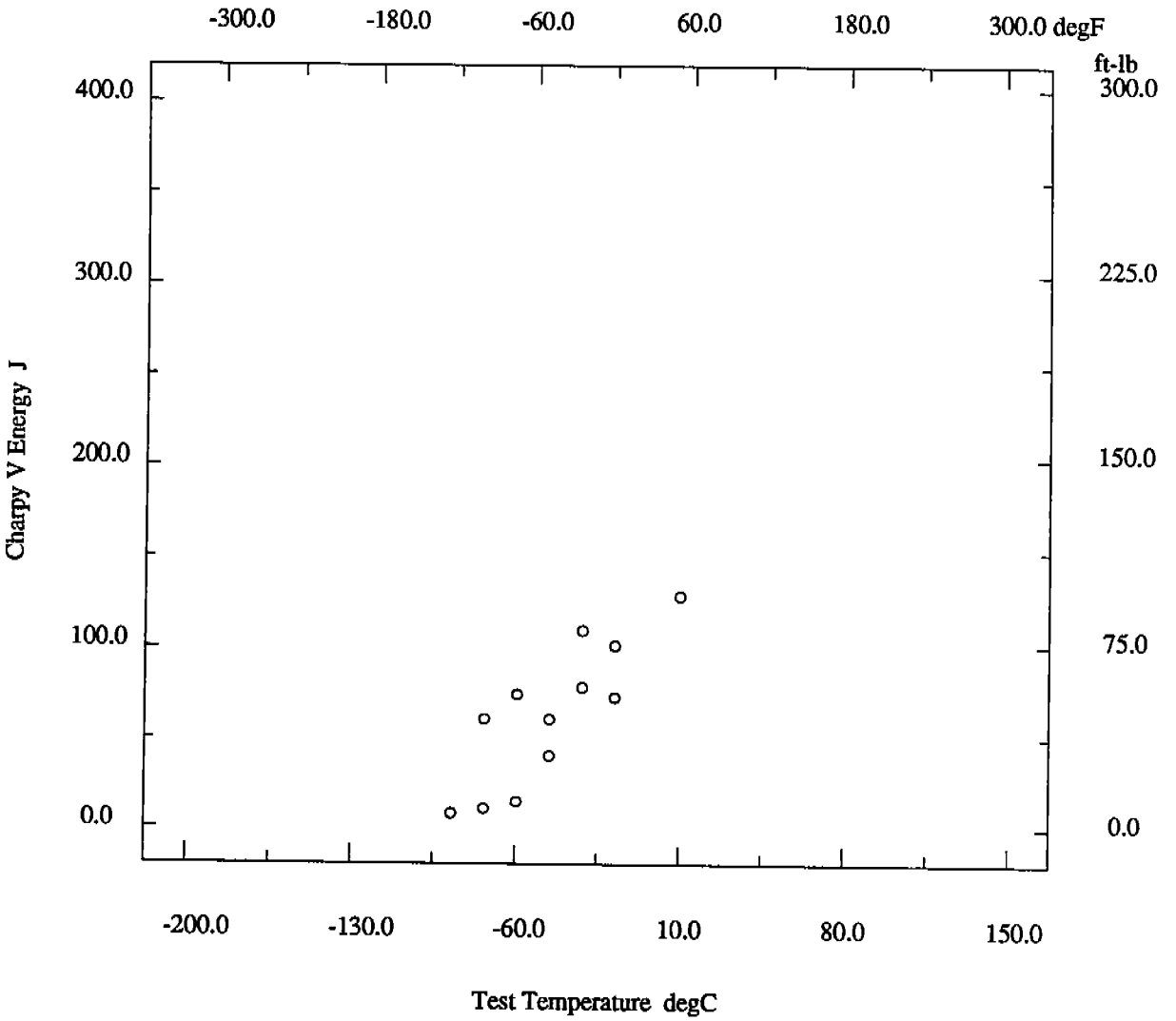
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-125	6	4	5
L-T °	-125	6	7	5
L-T °	-100	45	29	20
L-T °	-100	8	4	10
L-T °	-75	11	8	15
L-T °	-75	55	36	25
L-T °	-50	30	23	30
L-T °	-50	45	33	30
L-T °	-25	58	42	40
L-T °	-25	81	60	70
L-T °	0	54	44	40
L-T °	0	75	50	70
L-T °	50	95	74	70
L-T °	50	95	76	70

* - not reported

Material A572 Gr50

Description

Material Code	016.001.02BS1	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A572 Gr50

Description

Material Code	016.001.09BS2	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

See Page 7700.1

Fabrication History

See Page 7700.1

Weld

Weld Code	016.001.09BS2	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	5/16 in
Interpass Temperature	350 degF	Passes	9
Filler Specification	E70-EA2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	75 KJ/in
Joint Preparation	V Groove	Number of Sides	1
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1100 degF	Post-Weld Heat Time	5 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

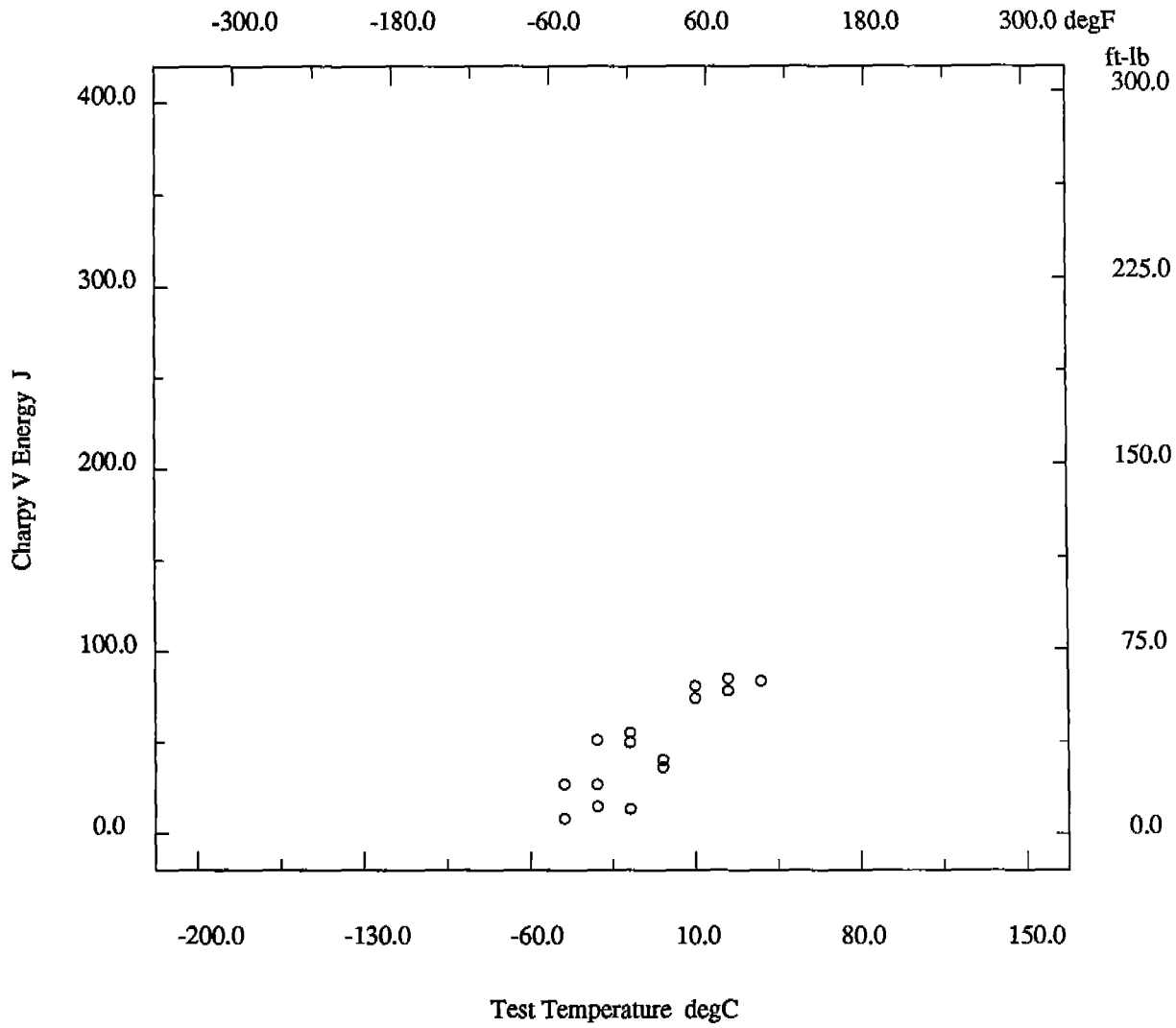
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-50	20	16	15
L-T °	-50	6	5	5
L-T °	-25	11	12	15
L-T °	-25	20	21	15
L-T °	-25	38	34	25
L-T °	0	10	13	20
L-T °	0	37	36	30
L-T °	0	41	39	30
L-T °	25	27	33	35
L-T °	25	30	31	25
L-T °	50	55	53	70
L-T °	50	60	55	75
L-T °	75	58	61	80
L-T °	75	63	57	65
L-T °	100	62	63	80

* - not reported

Material A572 Gr50

Description

Material Code	016.001.09BS2	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A572 Gr50

Description

Material Code	016.001.02BS2	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 7700.1

Fabrication History See Page 7700.1

Weld

Weld Code	016.001.02BS2	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	5/16 in
Interpass Temperature	350 degF	Passes	9
Filler Specification	E70-EA2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	75 KJ/in
Joint Preparation	V Groove	Number of Sides	1
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1100 degF	Post-Weld Heat Time	5 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

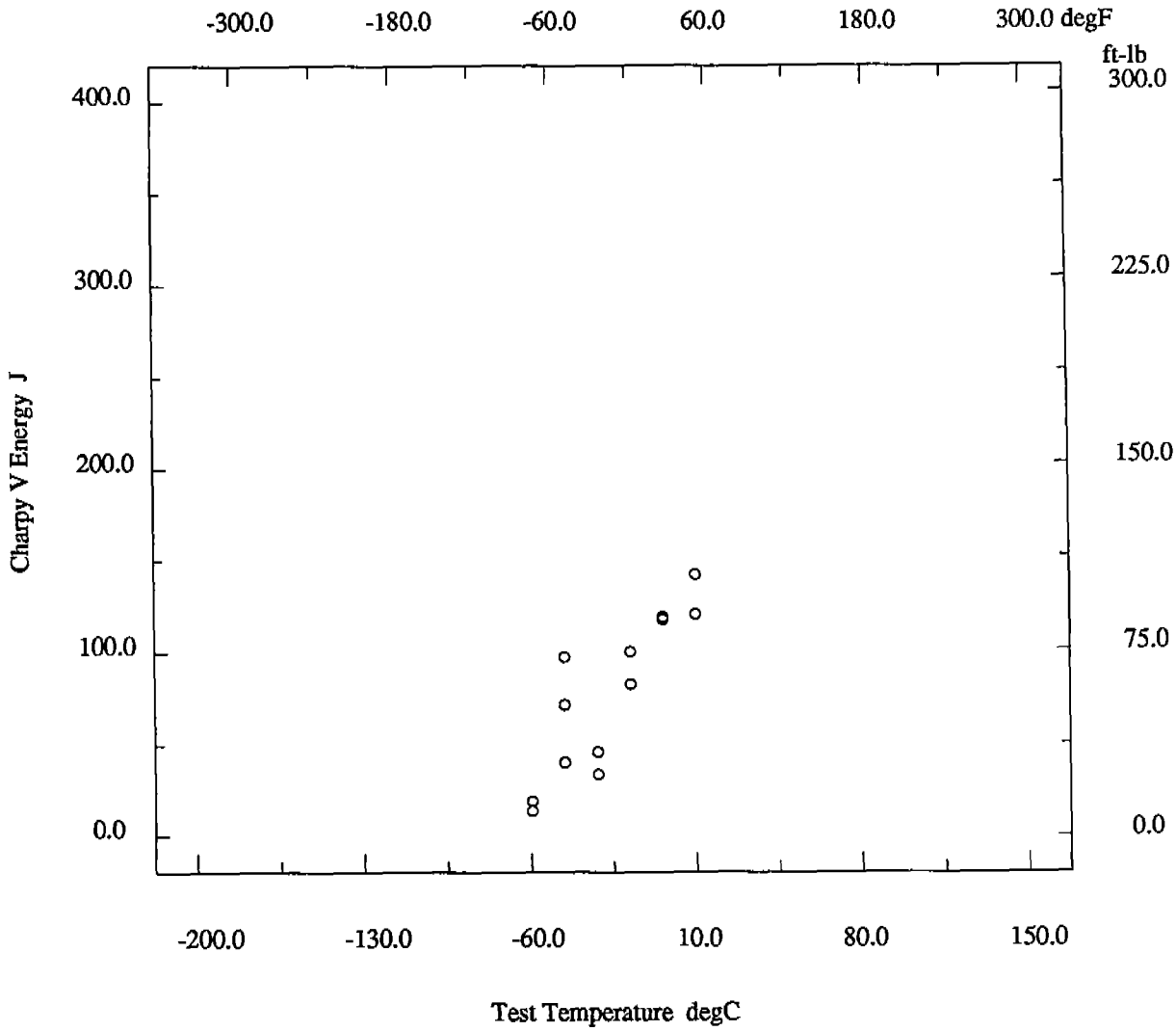
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-75	10	7	5
L-T °	-75	14	9	5
L-T °	-50	30	21	15
L-T °	-50	53	38	30
L-T °	-50	72	74	35
L-T °	-25	25	20	15
L-T °	-25	34	27	25
L-T °	0	61	45	50
L-T °	0	74	54	45
L-T °	25	87	66	65
L-T °	25	88	61	60
L-T °	50	105	78	100
L-T °	50	89	73	85

* - not reported

Material A572 Gr50

Description

Material Code	016.001.02BS2	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A572 Gr50

Description

Material Code	016.001.09BS3	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

See Page 7700.1

Fabrication History

See Page 7700.1

Weld

Weld Code	016.001.09BS3	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	5/16 in
Interpass Temperature	350 degF	Passes	9
Filler Specification	E70-EA2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	75 KJ/in
Joint Preparation	V Groove	Number of Sides	1
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1200 degF	Post-Weld Heat Time	1 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

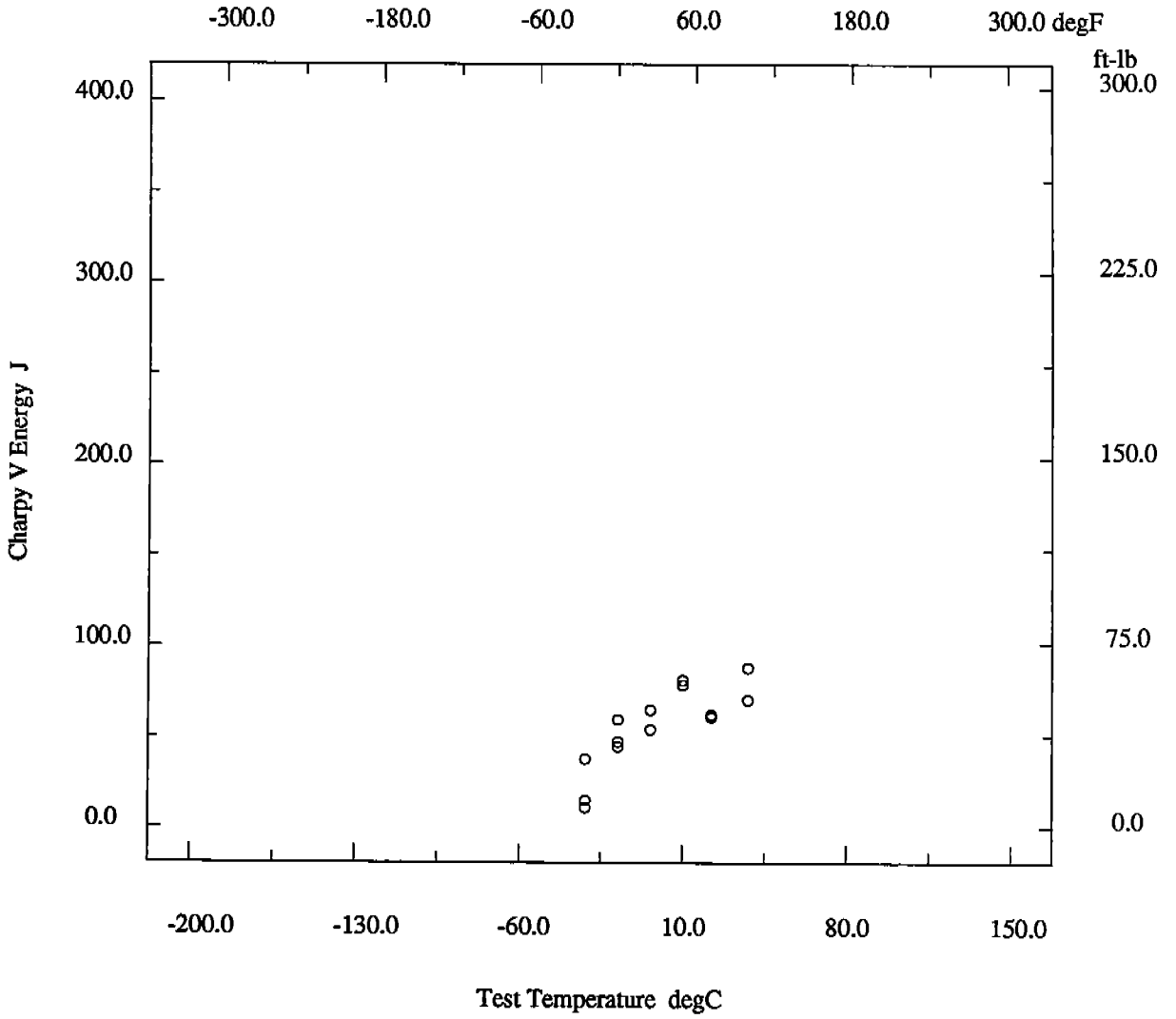
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-25	11	12	10
L-T °	-25	28	25	15
L-T °	-25	8	13	15
L-T °	0	33	41	25
L-T °	0	35	35	30
L-T °	0	44	40	25
L-T °	25	40	40	35
L-T °	25	48	42	55
L-T °	50	58	53	55
L-T °	50	60	57	60
L-T °	72	45	49	60
L-T °	72	46	48	60
L-T °	100	52	57	70
L-T °	100	65	68	80

* - not reported

Material A572 Gr50

Description

Material Code	016.001.09BS3	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A572 Gr50

Description

Material Code	016.001.02BS3	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 7700.1

Fabrication History See Page 7700.1

Weld

Weld Code	016.001.02BS3	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	5/16 in
Interpass Temperature	350 degF	Passes	9
Filler Specification	E70-EA2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	75 KJ/in
Joint Preparation	V Groove	Number of Sides	1
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1200 degF	Post-Weld Heat Time	1 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

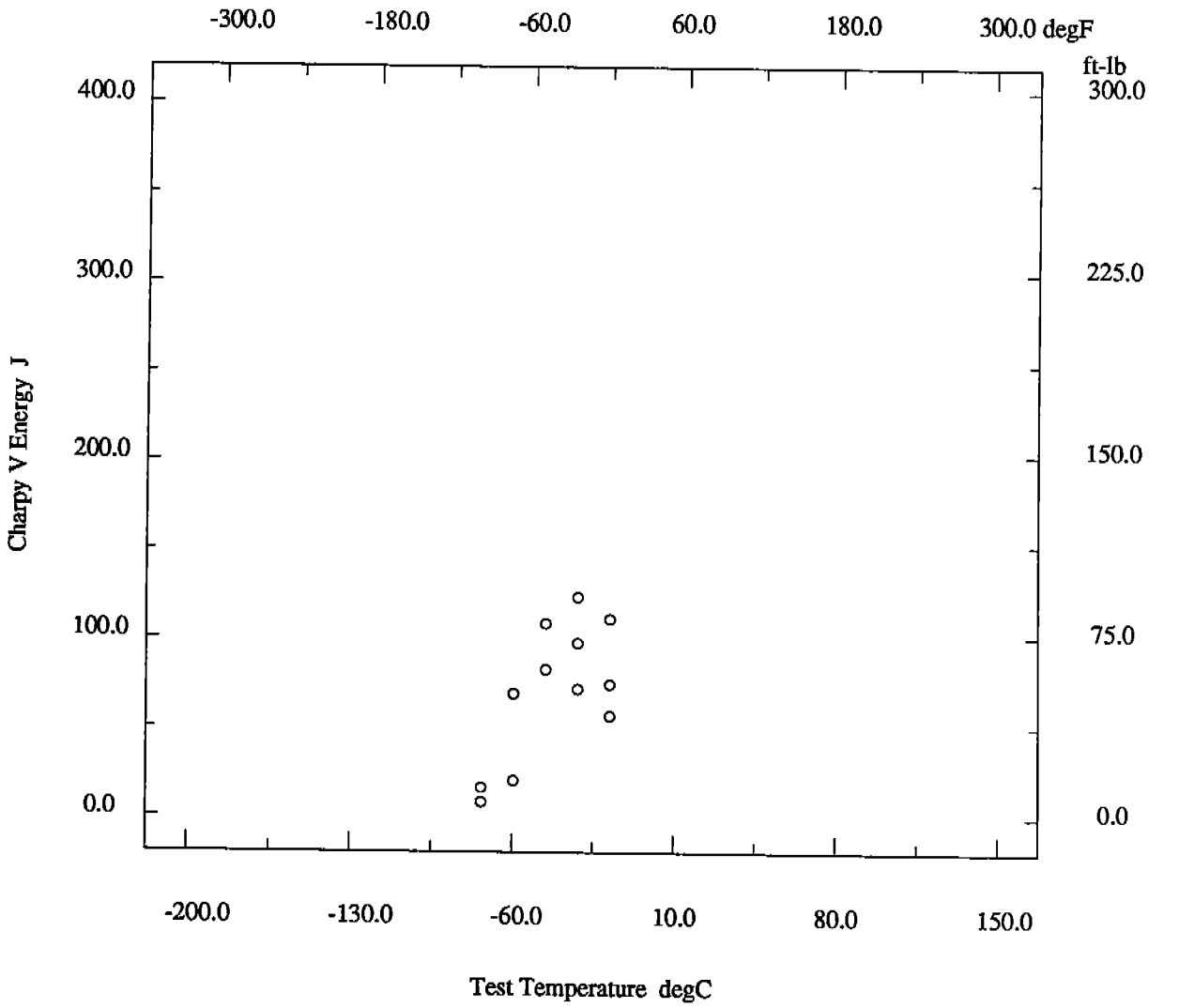
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-100	12	9	5
L-T °	-100	6	5	5
L-T °	-75	15	8	10
L-T °	-75	51	37	25
L-T °	-50	61	42	25
L-T °	-50	80	55	30
L-T °	-25	53	41	35
L-T °	-25	72	54	40
L-T °	-25	91	63	50
L-T °	0	42	31	35
L-T °	0	55	47	50
L-T °	0	82	65	60

* - not reported

Material A572 Gr50

Description

Material Code	016.001.02BS3	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A572 Gr50

Description

Material Code	016.001.09BS4	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 7700.1

Fabrication History See Page 7700.1

Weld

Weld Code	016.001.09BS4	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	5/16 in
Interpass Temperature	350 degF	Passes	9
Filler Specification	E70-EA2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	75 KJ/in
Joint Preparation	V Groove	Number of Sides	1
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1200 degF	Post-Weld Heat Time	5 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

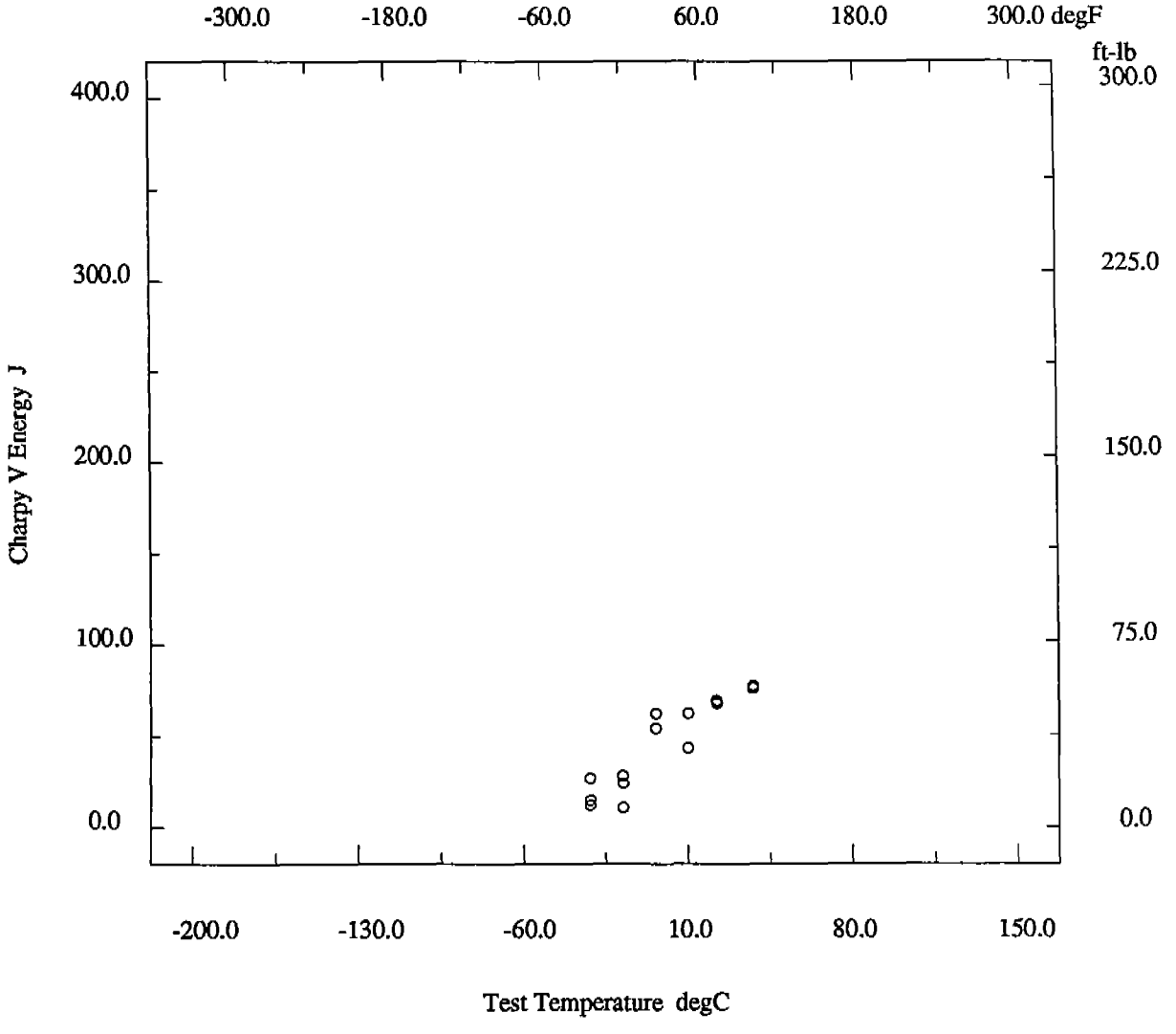
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-25	11	12	15
L-T °	-25	20	17	15
L-T °	-25	9	12	15
L-T °	0	18	24	20
L-T °	0	21	18	15
L-T °	0	8	18	20
L-T °	25	40	38	20
L-T °	25	46	46	20
L-T °	50	32	34	40
L-T °	50	46	45	40
L-T °	72	50	55	85
L-T °	72	51	54	60
L-T °	100	56	56	70
L-T °	100	57	59	80

* - not reported

Material A572 Gr50

Description

Material Code	016.001.09BS4	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A572 Gr50

Description

Material Code	016.001.02BS4	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 7700.1

Fabrication History See Page 7700.1

Weld

Weld Code	016.001.02BS4	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	5/16 in
Interpass Temperature	350 degF	Passes	9
Filler Specification	E70-EA2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	75 KJ/in
Joint Preparation	V Groove	Number of Sides	1
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1200 degF	Post-Weld Heat Time	5 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

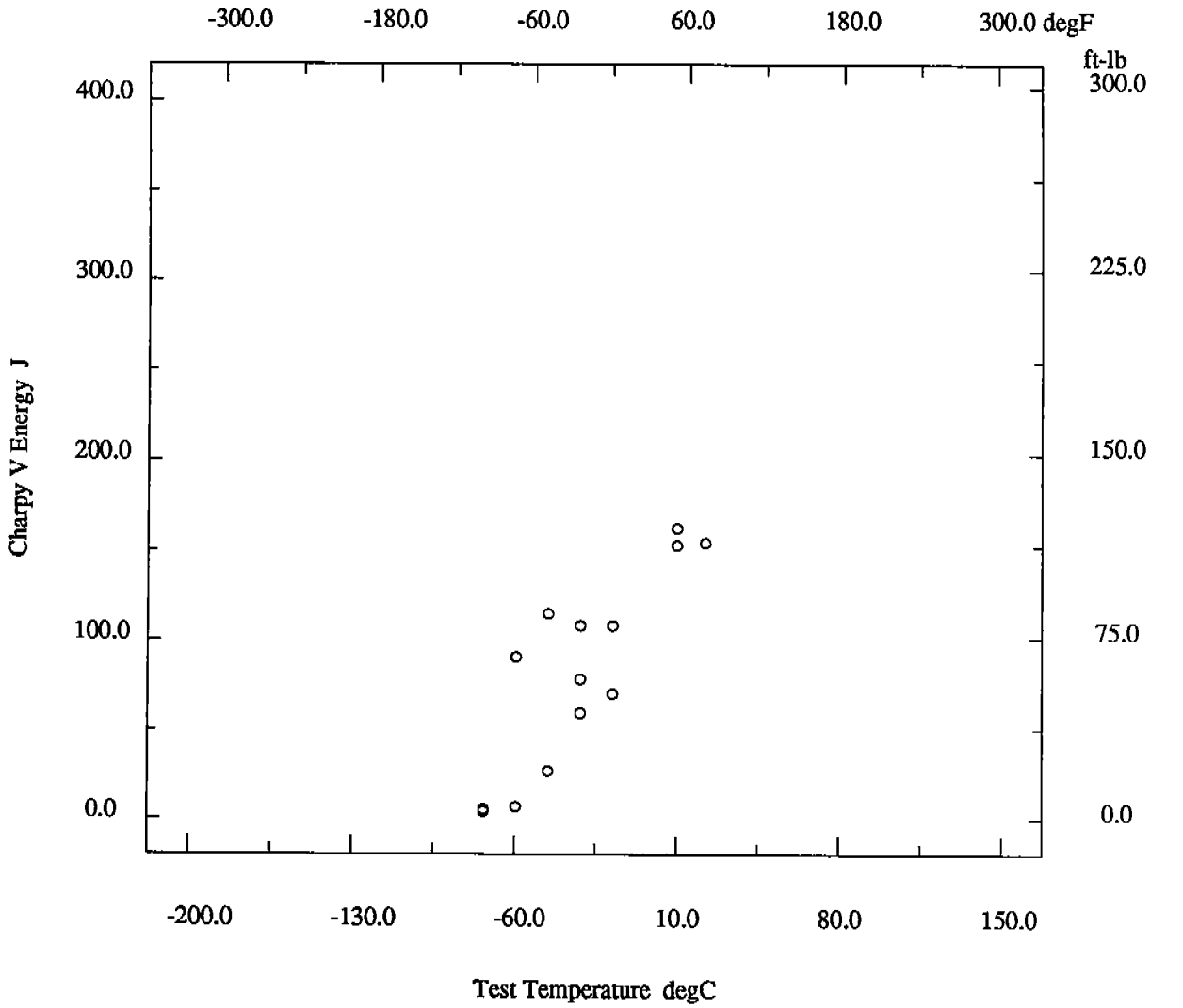
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-100	3	3	5
L-T °	-100	4	0	5
L-T °	-75	5	2	5
L-T °	-75	67	46	30
L-T °	-50	20	14	10
L-T °	-50	85	58	40
L-T °	-25	44	31	20
L-T °	-25	58	41	40
L-T °	-25	80	57	30
L-T °	0	52	38	30
L-T °	0	52	41	30
L-T °	0	80	56	50
L-T °	50	113	83	85
L-T °	50	120	86	80
L-T °	72	114	86	100

* - not reported

Material A572 Gr50

Description

Material Code	016.001.02BS4	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A572 Gr50

Description

Material Code	016.002.01	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	A0161
Reference	1010		

Composition

C	0.19 %	Mn	1.02 %
P	0.011 %	S	0.004 %
Si	0.23 %	Cr	*
Ni	*	Mo	*
V	0.055 %	Cu	*
Cb	*	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	F	Producer	Lukens
Year Produced	1983	Addl Info	*
Source	Lukens	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	A,R
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	1/2T
Specimen Type	Cylindrical	Specimen Thickness	0.252 in
Gage Length	1.0 in	Loading Rate	*
Tensile Strength Offset	*	Tensile Yield Point	*
Uniform Elongation	*	Tensile Modulus	*
Standard Method	*	Standard Year	*

Orient	Test Temp degF	UTS ksi	TYS ksi	Elongation %	RA %
L	75	84.2	59.1	27.5	71.3
L	75	84.9	60.1	27.5	69.3
T	75	85.5	63.7	28.4	69.4
T	75	86.5	59.1	27.5	69.5

* - not reported

Material A572 Gr50

Description

Material Code	016.002.01	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	A0161
Reference	1010		

Composition

See Page 7800.1

Fabrication History

See Page 7800.1

Property Measurements

Test Type	Fracture Toughness	Position	1/2T
Specimen Type	Compact	Specimen Thickness	1.0 in
Crack Length	*	Loading Type	*
Loading Rate	*	KQ	*
KIc	*	Valid KIc?	*
Reason for Invalid	*	JIc	*
KJc	*	JIcpr	Per Standard
Curve Shape	*	Standard Method	E813
Standard Year	1987		

Orien	Test Temp degF	CODi in	CODIc in	JI in-lb/in2	Jmax in-lb/in2	Tear Mod in-lb/in**2
L-T	72	0.0237	0.0361	3908	3895	289.6
L-T	72	0.0256	0.0329	4067	3583	263.8
T-L	72	0.0137	0.0261	2370	2770	218.9

* - not reported

Material A572 Gr50

Description

Material Code	016.002.01	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	A0161
Reference	1010		

Composition See Page 7800.1

Fabrication History See Page 7800.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Did Specimen Fracture?	*
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

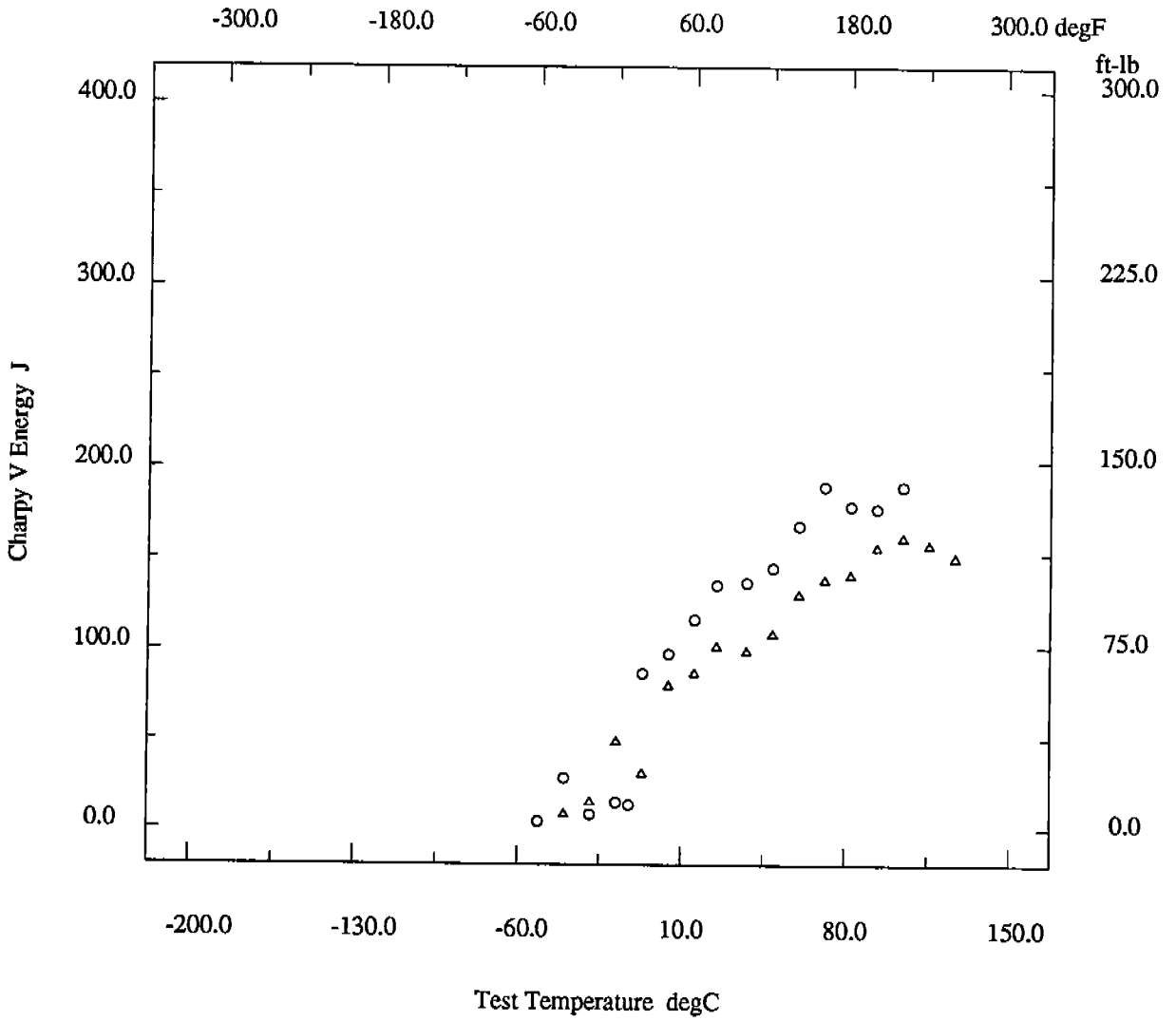
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T ○	-60	3	3	0
L-T ○	-40	21	14	8
L-T ○	-20	6	5	8
L-T ○	0	11	11	14
L-T ○	10	10	10	15
L-T ○	20	64	52	29
L-T ○	40	72	60	40
L-T ○	60	86	67	49
L-T ○	77	100	79	67
L-T ○	100	101	78	70
L-T ○	120	107	82	74
L-T ○	140	124	93	90
L-T ○	160	140	95	100
L-T ○	180	132	93	100
L-T ○	200	131	94	100
L-T ○	220	140	94	100
T-L △	-40	6	4	5
T-L △	-20	11	7	8
T-L △	0	36	30	14
T-L △	20	23	20	25
T-L △	40	59	48	35
T-L △	60	64	52	38
T-L △	77	75	62	56
T-L △	100	73	62	51
T-L △	120	80	67	76
T-L △	140	96	78	80
T-L △	160	102	82	90
T-L △	180	104	81	92
T-L △	200	115	88	100
T-L △	220	119	88	100
T-L △	240	116	87	100
T-L △	260	111	83	100

* - not reported

Material A572 Gr50

Description

Material Code	016.002.01	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	A0161
Reference	1010		



* - not reported

Material A572 Gr50

Description

Material Code	016.002.01	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	A0161
Reference	1010		

Composition See Page 7800.1

Fabrication History See Page 7800.1

Property Measurements

Test Type	Dynamic Tear	Position	1/4T
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Standard Method	*	Standard Year	*

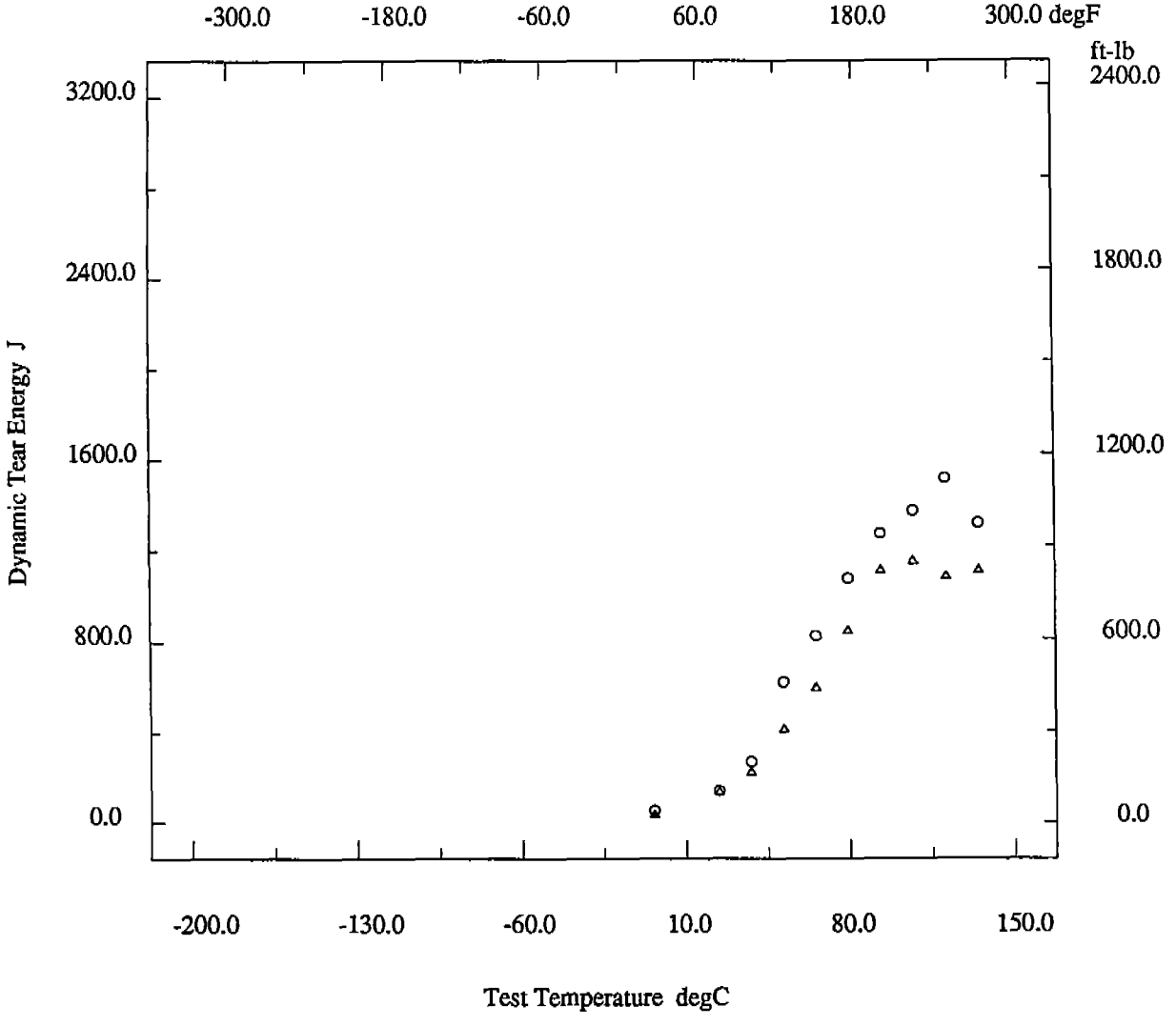
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
L-T ○	25	40	8
L-T ○	75	105	29
L-T ○	100	200	39
L-T ○	125	460	45
L-T ○	150	610	60
L-T ○	175	795	76
L-T ○	200	940	99
L-T ○	225	1015	100
L-T ○	250	1120	100
L-T ○	275	975	100
T-L △	25	25	8
T-L △	75	100	24
T-L △	100	165	32
T-L △	125	305	42
T-L △	150	440	52
T-L △	175	625	71
T-L △	200	820	97
T-L △	225	850	100
T-L △	250	800	100
T-L △	275	820	100

* - not reported

Material A572 Gr50

Description

Material Code	016.002.01	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	A0161
Reference	1010		



* - not reported

Material A572 Gr50

Description

Material Code	016.003.01	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	D4179-3B
Reference	1010		

Composition

C	0.11 %	Mn	1.27 %
P	0.015 %	S	0.019 %
Si	0.24 %	Cr	*
Ni	*	Mo	*
V	0.048 %	Cu	*
Cb	*	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	F	Producer	Lukens
Year Produced	1983	Addl Info	*
Source	Lukens	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	A,R
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	1/2T
Specimen Type	Cylindrical	Specimen Thickness	0.252 in
Gage Length	1.0 in	Loading Rate	*
Tensile Strength Offset	*	Tensile Yield Point	*
Uniform Elongation	*	Tensile Modulus	*
Standard Method	*	Standard Year	*

Orient	Test Temp degF	UTS ksi	TYS ksi	Elongation %	RA %
L	75	82.9	60.6	28.7	75.6
L	75	82.9	62.4	28.7	75.6
T	75	80.2	57.1	25.4	60.7
T	75	81.2	59.6	25.8	61.2

* - not reported

Material A572 Gr50

Description

Material Code	016.003.01	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	D4179-3B
Reference	1010		

Composition See Page 7900.1

Fabrication History See Page 7900.1

Property Measurements

Test Type	Fracture Toughness	Position	1/2T
Specimen Type	*	Specimen Thickness	1.0 in
Crack Length	*	Loading Type	*
Loading Rate	*	KQ	*
KIc	*	Valid KIc?	*
Reason for Invalid	*	JIc	*
KJc	*	JIcpr	Per Standard
Curve Shape	*	Standard Method	E813
Standard Year	*		

Orien	Test Temp degF	CODi in	CODIc in	JI in-lb/in2	Jmax in-lb/in2	Tear Mod in-lb/in**2
L-T	70	0.0072	0.0166	1186	1674	231.6
L-T	71	0.0027	0.0030	359	295	57.1
L-T	71	0.0072	0.0154	1255	1591	243.3
L-T	72	0.0028	0.0034	357	340	52.7

* - not reported

Material A572 Gr50

Description

Material Code	016.003.01	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	D4179-3B
Reference	1010		

Composition See Page 7900.1

Fabrication History See Page 7900.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Did Specimen Fracture?	*
Standard Method	*	Standard Year	*

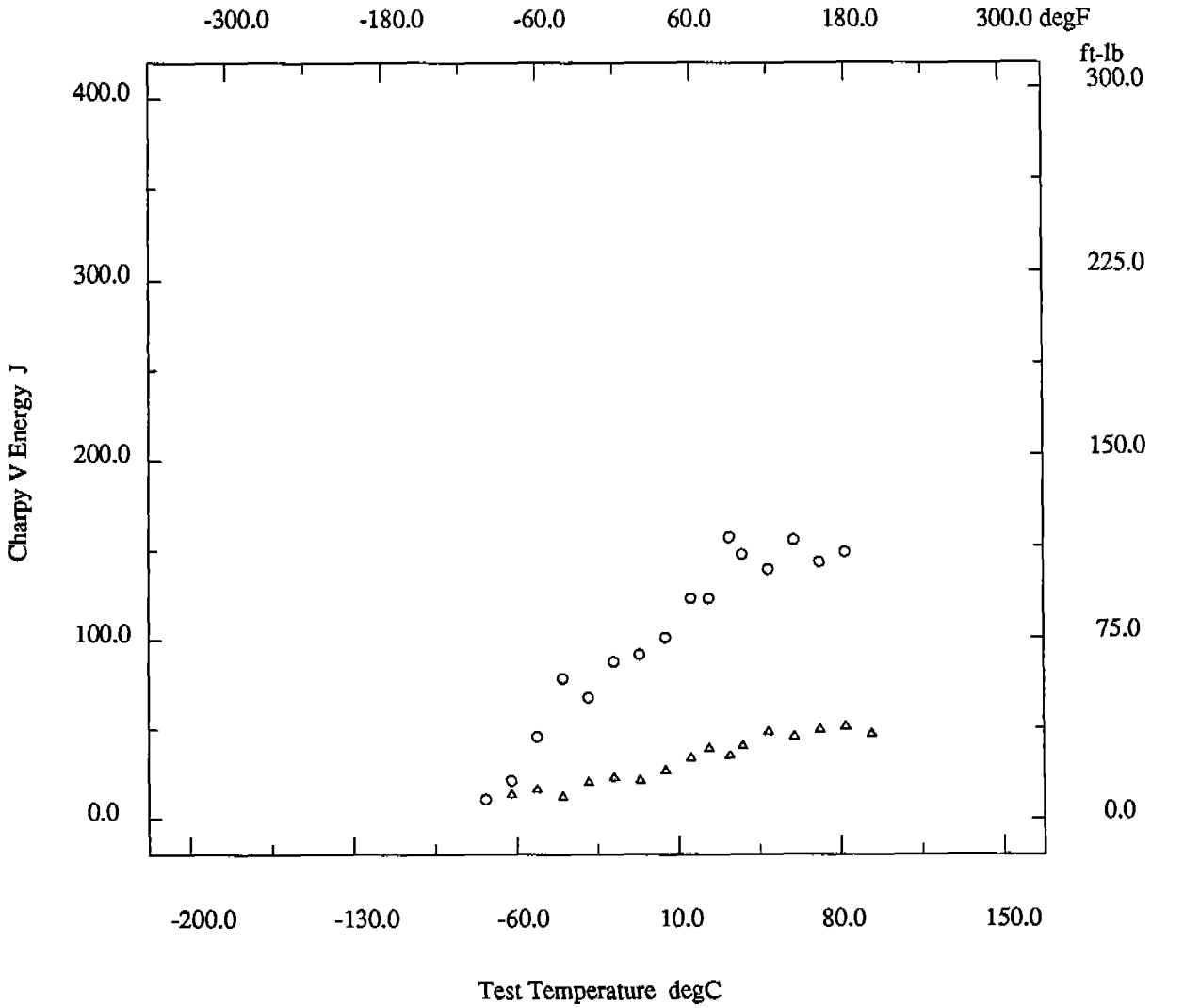
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %	Split?
L-T ○	-100	8	5	0	*
L-T ○	-80	16	10	6	*
L-T ○	-60	34	26	10	*
L-T ○	-40	58	49	15	*
L-T ○	-20	50	44	18	*
L-T ○	0	65	57	29	*
L-T ○	20	68	62	35	*
L-T ○	40	75	63	44	*
L-T ○	60	91	73	60	Yes
L-T ○	74	91	74	60	*
L-T ○	90	116	87	100	Yes
L-T ○	100	109	86	100	Yes
L-T ○	120	103	86	99	Yes
L-T ○	140	115	90	100	Yes
L-T ○	160	106	84	100	Yes
L-T ○	180	110	87	100	Yes
T-L △	-80	10	7	2	*
T-L △	-60	12	11	8	*
T-L △	-40	9	8	6	*
T-L △	-20	15	14	17	*
T-L △	0	17	17	22	*
T-L △	20	16	18	30	*
T-L △	40	20	23	42	*
T-L △	60	25	29	58	*
T-L △	74	29	33	62	*
T-L △	90	26	33	69	*
T-L △	100	30	34	70	*
T-L △	120	36	41	97	*
T-L △	140	34	40	100	*
T-L △	160	37	43	100	*
T-L △	180	38	45	100	*
T-L △	200	35	42	100	*

* - not reported

Material A572 Gr50

Description

Material Code	016.003.01	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	D4179-3B
Reference	1010		



* - not reported

Material A572 Gr50

Description

Material Code	016.003.01	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	D4179-3B
Reference	1010		

Composition See Page 7900.1

Fabrication History See Page 7900.1

Property Measurements

Test Type	Dynamic Tear	Position	1/4T
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Standard Method	*	Standard Year	*

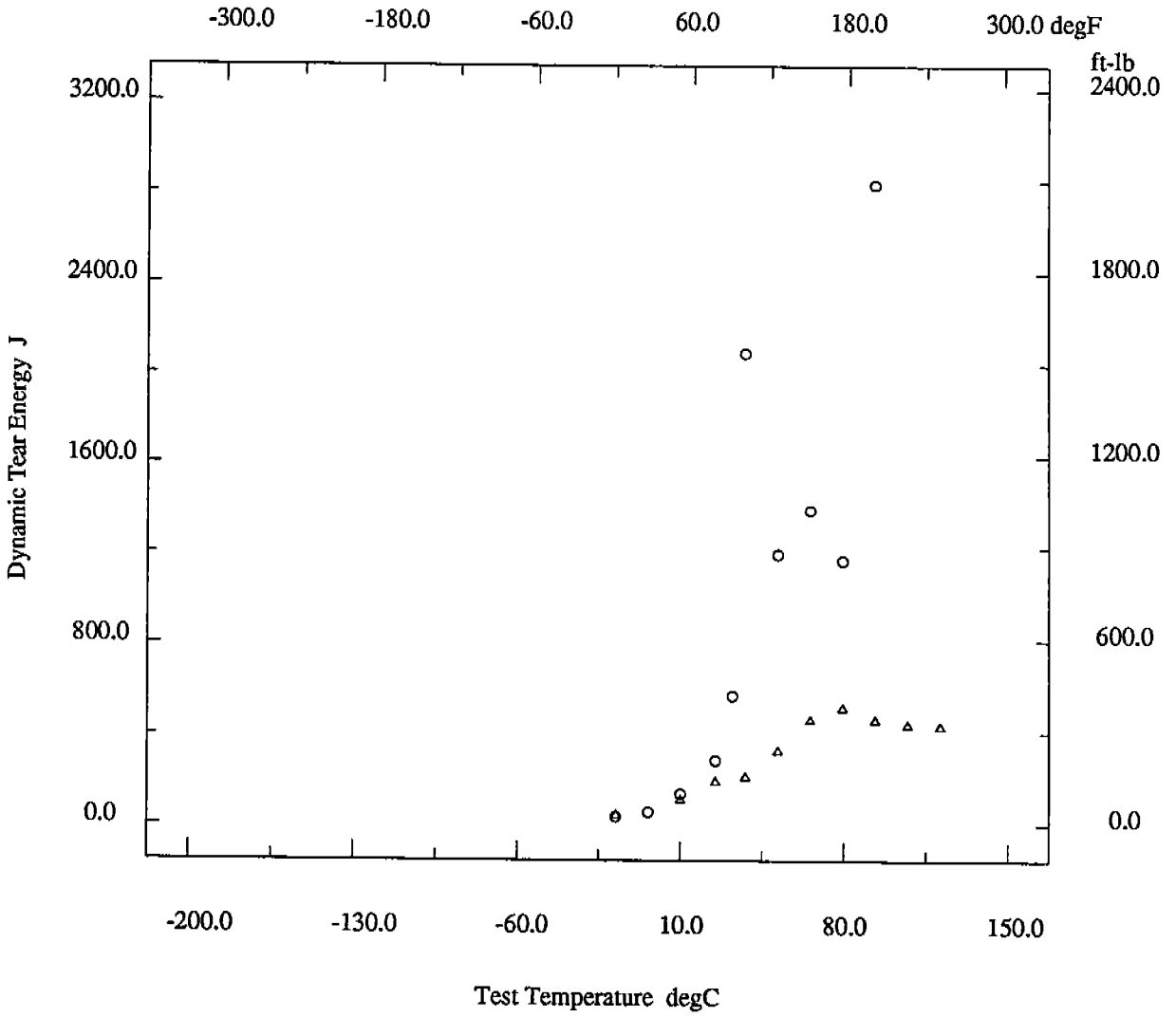
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
L-T ○	0	25	6
L-T ○	25	40	15
L-T ○	50	100	27
L-T ○	77	210	39
L-T ○	90	420	65
L-T ○	100	1540	100
L-T ○	125	880	100
L-T ○	150	1025	100
L-T ○	175	860	100
L-T ○	200	2090	100
T-L △	0	30	12
T-L △	50	80	25
T-L △	77	140	48
T-L △	100	155	48
T-L △	125	240	71
T-L △	150	340	98
T-L △	175	380	97
T-L △	200	340	100
T-L △	225	325	100
T-L △	250	320	100

* - not reported

Material A572 Gr50

Description

Material Code	016.003.01	Material Name	A572 Gr50
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	D4179-3B
Reference	1010		



* - not reported

Material A588

Description

Material Code	012.001.09A	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		

Composition

C	0.18 %	Mn	1.20 %
P	0.01 %	S	0.02 %
Si	0.37 %	Cr	0.56 %
Ni	0.16 %	Mo	*
V	*	Cu	0.32 %
Cb	*	Ti	*
B	*	Al	0.009 %
N	*	Other Components	None %

Fabrication History

Heat Treatment	*	Producer	US Steel
Year Produced	*	Addl Info	None
Source	OGC	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	*
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Weld

Weld Code	012.001.09A	Weld Type	ESW
Base Metal Thickness	3 in	Welding Position	Vertical
Preheat Temperature	*	Metal Gap	1.25 in
Interpass Temperature	*	Passes	*
Filler Specification	*	Filler Name	LindeWS
Filler Carbon Content	0.09 %	Filler Metal Size	*
Shielding Gas	*	Voltage	38 volts
Amperage	850 amps	Polarity	*
Travel Speed	*	Heat Input/Pass	3835 KJ/in
Joint Preparation	Smooth Butt	Number of Sides	*
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Hobart201
Weld Composition Reported?	No		

(continued)

* - not reported

Material A588

(continued)

Property Measurements

Test Type	Charpy V Impact	Specimen Type	Full
Lateral Expansion	*	Shear Fracture	*
Did Specimen Fracture?	Yes	Did Specimen Split?	No
Standard Method	*	Standard Year	*

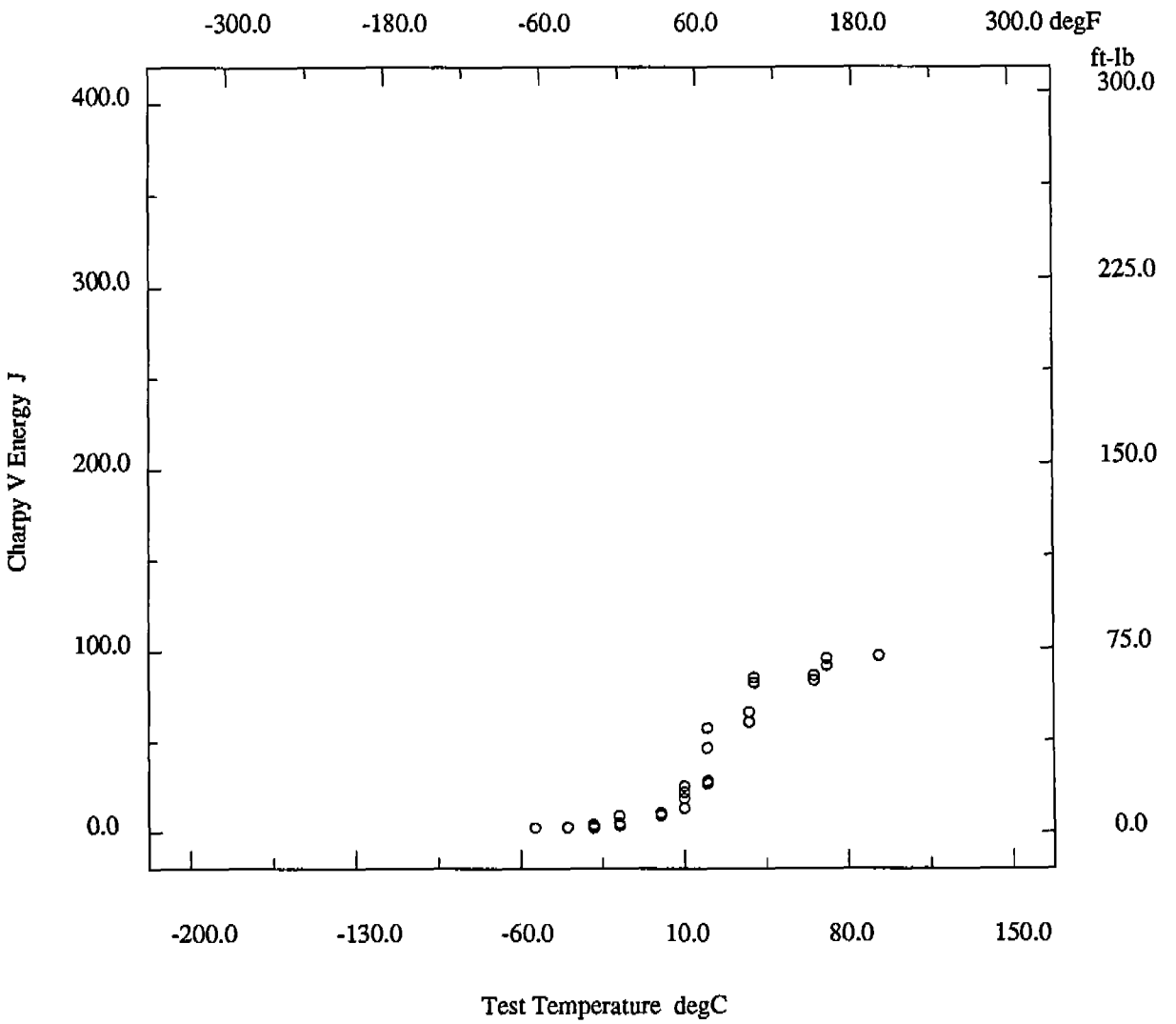
Position	Orien	Test Temp degF	CVN Energy ft-lb
1/4T	T-L °	-65	2.0
1/4T	T-L °	-65	2.0
1/2T	T-L °	-40	2.2
1/2T	T-L °	-40	2.2
1/2T	T-L °	-20	3.0
1/2T	T-L °	-20	3.4
1/4T	T-L °	-20	2.0
1/2T	T-L °	0	4.0
1/2T	T-L °	0	7.0
1/4T	T-L °	0	3.0
1/4T	T-L °	0	4.0
1/2T	T-L °	32	7.0
1/2T	T-L °	32	8.0
1/2T	T-L °	50	10.0
1/2T	T-L °	50	19.0
1/4T	T-L °	50	14.0
1/4T	T-L °	50	16.5
1/2T	T-L °	68	34.5
1/2T	T-L °	68	42.5
1/4T	T-L °	68	20.0
1/4T	T-L °	68	21.0
1/2T	T-L °	100	45.0
1/2T	T-L °	100	49.0
1/4T	T-L °	104	61.0
1/4T	T-L °	104	63.0
1/2T	T-L °	150	62.0
1/2T	T-L °	150	64.0
1/4T	T-L °	160	68.0
1/4T	T-L °	160	71.0
1/2T	T-L °	200	72.0

* - not reported

Material A588

Description

Material Code	012.001.09A	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		



* - not reported

Material A588

Description

Material Code	012.001.03A	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		

Composition See Page 8000.1

Fabrication History See Page 8000.1

Weld

Weld Code	012.001.03A	Weld Type	ESW
Base Metal Thickness	3 in	Welding Position	Vertical
Preheat Temperature	*	Metal Gap	1.25 in
Interpass Temperature	*	Passes	*
Filler Specification	*	Filler Name	LindeWS
Filler Carbon Content	0.09 %	Filler Metal Size	*
Shielding Gas	*	Voltage	38 volts
Amperage	850 amps	Polarity	*
Travel Speed	*	Heat Input/Pass	3835 KJ/in
Joint Preparation	Smooth Butt	Number of Sides	*
Location wrt Weld	1mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Hobart201
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Yes
Did Specimen Split?	No	Standard Method	*
Standard Year	*		

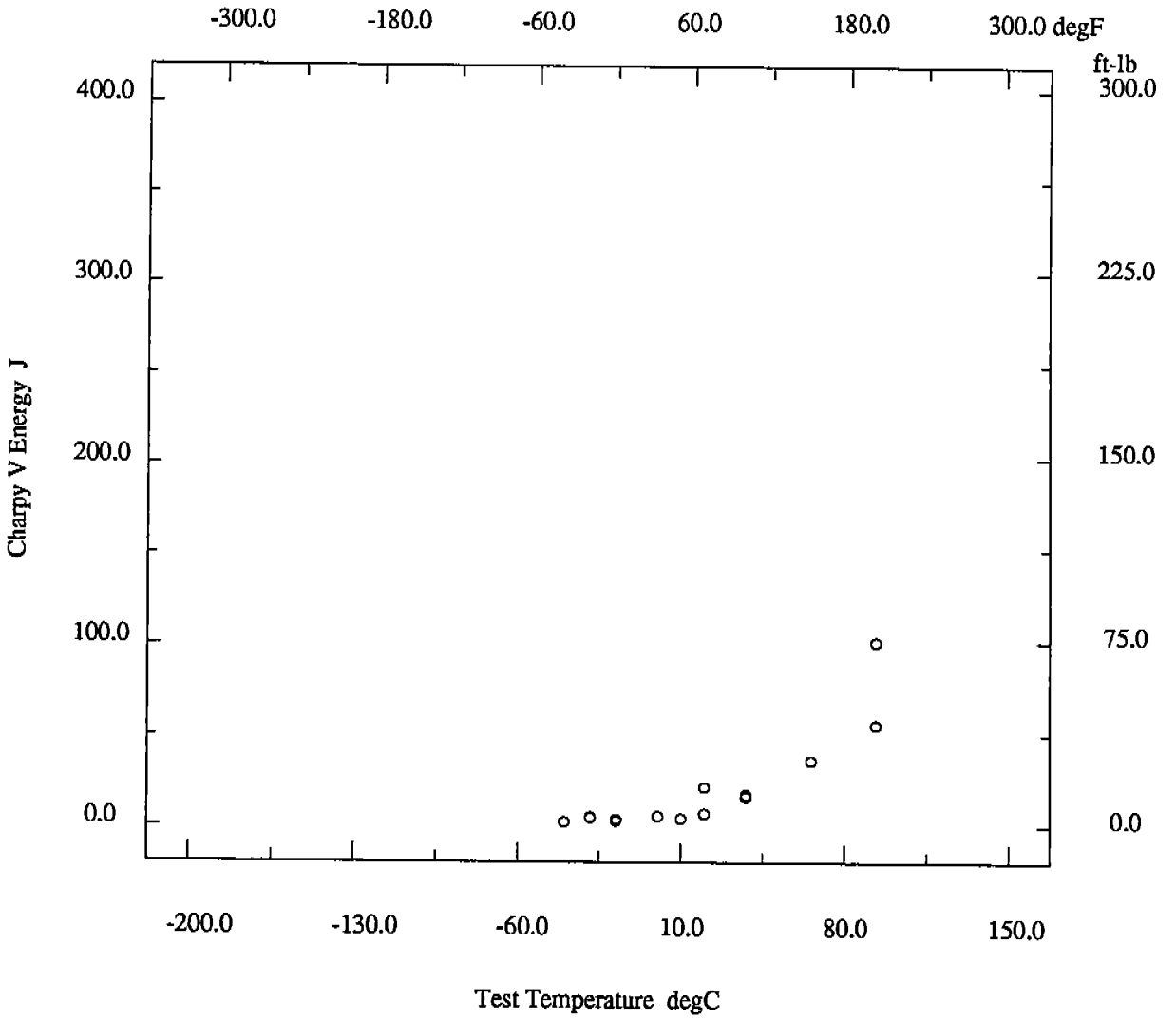
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-40	1.5
T-L °	-40	1.5
T-L °	-20	3.3
T-L °	-20	3.6
T-L °	0	2.0
T-L °	0	2.7
T-L °	32	4.0
T-L °	50	3.0
T-L °	50	3.0
T-L °	68	16.0
T-L °	68	5.0
T-L °	100	12.0
T-L °	100	13.0
T-L °	150	27.0
T-L °	200	41.5
T-L °	200	75.0

* - not reported

Material A588

Description

Material Code	012.001.03A	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		



* - not reported

Material A588

Description

Material Code	012.001.09B	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		

Composition

C	0.18 %	Mn	1.20 %
P	0.01 %	S	0.02 %
Si	0.37 %	Cr	0.56 %
Ni	0.16 %	Mo	*
V	*	Cu	0.32 %
Cb	*	Ti	*
B	*	Al	0.009 %
N	*	Other Components	None %

Fabrication History

Heat Treatment	*	Producer	US Steel
Year Produced	*	Addl Info	None
Source	OGC	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	*
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Weld

Weld Code	012.001.09B	Weld Type	NGESW
Base Metal Thickness	3 in	Welding Position	Vertical
Preheat Temperature	*	Metal Gap	0.75 in
Interpass Temperature	*	Passes	*
Filler Specification	*	Filler Name	LindeWS
Filler Carbon Content	0.09 %	Filler Metal Size	*
Shielding Gas	*	Voltage	38 volts
Amperage	1000 amps	Polarity	*
Travel Speed	*	Heat Input/Pass	2180 KJ/in
Joint Preparation	No Groove	Number of Sides	*
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Hobart201
Weld Composition Reported?	No		

(continued)

* - not reported

Material A588

(continued)

Property Measurements

Test Type	Charpy V Impact	Specimen Type	Full
Lateral Expansion	*	Shear Fracture	*
Did Specimen Fracture?	Yes	Did Specimen Split?	No
Standard Method	*	Standard Year	*

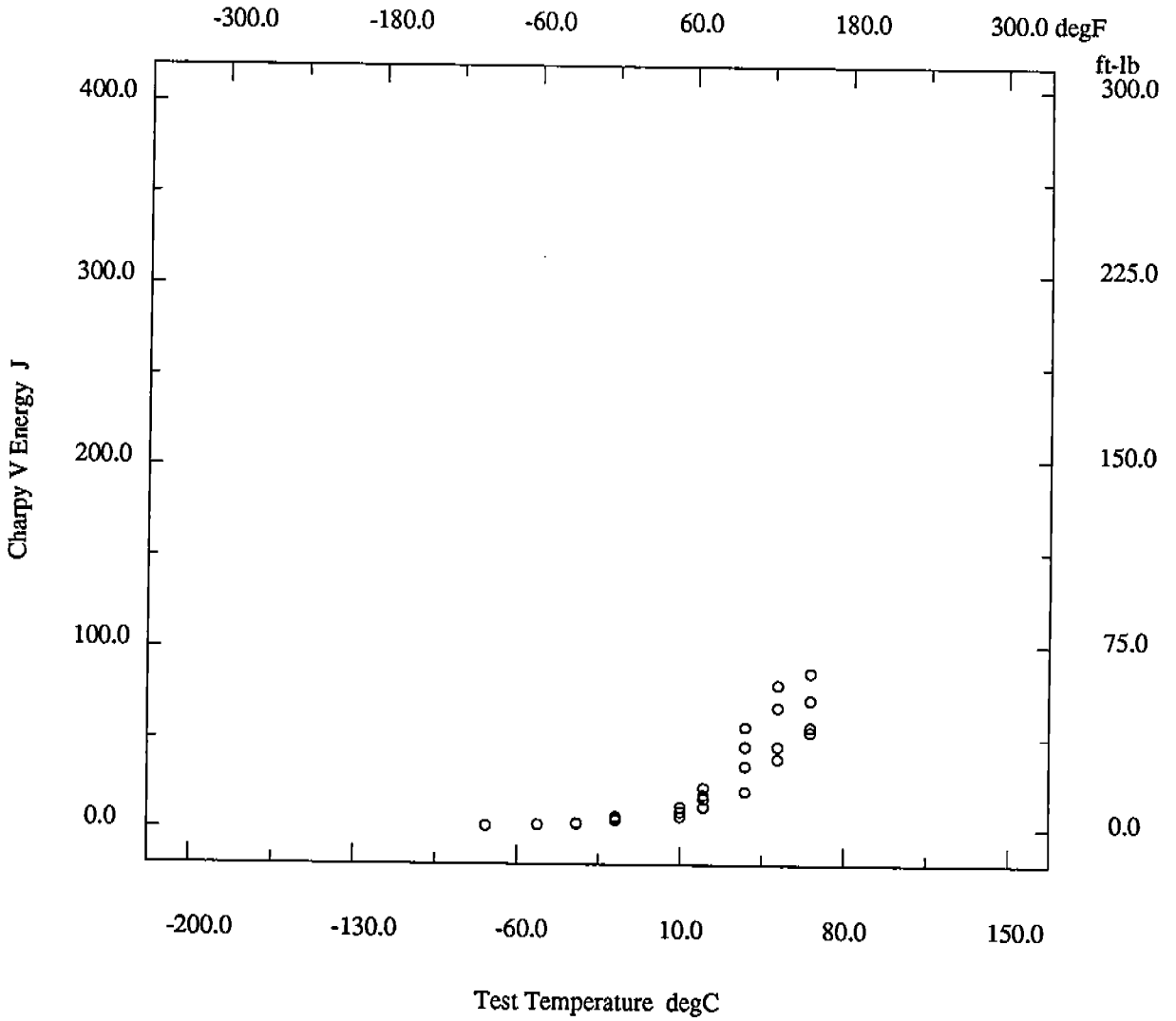
Position	Orien	Test Temp degF	CVN Energy ft-lb
1/2T	T-L o	-100	1.0
1/2T	T-L o	-60	1.5
1/2T	T-L o	-60	1.5
1/4T	T-L o	-60	1.5
1/4T	T-L o	-60	1.5
1/2T	T-L o	-30	2.0
1/2T	T-L o	-30	2.2
1/4T	T-L o	-30	2.0
1/2T	T-L o	0	3.5
1/4T	T-L o	0	3.5
1/4T	T-L o	0	4.0
1/4T	T-L o	0	5.0
1/2T	T-L o	50	5.0
1/2T	T-L o	50	9.0
1/4T	T-L o	50	7.0
1/4T	T-L o	50	9.0
1/2T	T-L o	68	12.5
1/2T	T-L o	68	14.0
1/4T	T-L o	68	17.0
1/4T	T-L o	68	9.0
1/2T	T-L o	100	26.0
1/2T	T-L o	100	34.0
1/4T	T-L o	100	15.5
1/4T	T-L o	100	42.0
1/2T	T-L o	125	50.0
1/2T	T-L o	125	59.0
1/4T	T-L o	125	29.0
1/4T	T-L o	125	34.0
1/2T	T-L o	150	53.0
1/2T	T-L o	150	64.0
1/4T	T-L o	150	40.0
1/4T	T-L o	150	42.0

* - not reported

Material A588

Description

Material Code	012.001.09B	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		



* - not reported

Material A588

Description

Material Code	012.001.03B	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		

Composition

See Page 8100.1

Fabrication History

See Page 8100.1

Weld

Weld Code	012.001.03B	Weld Type	NGESW
Base Metal Thickness	3 in	Welding Position	Vertical
Preheat Temperature	*	Metal Gap	0.75 in
Interpass Temperature	*	Passes	*
Filler Specification	*	Filler Name	LindeWS
Filler Carbon Content	0.09 %	Filler Metal Size	*
Shielding Gas	*	Voltage	38 volts
Amperage	1000 amps	Polarity	*
Travel Speed	*	Heat Input/Pass	2180 KJ/in
Joint Preparation	No Groove	Number of Sides	*
Location wrt Weld	1mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Hobart201
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Yes
Did Specimen Split?	No	Standard Method	*
Standard Year	*		

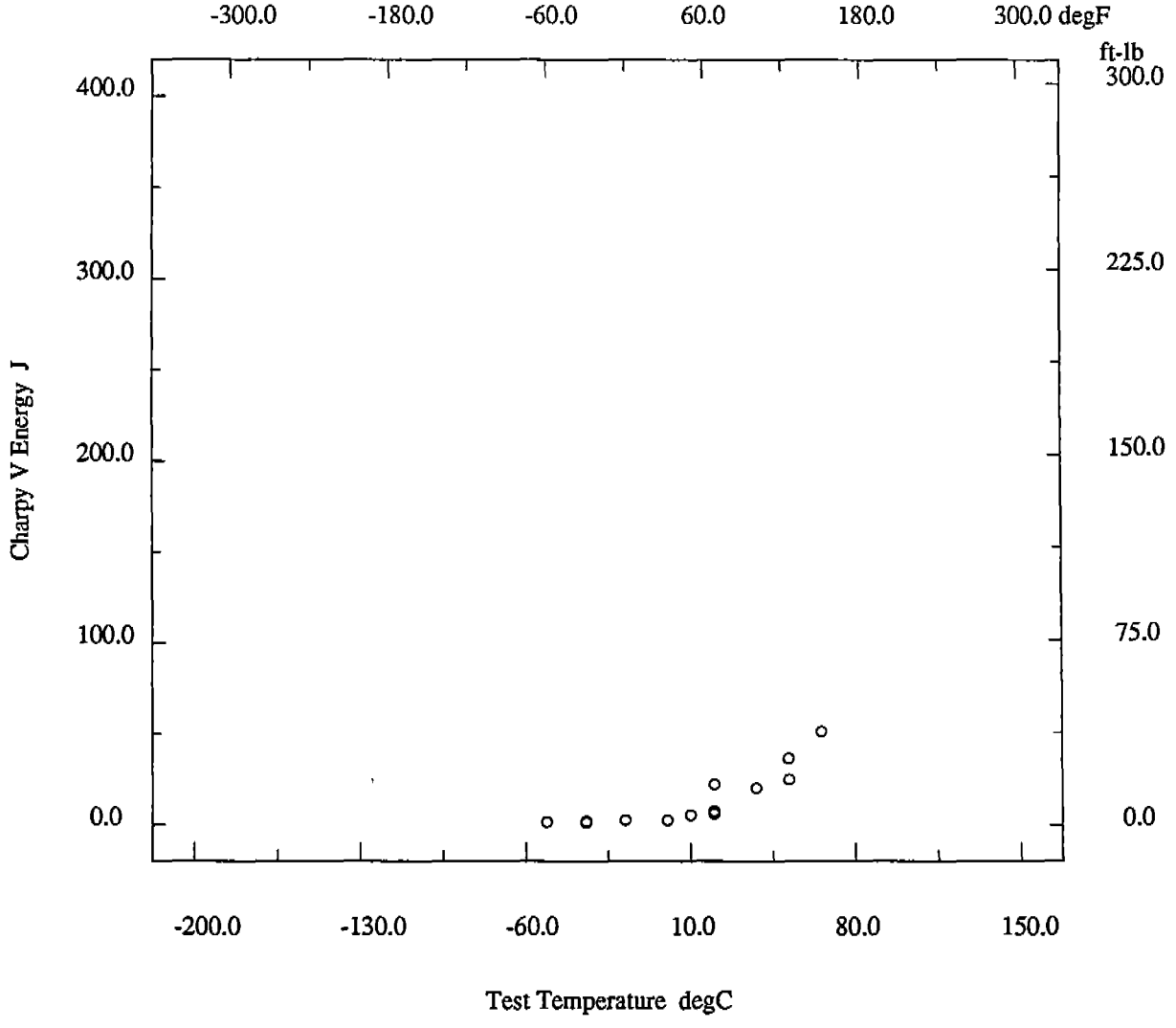
Orien	Test Temp degF	CVN Energy ft-lb
T-L ○	-60	1.1
T-L ○	-30	1.0
T-L ○	-30	1.5
T-L ○	0	2.0
T-L ○	0	2.0
T-L ○	32	2.0
T-L ○	50	4.0
T-L ○	68	16.5
T-L ○	68	4.5
T-L ○	68	5.5
T-L ○	100	15.0
T-L ○	125	18.5
T-L ○	125	27.0
T-L ○	150	38.0

* - not reported

Material A588

Description

Material Code	012.001.03B	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		



* - not reported

Material A588

Description

Material Code	012.001.09C	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		

Composition

C	0.18 %	Mn	1.20 %
P	0.01 %	S	0.02 %
Si	0.37 %	Cr	0.56 %
Ni	0.16 %	Mo	*
V	*	Cu	0.32 %
Cb	*	Ti	*
B	*	Al	0.009 %
N	*	Other Components	None %

Fabrication History

Heat Treatment	*	Producer	US Steel
Year Produced	*	Addl Info	None
Source	OGC	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	*
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Weld

Weld Code	012.001.09C	Weld Type	NGESW
Base Metal Thickness	3 in	Welding Position	Vertical
Preheat Temperature	*	Metal Gap	0.75 in
Interpass Temperature	*	Passes	*
Filler Specification	*	Filler Name	LindeWS
Filler Carbon Content	0.09 %	Filler Metal Size	*
Shielding Gas	*	Voltage	38 volts
Amperage	1300 amps	Polarity	*
Travel Speed	*	Heat Input/Pass	1780 KJ/in
Joint Preparation	No Groove	Number of Sides	*
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Hobart201
Weld Composition Reported?	No		

(continued)

* - not reported

Material A588

(continued)

Property Measurements

Test Type	Charpy V Impact	Specimen Type	Full
Lateral Expansion	*	Shear Fracture	*
Did Specimen Fracture?	Yes	Did Specimen Split?	No
Standard Method	*	Standard Year	*

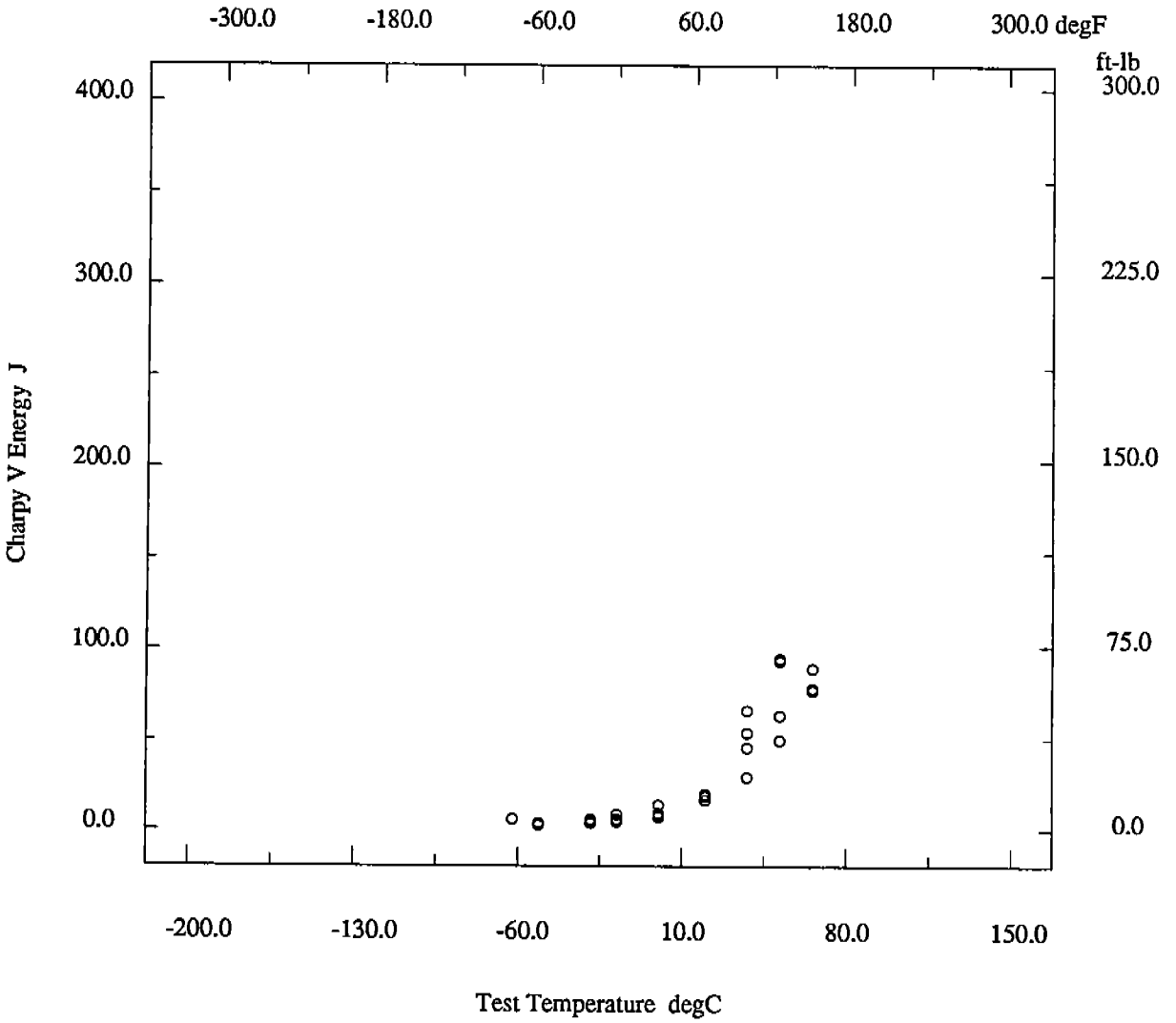
Position	Orien	Test Temp degF	CVN Energy ft-lb
1/4T	T-L o	-80	4.5
1/2T	T-L o	-60	2.0
1/2T	T-L o	-60	2.5
1/4T	T-L o	-60	2.5
1/4T	T-L o	-60	3.0
1/2T	T-L o	-20	3.0
1/2T	T-L o	-20	3.5
1/4T	T-L o	-20	3.5
1/4T	T-L o	-20	4.5
1/2T	T-L o	0	3.5
1/2T	T-L o	0	4.5
1/4T	T-L o	0	4.5
1/4T	T-L o	0	6.5
1/2T	T-L o	32	10.5
1/2T	T-L o	32	7.0
1/4T	T-L o	32	5.5
1/4T	T-L o	32	6.5
1/2T	T-L o	68	14.0
1/2T	T-L o	68	14.0
1/4T	T-L o	68	12.5
1/4T	T-L o	68	15.0
1/2T	T-L o	100	34.0
1/2T	T-L o	100	40.0
1/4T	T-L o	100	22.0
1/4T	T-L o	100	49.0
1/2T	T-L o	125	37.0
1/2T	T-L o	125	70.0
1/4T	T-L o	125	47.0
1/4T	T-L o	125	69.0
1/2T	T-L o	150	58.0
1/2T	T-L o	150	66.0
1/4T	T-L o	150	57.0
1/4T	T-L o	150	66.0

* - not reported

Material A588

Description

Material Code	012.001.09C	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		



* - not reported

Material A588

Description

Material Code	012.001.03C	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		

Composition

See Page 8200.1

Fabrication History

See Page 8200.1

Weld

Weld Code	012.001.03C	Weld Type	NGESW
Base Metal Thickness	3 in	Welding Position	Vertical
Preheat Temperature	*	Metal Gap	0.75 in
Interpass Temperature	*	Passes	*
Filler Specification	*	Filler Name	LindeWS
Filler Carbon Content	0.09 %	Filler Metal Size	*
Shielding Gas	*	Voltage	38 volts
Amperage	1300 amps	Polarity	*
Travel Speed	*	Heat Input/Pass	1780 KJ/in
Joint Preparation	No Groove	Number of Sides	*
Location wrt Weld	1mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Hobart201
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Yes
Did Specimen Split?	No	Standard Method	*
Standard Year	*		

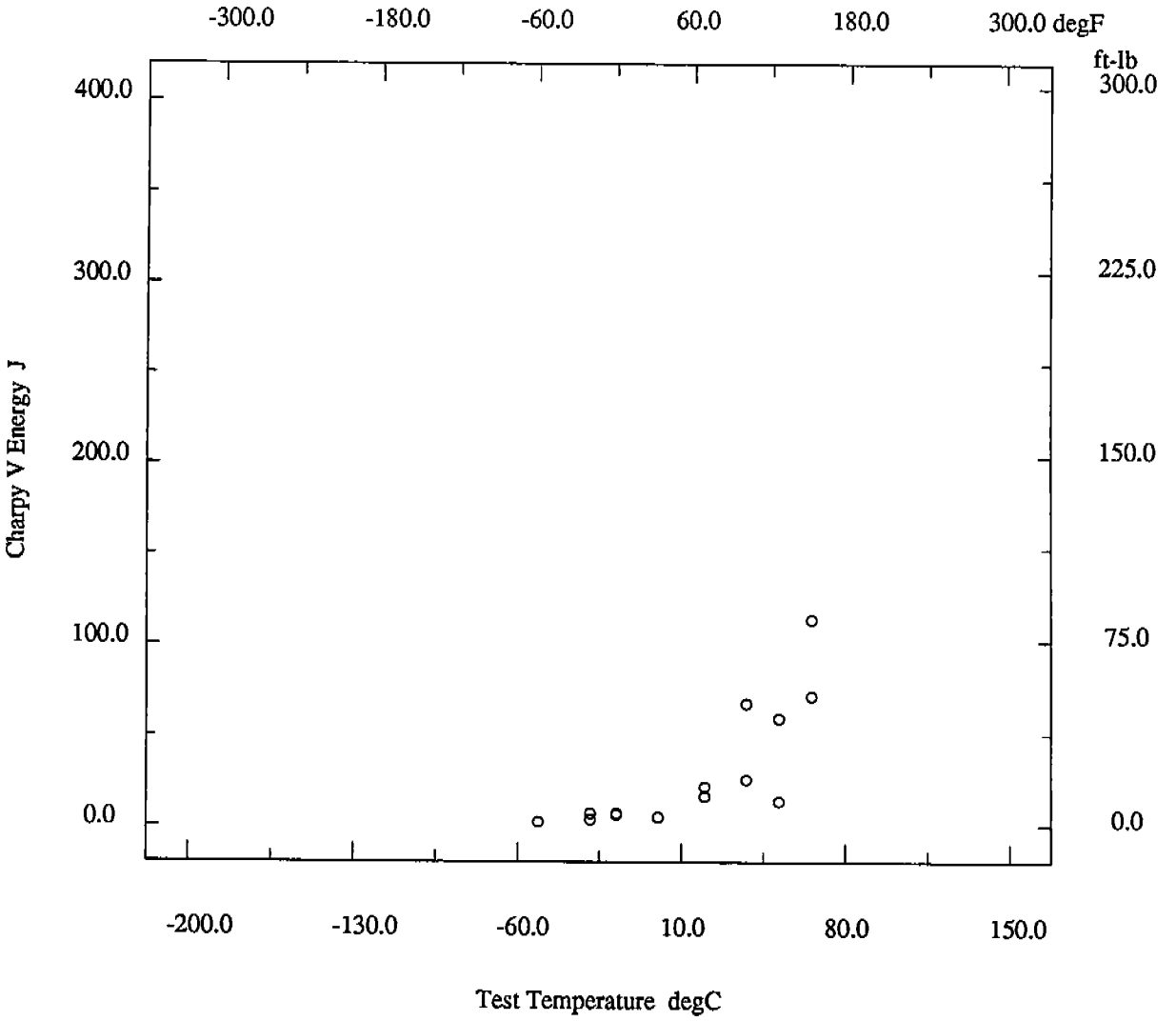
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-60	1.5
T-L °	-20	2.5
T-L °	-20	5.0
T-L °	0	4.5
T-L °	0	5.0
T-L °	32	3.5
T-L °	32	3.5
T-L °	68	12.0
T-L °	68	16.0
T-L °	100	19.0
T-L °	100	50.0
T-L °	125	10.0
T-L °	125	44.0
T-L °	150	53.0
T-L °	150	84.0

* - not reported

Material A588

Description

Material Code	012.001.03C	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		



* - not reported

Material A588

Description

Material Code	012.001.09D	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		

Composition

C	0.18 %	Mn	1.20 %
P	0.01 %	S	0.02 %
Si	0.37 %	Cr	0.56 %
Ni	0.16 %	Mo	*
V	*	Cu	0.32 %
Cb	*	Ti	*
B	*	Al	0.009 %
N	*	Other Components	None %

Fabrication History

Heat Treatment	*	Producer	US Steel
Year Produced	*	Addl Info	None
Source	OGC	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	*
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Weld

Weld Code	012.001.09D	Weld Type	NGESW
Base Metal Thickness	3 in	Welding Position	Vertical
Preheat Temperature	*	Metal Gap	0.75 in
Interpass Temperature	*	Passes	*
Filler Specification	*	Filler Name	TW8544
Filler Carbon Content	0.03 %	Filler Metal Size	*
Shielding Gas	*	Voltage	38 volts
Amperage	1000 amps	Polarity	*
Travel Speed	*	Heat Input/Pass	2130 KJ/in
Joint Preparation	No Groove	Number of Sides	*
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Hobart201
Weld Composition Reported?	No		

(continued)

* - not reported

Material A588

(continued)

Property Measurements

Test Type	Charpy V Impact	Specimen Type	Full
Lateral Expansion	*	Shear Fracture	*
Did Specimen Fracture?	Yes	Did Specimen Split?	No
Standard Method	*	Standard Year	*

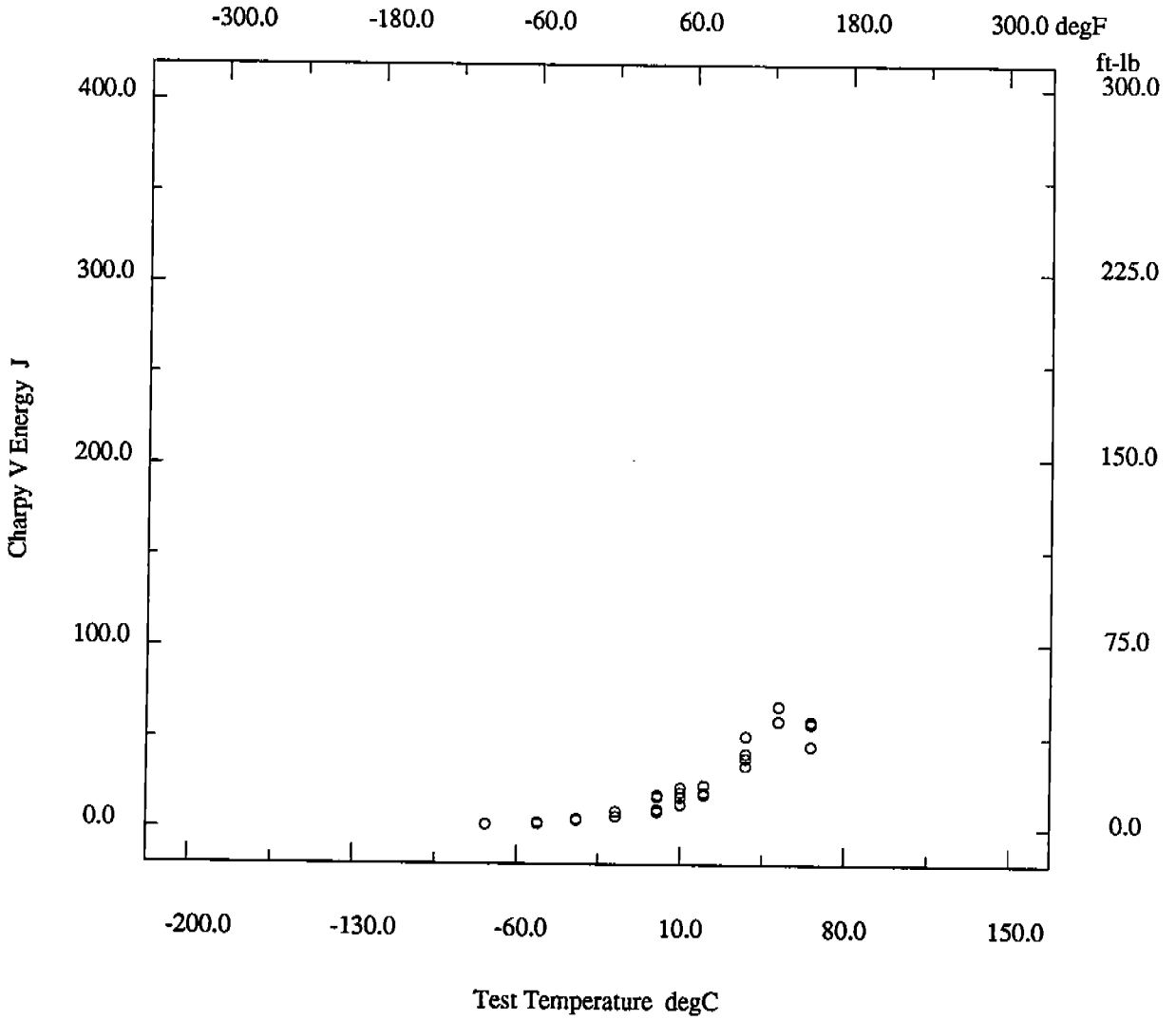
Position	Orien	Test Temp degF	CVN Energy ft-lb
1/2T	T-L o	-100	1.5
1/2T	T-L o	-60	2.0
1/2T	T-L o	-60	2.5
1/4T	T-L o	-60	2.0
1/4T	T-L o	-60	2.5
1/2T	T-L o	-30	4.0
1/2T	T-L o	-30	4.0
1/4T	T-L o	-30	3.5
1/4T	T-L o	-30	4.0
1/4T	T-L o	-30	4.0
1/2T	T-L o	0	5.0
1/2T	T-L o	0	7.0
1/4T	T-L o	0	5.0
1/4T	T-L o	0	7.0
1/2T	T-L o	32	13.0
1/2T	T-L o	32	14.0
1/4T	T-L o	32	7.0
1/4T	T-L o	32	8.0
1/2T	T-L o	50	13.0
1/2T	T-L o	50	15.0
1/4T	T-L o	50	10.0
1/4T	T-L o	50	17.0
1/2T	T-L o	68	14.0
1/2T	T-L o	68	18.0
1/4T	T-L o	68	14.0
1/4T	T-L o	68	15.0
1/2T	T-L o	100	31.0
1/2T	T-L o	100	38.0
1/4T	T-L o	100	26.0
1/4T	T-L o	100	29.0
1/4T	T-L o	125	44.0
1/4T	T-L o	125	50.0
1/2T	T-L o	150	34.0
1/2T	T-L o	150	44.0
1/4T	T-L o	150	43.0
1/4T	T-L o	150	44.0

* - not reported

Material A588

Description

Material Code	012.001.09D	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		



* - not reported

Material A588

Description

Material Code	012.001.03D	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		

Composition

See Page 8300.1

Fabrication History

See Page 8300.1

Weld

Weld Code	012.001.03D	Weld Type	NGESW
Base Metal Thickness	3 in	Welding Position	Vertical
Preheat Temperature	*	Metal Gap	0.75 in
Interpass Temperature	*	Passes	*
Filler Specification	*	Filler Name	TW8544
Filler Carbon Content	0.03 %	Filler Metal Size	*
Shielding Gas	*	Voltage	38 volts
Amperage	1000 amps	Polarity	*
Travel Speed	*	Heat Input/Pass	2130 KJ/in
Joint Preparation	No Groove	Number of Sides	*
Location wrt Weld	1mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Hobart201
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Yes
Did Specimen Split?	No	Standard Method	*
Standard Year	*		

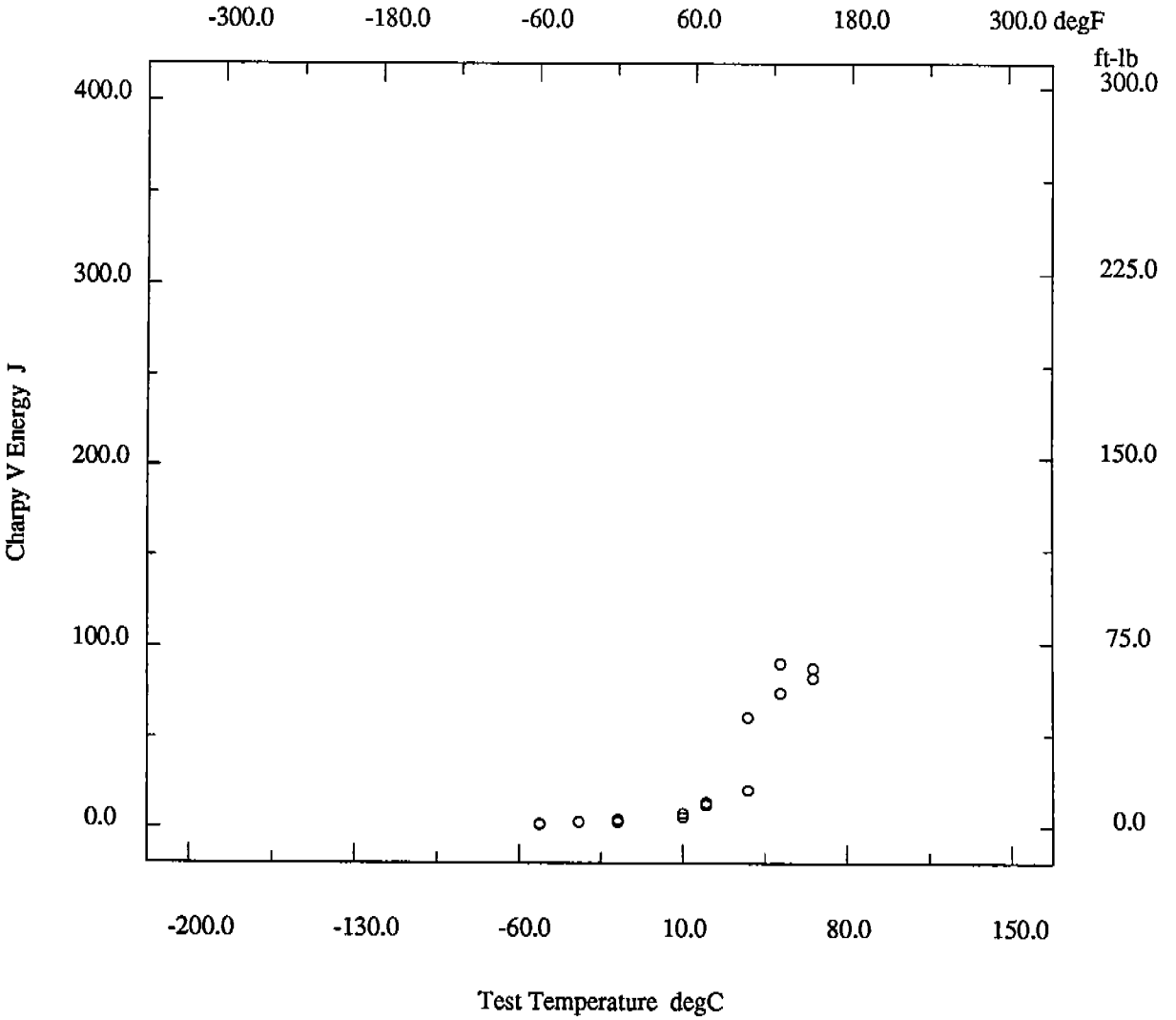
Orien	Test Temp degF	CVN Energy ft-lb
T-L o	-60	1.0
T-L o	-60	1.2
T-L o	-30	2.0
T-L o	0	2.0
T-L o	0	3.0
T-L o	50	4.0
T-L o	50	5.5
T-L o	68	10.0
T-L o	68	9.0
T-L o	100	15.0
T-L o	100	45.0
T-L o	125	55.0
T-L o	125	67.0
T-L o	150	61.0
T-L o	150	65.0

* - not reported

Material A588

Description

Material Code	012.001.03D	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		



* - not reported

(172) 174

Material A588

Description

Material Code	012.001.01	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		

Composition

C	0.18 %	Mn	1.20 %
P	0.01 %	S	0.02 %
Si	0.37 %	Cr	0.56 %
Ni	0.16 %	Mo	*
V	*	Cu	0.32 %
Cb	*	Ti	*
B	*	Al	0.009 %
N	*	Other Components	None %

Fabrication History

Heat Treatment	*	Producer	US Steel
Year Produced	*	Addl Info	None
Source	OGC	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	*
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Yes
Did Specimen Split?	No	Standard Method	*
Standard Year	*		

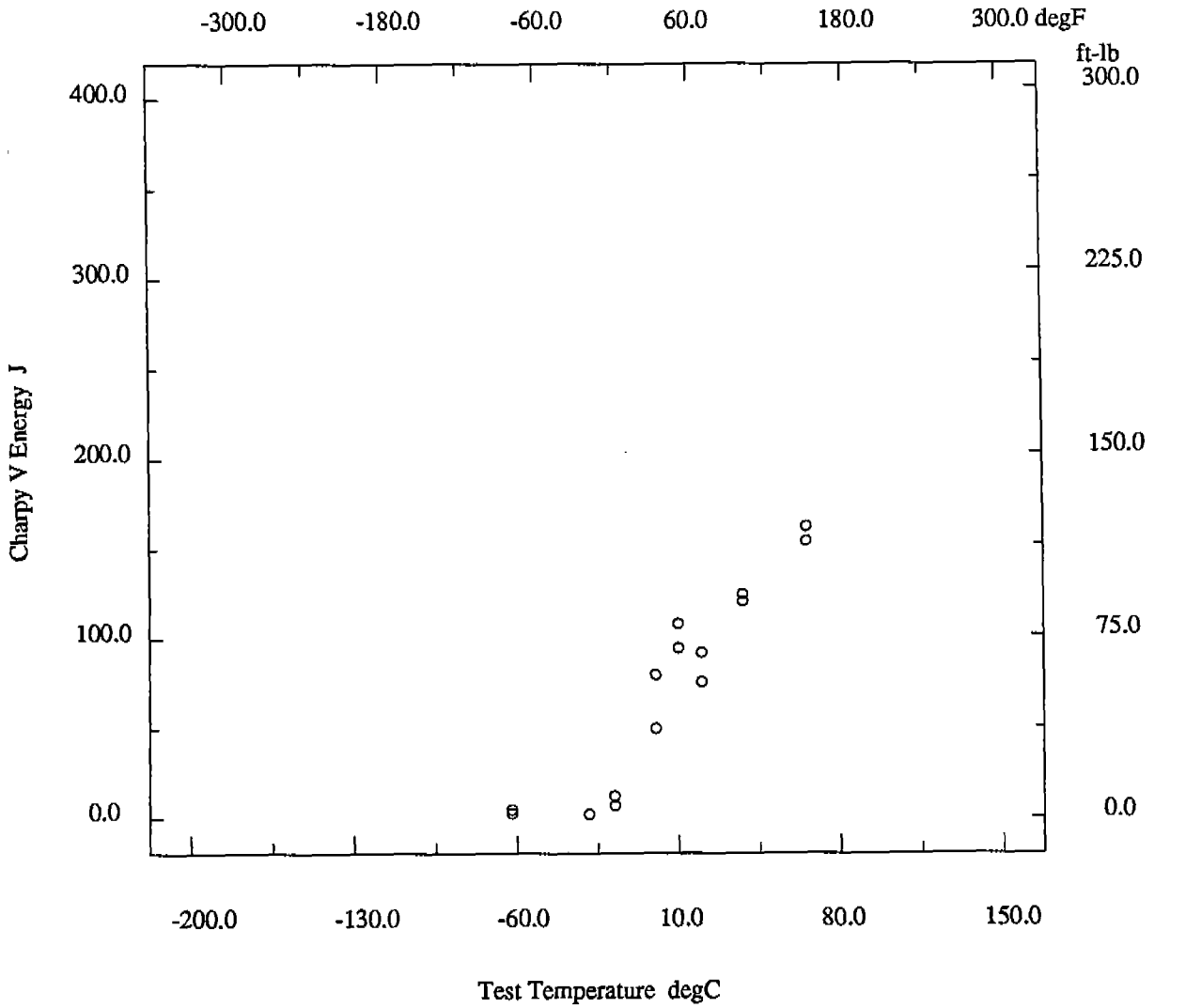
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-80	2.0
T-L °	-80	3.5
T-L °	-20	1.5
T-L °	0	5.0
T-L °	0	9.0
T-L °	32	37.0
T-L °	32	59.0
T-L °	50	70.0
T-L °	50	80.0
T-L °	68	56.0
T-L °	68	68.0
T-L °	100	89.0
T-L °	100	92.0
T-L °	150	114.0
T-L °	150	120.0

* - not reported

Material A588

Description

Material Code	012.001.01	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		



* - not reported

Material A588

Description

Material Code	012.001.09E	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		

Composition

C	0.18 %	Mn	1.20 %
P	0.01 %	S	0.02 %
Si	0.37 %	Cr	0.56 %
Ni	0.16 %	Mo	*
V	*	Cu	0.32 %
Cb	*	Ti	*
B	*	Al	0.009 %
N	*	Other Components	None %

Fabrication History

Heat Treatment	*	Producer	US Steel
Year Produced	*	Addl Info	None
Source	OGC	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	*
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Weld

Weld Code	012.001.09E	Weld Type	NGESW
Base Metal Thickness	3 in	Welding Position	Vertical
Preheat Temperature	*	Metal Gap	0.75 in
Interpass Temperature	*	Passes	*
Filler Specification	*	Filler Name	TW8544
Filler Carbon Content	0.03 %	Filler Metal Size	*
Shielding Gas	*	Voltage	38 volts
Amperage	1300 amps	Polarity	*
Travel Speed	*	Heat Input/Pass	1880 KJ/in
Joint Preparation	No Groove	Number of Sides	*
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Hobart201
Weld Composition Reported?	No		

(continued)

* - not reported

Material A588

(continued)

Property Measurements

Test Type	Charpy V Impact	Specimen Type	Full
Lateral Expansion	*	Shear Fracture	*
Did Specimen Fracture?	Yes	Did Specimen Split?	No
Standard Method	*	Standard Year	*

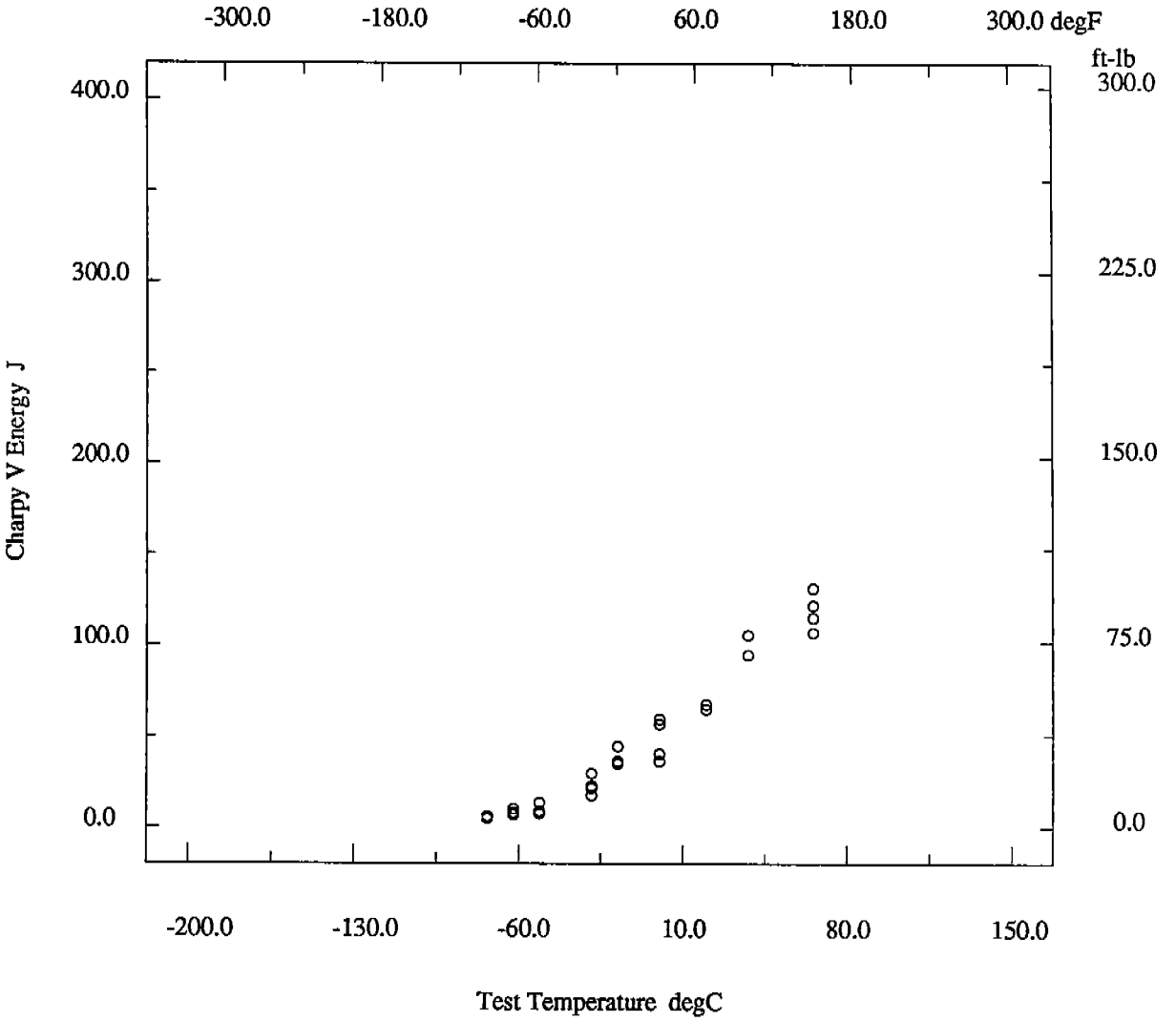
Position	Orien	Test Temp degF	CVN Energy ft-lb
1/2T	T-L °	-100	4.0
1/2T	T-L °	-100	4.5
1/4T	T-L °	-100	3.5
1/4T	T-L °	-100	3.5
1/2T	T-L °	-80	5.0
1/2T	T-L °	-80	5.0
1/4T	T-L °	-80	6.0
1/4T	T-L °	-80	7.5
1/2T	T-L °	-60	5.5
1/4T	T-L °	-60	10.0
1/4T	T-L °	-60	6.5
1/2T	T-L °	-20	13.0
1/2T	T-L °	-20	16.0
1/4T	T-L °	-20	17.0
1/4T	T-L °	-20	22.0
1/2T	T-L °	0	26.0
1/2T	T-L °	0	26.0
1/4T	T-L °	0	27.0
1/4T	T-L °	0	33.0
1/2T	T-L °	32	27.0
1/2T	T-L °	32	30.0
1/4T	T-L °	32	42.0
1/4T	T-L °	32	44.0
1/2T	T-L °	68	50.0
1/2T	T-L °	68	50.0
1/2T	T-L °	68	50.0
1/4T	T-L °	68	48.0
1/4T	T-L °	68	50.0
1/4T	T-L °	100	70.0
1/4T	T-L °	100	78.0
1/2T	T-L °	150	79.0
1/2T	T-L °	150	85.0
1/4T	T-L °	150	90.0
1/4T	T-L °	150	97.0

* - not reported

Material A588

Description

Material Code	012.001.09E	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		



* - not reported

Material A588

Description

Material Code	012.001.03E	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		

Composition

See Page 8500.1

Fabrication History

See Page 8500.1

Weld

Weld Code	012.001.03E	Weld Type	NGESW
Base Metal Thickness	3 in	Welding Position	Vertical
Preheat Temperature	*	Metal Gap	0.75 in
Interpass Temperature	*	Passes	*
Filler Specification	*	Filler Name	TW8544
Filler Carbon Content	0.03 %	Filler Metal Size	*
Shielding Gas	*	Voltage	38 volts
Amperage	1300 amps	Polarity	*
Travel Speed	*	Heat Input/Pass	1880 KJ/in
Joint Preparation	No Groove	Number of Sides	*
Location wrt Weld	1mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Hobart201
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Yes
Did Specimen Split?	No	Standard Method	*
Standard Year	*		

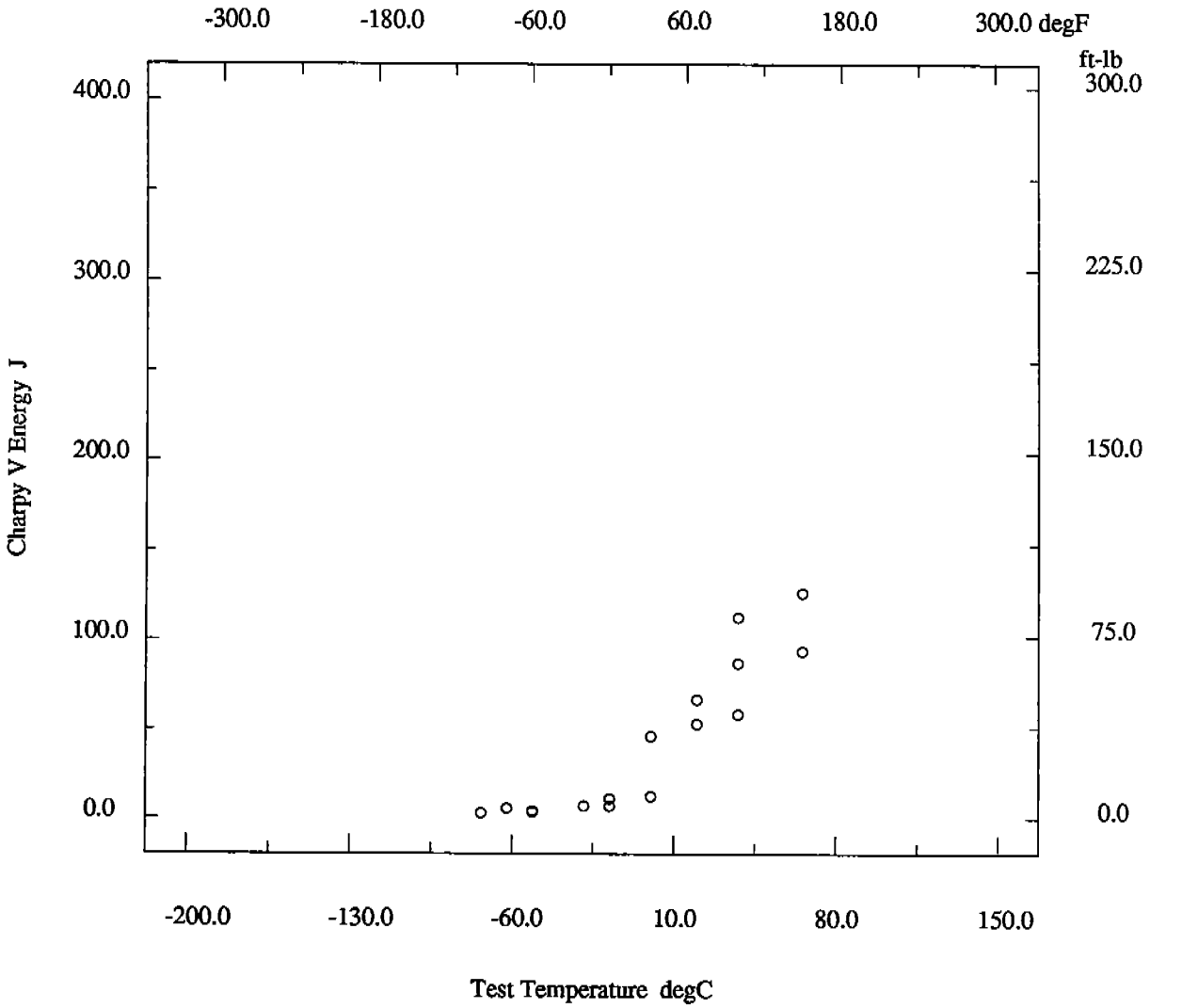
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-100	2.0
T-L °	-80	4.0
T-L °	-60	2.5
T-L °	-60	3.0
T-L °	-20	5.0
T-L °	-20	5.0
T-L °	0	5.0
T-L °	0	8.0
T-L °	32	34.0
T-L °	32	34.0
T-L °	32	9.0
T-L °	68	39.0
T-L °	68	49.0
T-L °	100	43.0
T-L °	100	64.0
T-L °	100	83.0
T-L °	150	69.0
T-L °	150	93.0

* - not reported

Material A588

Description

Material Code	012.001.03E	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		



* - not reported

Material A588

Description

Material Code	012.002.09A	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		

Composition

C	0.18 %	Mn	1.20 %
P	0.01 %	S	0.02 %
Si	0.37 %	Cr	0.56 %
Ni	0.16 %	Mo	*
V	*	Cu	0.32 %
Cb	*	Ti	*
B	*	Al	0.009 %
N	*	Other Components	None %

Fabrication History

Heat Treatment	*	Producer	OrStMills
Year Produced	*	Addl Info	None
Source	OGC	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	*
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Weld

Weld Code	012.002.09A	Weld Type	ESW
Base Metal Thickness	2.0 in	Welding Position	Vertical
Preheat Temperature	*	Metal Gap	1.25 in
Interpass Temperature	*	Passes	*
Filler Specification	*	Filler Name	LindeWS
Filler Carbon Content	0.09 %	Filler Metal Size	*
Shielding Gas	*	Voltage	42 volts
Amperage	600 amps	Polarity	*
Travel Speed	*	Heat Input/Pass	2540 KJ/in
Joint Preparation	Smooth Butt	Number of Sides	*
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Hobart201
Weld Composition Reported?	No		

(continued)

* - not reported

Material A588

(continued)

Property Measurements

Test Type	Charpy V Impact	Specimen Type	Full
Lateral Expansion	*	Shear Fracture	*
Did Specimen Fracture?	Yes	Did Specimen Split?	No
Standard Method	*	Standard Year	*

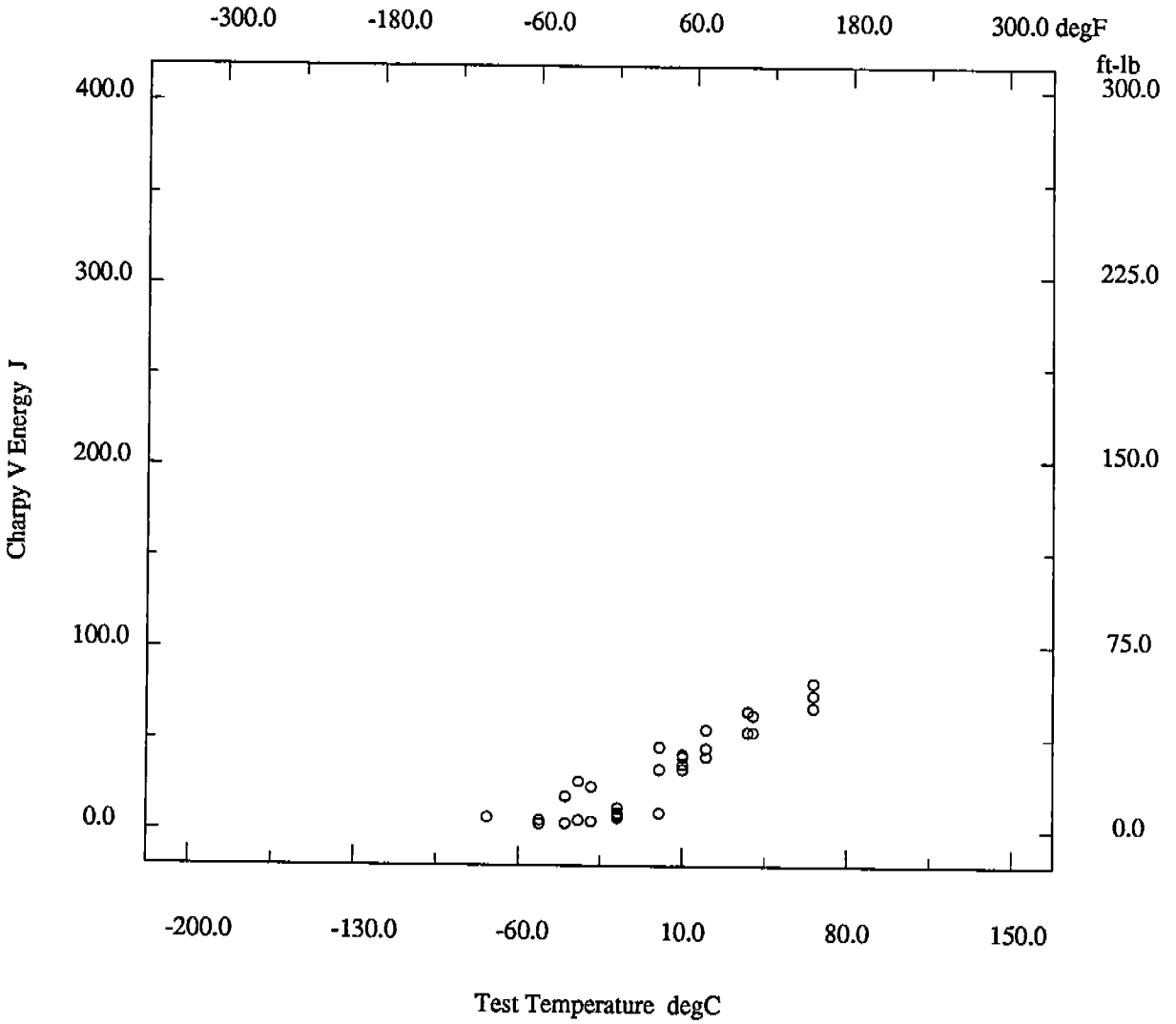
Position	Orien	Test Temp degF	CVN Energy ft-lb
1/4T	T-L °	-100	5.0
1/4T	T-L °	-60	2.5
1/4T	T-L °	-60	4.0
1/2T	T-L °	-40	13.7
1/2T	T-L °	-40	2.7
1/4T	T-L °	-30	20.0
1/4T	T-L °	-30	4.0
1/2T	T-L °	-20	17.7
1/2T	T-L °	-20	3.5
1/2T	T-L °	0	5.0
1/2T	T-L °	0	7.0
1/2T	T-L °	0	9.0
1/4T	T-L °	0	5.0
1/4T	T-L °	0	6.0
1/2T	T-L °	32	25.0
1/2T	T-L °	32	25.0
1/4T	T-L °	32	34.0
1/4T	T-L °	32	7.0
1/2T	T-L °	50	30.0
1/2T	T-L °	50	31.0
1/4T	T-L °	50	25.0
1/4T	T-L °	50	27.0
1/2T	T-L °	68	33.5
1/2T	T-L °	68	41.0
1/4T	T-L °	68	30.0
1/4T	T-L °	68	41.0
1/2T	T-L °	100	40.0
1/2T	T-L °	100	48.5
1/4T	T-L °	104	40.0
1/4T	T-L °	104	47.0
1/2T	T-L °	150	50.0
1/2T	T-L °	150	55.0
1/4T	T-L °	150	55.0
1/4T	T-L °	150	60.0

* - not reported

Material A588

Description

Material Code	012.002.09A	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		



* - not reported

Material A588

Description

Material Code	012.002.03A	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		

Composition See Page 8600.1

Fabrication History See Page 8600.1

Weld

Weld Code	012.002.03A	Weld Type	ESW
Base Metal Thickness	2.0 in	Welding Position	Vertical
Preheat Temperature	*	Metal Gap	1.25 in
Interpass Temperature	*	Passes	*
Filler Specification	*	Filler Name	LindeWS
Filler Carbon Content	0.09 %	Filler Metal Size	*
Shielding Gas	*	Voltage	42 volts
Amperage	600 amps	Polarity	*
Travel Speed	*	Heat Input/Pass	2540 KJ/in
Joint Preparation	Smooth Butt	Number of Sides	*
Location wrt Weld	1mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Hobart201
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Yes
Did Specimen Split?	No	Standard Method	*
Standard Year	*		

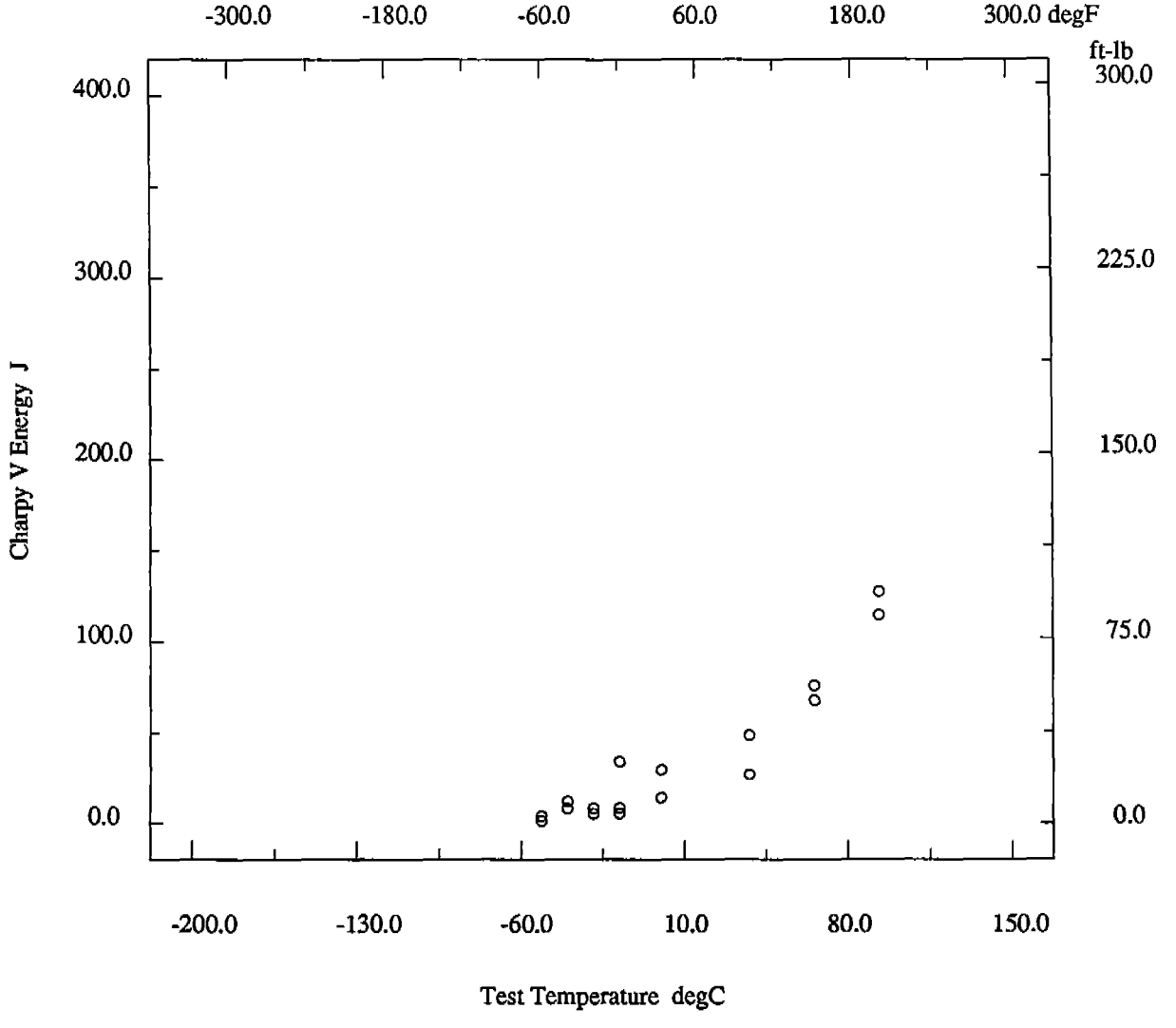
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-60	1.0
T-L °	-60	3.0
T-L °	-40	6.0
T-L °	-40	9.0
T-L °	-20	4.0
T-L °	-20	6.2
T-L °	0	25.3
T-L °	0	4.0
T-L °	0	6.2
T-L °	32	10.5
T-L °	32	22.0
T-L °	100	20.0
T-L °	100	36.0
T-L °	150	50.0
T-L °	150	56.0
T-L °	200	84.5
T-L °	200	94.0

* - not reported

Material A588

Description

Material Code	012.002.03A	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		



* - not reported

Material A588

Description

Material Code	012.002.09B	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		

Composition

C	0.18 %	Mn	1.20 %
P	0.01 %	S	0.02 %
Si	0.37 %	Cr	0.56 %
Ni	0.16 %	Mo	*
V	*	Cu	0.32 %
Cb	*	Ti	*
B	*	Al	0.009 %
N	*	Other Components	None %

Fabrication History

Heat Treatment	*	Producer	OrStMills
Year Produced	*	Addl Info	None
Source	OGC	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	*
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Weld

Weld Code	012.002.09B	Weld Type	NGESW
Base Metal Thickness	2.0 in	Welding Position	Vertical
Preheat Temperature	*	Metal Gap	0.75 in
Interpass Temperature	*	Passes	*
Filler Specification	*	Filler Name	LindeWS
Filler Carbon Content	0.09 %	Filler Metal Size	*
Shielding Gas	*	Voltage	38 volts
Amperage	1000 amps	Polarity	*
Travel Speed	*	Heat Input/Pass	1625 KJ/in
Joint Preparation	No Groove	Number of Sides	*
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Hobart201
Weld Composition Reported?	No		

(continued)

* - not reported

Material A588

(continued)

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Yes
Did Specimen Split?	No	Standard Method	*
Standard Year	*		

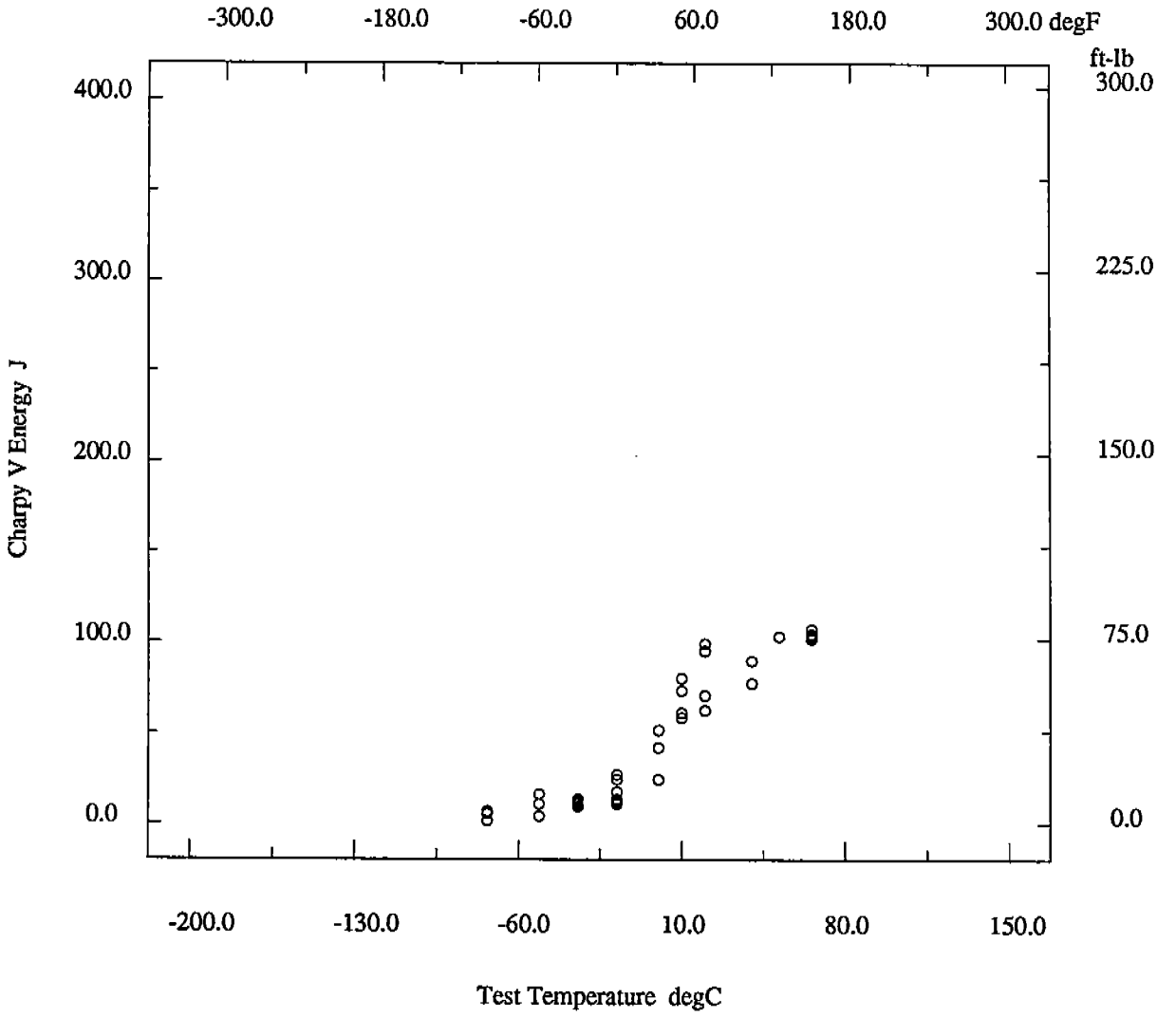
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-100	1.0
T-L °	-100	4.0
T-L °	-100	5.0
T-L °	-60	12.0
T-L °	-60	3.0
T-L °	-60	3.0
T-L °	-60	8.0
T-L °	-30	10.0
T-L °	-30	7.0
T-L °	-30	8.0
T-L °	-30	9.0
T-L °	0	10.0
T-L °	0	13.0
T-L °	0	18.0
T-L °	0	20.0
T-L °	0	8.0
T-L °	0	9.0
T-L °	32	18.0
T-L °	32	31.0
T-L °	32	38.0
T-L °	50	43.0
T-L °	50	45.0
T-L °	50	54.0
T-L °	50	59.0
T-L °	68	46.0
T-L °	68	52.0
T-L °	68	70.0
T-L °	68	73.0
T-L °	104	57.0
T-L °	104	66.0
T-L °	125	76.0
T-L °	150	75.0
T-L °	150	76.0
T-L °	150	77.0
T-L °	150	79.0

* - not reported

Material A588

Description

Material Code	012.002.09B	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		



* - not reported

Material A588

Description

Material Code	012.002.03B	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		

Composition See Page 8700.1

Fabrication History See Page 8700.1

Weld

Weld Code	012.002.03B	Weld Type	NGESW
Base Metal Thickness	2.0 in	Welding Position	Vertical
Preheat Temperature	*	Metal Gap	0.75 in
Interpass Temperature	*	Passes	*
Filler Specification	*	Filler Name	LindeWS
Filler Carbon Content	0.09 %	Filler Metal Size	*
Shielding Gas	*	Voltage	38 volts
Amperage	1000 amps	Polarity	*
Travel Speed	*	Heat Input/Pass	1625 KJ/in
Joint Preparation	No Groove	Number of Sides	*
Location wrt Weld	1mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Hobart201
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Yes
Did Specimen Split?	No	Standard Method	*
Standard Year	*		

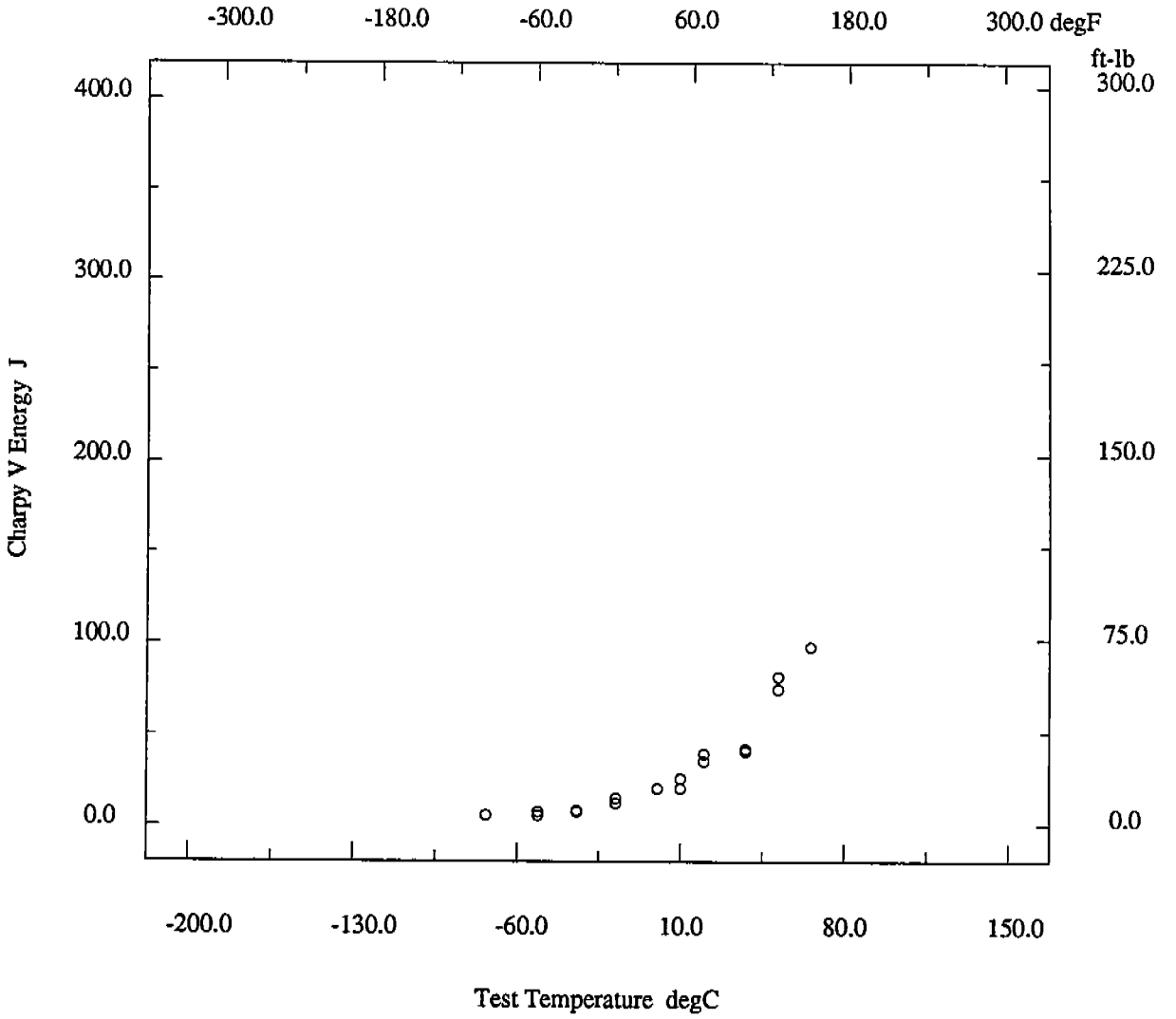
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-100	4.0
T-L °	-60	4.0
T-L °	-60	5.5
T-L °	-30	5.5
T-L °	-30	6.0
T-L °	0	11.0
T-L °	0	9.0
T-L °	32	15.0
T-L °	50	15.0
T-L °	50	19.0
T-L °	68	26.0
T-L °	68	29.0
T-L °	100	30.0
T-L °	100	31.0
T-L °	125	55.0
T-L °	125	60.0
T-L °	150	72.0

* - not reported

Material A588

Description

Material Code	012.002.03B	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		



* - not reported

Material A588

Description

Material Code	012.002.09C	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		

Composition

C	0.18 %	Mn	1.20 %
P	0.01 %	S	0.02 %
Si	0.37 %	Cr	0.56 %
Ni	0.16 %	Mo	*
V	*	Cu	0.32 %
Cb	*	Ti	*
B	*	Al	0.009 %
N	*	Other Components	None %

Fabrication History

Heat Treatment	*	Producer	OrStMills
Year Produced	*	Addl Info	None
Source	OGC	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	*
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Weld

Weld Code	012.002.09C	Weld Type	NGESW
Base Metal Thickness	2.0 in	Welding Position	Vertical
Preheat Temperature	*	Metal Gap	0.75 in
Interpass Temperature	*	Passes	*
Filler Specification	*	Filler Name	TW8544
Filler Carbon Content	0.03 %	Filler Metal Size	*
Shielding Gas	*	Voltage	38 volts
Amperage	800 amps	Polarity	*
Travel Speed	*	Heat Input/Pass	1600 KJ/in
Joint Preparation	No Groove	Number of Sides	*
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Hobart201
Weld Composition Reported?	No		

(continued)

* - not reported

Material A588

(continued)

Property Measurements

Test Type	Charpy V Impact	Specimen Type	Full
Lateral Expansion	*	Shear Fracture	*
Did Specimen Fracture?	Yes	Did Specimen Split?	No
Standard Method	*	Standard Year	*

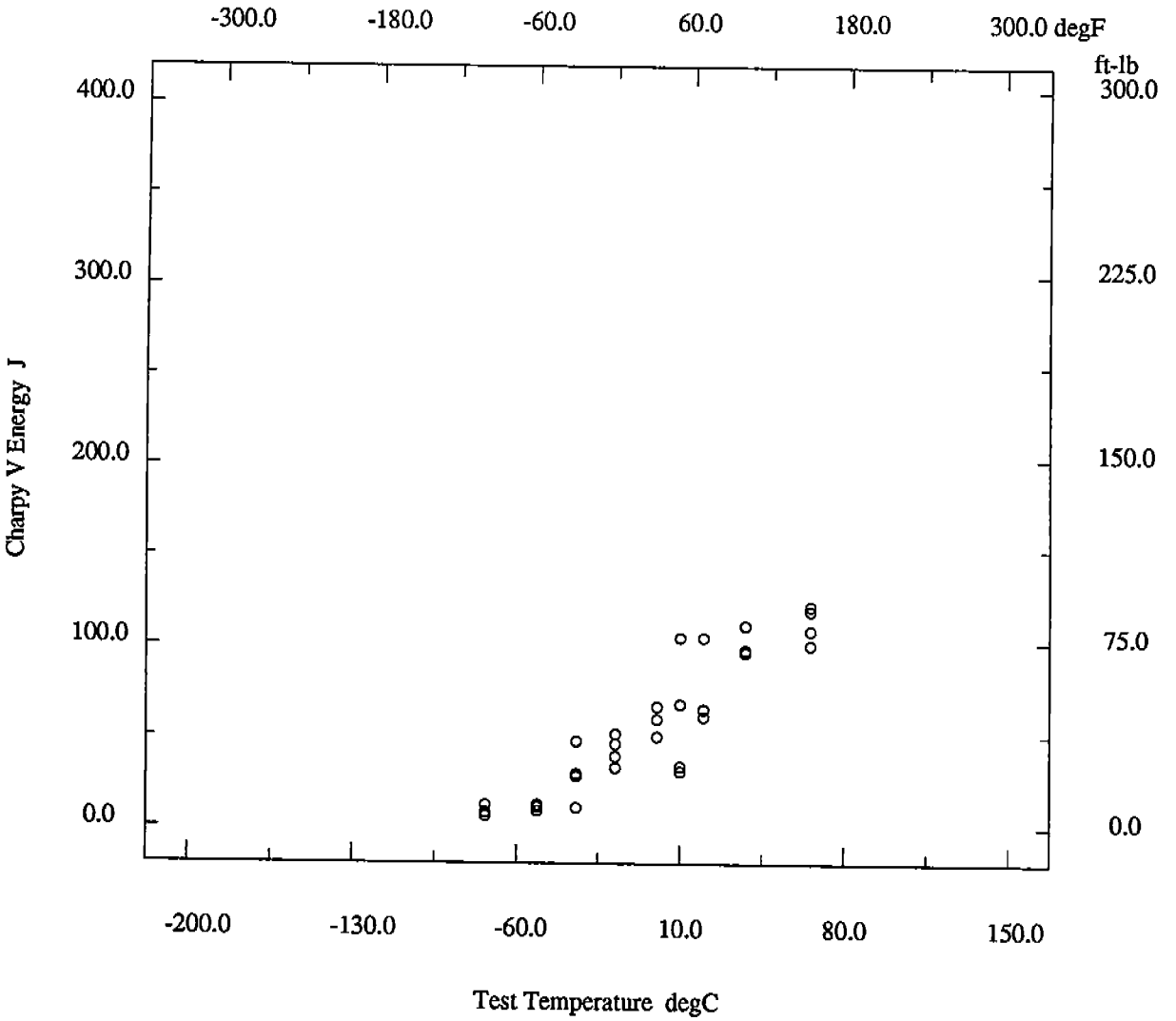
Position	Orien	Test Temp degF	CVN Energy ft-lb
1/2T	T-L °	-100	6.0
1/2T	T-L °	-100	9.0
1/4T	T-L °	-100	4.5
1/2T	T-L °	-60	6.6
1/2T	T-L °	-60	6.7
1/4T	T-L °	-60	8.2
1/4T	T-L °	-60	9.2
1/2T	T-L °	-30	21.0
1/2T	T-L °	-30	22.0
1/4T	T-L °	-30	35.0
1/4T	T-L °	-30	8.0
1/2T	T-L °	0	29.0
1/2T	T-L °	0	34.0
1/4T	T-L °	0	24.5
1/4T	T-L °	0	38.0
1/2T	T-L °	32	49.0
1/4T	T-L °	32	37.0
1/4T	T-L °	32	44.0
1/2T	T-L °	50	50.0
1/2T	T-L °	50	77.0
1/4T	T-L °	50	23.0
1/4T	T-L °	50	25.0
1/2T	T-L °	68	77.0
1/4T	T-L °	68	45.0
1/4T	T-L °	68	48.0
1/2T	T-L °	100	72.0
1/2T	T-L °	100	82.0
1/4T	T-L °	100	71.0
1/2T	T-L °	150	74.0
1/2T	T-L °	150	88.0
1/4T	T-L °	150	80.0
1/4T	T-L °	150	90.0

* - not reported

Material A588

Description

Material Code	012.002.09C	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		



* - not reported

Material A588

Description

Material Code	012.002.03C	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		

Composition

See Page 8800.1

Fabrication History

See Page 8800.1

Weld

Weld Code	012.002.03C	Weld Type	NGESW
Base Metal Thickness	2.0 in	Welding Position	Vertical
Preheat Temperature	*	Metal Gap	0.75 in
Interpass Temperature	*	Passes	*
Filler Specification	*	Filler Name	TW8544
Filler Carbon Content	0.03 %	Filler Metal Size	*
Shielding Gas	*	Voltage	38 volts
Amperage	800 amps	Polarity	*
Travel Speed	*	Heat Input/Pass	1600 KJ/in
Joint Preparation	No Groove	Number of Sides	*
Location wrt Weld	1mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Hobart201
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Yes
Did Specimen Split?	No	Standard Method	*
Standard Year	*		

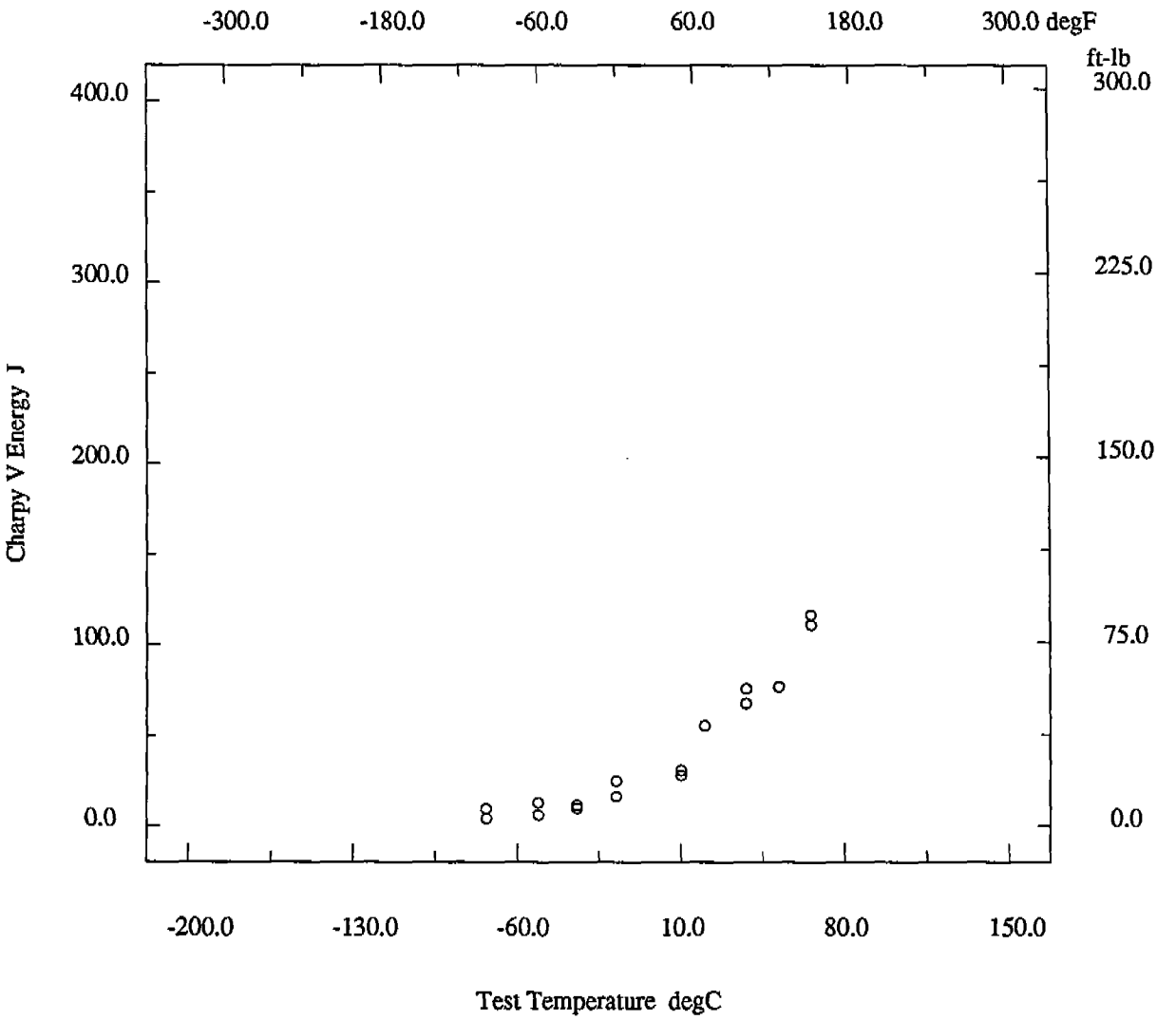
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-100	3.0
T-L °	-100	7.0
T-L °	-60	4.5
T-L °	-60	9.5
T-L °	-30	7.2
T-L °	-30	8.5
T-L °	0	12.0
T-L °	0	18.5
T-L °	50	21.0
T-L °	50	23.0
T-L °	68	41.0
T-L °	100	50.0
T-L °	100	56.0
T-L °	125	57.0
T-L °	150	82.0
T-L °	150	86.0

* - not reported

Material A588

Description

Material Code	012.002.03C	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		



* - not reported

Material A588

Description

Material Code	012.002.01	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		

Composition

C	0.18 %	Mn	1.20 %
P	0.01 %	S	0.02 %
Si	0.37 %	Cr	0.56 %
Ni	0.16 %	Mo	*
V	*	Cu	0.32 %
Cb	*	Ti	*
B	*	Al	0.009 %
N	*	Other Components	None %

Fabrication History

Heat Treatment	*	Producer	OrStMills
Year Produced	*	Addl Info	None
Source	OGC	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	*
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Yes
Did Specimen Split?	No	Standard Method	*
Standard Year	*		

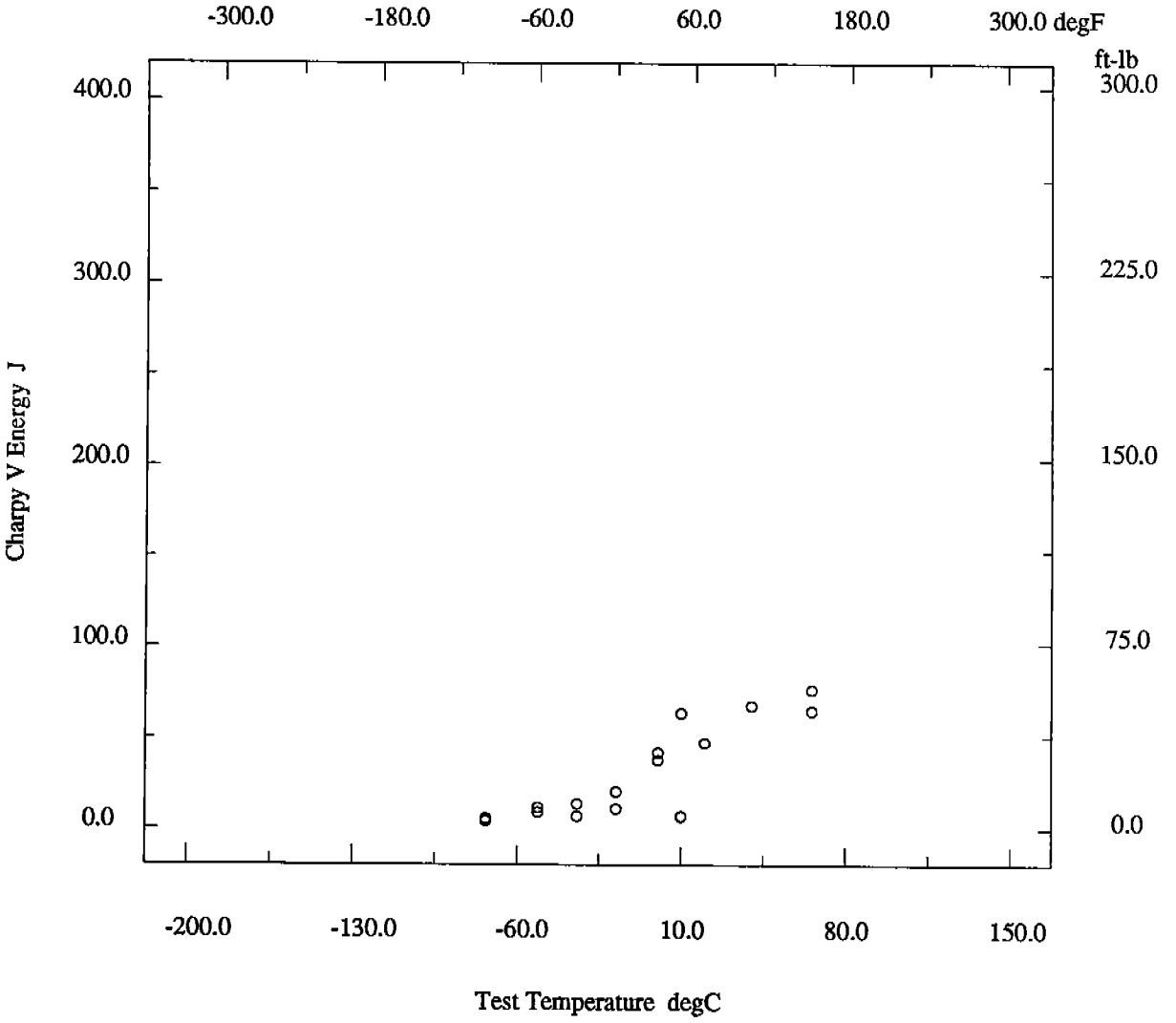
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-100	3.0
T-L °	-100	4.0
T-L °	-60	6.5
T-L °	-60	8.5
T-L °	-30	10.0
T-L °	-30	5.0
T-L °	0	15.0
T-L °	0	8.0
T-L °	32	28.0
T-L °	32	31.0
T-L °	50	47.0
T-L °	50	5.0
T-L °	68	35.0
T-L °	104	50.0
T-L °	150	48.0
T-L °	150	56.5

* - not reported

Material A588

Description

Material Code	012.002.01	Material Name	A588
UNS	*	Other Designation	Grade A
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	OGC-1		



* - not reported

Material A588

Description

Material Code	012.003.01	Material Name	A588
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	D6274-4
Reference	1211		

Composition

C	0.15 %	Mn	1.07 %
P	0.006 %	S	0.02 %
Si	0.24 %	Cr	0.58 %
Ni	0.16 %	Mo	0.065 %
V	0.051 %	Cu	0.27 %
Cb	*	Ti	*
B	*	Al	0.026 %
N	*	Other Components	None %

Fabrication History

Heat Treatment	N	Producer	Lukens
Year Produced	1980	Addl Info	*
Source	Lukens	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	N
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	1/2T
Specimen Type	Cylindrical	Specimen Thickness	0.252 in
Gage Length	1.0 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
L	80	75.8	49.7	51.7	31.5	74.6
L	80	76.5	51.3	52.4	32.1	75.2
T	80	73.7	47.9	50.6	30.2	60.2
T	80	74.7	49.3	50.9	28.5	59.9
S	80	64.5	48.7	49.9	9.0	7.8
S	80	71.2	48.8	50.3	11.1	8.6

* - not reported

Material A588

Description

Material Code	012.003.01	Material Name	A588
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	D6274-4
Reference	1211		

Composition See Page 9000.1

Fabrication History See Page 9000.1

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	Full	Did Specimen Fracture?	*
Standard Method	*	Standard Year	*

Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %	Split?
L-T ○	-140	6	3	0	No
L-T ○	-120	8	7	3	No
L-T ○	-100	15	12	8	No
L-T ○	-80	27	23	14	Yes
L-T ○	-60	34	30	17	Yes
L-T ○	-40	51	44	33	Yes
L-T ○	-30	37	34	30	Yes
L-T ○	-20	60	51	36	Yes
L-T ○	-10	82	65	60	Yes
L-T ○	0	104	80	77	Yes
L-T ○	10	104	80	75	Yes
L-T ○	20	118	91	100	Yes
L-T ○	40	119	87	100	Yes
L-T ○	60	114	85	100	Yes
L-T ○	Room	119	89	100	Yes
L-T ○	100	118	90	100	Yes
L-S △	-180	4	1	0	*
L-S △	-160	6	2	0	*
L-S △	-140	11	6	3	*
L-S △	-120	8	4	3	*
L-S △	-100	19	14	9	*
L-S △	-95	8	6	8	*
L-S △	-90	126	99	31	*
L-S △	-85	238	104	100	*
L-S △	-80	239	104	100	*
L-S △	-60	239	105	100	*
L-S △	-40	240	105	100	*
L-S △	-20	213	102	100	*
L-S △	0	240	105	100	*
L-S △	Room	200	102	100	*
L-S △	Room	240	104	100	*
T-L ×	-120	5	2	2	No
T-L ×	-100	11	8	8	No
T-L ×	-80	13	11	17	No
T-L ×	-60	18	18	22	No

(continued)

* - not reported

Material A588

(continued)

Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %	Split?
T-L ×	-40	22	23	34	No
T-L ×	-30	24	27	36	No
T-L ×	-20	32	35	50	Yes
T-L ×	0	34	38	63	Yes
T-L ×	20	38	40	77	Yes
T-L ×	30	45	49	98	Yes
T-L ×	40	48	51	96	Yes
T-L ×	60	50	52	100	Yes
T-L ×	Room	51	51	100	Yes
T-L ×	100	47	54	100	Yes
T-L ×	120	51	53	100	Yes
T-L ×	140	47	52	100	Yes
T-S □	-140	5	1	0	No
T-S □	-120	7	3	3	No
T-S □	-100	7	5	6	No
T-S □	-80	11	10	14	No
T-S □	-60	12	12	25	No
T-S □	-50	19	18	24	No
T-S □	-40	25	24	35	No
T-S □	-30	30	29	51	Yes
T-S □	-20	30	31	55	Yes
T-S □	-10	43	41	64	Yes
T-S □	0	61	57	100	Yes
T-S □	10	60	56	100	Yes
T-S □	20	54	52	100	Yes
T-S □	40	61	57	99	Yes
T-S □	60	59	59	100	Yes
T-S □	Room	63	64	100	Yes
S-L +	-80	3	1	10	No
S-L +	-60	6	5	16	No
S-L +	-40	8	9	27	No
S-L +	-30	6	9	38	No
S-L +	-20	10	12	58	No
S-L +	-10	8	10	50	No
S-L +	0	11	16	65	No
S-L +	10	13	17	75	No
S-L +	20	14	20	85	No
S-L +	30	16	23	95	No
S-L +	40	16	21	97	No
S-L +	60	17	23	100	No
S-L +	Room	18	26	100	No
S-L +	100	18	26	100	No
S-L +	120	17	25	100	No
S-L +	140	17	25	100	No
S-T ◇	-80	3	3	15	No
S-T ◇	-60	5	7	25	No
S-T ◇	-40	8	13	36	No

(continued)

* - not reported

Material A588

(continued)

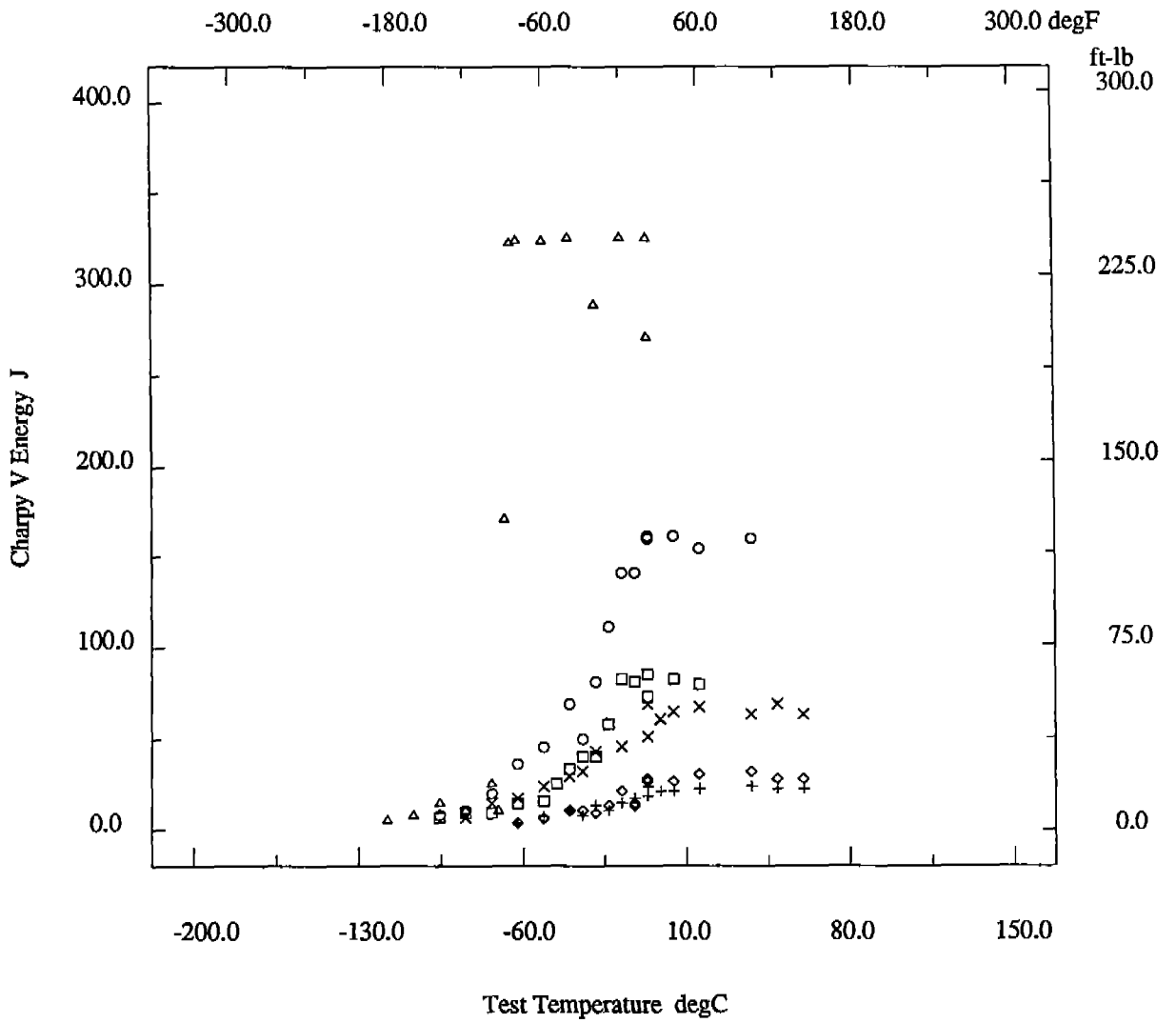
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %	Split?
S-T ◇	-30	8	8	53	No
S-T ◇	-20	7	11	45	No
S-T ◇	-10	10	13	56	No
S-T ◇	0	16	20	77	No
S-T ◇	10	10	14	77	No
S-T ◇	10	11	14	82	No
S-T ◇	20	21	26	95	No
S-T ◇	40	20	25	99	No
S-T ◇	60	23	29	100	No
S-T ◇	Room	20	27	100	No
S-T ◇	100	24	31	100	No
S-T ◇	120	21	33	100	No
S-T ◇	140	21	32	100	No

* - not reported

Material A588

Description

Material Code	012.003.01	Material Name	A588
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	D6274-4
Reference	1211		



* - not reported

Material A588

Description

Material Code	012.003.01	Material Name	A588
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	D6274-4
Reference	1211		

Composition See Page 9000.1

Fabrication History See Page 9000.1

Property Measurements

Test Type	Fracture Toughness	Position	1/2T
Specimen Type	Compact	Specimen Thickness	1.0 in
Crack Length	*	Loading Type	*
Loading Rate	*	KQ	*
KIc	*	Valid KIc?	*
Reason for Invalid	*	JIc	*
KJc	*	JIcpr	Per Standard
Curve Shape	*	Standard Method	E813
Standard Year	1987		

Orien	Test Temp degF	CODi in	CODIc in	JI in-lb/in2	Jmax in-lb/in2	Tear Mod in-lb/in**2
L-T	72	0.0118	0.0202	1516	1945	209.7
L-T	75	0.0125	0.0143	1398	1312	161.9
T-L	75	0.0065	0.0076	657	655	97.9
T-L	75	0.0074	0.0073	714	620	78.9
S-L	72	0.0027	0.0025	264	213	49.3
S-L	74	0.0021	0.0021	204	178	41.6

* - not reported

Material A588

Description

Material Code	012.003.01	Material Name	A588
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	D6274-4
Reference	1211		

Composition See Page 9000.1

Fabrication History See Page 9000.1

Property Measurements

Test Type	Dynamic Tear	Position	1/2T
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Standard Method	*	Standard Year	*

Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
L-T ○	-50	35	10
L-T ○	-25	70	22
L-T ○	0	155	34
L-T ○	15	335	58
L-T ○	25	370	59
L-T ○	40	600	69
L-T ○	50	960	100
L-T ○	75	940	100
L-T ○	100	975	100
L-T ○	125	950	100
L-S △	-75	15	2
L-S △	-50	30	10
L-S △	-25	80	26
L-S △	0	190	30
L-S △	15	510	53
L-S △	20	2090	100
L-S △	25	1150	67
L-S △	35	2095	100
L-S △	50	2090	100
L-S △	75	2095	100
T-L ×	-50	35	14
T-L ×	-25	65	25
T-L ×	0	110	36
T-L ×	15	175	54
T-L ×	25	270	73
T-L ×	50	290	74
T-L ×	75	415	100
T-L ×	100	425	100
T-L ×	125	400	100
T-L ×	150	400	100
T-S □	-50	25	10
T-S □	-25	55	25
T-S □	0	150	43
T-S □	25	260	63

(continued)

* - not reported

Material A588

(continued)

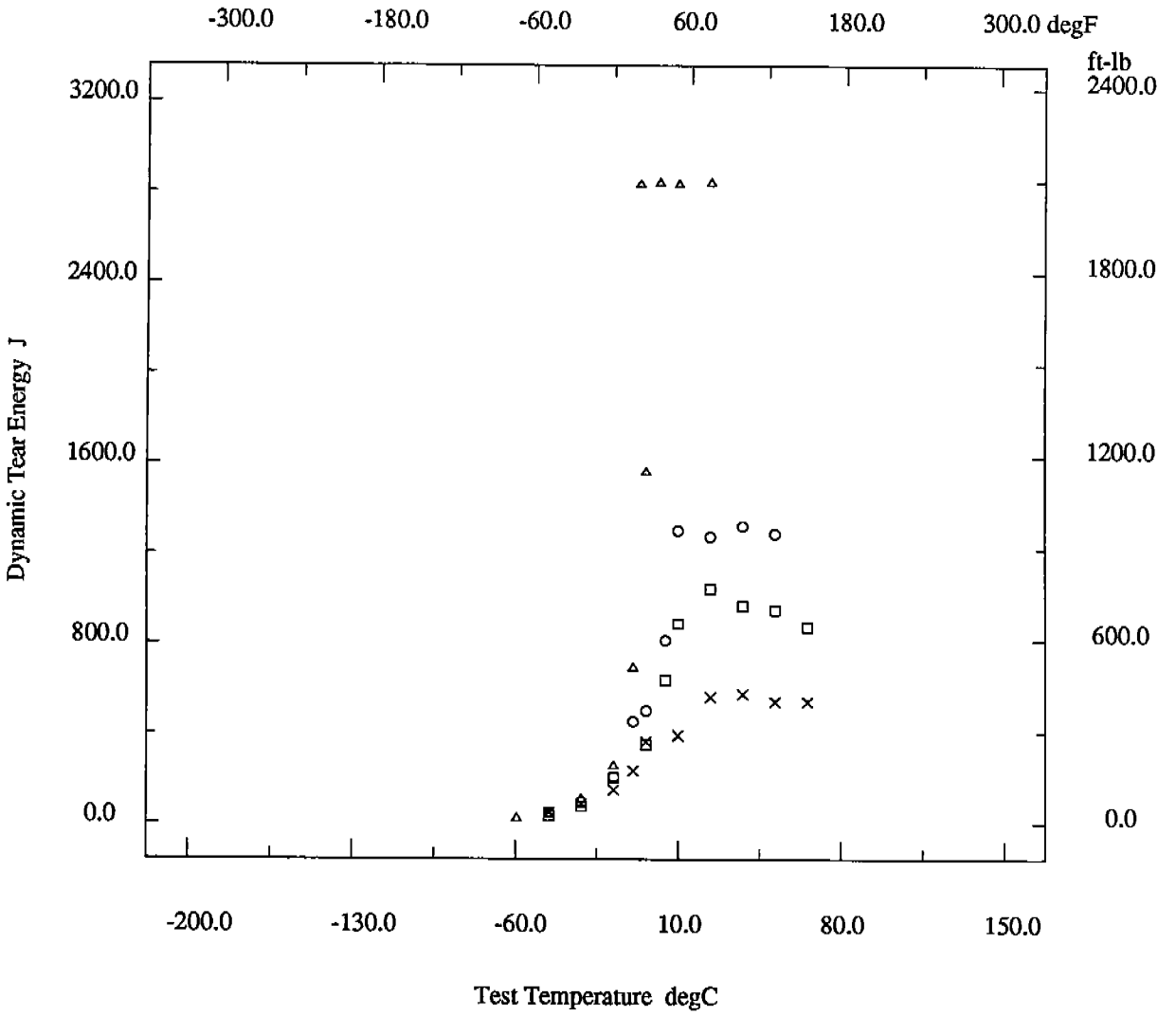
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-S □	40	470	77
T-S □	50	655	95
T-S □	75	770	100
T-S □	100	715	100
T-S □	125	700	100
T-S □	150	645	100

* - not reported

Material A588

Description

Material Code	012.003.01	Material Name	A588
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	D6274-4
Reference	1211		



* - not reported

Material A588

Description

Material Code	012.004.01	Material Name	A588
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	D6274-4
Reference	1211		

Composition

C	0.15 %	Mn	1.11 %
P	0.011 %	S	0.003 %
Si	0.46 %	Cr	0.59 %
Ni	0.19 %	Mo	0.048 %
V	0.081 %	Cu	0.29 %
Cb	*	Ti	*
B	*	Al	0.03 %
N	*	Other Components	None %

Fabrication History

Heat Treatment	N	Producer	Lukens
Year Produced	1980	Addl Info	*
Source	Lukens	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	N
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	1/2T
Specimen Type	Cylindrical	Specimen Thickness	0.252 in
Gage Length	1 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
L	80	79.8	52.9	56.1	32.5	77.0
L	80	80.2	53.4	56.4	34.0	76.4
T	80	77.8	52.6	55.0	31.2	73.8
T	80	79.7	53.8	54.6	33.4	75.0
S	80	77.8	52.1	53.6	32.7	67.3
S	80	78.1	52.9	53.6	30.0	64.8

* - not reported

Material A588

Description

Material Code	012.004.01	Material Name	A588
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	D6274-4
Reference	1211		

Composition

See Page 9100.1

Fabrication History

See Page 9100.1

Property Measurements

Test Type	Fracture Toughness	Position	1/2T
Specimen Type	Compact	Specimen Thickness	1.0 in
Crack Length	*	Loading Type	*
Loading Rate	*	KQ	*
KIc	*	Valid KIc?	*
Reason for Invalid	*	JIc	*
KJc	*	JIcpr	Per Standard
Curve Shape	*	Standard Method	E813
Standard Year	1987		

Orien	Test Temp degF	CODi in	CODIc in	JI in-lb/in2	Jmax in-lb/in2	Tear Mod in-lb/in**2
L-T	72	0.0186	0.0349	3841	4195	306.1
L-T	72	0.0236	0.0380	4346	4315	260.2
T-L	72	0.0167	0.0251	2568	2923	230.8
T-L	75	0.0171	0.0253	2724	2841	218.4
S-L	72	0.0118	0.0196	1786	2098	181.7
S-L	75	0.0131	0.0220	1971	2465	229.8

* - not reported

Material A588

Description

Material Code	012.004.01	Material Name	A588
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	D6274-4
Reference	1211		

Composition See Page 9100.1

Fabrication History See Page 9100.1

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	Full	Did Specimen Fracture?	*
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T ○	-160	6	5	0
L-T ○	-140	12	9	3
L-T ○	-120	63	51	12
L-T ○	-100	90	76	25
L-T ○	-80	95	81	25
L-T ○	-60	98	80	35
L-T ○	-50	107	86	37
L-T ○	-40	137	100	56
L-T ○	-20	130	96	50
L-T ○	0	184	89	79
L-T ○	10	203	89	100
L-T ○	20	104	77	47
L-T ○	40	185	95	100
L-T ○	60	229	92	100
L-T ○	75	175	92	100
L-T ○	100	239	93	100
L-S △	-160	5	1	0
L-S △	-140	54	44	8
L-S △	-130	63	52	12
L-S △	-100	60	50	10
L-S △	-80	50	40	14
L-S △	-60	78	66	25
L-S △	-40	111	86	37
L-S △	-20	118	90	39
L-S △	0	119	91	55
L-S △	20	145	89	66
L-S △	40	144	83	72
L-S △	60	167	87	90
L-S △	75	216	88	100
L-S △	100	226	79	100
L-S △	120	190	91	100
L-S △	140	223	72	100
T-L ×	-160	9	6	0
T-L ×	-140	57	46	12

(continued)

* - not reported

Material A588

(continued)

Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
T-L ×	-100	54	48	12
T-L ×	-80	68	58	20
T-L ×	-60	66	56	20
T-L ×	-40	74	60	25
T-L ×	-20	81	66	31
T-L ×	0	93	76	43
T-L ×	20	105	82	47
T-L ×	40	101	75	50
T-L ×	60	130	89	77
T-L ×	75	144	92	100
T-L ×	100	145	92	87
T-L ×	120	155	93	100
T-L ×	140	157	90	100
T-S □	-160	17	14	3
T-S □	-140	18	14	6
T-S □	-120	37	31	10
T-S □	-100	73	60	17
T-S □	-80	39	32	15
T-S □	-60	71	60	23
T-S □	-40	61	51	25
T-S □	-20	82	64	35
T-S □	0	74	58	36
T-S □	20	106	80	57
T-S □	40	122	81	75
T-S □	60	145	85	100
T-S □	75	139	88	82
T-S □	100	151	85	100
T-S □	120	139	86	100
T-S □	140	142	85	100
S-L +	-100	4	2	0
S-L +	-80	22	19	11
S-L +	-60	33	29	17
S-L +	-40	32	29	21
S-L +	-20	70	59	35
S-L +	-10	57	49	33
S-L +	0	30	33	30
S-L +	20	61	53	45
S-L +	40	79	65	52
S-L +	60	86	71	74
S-L +	75	102	77	81
S-L +	100	99	74	90
S-L +	120	110	82	100
S-L +	140	88	77	100
S-L +	160	121	88	100
S-L +	180	119	80	100
S-T ◇	-140	4	1	0
S-T ◇	-100	24	19	70

(continued)

* - not reported

Material A588

(continued)

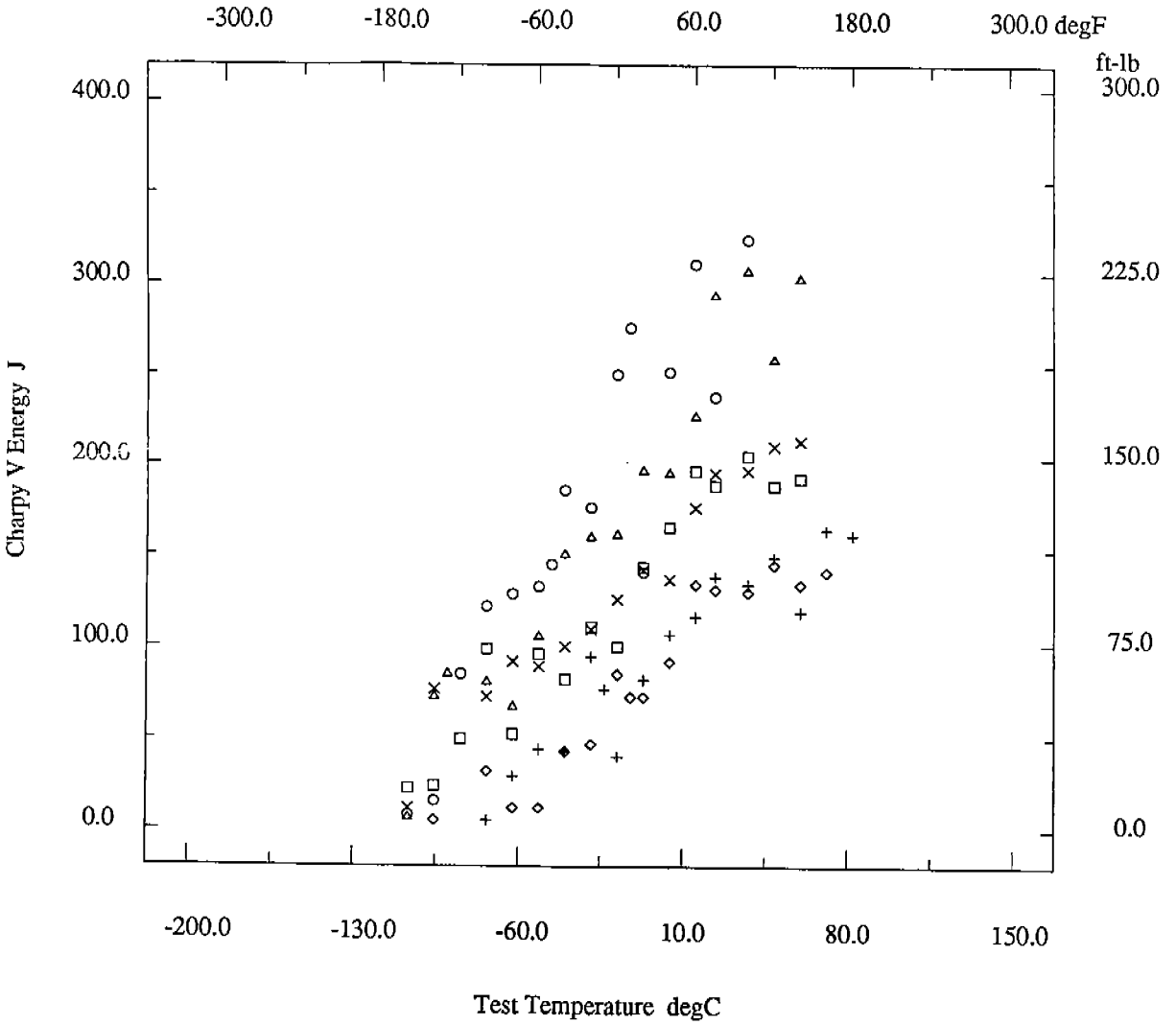
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
S-T ◇	-80	9	10	15
S-T ◇	-60	9	11	17
S-T ◇	-40	32	30	27
S-T ◇	-20	35	35	33
S-T ◇	0	63	50	45
S-T ◇	10	54	44	37
S-T ◇	20	54	45	42
S-T ◇	40	68	54	61
S-T ◇	60	99	74	79
S-T ◇	75	97	72	70
S-T ◇	100	96	80	99
S-T ◇	120	107	80	100
S-T ◇	140	99	79	100
S-T ◇	160	104	78	100

* - not reported

Material A588

Description

Material Code	012.004.01	Material Name	A588
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	D6274-4
Reference	1211		



* - not reported

Material A588

Description

Material Code	012.004.01	Material Name	A588
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	D6274-4
Reference	1211		

Composition

See Page 9100.1

Fabrication History

See Page 9100.1

Property Measurements

Test Type	Dynamic Tear	Position	1/2T
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Standard Method	*	Standard Year	*

Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
L-T ○	-50	55	17
L-T ○	-25	120	23
L-T ○	0	280	29
L-T ○	25	300	34
L-T ○	40	675	47
L-T ○	50	890	71
L-T ○	75	1115	79
L-T ○	100	1380	100
L-T ○	125	1320	100
L-T ○	150	1420	100
L-S △	-50	40	14
L-S △	-25	90	20
L-S △	0	260	34
L-S △	25	630	45
L-S △	40	700	43
L-S △	50	750	53
L-S △	60	1790	100
L-S △	75	1700	100
L-S △	100	1730	100
L-S △	125	1490	100
T-L ×	-50	35	9
T-L ×	-25	100	17
T-L ×	0	300	31
T-L ×	25	380	35
T-L ×	50	560	42
T-L ×	75	720	65
T-L ×	100	920	85
T-L ×	125	1000	100
T-L ×	150	1030	100
T-L ×	175	1005	100
T-S □	-50	30	13
T-S □	-25	95	19
T-S □	0	200	32
T-S □	25	550	33

* - not reported

(continued)

Material A588

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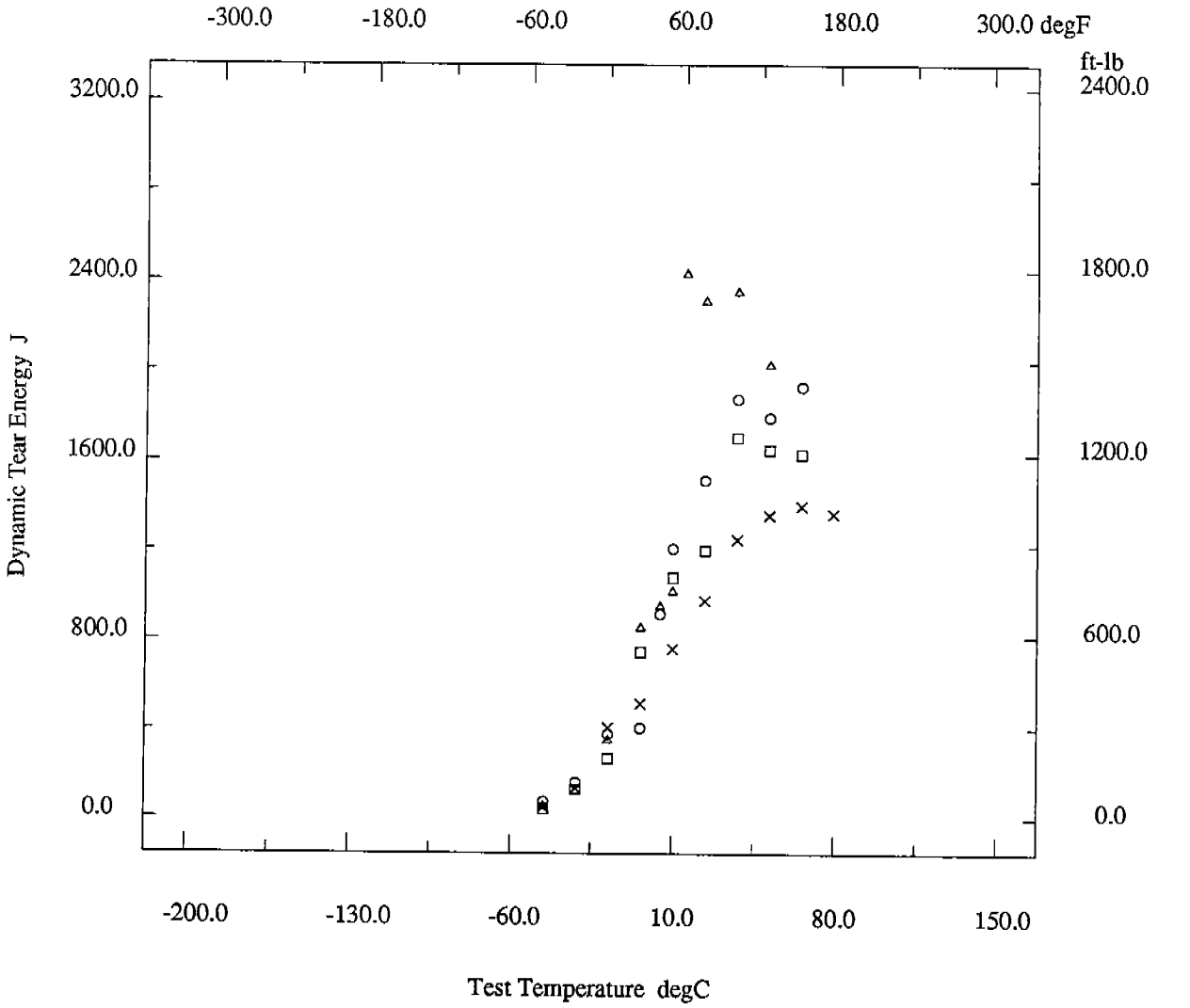
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-S □	50	795	54
T-S □	75	885	85
T-S □	100	1255	100
T-S □	125	1215	100
T-S □	150	1200	100

* - not reported

Material A588

Description

Material Code	012.004.01	Material Name	A588
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	*	Lot ID	D6274-4
Reference	1211		



* - not reported

Material A588 GrA

Description

Material Code	012.005.010A	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

C	0.200 %	Mn	1.000 %
P	0.007 %	S	0.026 %
Si	0.460 %	Cr	0.610 %
Ni	0.200 %	Mo	0.030 %
V	0.087 %	Cu	0.330 %
Cb	<0.005 %	Ti	*
B	*	Al	0.024 %
N	0.007 %	Other Components	*

Fabrication History

Heat Treatment	*	Producer	US Steel
Year Produced	*	Addl Info	*
Source	US Steel	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	N
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	1/4T
Orientation	*	Specimen Type	Cylindrical
Specimen Thickness	0.357 in	Gage Length	1.4 in
Loading Rate	*	Tensile Strength Offset	0.2 %
Uniform Elongation	*	Tensile Modulus	*
Standard Method	*	Standard Year	*

Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
Room	92.1	63.4	*	28.1	67.3

* - not reported

Material A588 GrA

Description

Material Code	012.005.09AA	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

See Page 9200.1

Fabrication History

See Page 9200.1

Weld

Weld Code	012.005.09AA	Weld Type	SMA
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	330 degF	Passes	19
Filler Specification	E8018C-2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

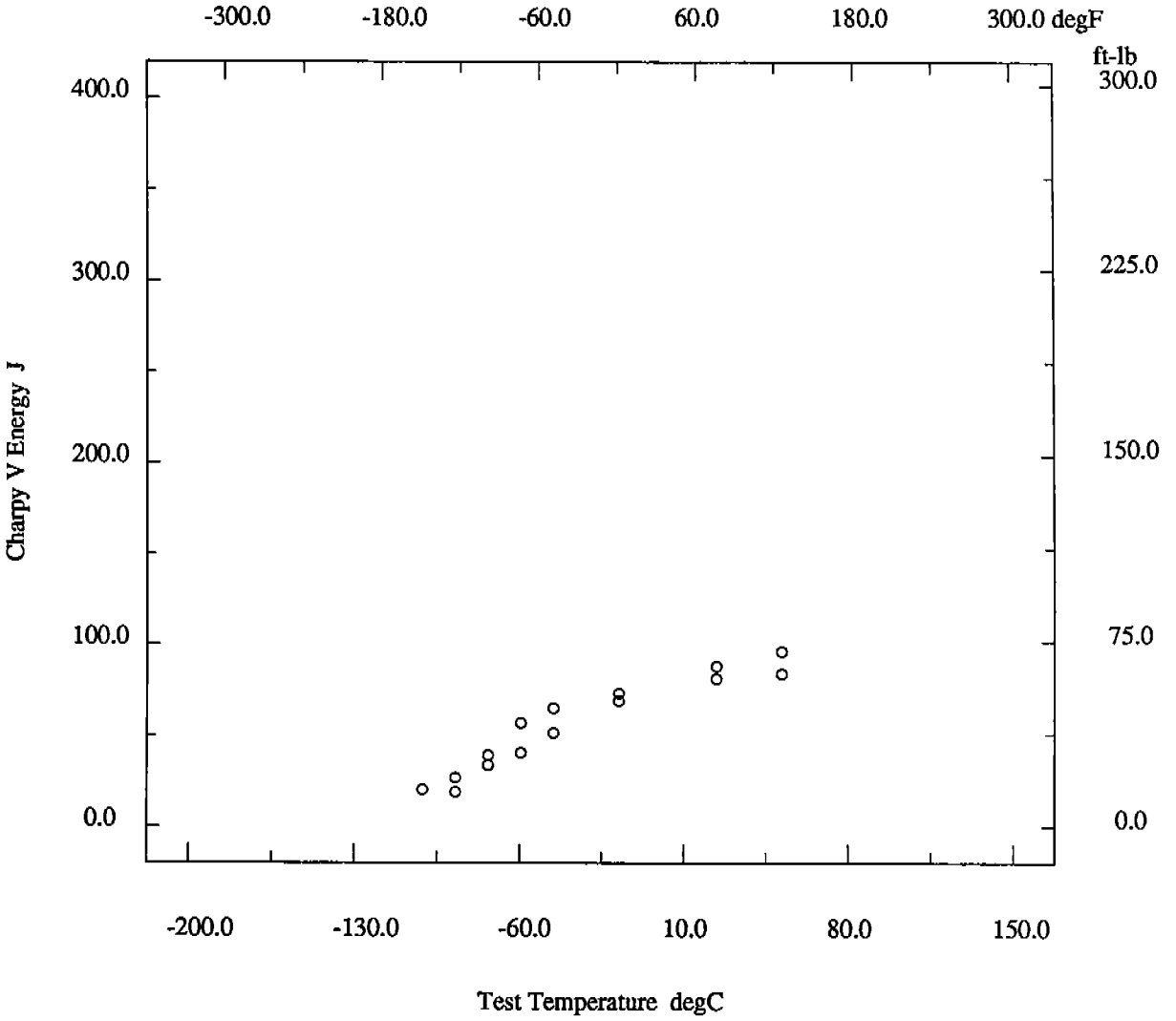
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-150	15	17	20
L-T °	-125	14	12	40
L-T °	-125	20	17	40
L-T °	-100	25	19	40
L-T °	-100	29	29	45
L-T °	-75	30	28	45
L-T °	-75	42	33	50
L-T °	-50	38	33	60
L-T °	-50	48	40	65
L-T °	0	51	50	80
L-T °	0	54	46	80
L-T °	75	60	56	98
L-T °	75	65	66	98
L-T °	125	62	59	78
L-T °	125	71	72	78

* - not reported

Material A588 GrA

Description

Material Code	012.005.09AA	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A588 GrA

Description

Material Code	012.005.02AA	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

See Page 9200.1

Fabrication History

See Page 9200.1

Weld

Weld Code	012.005.02AA	Weld Type	SMA
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	330 degF	Passes	19
Filler Specification	E8018C-2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

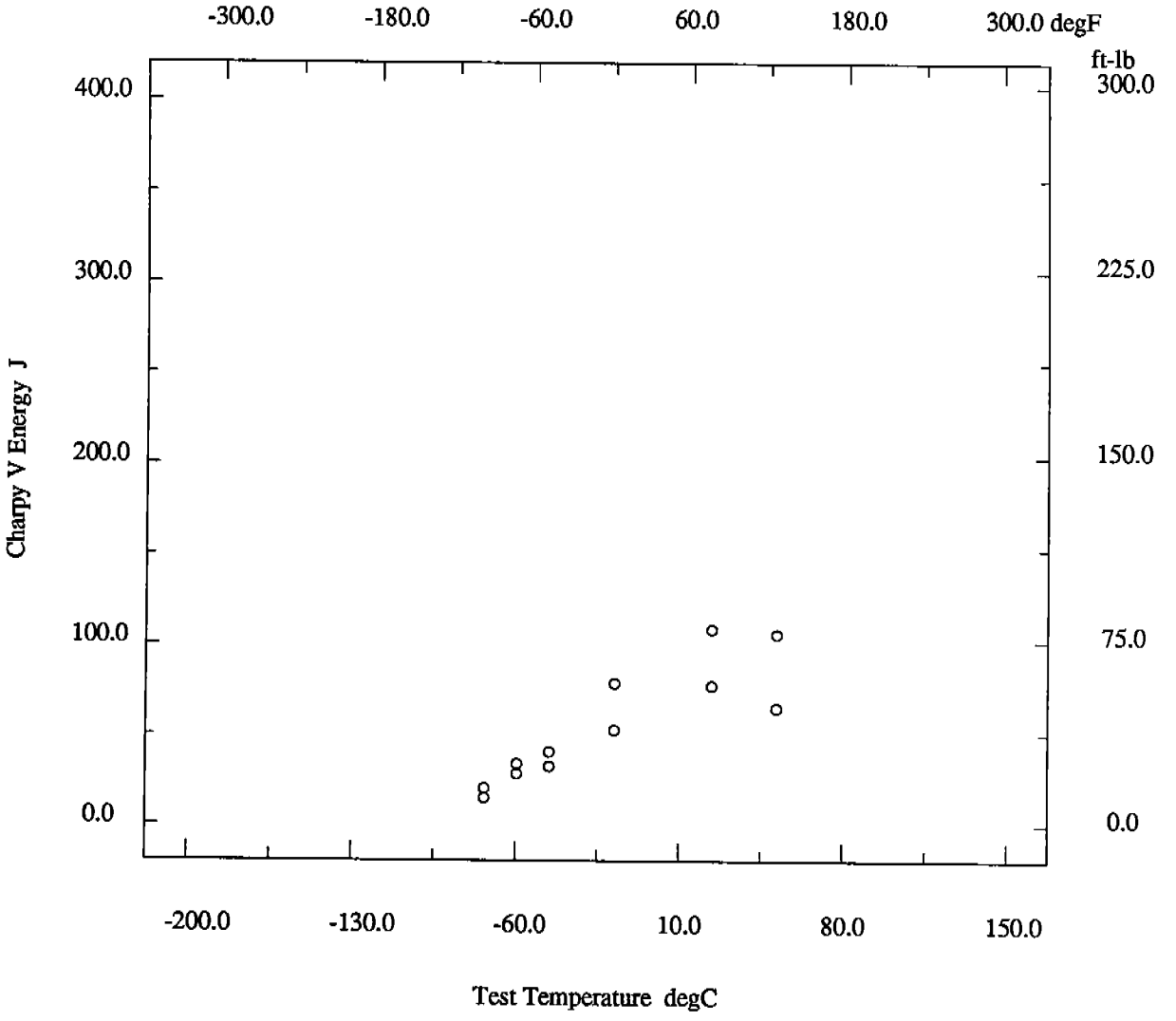
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T o	-100	11	6	10
L-T o	-100	15	9	20
L-T o	-75	21	15	40
L-T o	-75	25	14	45
L-T o	-50	24	21	50
L-T o	-50	30	24	50
L-T o	0	39	24	60
L-T o	0	58	32	60
L-T o	75	57	40	98
L-T o	75	80	47	98
L-T o	125	48	34	98
L-T o	125	78	45	98

* - not reported

Material A588 GrA

Description

Material Code	012.005.02AA	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A588 GrA

Description

Material Code	012.005.09AS1	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 9200.1

Fabrication History See Page 9200.1

Weld

Weld Code	012.005.09AS1	Weld Type	SMA
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	330 degF	Passes	19
Filler Specification	E8018C-2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	1100 degF	Post-Weld Heat Time	1 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

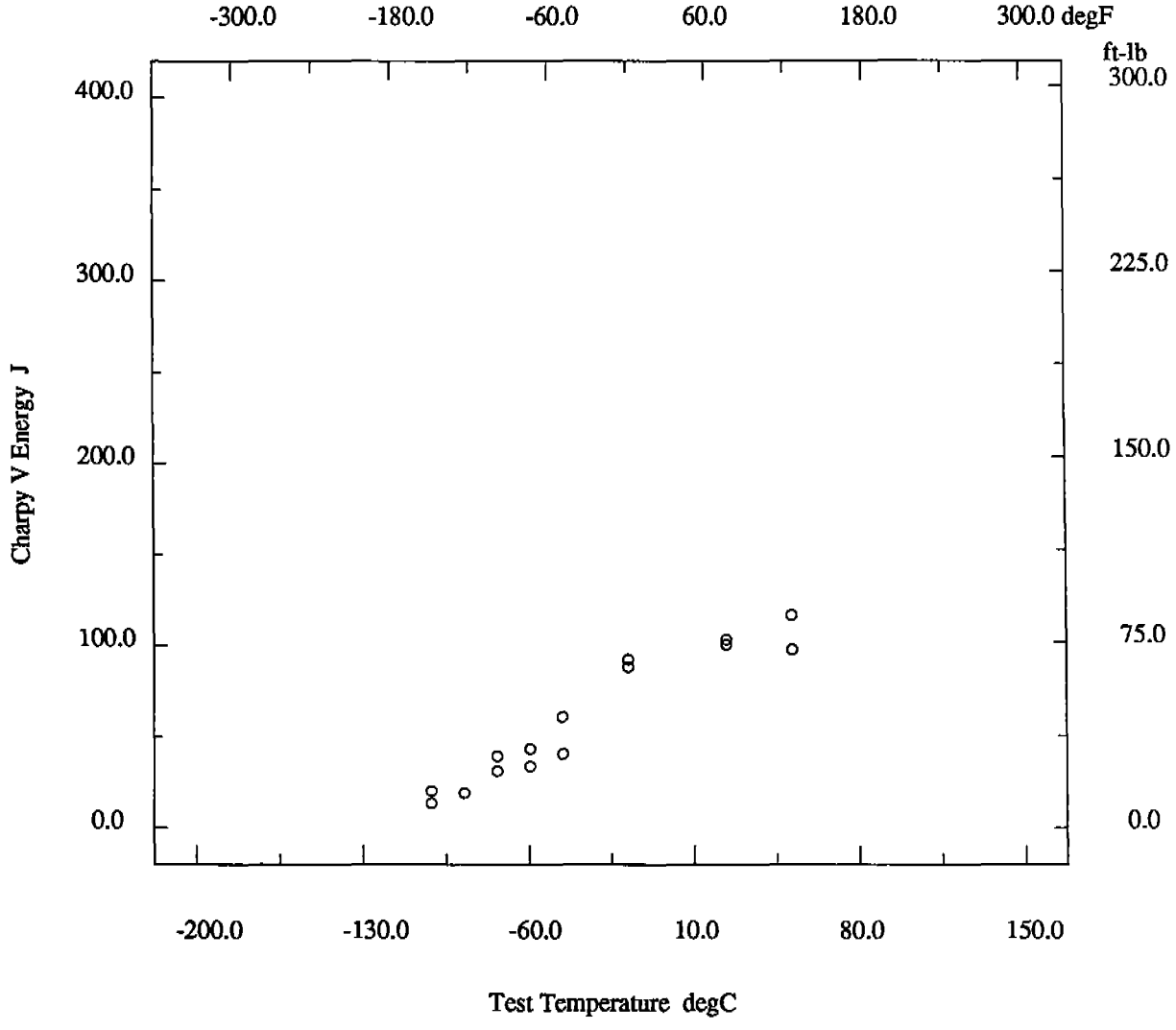
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-150	10	8	10
L-T °	-150	15	9	10
L-T °	-125	14	15	20
L-T °	-100	23	21	40
L-T °	-100	29	25	40
L-T °	-75	25	24	40
L-T °	-75	32	28	45
L-T °	-50	30	41	40
L-T °	-50	45	35	50
L-T °	0	65	56	70
L-T °	0	68	56	70
L-T °	75	74	65	98
L-T °	75	76	72	98
L-T °	125	72	70	98
L-T °	125	86	82	98

* - not reported

Material A588 GrA

Description

Material Code	012.005.09AS1	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A588 GrA

Description

Material Code	012.005.02AS1	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 9200.1

Fabrication History See Page 9200.1

Weld

Weld Code	012.005.02AS1	Weld Type	SMA
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	330 degF	Passes	19
Filler Specification	E8018C-2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	1100 degF	Post-Weld Heat Time	1 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

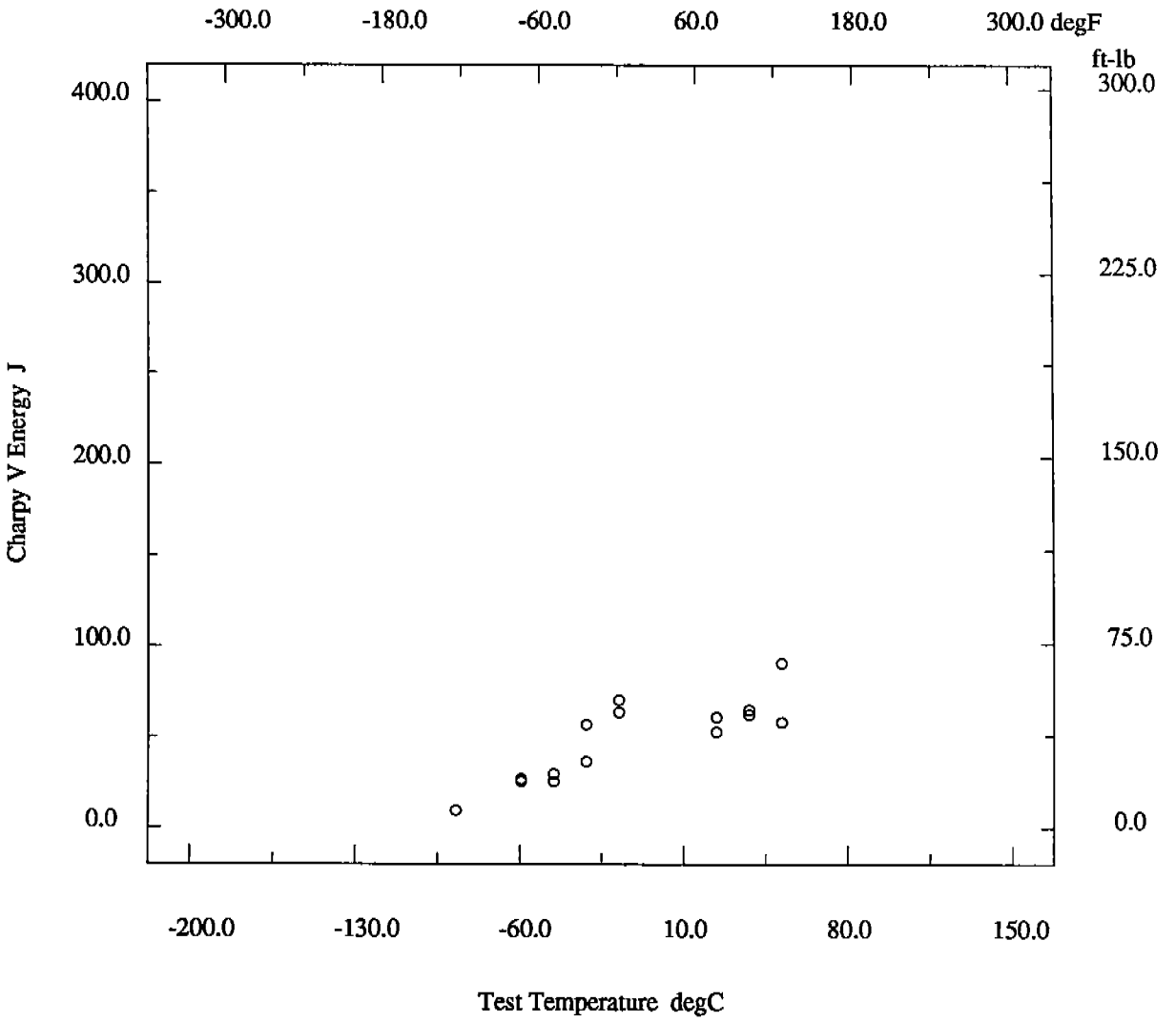
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-125	7	2	5
L-T °	-75	19	12	35
L-T °	-75	20	11	30
L-T °	-50	19	15	40
L-T °	-50	22	16	45
L-T °	-25	27	14	50
L-T °	-25	42	26	50
L-T °	0	47	30	60
L-T °	0	52	34	70
L-T °	75	39	31	90
L-T °	75	45	33	95
L-T °	100	46	45	95
L-T °	100	48	40	95
L-T °	125	43	35	98
L-T °	125	67	61	98

* - not reported

Material A588 GrA

Description

Material Code	012.005.02AS1	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A588 GrA

Description

Material Code	012.005.09AS2	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

See Page 9200.1

Fabrication History

See Page 9200.1

Weld

Weld Code	012.005.09AS2	Weld Type	SMA
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	330 degF	Passes	19
Filler Specification	E8018C-2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	1100 degF	Post-Weld Heat Time	5 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

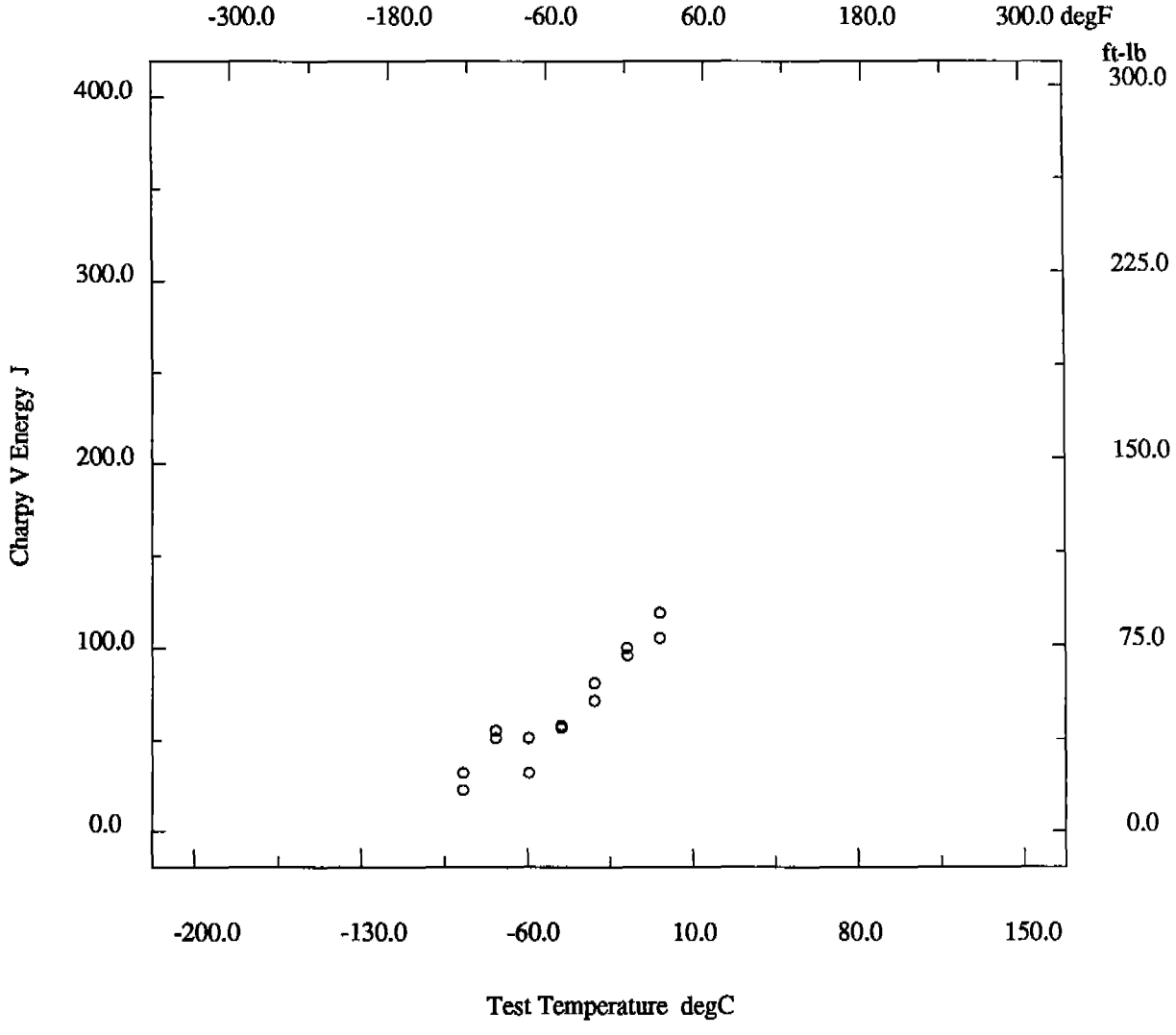
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T o	-125	17	18	25
L-T o	-125	24	24	25
L-T o	-100	38	22	25
L-T o	-100	41	33	30
L-T o	-75	24	26	35
L-T o	-75	38	33	45
L-T o	-50	42	44	45
L-T o	-50	43	43	45
L-T o	-25	53	47	60
L-T o	-25	60	58	75
L-T o	0	71	60	75
L-T o	0	74	57	70
L-T o	25	78	67	95
L-T o	25	88	73	100

* - not reported

Material A588 GrA

Description

Material Code	012.005.09AS2	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A588 GrA

Description

Material Code	012.005.02AS2	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

See Page 9200.1

Fabrication History

See Page 9200.1

Weld

Weld Code	012.005.02AS2	Weld Type	SMA
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	330 degF	Passes	19
Filler Specification	E8018C-2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	1100 degF	Post-Weld Heat Time	5 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

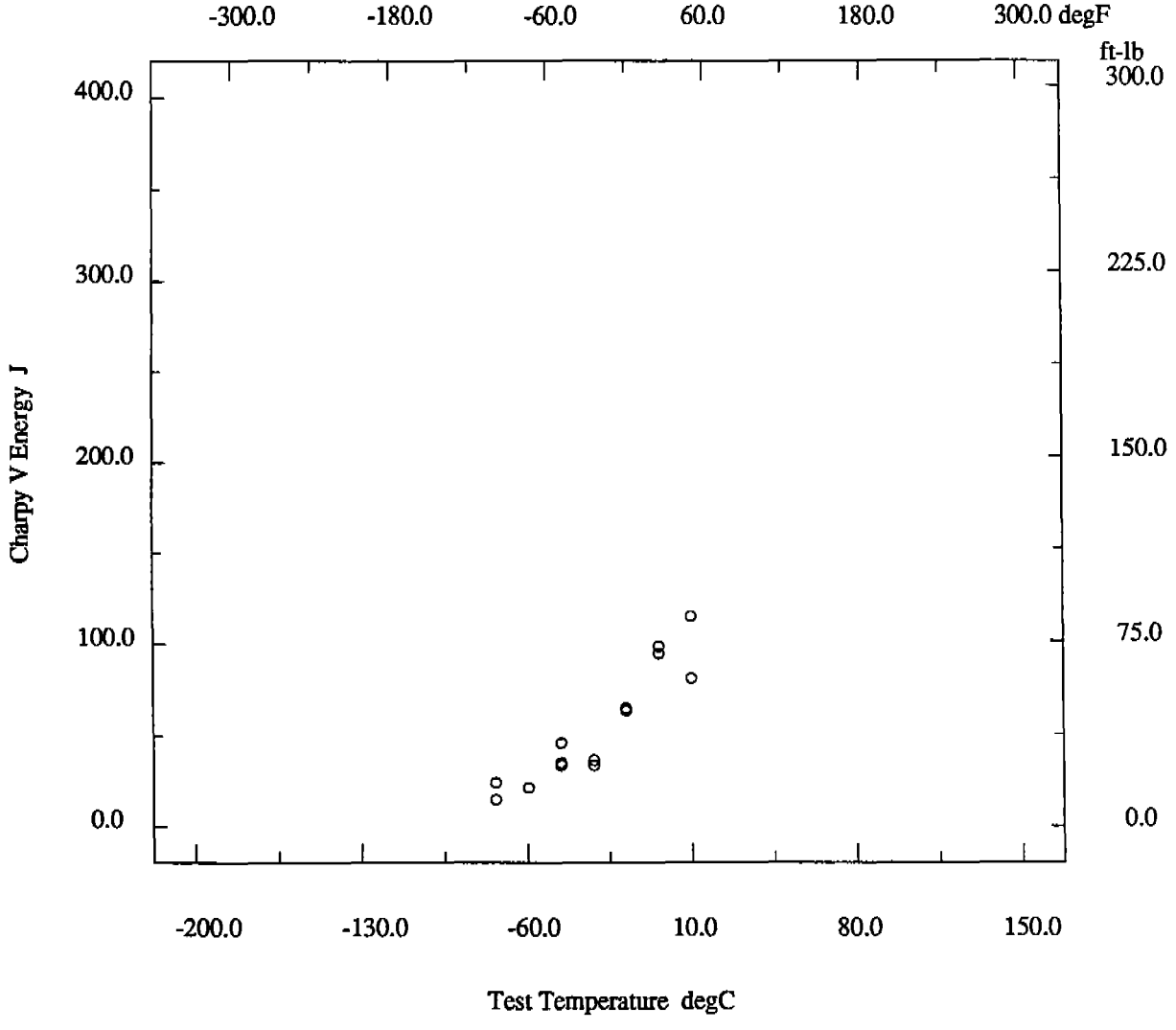
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-100	11	10	20
L-T °	-100	18	18	20
L-T °	-75	16	11	25
L-T °	-75	16	14	30
L-T °	-50	25	22	45
L-T °	-50	26	24	40
L-T °	-50	34	28	50
L-T °	-25	25	22	35
L-T °	-25	27	25	35
L-T °	0	47	35	75
L-T °	0	48	39	60
L-T °	25	70	52	95
L-T °	25	73	50	60
L-T °	50	60	46	85
L-T °	50	85	58	100

* - not reported

Material A588 GrA

Description

Material Code	012.005.02AS2	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A588 GrA

Description

Material Code	012.005.09AS3	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 9200.1

Fabrication History See Page 9200.1

Weld

Weld Code	012.005.09AS3	Weld Type	SMA
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	330 degF	Passes	19
Filler Specification	E8018C-2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	1200 degF	Post-Weld Heat Time	1 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

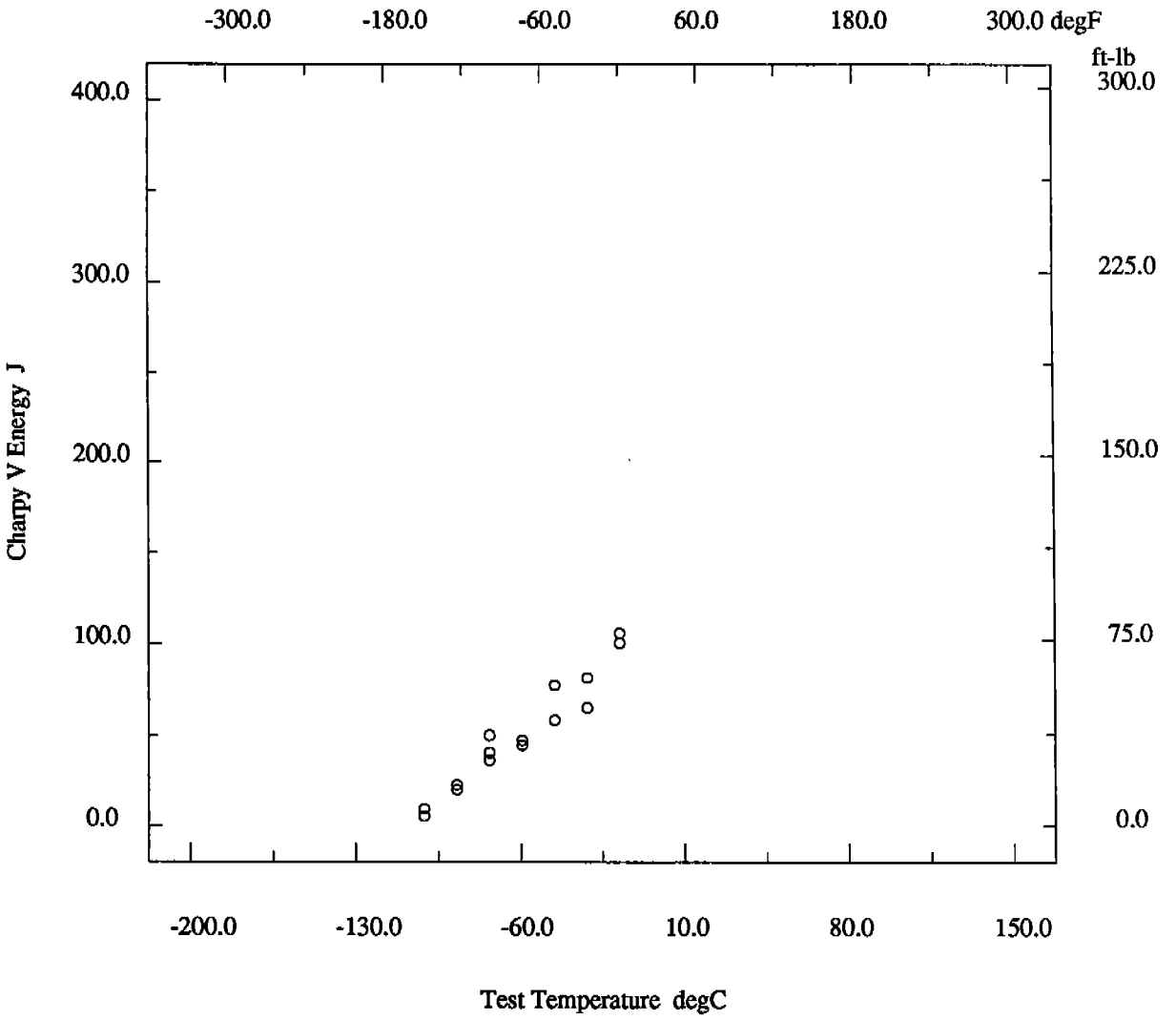
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-150	4	6	10
L-T °	-150	7	10	10
L-T °	-125	15	17	20
L-T °	-125	17	19	15
L-T °	-100	27	27	30
L-T °	-100	30	29	25
L-T °	-100	37	24	35
L-T °	-75	33	30	30
L-T °	-75	35	30	30
L-T °	-50	43	40	45
L-T °	-50	57	55	50
L-T °	-25	48	47	60
L-T °	-25	60	54	60
L-T °	0	74	67	90
L-T °	0	78	54	90

* - not reported

Material A588 GrA

Description

Material Code	012.005.09AS3	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A588 GrA

Description

Material Code	012.005.02AS3	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 9200.1

Fabrication History See Page 9200.1

Weld

Weld Code	012.005.02AS3	Weld Type	SMA
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	330 degF	Passes	19
Filler Specification	E8018C-2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	1200 degF	Post-Weld Heat Time	1 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

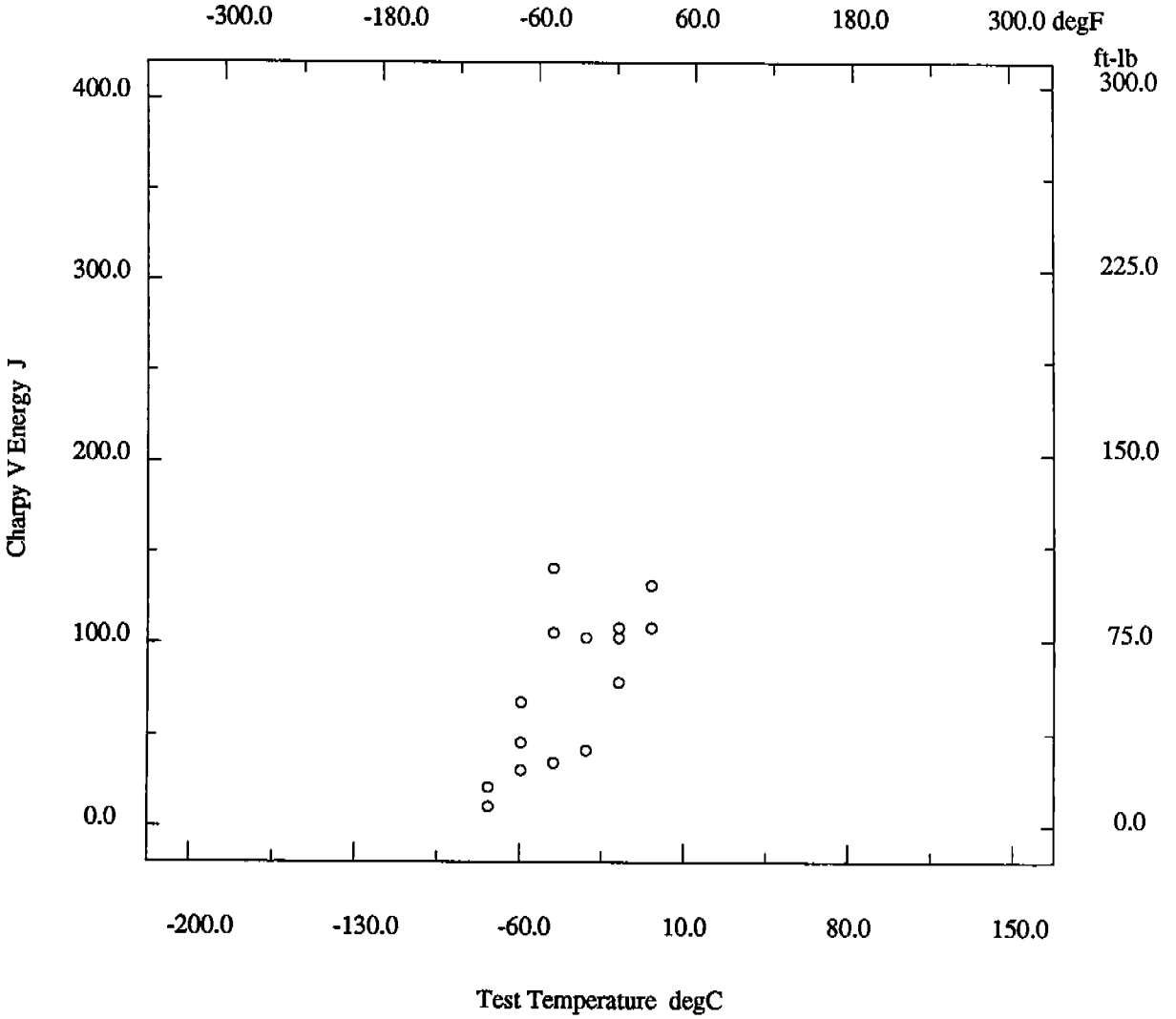
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-100	16	11	25
L-T °	-100	8	10	20
L-T °	-75	23	20	40
L-T °	-75	34	22	35
L-T °	-75	50	32	35
L-T °	-50	104	57	60
L-T °	-50	26	50	45
L-T °	-50	78	53	55
L-T °	-25	31	28	55
L-T °	-25	76	55	75
L-T °	0	58	46	75
L-T °	0	76	52	80
L-T °	0	80	56	95
L-T °	25	80	59	99
L-T °	25	97	68	100

* - not reported

Material A588 GrA

Description

Material Code	012.005.02AS3	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A588 GrA

Description

Material Code	012.005.09AS4	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

See Page 9200.1

Fabrication History

See Page 9200.1

Weld

Weld Code	012.005.09AS4	Weld Type	SMA
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	330 degF	Passes	19
Filler Specification	E8018C-2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	1200 degF	Post-Weld Heat Time	5 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

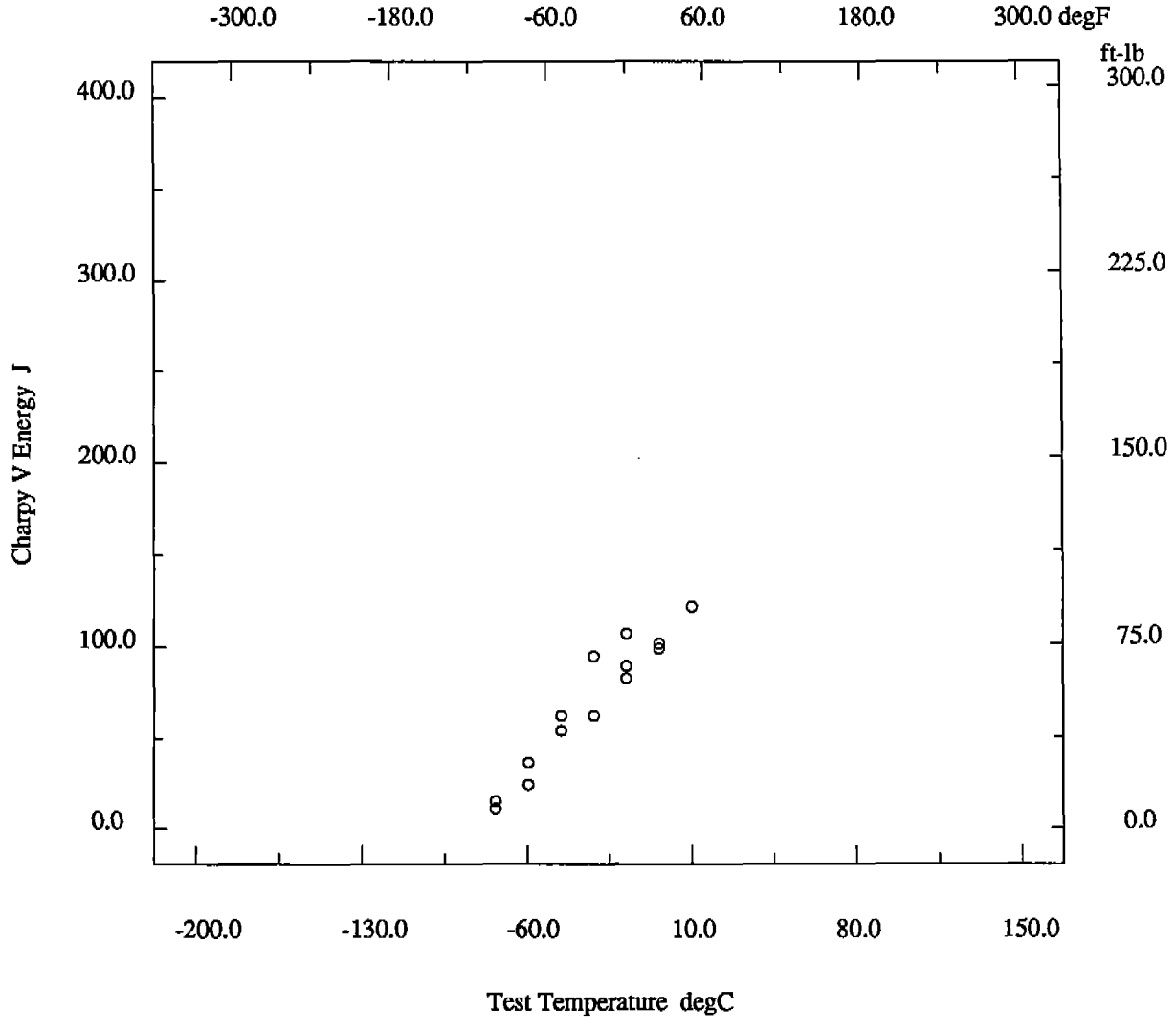
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-100	11	13	20
L-T °	-100	8	13	15
L-T °	-75	18	20	25
L-T °	-75	27	30	25
L-T °	-50	40	41	50
L-T °	-50	46	43	45
L-T °	-25	46	46	55
L-T °	-25	70	63	75
L-T °	0	61	53	70
L-T °	0	66	51	80
L-T °	0	79	68	85
L-T °	25	73	65	85
L-T °	25	75	68	85
L-T °	50	90	75	98
L-T °	50	90	83	98

* - not reported

Material A588 GrA

Description

Material Code	012.005.09AS4	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A588 GrA

Description

Material Code	012.005.02AS4	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

See Page 9200.1

Fabrication History

See Page 9200.1

Weld

Weld Code	012.005.02AS4	Weld Type	SMA
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	0 in
Interpass Temperature	330 degF	Passes	19
Filler Specification	E8018C-2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	1200 degF	Post-Weld Heat Time	5 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

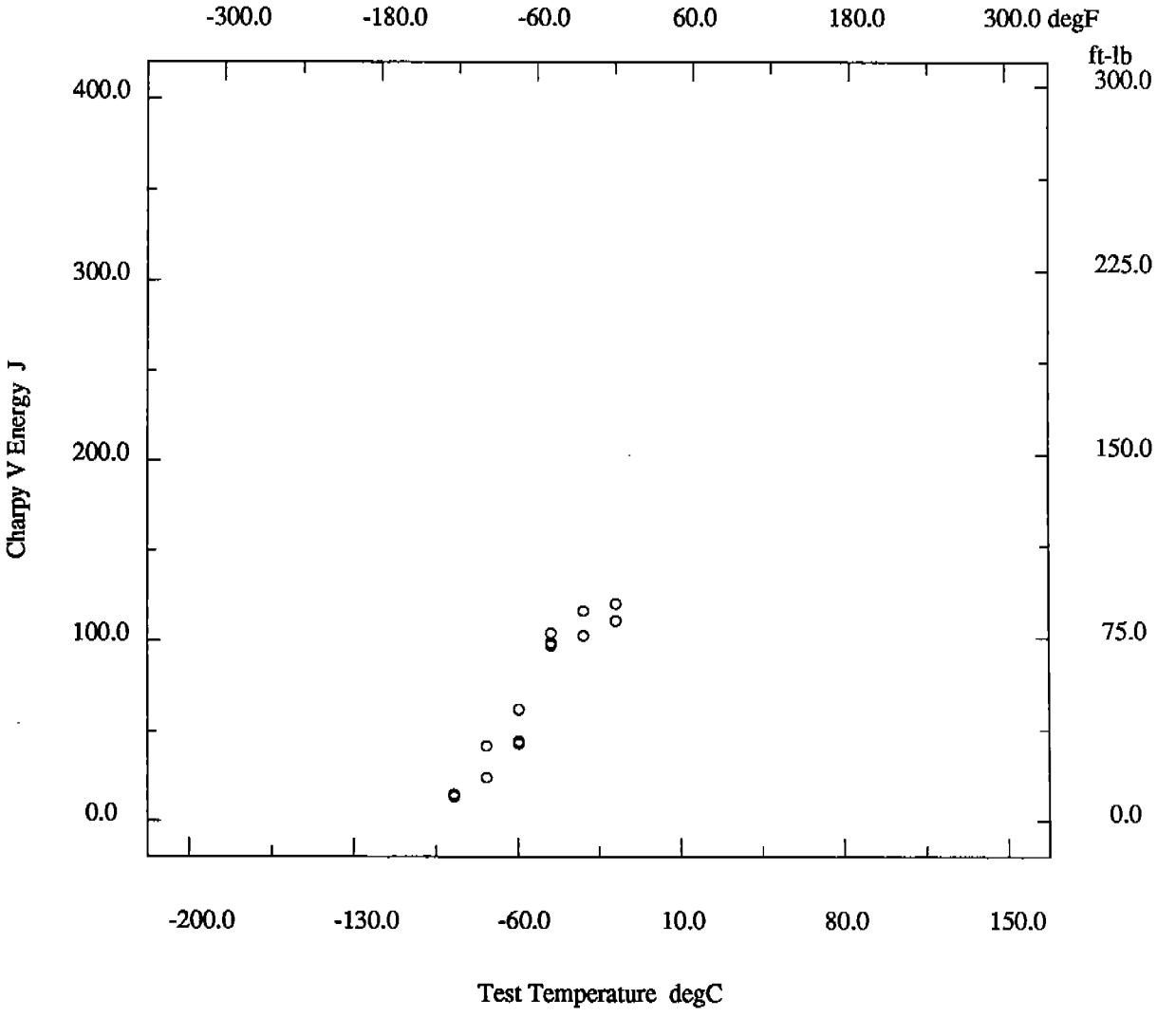
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-125	10	12	15
L-T °	-125	11	11	10
L-T °	-100	18	13	25
L-T °	-100	18	15	30
L-T °	-100	31	22	25
L-T °	-75	32	30	45
L-T °	-75	33	24	40
L-T °	-75	46	27	35
L-T °	-50	72	52	80
L-T °	-50	73	51	75
L-T °	-50	77	53	65
L-T °	-25	76	54	75
L-T °	-25	86	56	80
L-T °	0	82	55	90
L-T °	0	89	66	100

* - not reported

Material A588 GrA

Description

Material Code	012.005.02AS4	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A588 GrA

Description

Material Code	012.005.09BA	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

C	0.20 %	Mn	1.00 %
P	0.007 %	S	0.026 %
Si	0.46 %	Cr	0.61 %
Ni	0.20 %	Mo	0.03 %
V	0.087 %	Cu	0.33 %
Cb	<0.005 %	Ti	*
B	*	Al	0.024 %
N	0.007 %	Other Components	*

Fabrication History

Heat Treatment	*	Producer	US Steel
Year Produced	*	Addl Info	*
Source	US Steel	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	N
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Weld

Weld Code	012.005.09BA	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	5/16 in
Interpass Temperature	350 degF	Passes	9
Filler Specification	E72-EW-W	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

(continued)

* - not reported

Material A588 GrA

(continued)

Property Measurements

Test Type ..... Charpy V Impact
Specimen Type ..... Full
Did Specimen Split? ..... *
Standard Year ..... *
Position 3/4T
Did Specimen Fracture? ..... Assumed
Standard Method ..... *

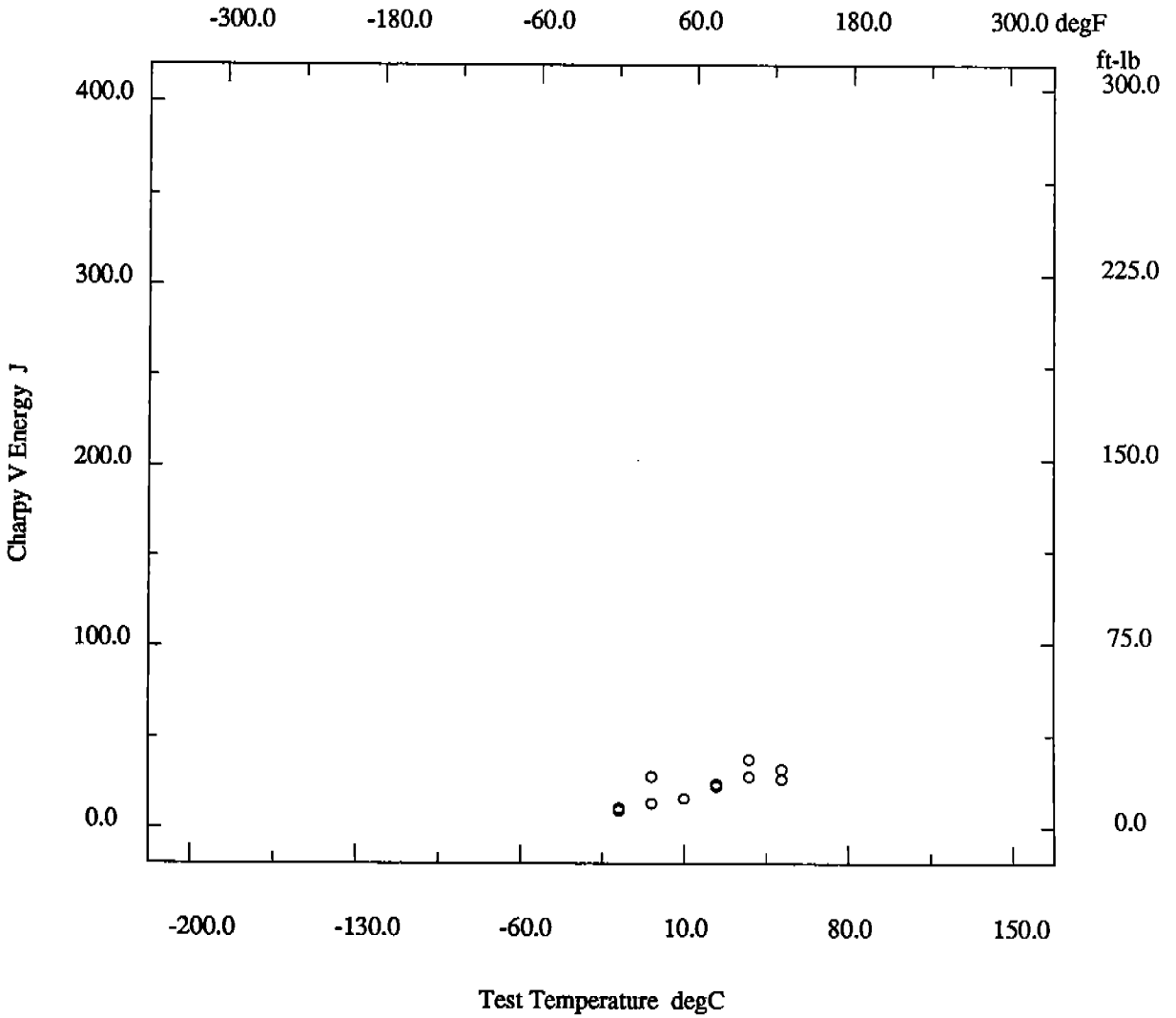
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T o	0	7	8	20
L-T o	0	8	7	20
L-T o	25	10	15	40
L-T o	25	21	21	30
L-T o	50	12	11	45
L-T o	50	12	13	40
L-T o	75	17	20	45
L-T o	75	18	26	60
L-T o	100	21	29	50
L-T o	100	28	32	50
L-T o	125	20	31	60
L-T o	125	24	32	70

* - not reported

Material A588 GrA

Description

Material Code	012.005.09BA	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A588 GrA

Description

Material Code	012.005.02BA	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 9300.1

Fabrication History See Page 9300.1

Weld

Weld Code	012.005.02BA	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	5/16 in
Interpass Temperature	350 degF	Passes	9
Filler Specification	E72-EW-W	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

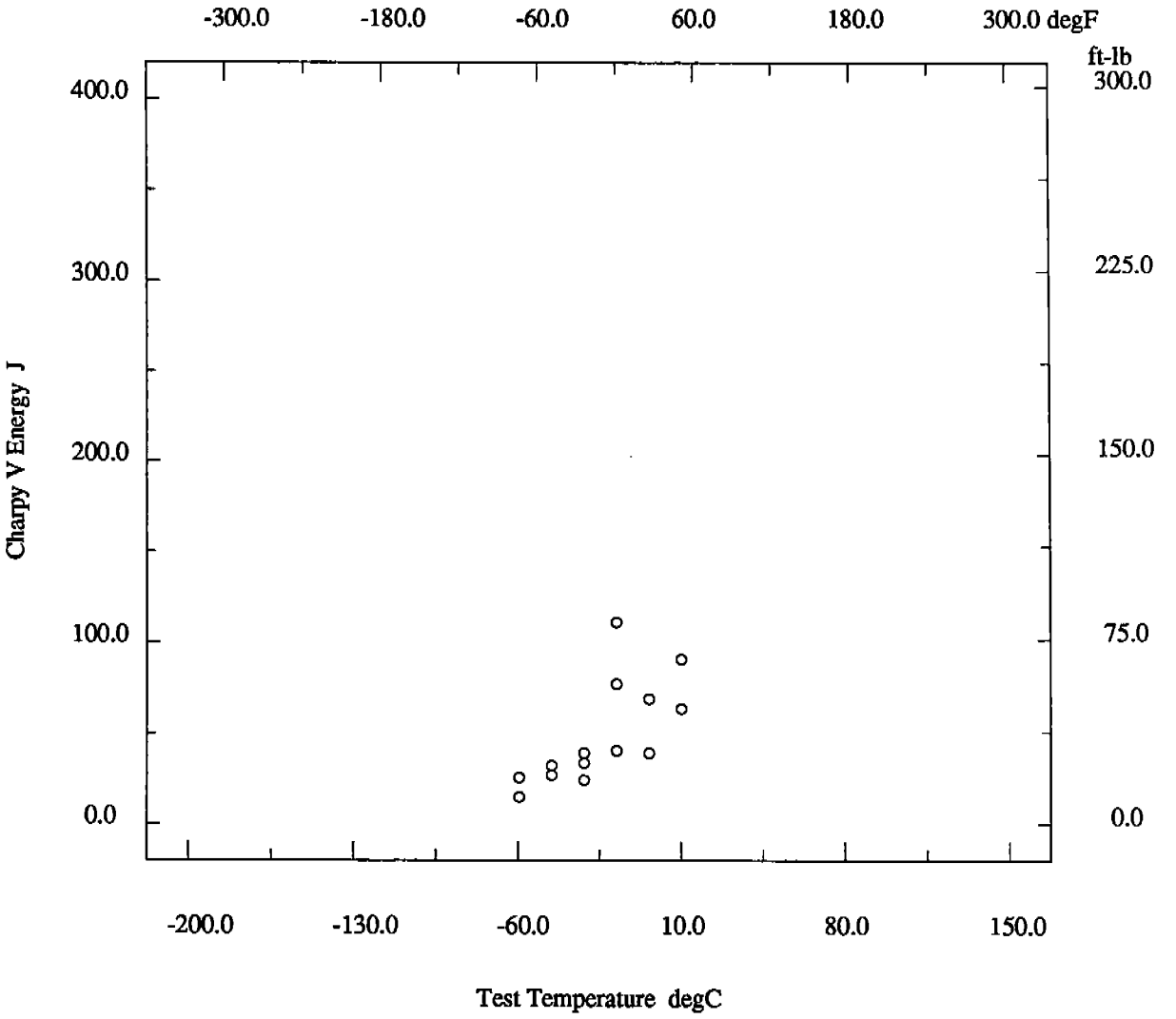
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-75	11	13	5
L-T °	-75	19	13	5
L-T °	-50	20	9	5
L-T °	-50	24	20	5
L-T °	-25	18	14	30
L-T °	-25	25	16	30
L-T °	-25	29	14	20
L-T °	0	30	18	35
L-T °	0	57	38	40
L-T °	0	82	52	50
L-T °	25	29	26	40
L-T °	25	51	36	40
L-T °	50	47	43	50
L-T °	50	67	51	50

* - not reported

Material A588 GrA

Description

Material Code	012.005.02BA	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A588 GrA

Description

Material Code	012.005.09BS1	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

See Page 9300.1

Fabrication History

See Page 9300.1

Weld

Weld Code	012.005.09BS1	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	5/16 in
Interpass Temperature	350 degF	Passes	9
Filler Specification	E72-EW-W	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1100 degF	Post-Weld Heat Time	1 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

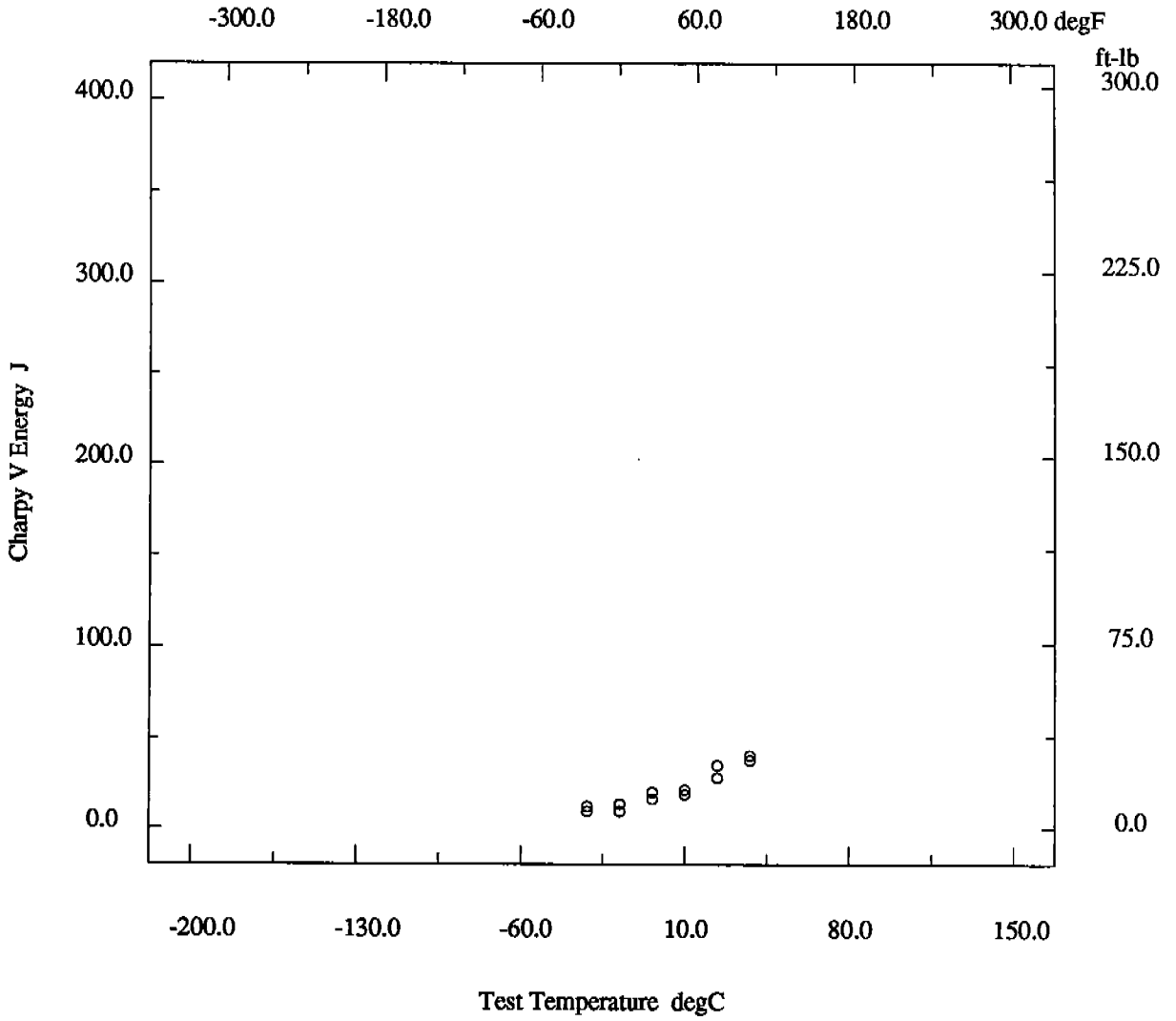
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-25	7	6	10
L-T °	-25	9	10	20
L-T °	0	10	11	10
L-T °	0	7	7	10
L-T °	25	12	14	40
L-T °	25	15	17	50
L-T °	50	14	20	40
L-T °	50	16	20	45
L-T °	75	21	30	70
L-T °	75	26	54	70
L-T °	100	28	34	75
L-T °	100	30	39	80

* - not reported

Material A588 GrA

Description

Material Code	012.005.09BS1	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A588 GrA

Description

Material Code	012.005.02BS1	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 9300.1

Fabrication History See Page 9300.1

Weld

Weld Code	012.005.02BS1	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	5/16 in
Interpass Temperature	350 degF	Passes	9
Filler Specification	E72-EW-W	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1100 degF	Post-Weld Heat Time	1 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

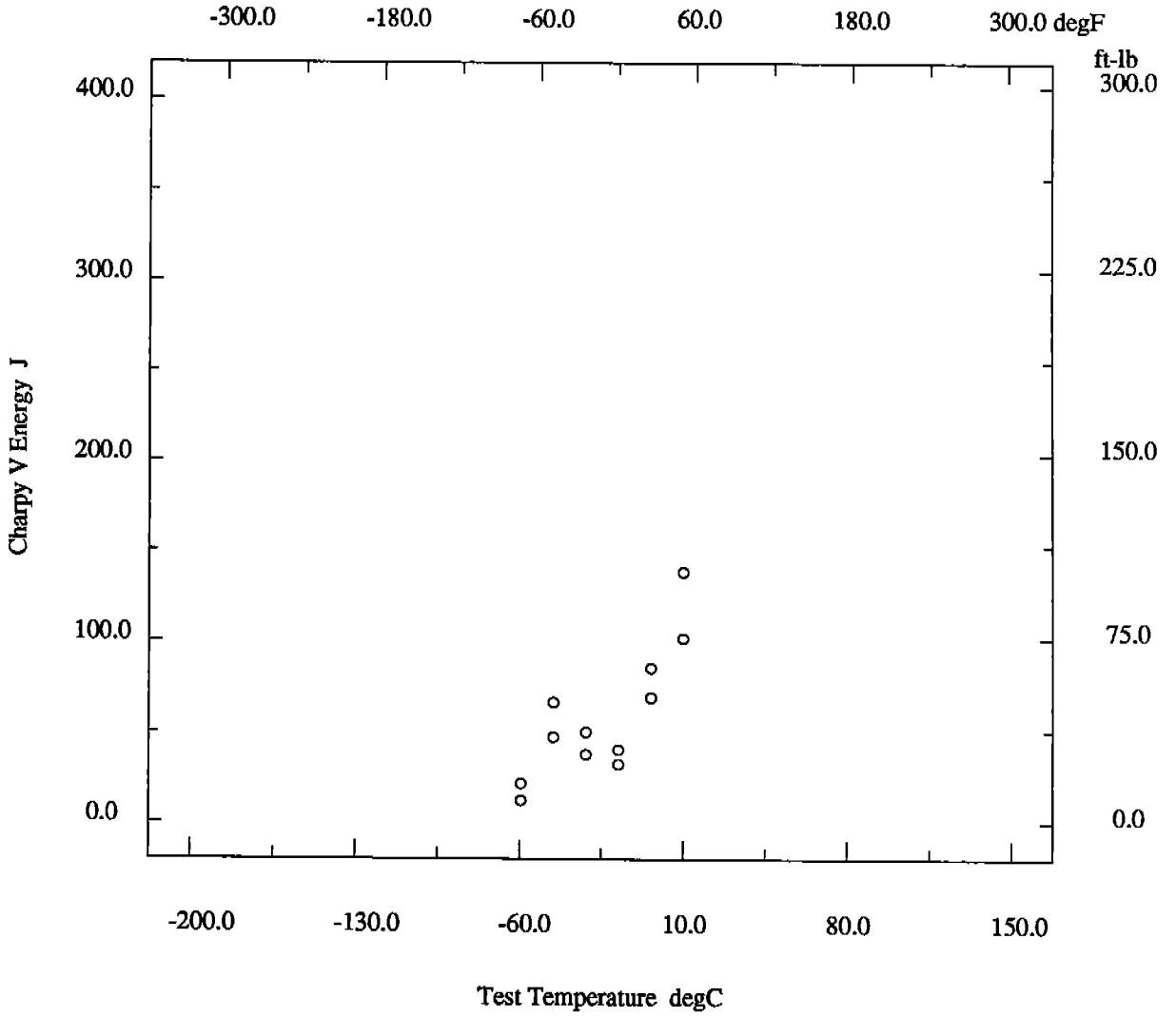
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T o	-75	16	8	5
L-T o	-75	9	6	5
L-T o	-50	35	26	55
L-T o	-50	49	32	55
L-T o	-25	28	25	70
L-T o	-25	37	23	10
L-T o	0	24	15	20
L-T o	0	30	20	30
L-T o	25	51	31	40
L-T o	25	63	47	50
L-T o	50	102	62	98
L-T o	50	75	56	70

* - not reported

Material A588 GrA

Description

Material Code	012.005.02BS1	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A588 GrA

Description

Material Code	012.005.09BS2	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

See Page 9300.1

Fabrication History

See Page 9300.1

Weld

Weld Code	012.005.09BS2	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	5/16 in
Interpass Temperature	350 degF	Passes	9
Filler Specification	E72-EW-W	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1100 degF	Post-Weld Heat Time	5 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

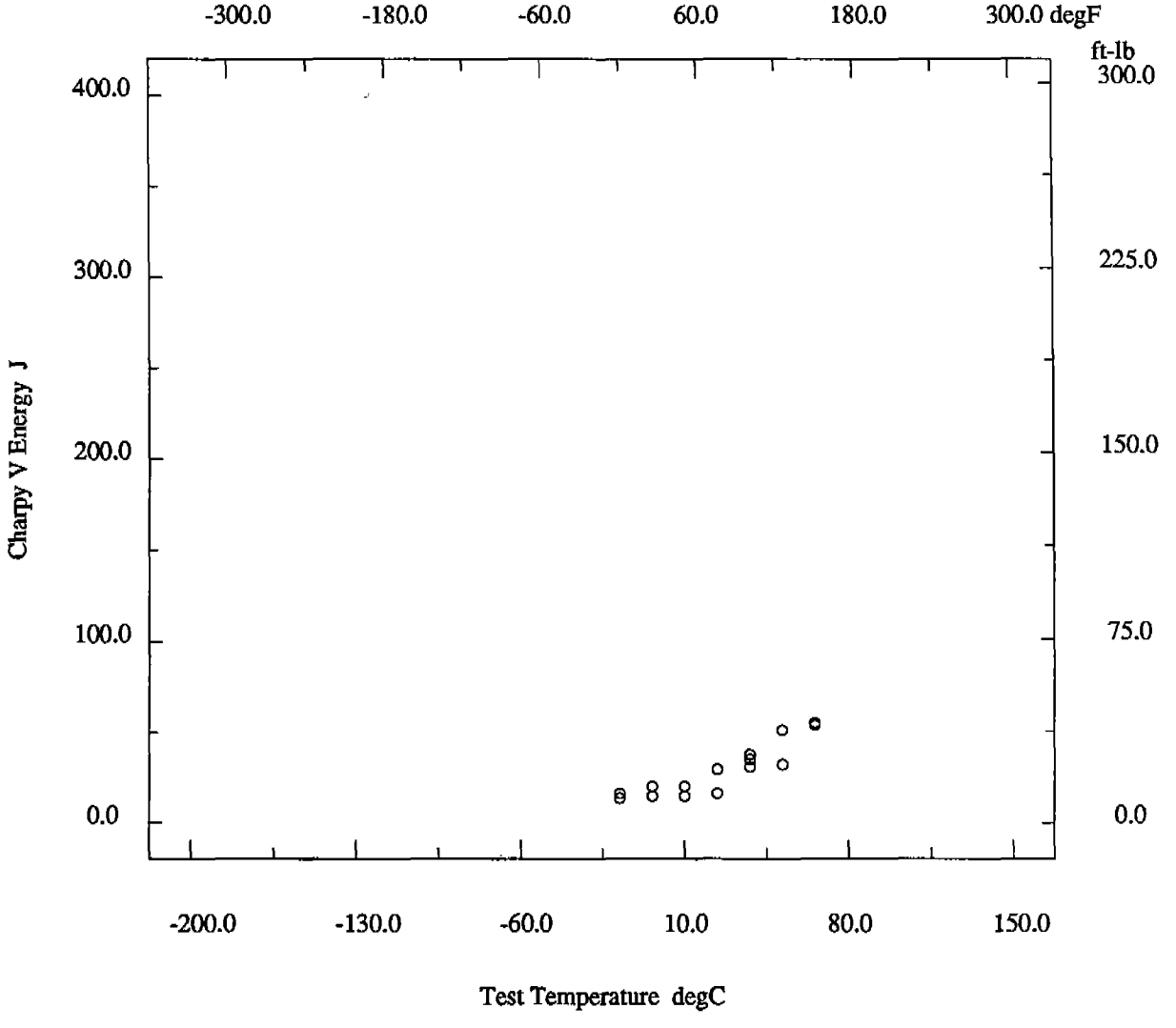
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T o	0	10	9	15
L-T o	0	12	13	15
L-T o	25	11	11	15
L-T o	25	15	15	25
L-T o	50	11	15	20
L-T o	50	15	18	25
L-T o	75	12	20	35
L-T o	75	22	28	40
L-T o	100	23	31	45
L-T o	100	26	37	60
L-T o	100	28	33	65
L-T o	125	24	33	60
L-T o	125	38	48	85
L-T o	150	40	46	100
L-T o	150	41	46	100

* - not reported

Material A588 GrA

Description

Material Code	012.005.09BS2	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A588 GrA

Description

Material Code	012.005.02BS2	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition

See Page 9300.1

Fabrication History

See Page 9300.1

Weld

Weld Code	012.005.02BS2	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	5/16 in
Interpass Temperature	350 degF	Passes	9
Filler Specification	E72-EW-W	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1100 degF	Post-Weld Heat Time	5 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

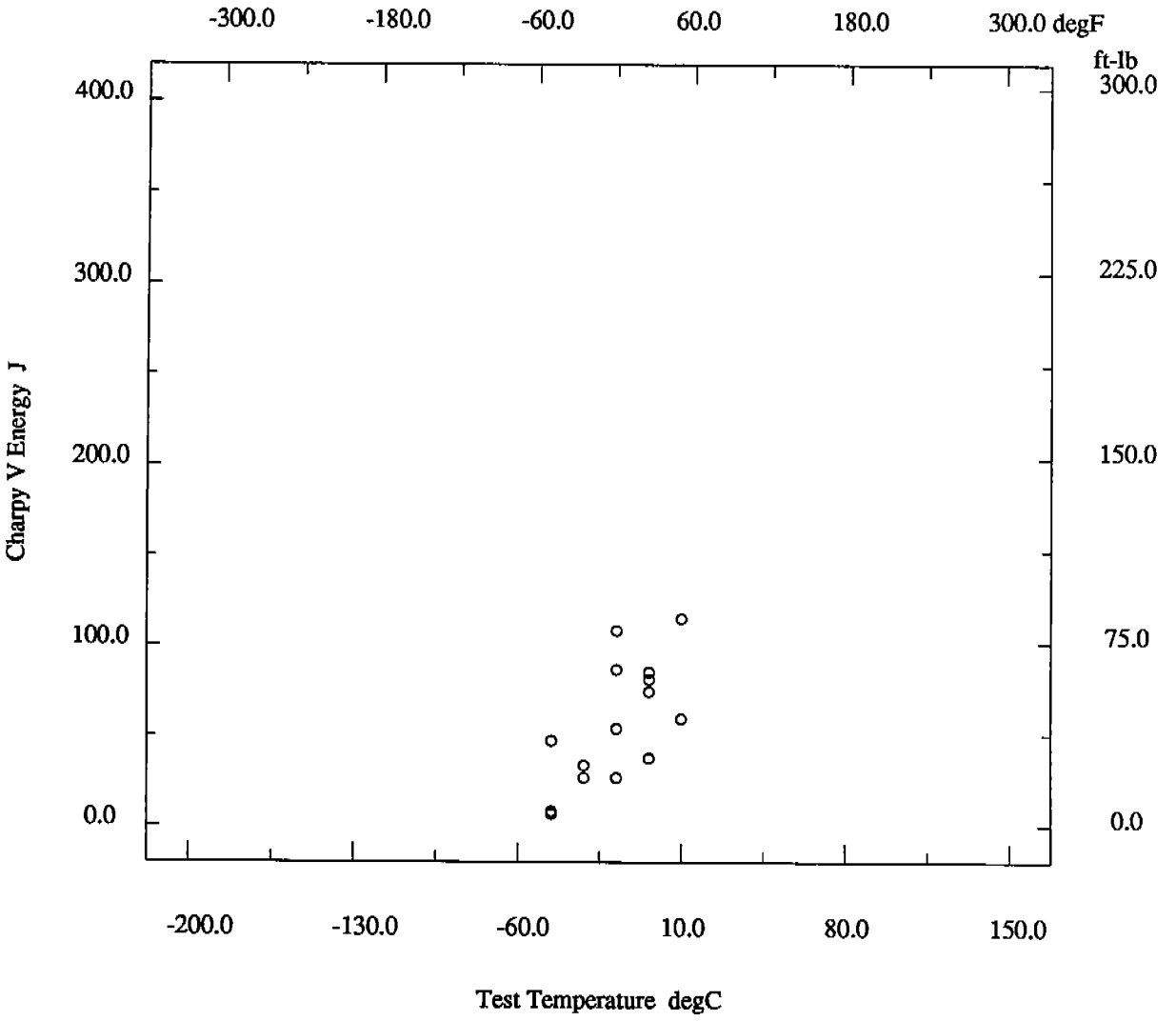
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-50	35	30	60
L-T °	-50	5	4	5
L-T °	-50	6	5	5
L-T °	-25	20	14	15
L-T °	-25	25	18	20
L-T °	0	20	24	20
L-T °	0	40	27	40
L-T °	0	64	51	85
L-T °	0	80	60	98
L-T °	25	28	22	30
L-T °	25	55	46	75
L-T °	25	60	40	60
L-T °	25	63	48	45
L-T °	50	44	36	40
L-T °	50	85	61	75

* - not reported

Material A588 GrA

Description

Material Code	012.005.02BS2	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A588 GrA

Description

Material Code	012.005.09BS3	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 9300.1

Fabrication History See Page 9300.1

Weld

Weld Code	012.005.09BS3	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	5/16 in
Interpass Temperature	350 degF	Passes	9
Filler Specification	E72-EW-W	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1200 degF	Post-Weld Heat Time	1 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

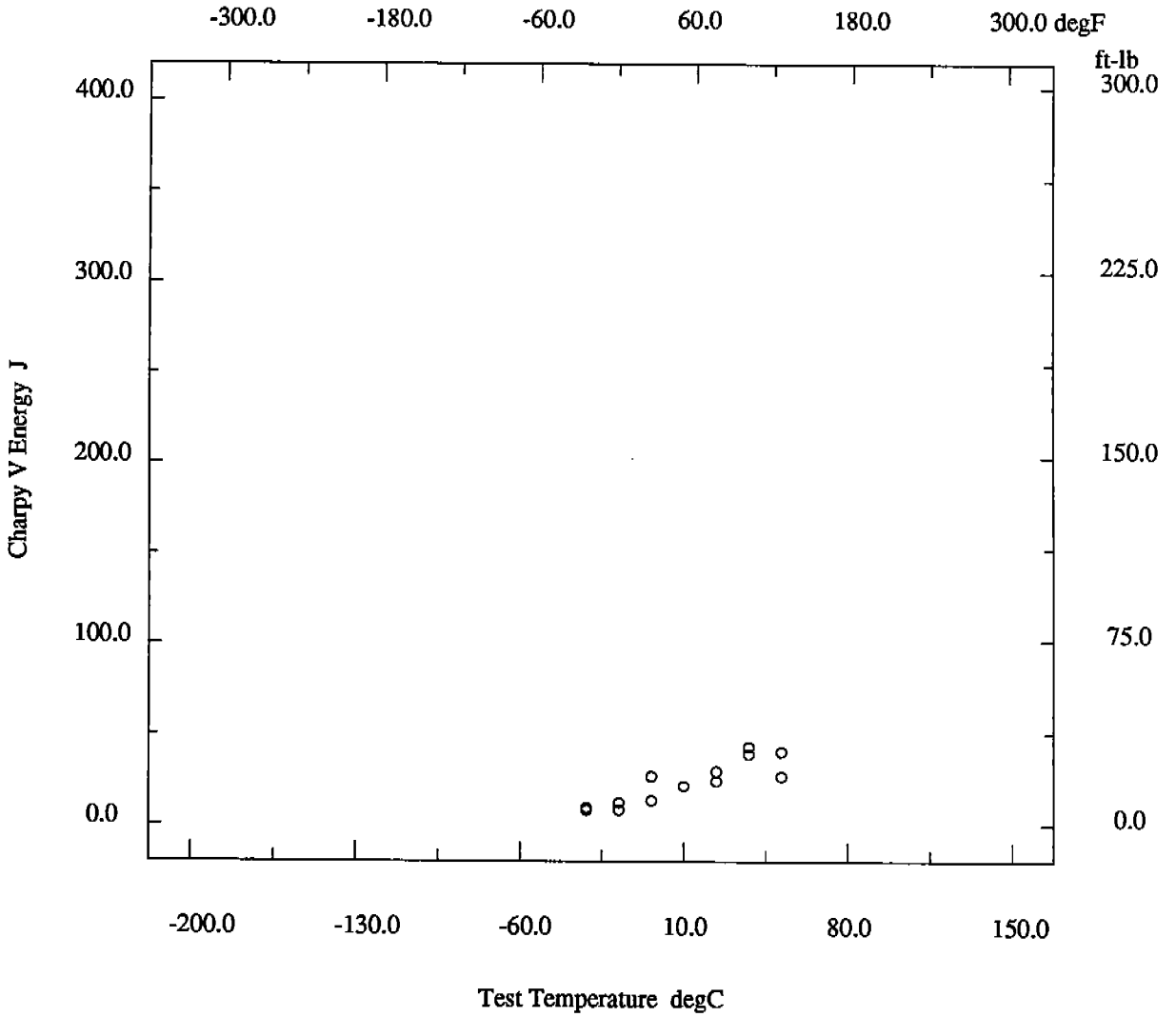
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T o	-25	6	9	10
L-T o	-25	7	7	10
L-T o	0	6	8	15
L-T o	0	9	10	15
L-T o	25	10	12	25
L-T o	25	20	18	20
L-T o	50	16	20	45
L-T o	50	16	22	35
L-T o	75	18	28	60
L-T o	75	22	35	40
L-T o	100	29	35	85
L-T o	100	32	41	90
L-T o	125	20	30	80
L-T o	125	30	44	100

* - not reported

Material A588 GrA

Description

Material Code	012.005.09BS3	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A588 GrA

Description

Material Code	012.005.02BS3	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 9300.1

Fabrication History See Page 9300.1

Weld

Weld Code	012.005.02BS3	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	5/16 in
Interpass Temperature	350 degF	Passes	9
Filler Specification	E72-EW-W	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1200 degF	Post-Weld Heat Time	1 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

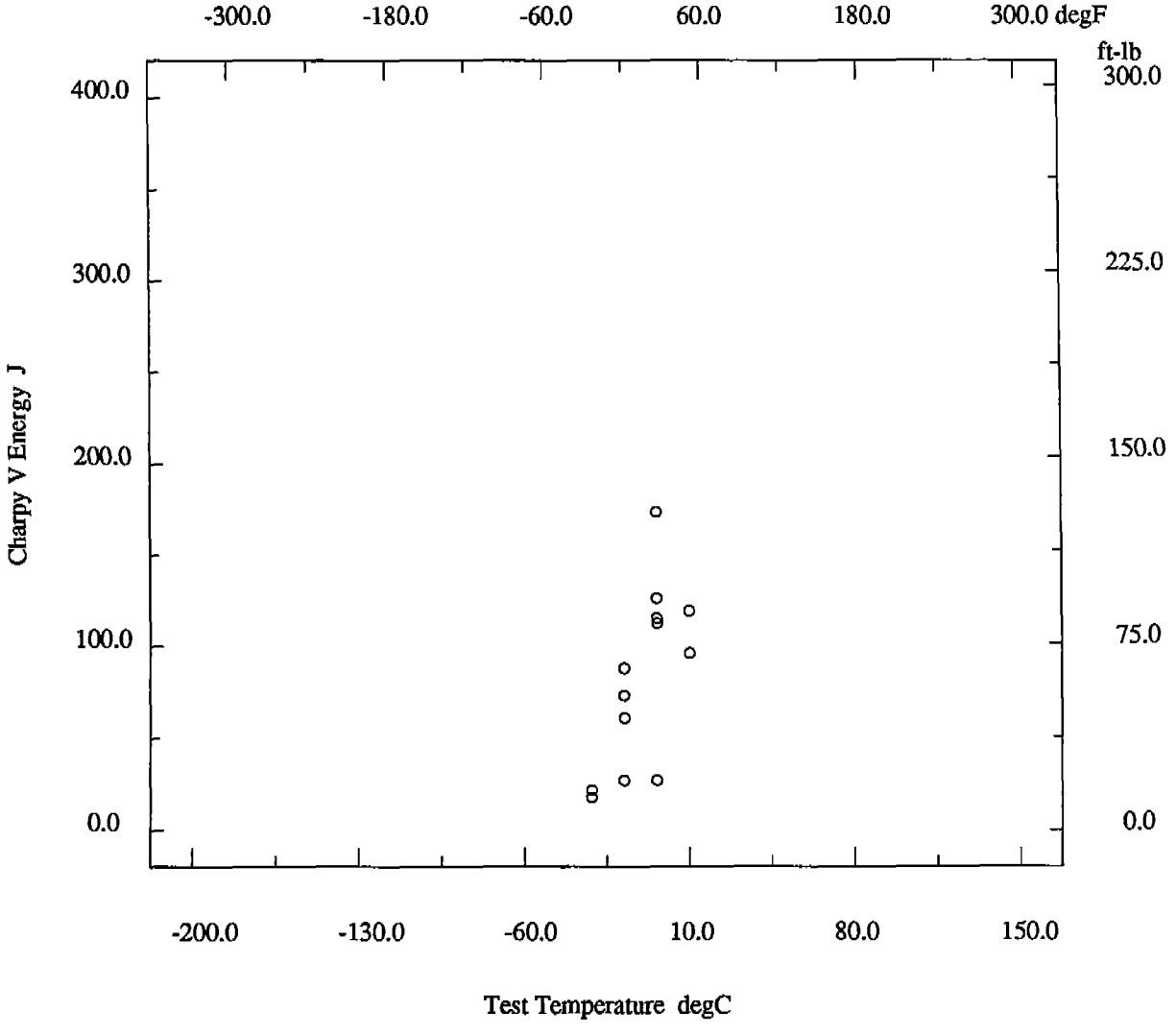
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-25	13	10	15
L-T °	-25	16	9	10
L-T °	0	20	13	15
L-T °	0	45	32	25
L-T °	0	54	35	35
L-T °	0	65	45	30
L-T °	25	128	75	85
L-T °	25	20	16	35
L-T °	25	83	60	50
L-T °	25	85	63	55
L-T °	25	93	64	50
L-T °	50	71	59	70
L-T °	50	88	62	90

* - not reported

Material A588 GrA

Description

Material Code	012.005.02BS3	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A588 GrA

Description

Material Code	012.005.09BS4	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 9300.1

Fabrication History See Page 9300.1

Weld

Weld Code	012.005.09BS4	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	5/16 in
Interpass Temperature	350 degF	Passes	9
Filler Specification	E72-EW-W	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1200 degF	Post-Weld Heat Time	5 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-25	5	11	15
L-T °	-25	7	12	15
L-T °	-25	7	15	10
L-T °	0	7	12	20
L-T °	0	8	10	20
L-T °	25	16	25	50
L-T °	25	19	21	50
L-T °	50	18	27	40
L-T °	50	21	31	70
L-T °	75	20	32	75
L-T °	75	27	40	80
L-T °	75	29	34	80
L-T °	100	25	41	100
L-T °	100	30	44	90
L-T °	100	30	45	85

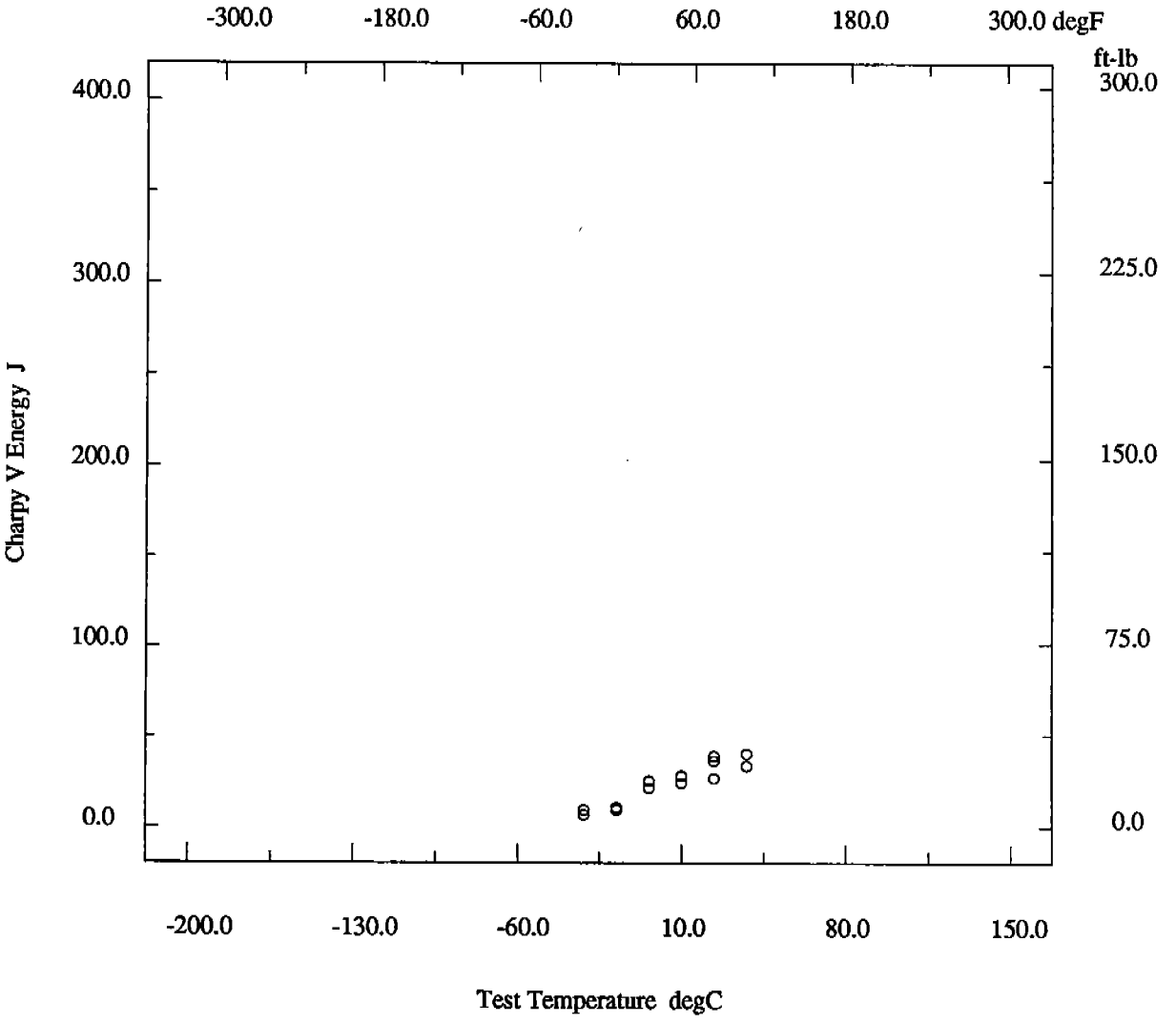
* - not reported

(262)

Material A588 GrA

Description

Material Code	012.005.09BS4	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A588 GrA

Description

Material Code	012.005.02BS4	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		

Composition See Page 9300.1

Fabrication History See Page 9300.1

Weld

Weld Code	012.005.02BS4	Weld Type	SAW
Base Metal Thickness	1 in	Welding Position	IG
Preheat Temperature	50 degF	Metal Gap	5/16 in
Interpass Temperature	350 degF	Passes	9
Filler Specification	E72-EW-W	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	34 KJ/in
Joint Preparation	K-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1200 degF	Post-Weld Heat Time	5 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	3/4T
Specimen Type	Full	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

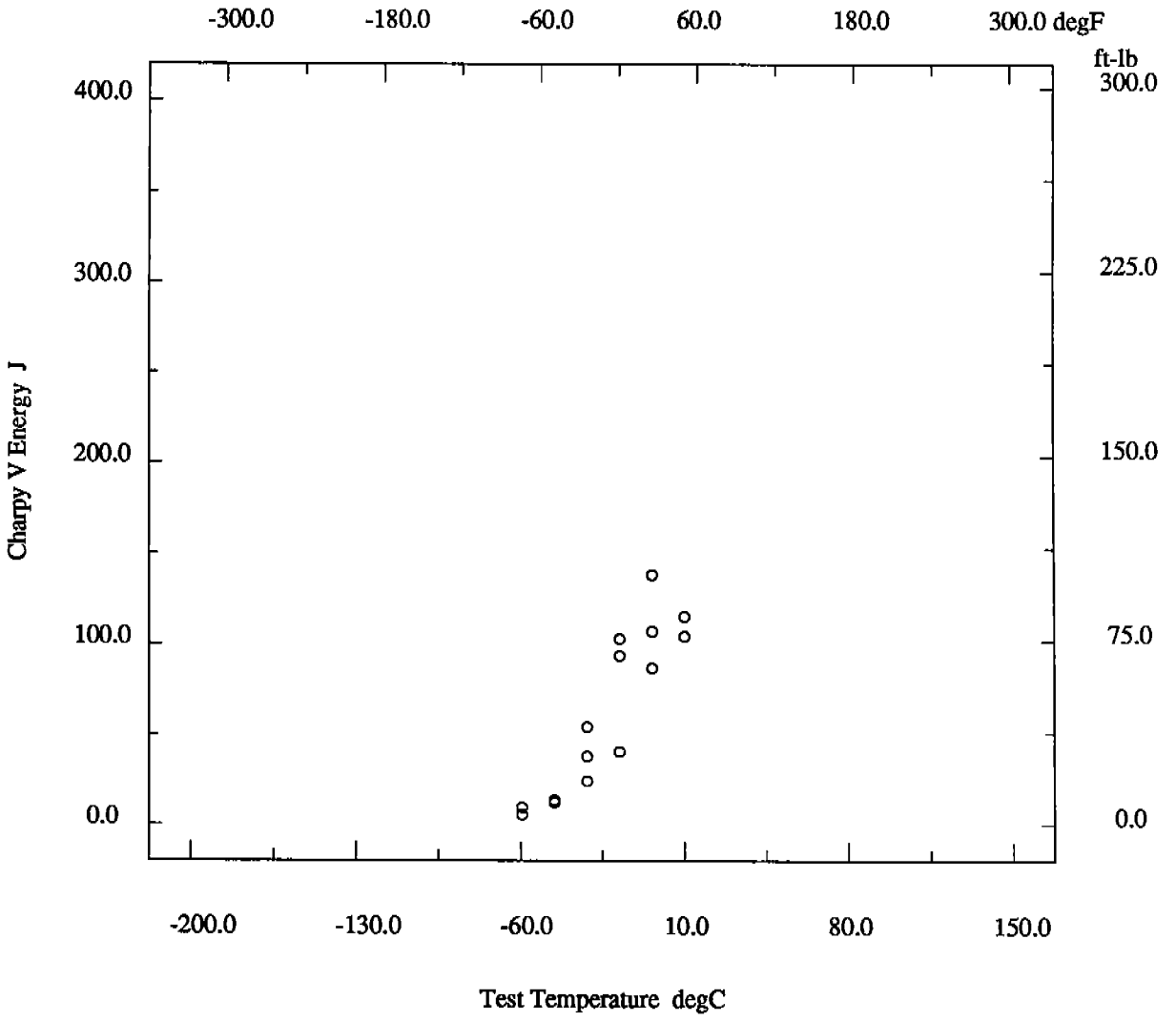
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T °	-75	4	4	5
L-T °	-75	7	5	5
L-T °	-50	10	14	15
L-T °	-50	9	9	10
L-T °	-25	18	19	25
L-T °	-25	28	22	25
L-T °	-25	40	28	30
L-T °	0	30	23	35
L-T °	0	69	50	30
L-T °	0	76	46	75
L-T °	25	102	70	65
L-T °	25	64	50	60
L-T °	25	79	59	75
L-T °	50	77	56	80
L-T °	50	85	59	100

* - not reported

Material A588 GrA

Description

Material Code	012.005.02BS4	Material Name	A588 GrA
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	KONKUL-1		



* - not reported

Material A710

Description

Material Code	002.001.01A1	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	5/16 in	Composition Type	Actual
Composition Position	*	Lot ID	57221
Reference	*		

Composition

C	0.04 %	Mn	0.50 %
P	0.01 %	S	0.01 %
Si	0.28 %	Cr	0.73 %
Ni	0.91 %	Mo	0.20 %
V	*	Cu	1.24 %
Cb	0.03 %	Ti	*
B	*	Al	*
N	*	Other Components	*

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1100 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	5/16 in
Gage Length	8 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	101	90.5	*	18	*

* - not reported

Material A710

Description

Material Code	002.001.01A1	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	5/16 in	Composition Type	Actual
Composition Position	*	Lot ID	57221
Reference	*		

Composition See Page 9400.1

Fabrication History See Page 9400.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	2/3	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

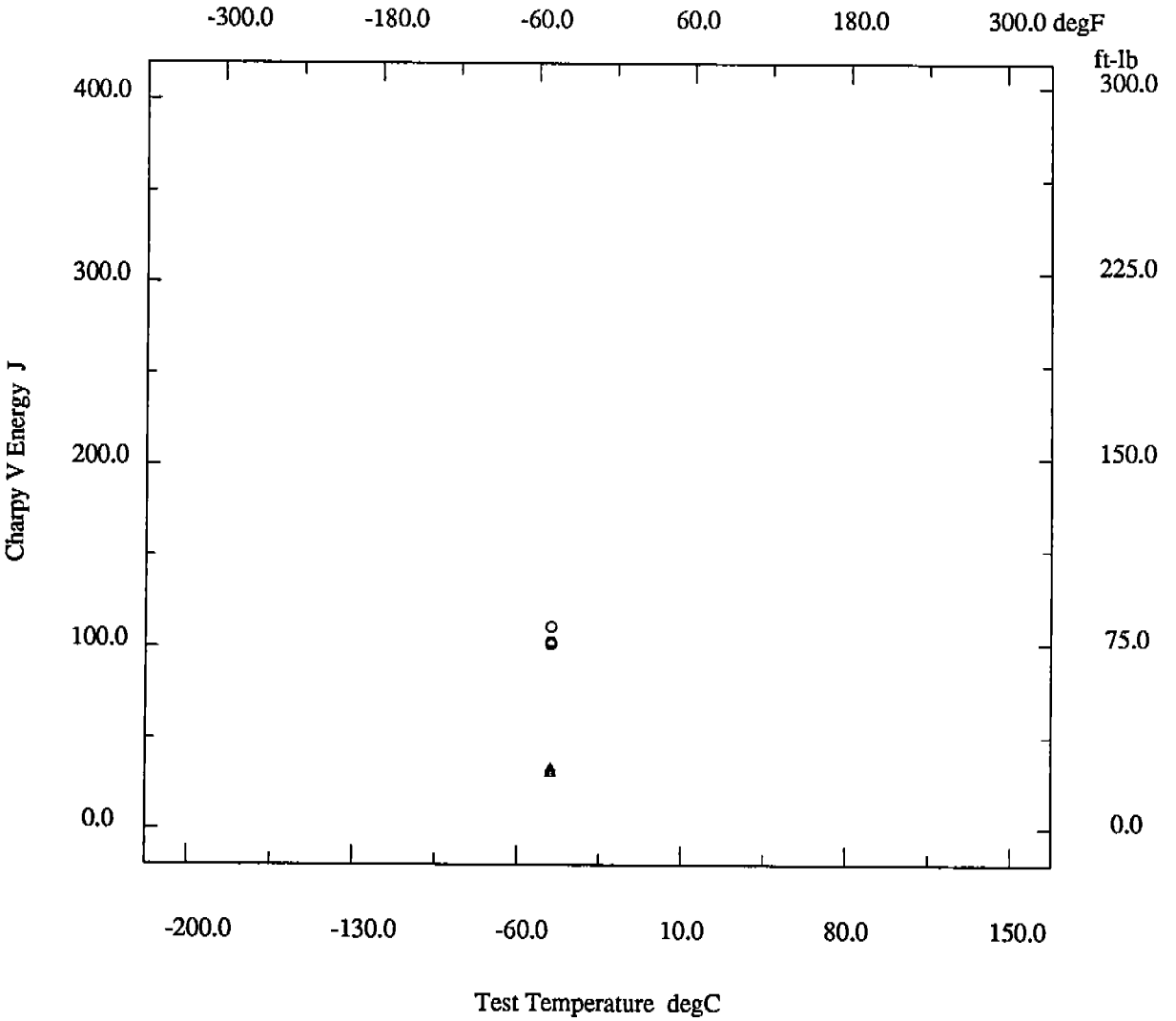
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T ○	-50	75	77
L-T ○	-50	76	81
L-T ○	-50	82	83
T-L △	-50	23	32
T-L △	-50	24	32
T-L △	-50	25	35

* - not reported

Material A710

Description

Material Code	002.001.01A1	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	5/16 in	Composition Type	Actual
Composition Position	*	Lot ID	57221
Reference	*		



* - not reported

Material A710

Description

Material Code	002.001.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	3/8 in	Composition Type	Actual
Composition Position	*	Lot ID	57221
Reference	*		

Composition

C	0.04 %	Mn	0.50 %
P	0.01 %	S	0.01 %
Si	0.28 %	Cr	0.73 %
Ni	0.91 %	Mo	0.20 %
V	*	Cu	1.24 %
Cb	0.03 %	Ti	*
B	*	Al	*
N	*	Other Components	*

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1200 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	3/8 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	74.5	70.1	*	28	*

* - not reported

Material A710

Description

Material Code	002.001.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	3/8 in	Composition Type	Actual
Composition Position	*	Lot ID	57221
Reference	*		

Composition See Page 9500.1

Fabrication History See Page 9500.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	3/4	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

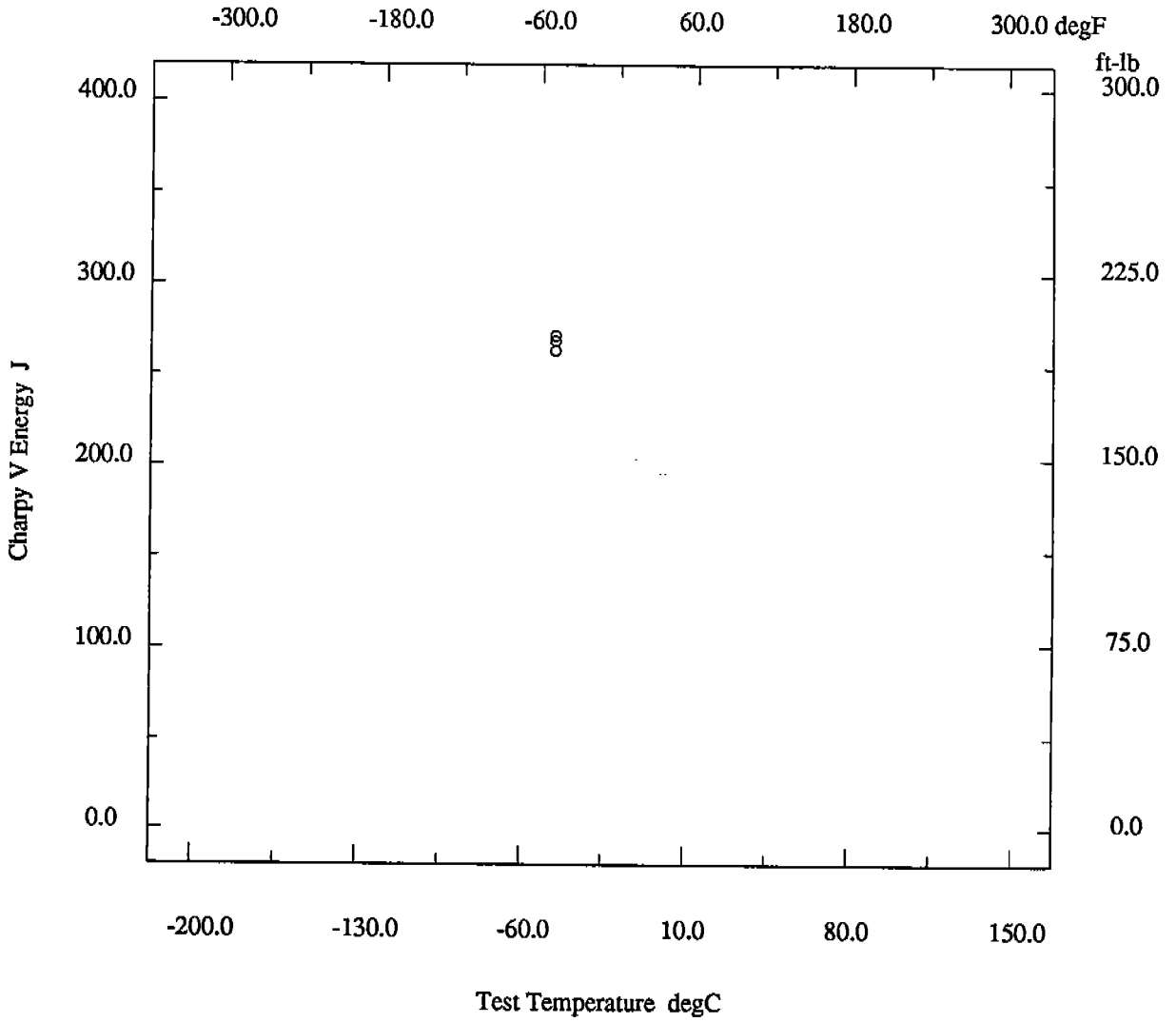
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T °	-50	194	78
L-T °	-50	198	85
L-T °	-50	200	90

* - not reported

Material A710

Description

Material Code	002.001.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	3/8 in	Composition Type	Actual
Composition Position	*	Lot ID	57221
Reference	*		



* - not reported

Material A710

Description

Material Code	002.001.01B2	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	*	Lot ID	57221
Reference	*		

Composition See Page 9500.1

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1100 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	4 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	79.7	61.9	*	30	*

* - not reported

Material A710

Description

Material Code	002.001.01B2	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	*	Lot ID	57221
Reference	*		

Composition See Page 9500.1

Fabrication History See Page 9500.4

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	3/4	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

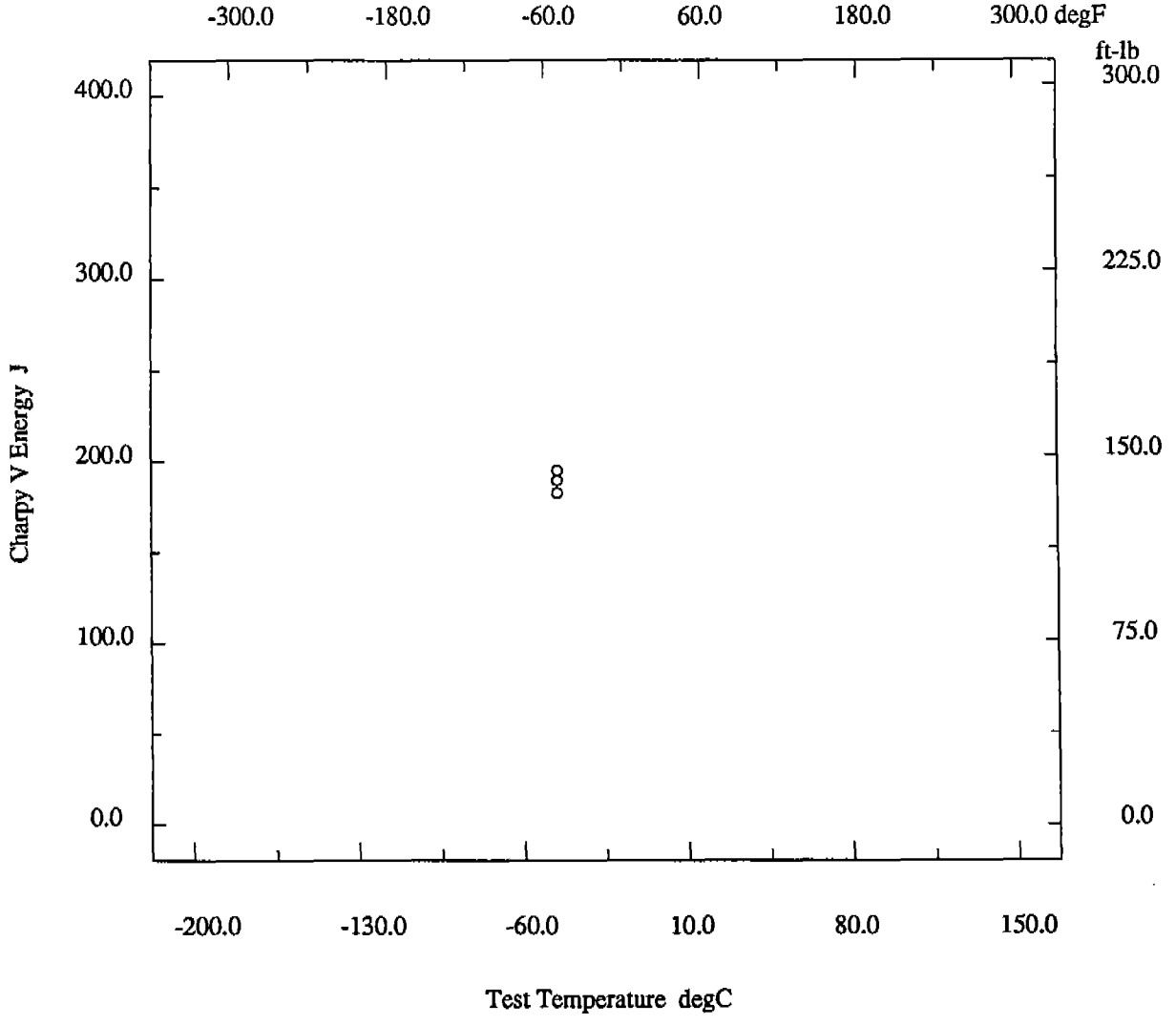
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T °	-50	135	92
L-T °	-50	140	94
L-T °	-50	144	96

* - not reported

Material A710

Description

Material Code	002.001.01B2	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	*	Lot ID	57221
Reference	*		



* - not reported

Material A710

Description

Material Code	002.002.01A1	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	5/16 in	Composition Type	Actual
Composition Position	*	Lot ID	47574
Reference	*		

Composition

C	0.04 %	Mn	0.60 %
P	0.01 %	S	0.009 %
Si	0.35 %	Cr	0.73 %
Ni	0.97 %	Mo	0.18 %
V	*	Cu	1.18 %
Cb	0.038 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1100 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	5/16 in
Gage Length	8 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	104.6	96.0	*	19	*

* - not reported

Material A710

Description

Material Code	002.002.01A1	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	5/16 in	Composition Type	Actual
Composition Position	*	Lot ID	47574
Reference	*		

Composition See Page 9600.1

Fabrication History See Page 9600.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	2/3	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

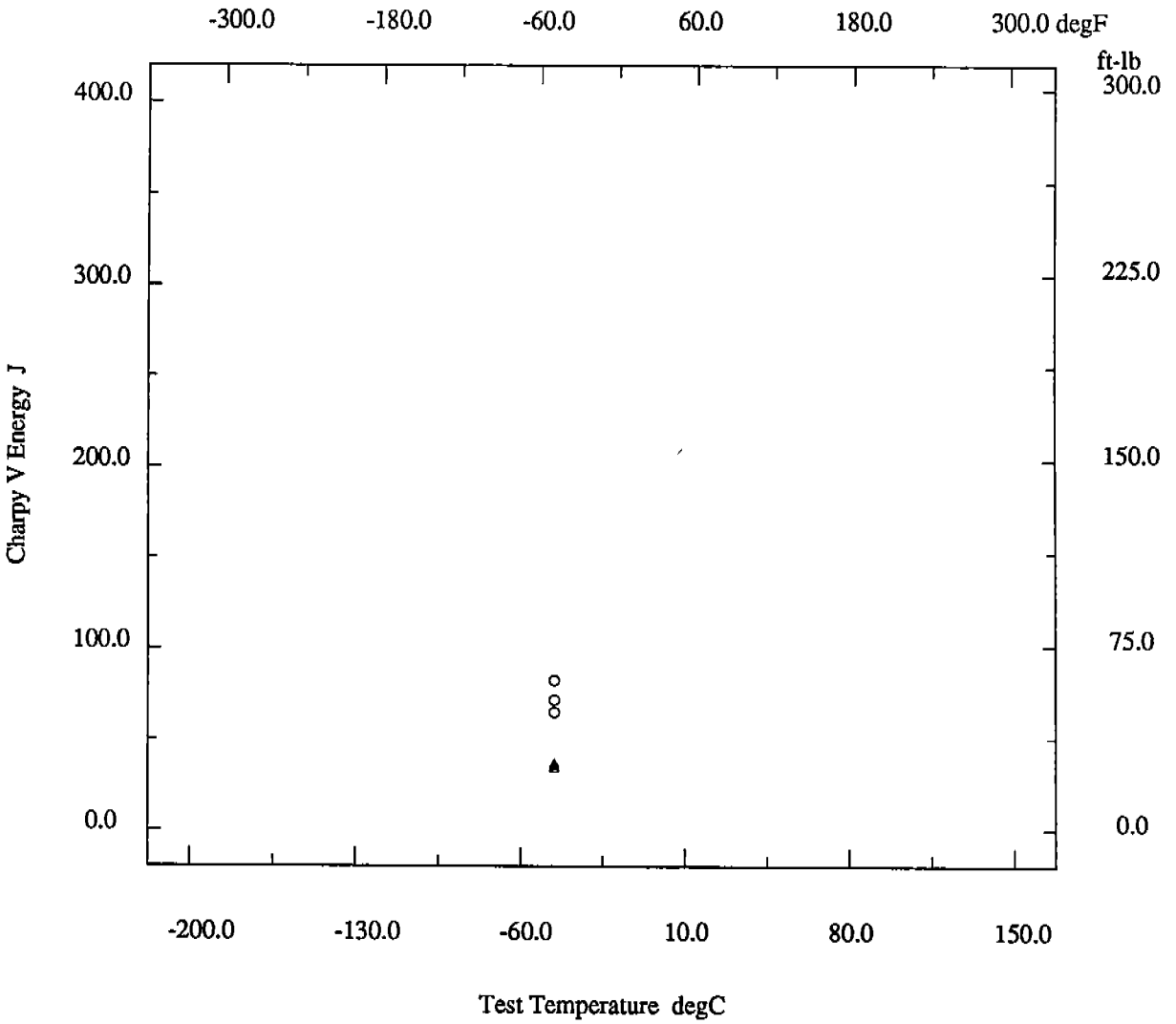
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T ○	-50	48	70
L-T ○	-50	53	74
L-T ○	-50	61	87
T-L △	-50	25	44
T-L △	-50	26	46
T-L △	-50	27	47

* - not reported

Material A710

Description

Material Code	002.002.01A1	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	5/16 in	Composition Type	Actual
Composition Position	*	Lot ID	47574
Reference	*		



* - not reported

Material A710

Description

Material Code	002.002.01A2	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	1/2 in	Composition Type	Actual
Composition Position	*	Lot ID	47574
Reference	*		

Composition See Page 9600.1

Fabrication History See Page 9600.1

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	1/2 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	104.7	89.4	*	46	60

* - not reported

Material A710

Description

Material Code	002.002.01A2	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	1/2 in	Composition Type	Actual
Composition Position	*	Lot ID	47574
Reference	*		

Composition See Page 9600.1

Fabrication History See Page 9600.1

Property Measurements

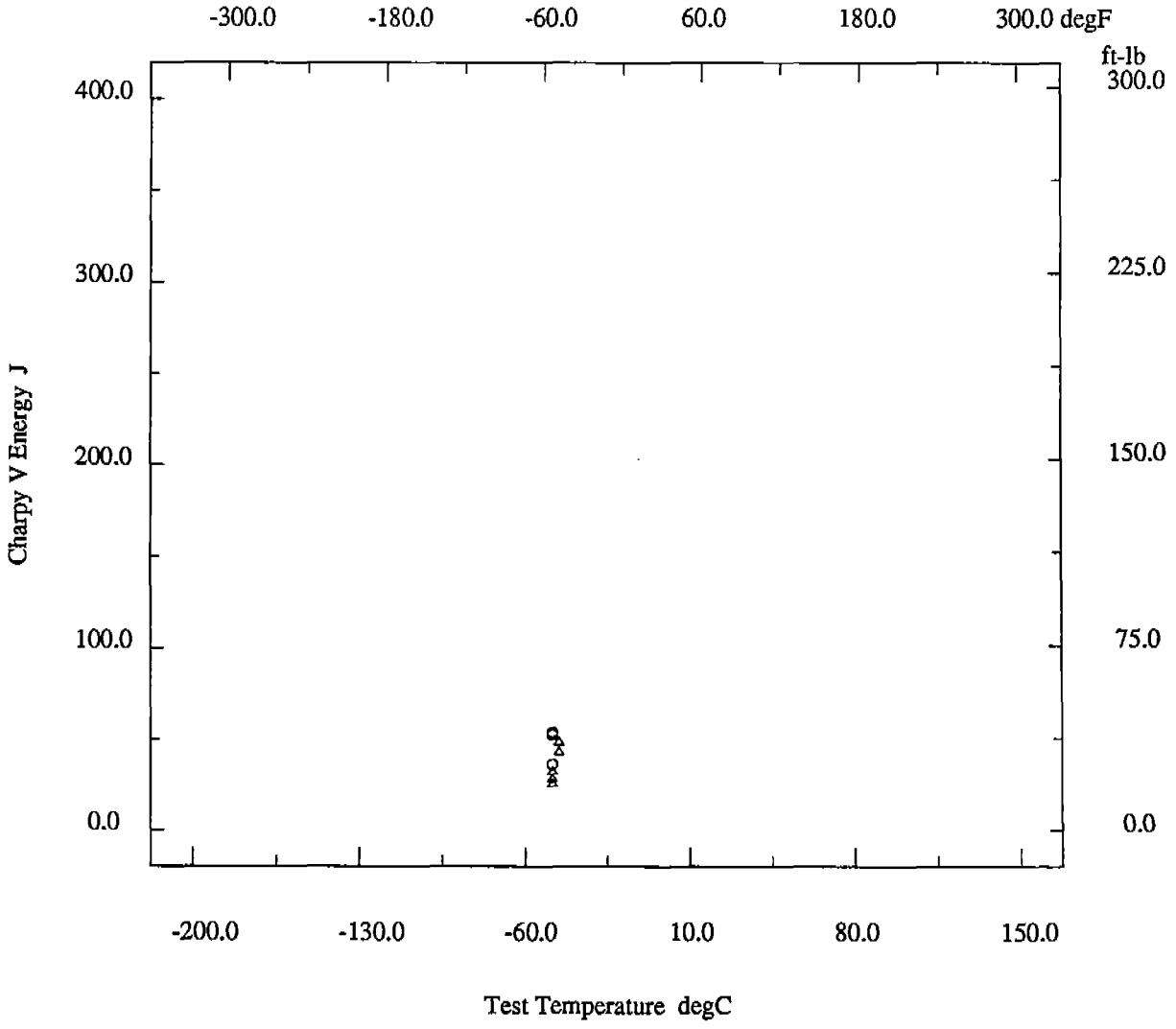
Test Type	Charpy V Impact	Position	*
Shear Fracture	*	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

Spec Type	Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
3/4	L-T ○	-55	27	25
3/4	L-T ○	-55	39	37
3/4	L-T ○	-55	40	39
3/4	T-L △	-55	19	17
3/4	T-L △	-55	21	19
3/4	T-L △	-55	24	20
Full	T-L △	-50	32	15
Full	T-L △	-50	36	16

* - not reported

Material A710

Description			
Material Code	002.002.01A2	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	1/2 in	Composition Type	Actual
Composition Position	*	Lot ID	47574
Reference	*		



* - not reported

Material A710

Description

Material Code	002.002.01A2	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	1/2 in	Composition Type	Actual
Composition Position	*	Lot ID	47574
Reference	*		

Composition See Page 9600.1

Fabrication History See Page 9600.1

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	1/2 in
Gage Length	1 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	101.5	86.4	*	29	68

* - not reported

Material A710

Description

Material Code	002.002.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	3/8 in	Composition Type	Actual
Composition Position	*	Lot ID	47574
Reference	*		

Composition

C	0.04 %	Mn	0.60 %
P	0.01 %	S	0.009 %
Si	0.35 %	Cr	0.73 %
Ni	0.97 %	Mo	0.18 %
V	*	Cu	1.18 %
Cb	0.038 %	Ti	*
B	*	Al	*
N	*	Other Components	*

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1200 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	3/8 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	78.7	75.6	*	32	*

* - not reported

Material A710

Description

Material Code	002.002.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	3/8 in	Composition Type	Actual
Composition Position	*	Lot ID	47574
Reference	*		

Composition See Page 9700.1

Fabrication History See Page 9700.1

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	3/4	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

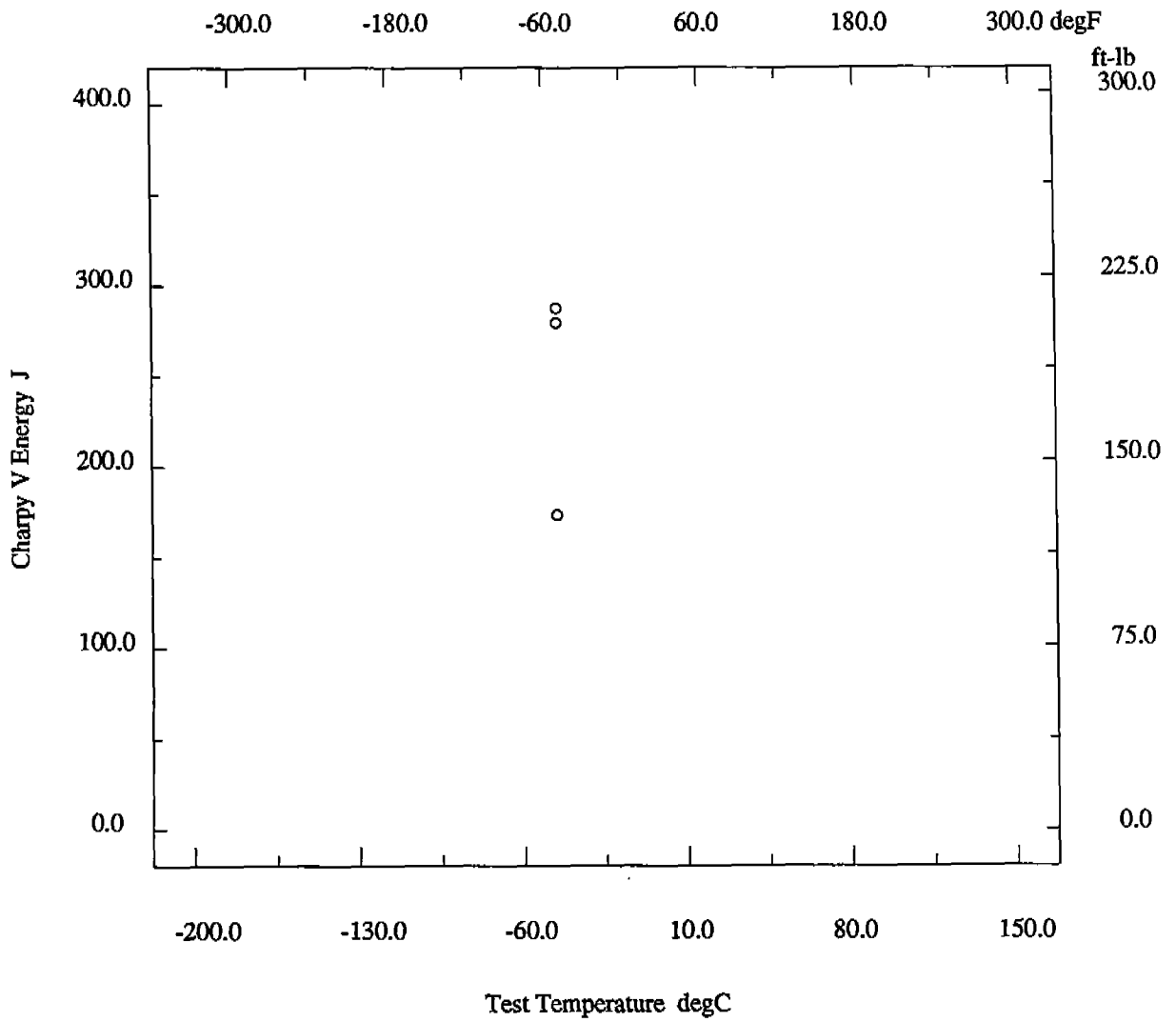
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T ○	-50	128	88
L-T ○	-50	206	93
L-T ○	-50	212	95

* - not reported

Material A710

Description

Material Code	002.002.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	3/8 in	Composition Type	Actual
Composition Position	*	Lot ID	47574
Reference	*		



* - not reported

Material A710

Description

Material Code	002.002.01B2	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	1/2 in	Composition Type	Actual
Composition Position	*	Lot ID	47574
Reference	*		

Composition See Page 9700.1

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1100 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	1/2 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	90.3	74.7	*	42	70

* - not reported

Material A710

Description

Material Code	002.002.01B2	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	1/2 in	Composition Type	Actual
Composition Position	*	Lot ID	47574
Reference	*		

Composition See Page 9700.1

Fabrication History See Page 9700.4

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	3/4	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

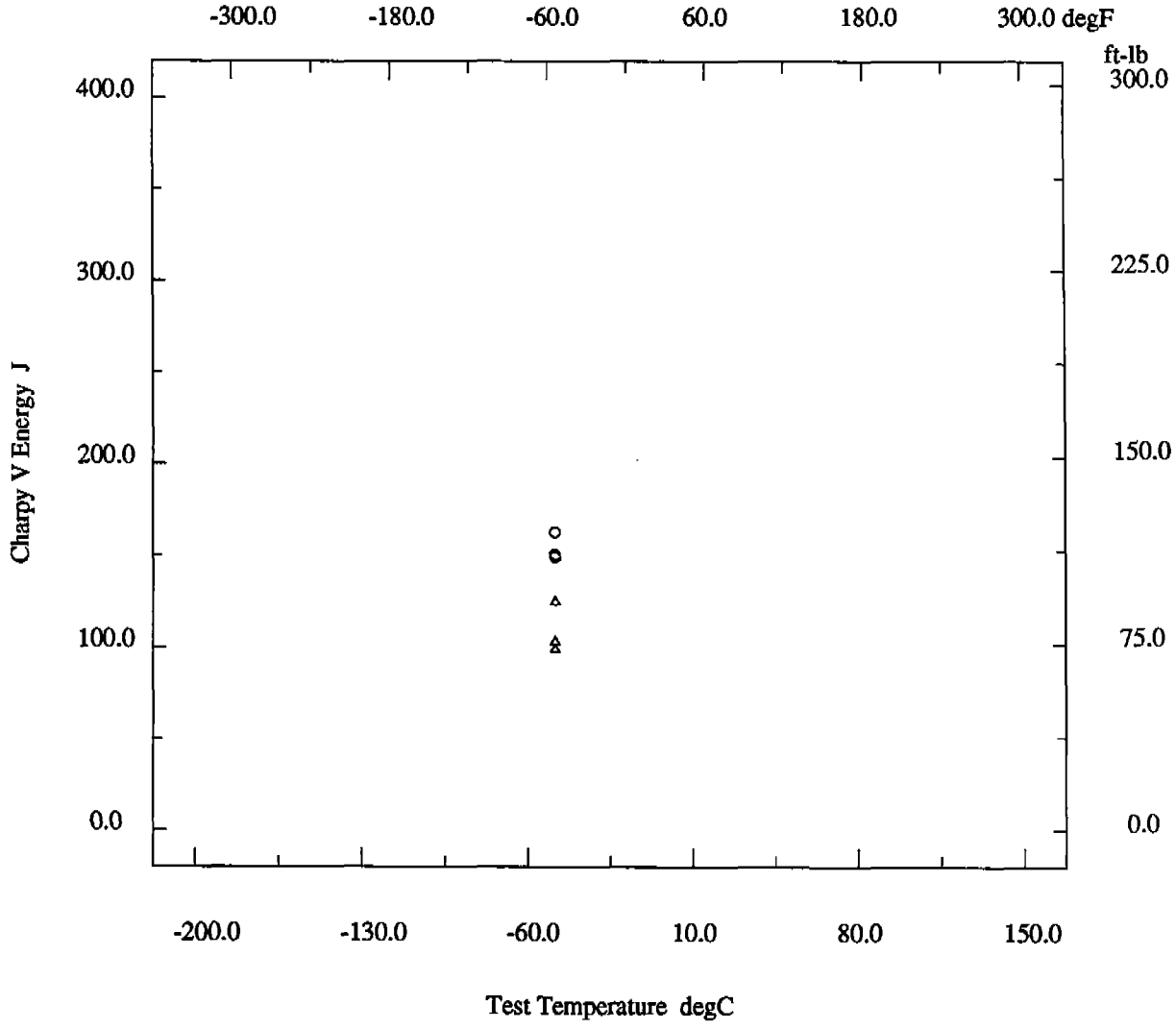
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T ○	-55	110	83
L-T ○	-55	111	88
L-T ○	-55	120	96
T-L △	-55	73	66
T-L △	-55	76	66
T-L △	-55	92	82

* - not reported

Material A710

Description

Material Code	002.002.01B2	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	1/2 in	Composition Type	Actual
Composition Position	*	Lot ID	47574
Reference	*		



* - not reported

Material A710

Description

Material Code	002.002.09B2	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Welded Joint	Form	Plate
Thickness	1/2 in	Composition Type	Actual
Composition Position	*	Lot ID	47574
Reference	*		

Composition

See Page 9700.1

Fabrication History

See Page 9700.4

Weld

Weld Code	002.002.09B	Weld Type	SMAW
Base Metal Thickness	1/2 in	Welding Position	Flat
Preheat Temperature	50 degF	Metal Gap	1/16 in
Interpass Temperature	350 degF	Passes	6
Filler Specification	E8018-C2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	5/32 in
Shielding Gas	*	Voltage	20 volts
Amperage	190 amps	Polarity	DCRP
Travel Speed	5 in/min	Heat Input/Pass	46 KJ/in
Joint Preparation	V Groove	Number of Sides	1
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1100 degF	Post-Weld Heat Time	0.5 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	3/4	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

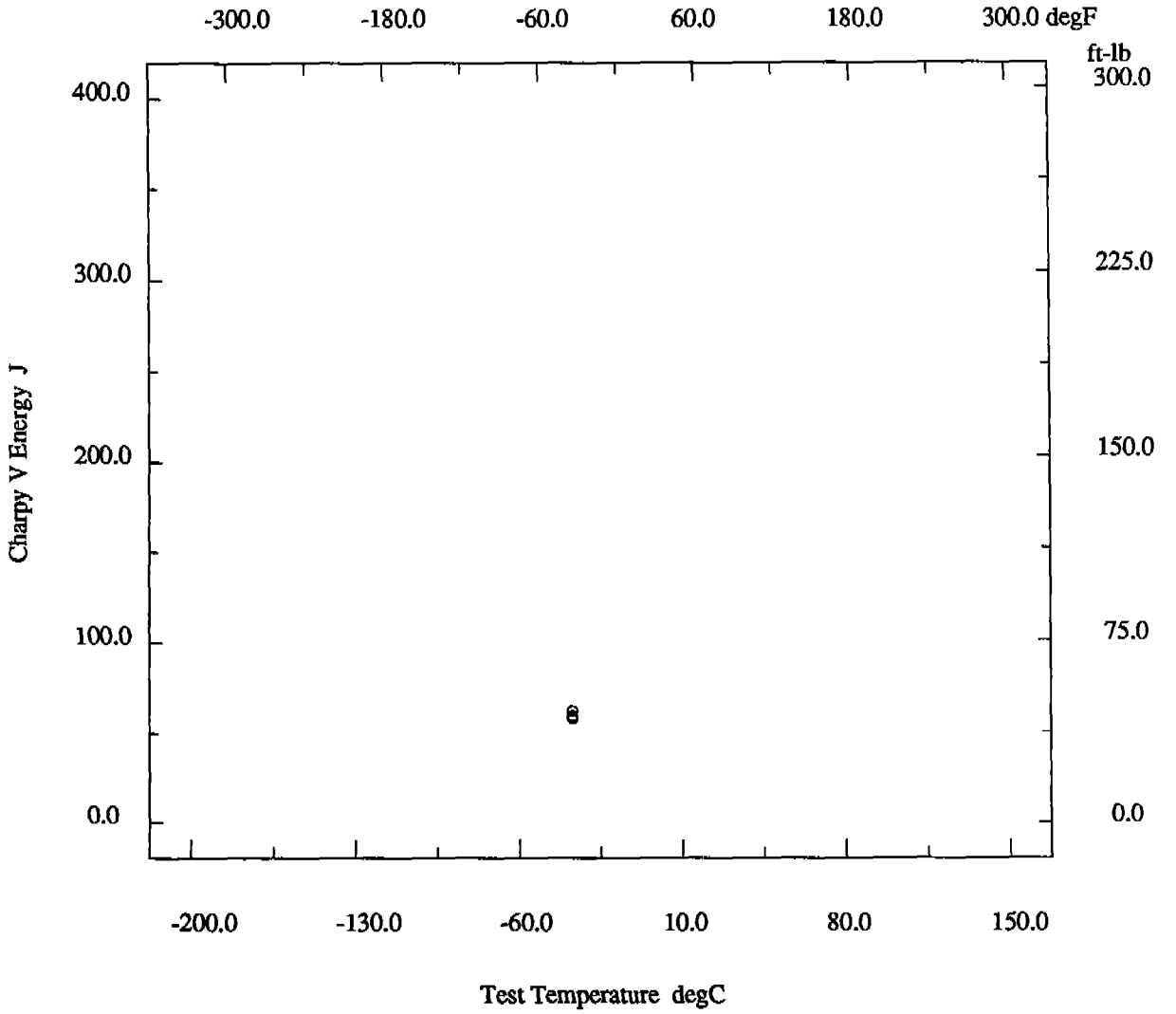
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L o	-35	43	60
T-L o	-35	44	62
T-L o	-35	46	62

* - not reported

Material A710

Description

Material Code	002.002.09B2	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Welded Joint	Form	Plate
Thickness	1/2 in	Composition Type	Actual
Composition Position	*	Lot ID	47574
Reference	*		



* - not reported

Material A710

Description

Material Code	002.002.02B2	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Welded Joint	Form	Plate
Thickness	1/2 in	Composition Type	Actual
Composition Position	*	Lot ID	47574
Reference	*		

Composition

See Page 9700.1

Fabrication History

See Page 9700.4

Weld

Weld Code	002.002.02B	Weld Type	SMAW
Base Metal Thickness	1/2 in	Welding Position	Flat
Preheat Temperature	50 degF	Metal Gap	1/16 in
Interpass Temperature	350 degF	Passes	6
Filler Specification	E8018-C2	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	5/32 in
Shielding Gas	*	Voltage	20 volts
Amperage	190 amps	Polarity	DCRP
Travel Speed	5 in/min	Heat Input/Pass	46 KJ/in
Joint Preparation	V Groove	Number of Sides	1
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	1100 degF	Post-Weld Heat Time	0.5 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	3/4	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

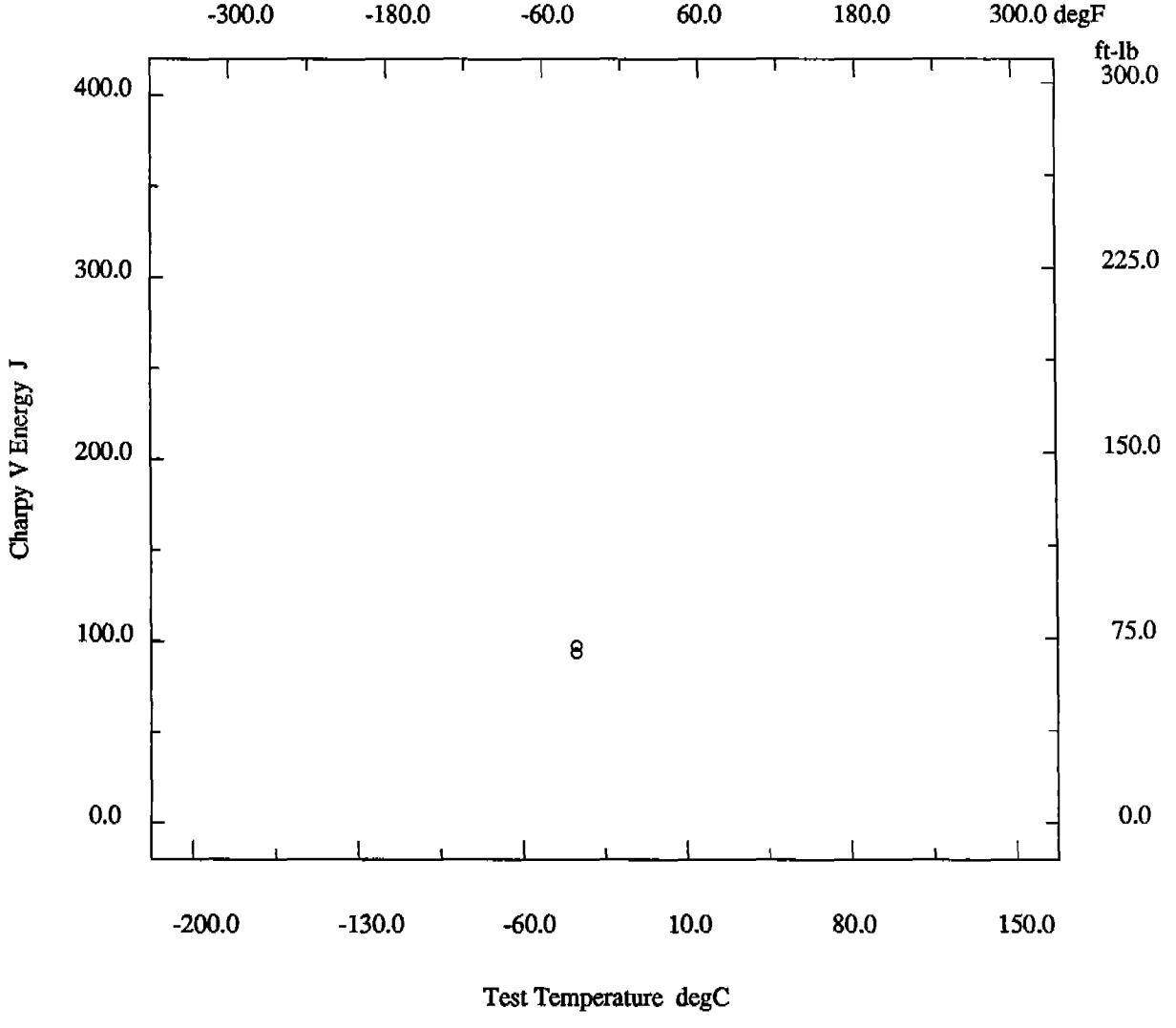
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L o	-35	69	83
T-L o	-35	69	85
T-L o	-35	72	68

* - not reported

Material A710

Description

Material Code	002.002.02B2	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Welded Joint	Form	Plate
Thickness	1/2 in	Composition Type	Actual
Composition Position	*	Lot ID	47574
Reference	*		



* - not reported

Material A710

Description

Material Code	002.002.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.5 in	Composition Type	Actual
Composition Position	*	Lot ID	47574
Reference	*		

Composition

C	0.04 %	Mn	0.60 %
P	0.01 %	S	0.009 %
Si	0.35 %	Cr	0.73 %
Ni	0.97 %	Mo	0.18 %
V	*	Cu	1.18 %
Cb	0.038 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1200 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	0.5 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	97.2	88.0	*	38	70

* - not reported

Material A710

Description

Material Code	002.002.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.5 in	Composition Type	Actual
Composition Position	*	Lot ID	47574
Reference	*		

Composition See Page 9800.1

Fabrication History See Page 9800.1

Property Measurements

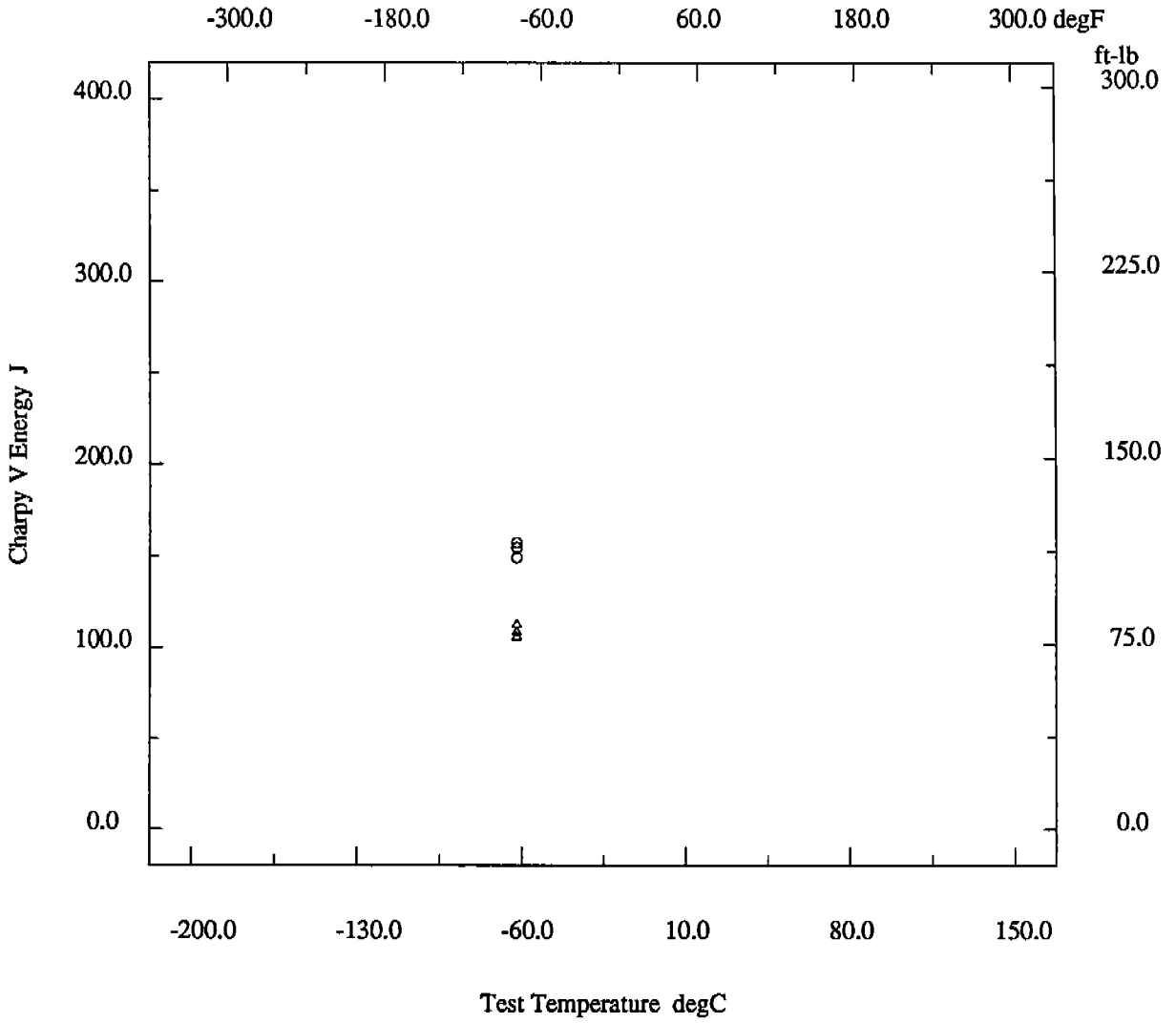
Test Type	Charpy V Impact	Position	*
Specimen Type	3/4	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T ○	-80	110	90
L-T ○	-80	114	90
L-T ○	-80	116	91
T-L △	-80	78	68
T-L △	-80	80	73
T-L △	-80	83	78

* - not reported

Material A710

Description			
Material Code	002.002.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.5 in	Composition Type	Actual
Composition Position	*	Lot ID	47574
Reference	*		



* - not reported

Material A710

Description

Material Code	002.003.01A1	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	3/8 in	Composition Type	Actual
Composition Position	*	Lot ID	48160
Reference	*		

Composition

C	0.04 %	Mn	0.60 %
P	0.01 %	S	0.007 %
Si	0.24 %	Cr	0.80 %
Ni	0.90 %	Mo	0.18 %
V	*	Cu	1.16 %
Cb	0.041 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1100 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	3/8 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	109.6	97.8	*	37	*

* - not reported

Material A710

Description

Material Code	002.003.01A1	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	3/8 in	Composition Type	Actual
Composition Position	*	Lot ID	48160
Reference	*		

Composition See Page 9900.1

Fabrication History See Page 9900.1

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	3/4	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

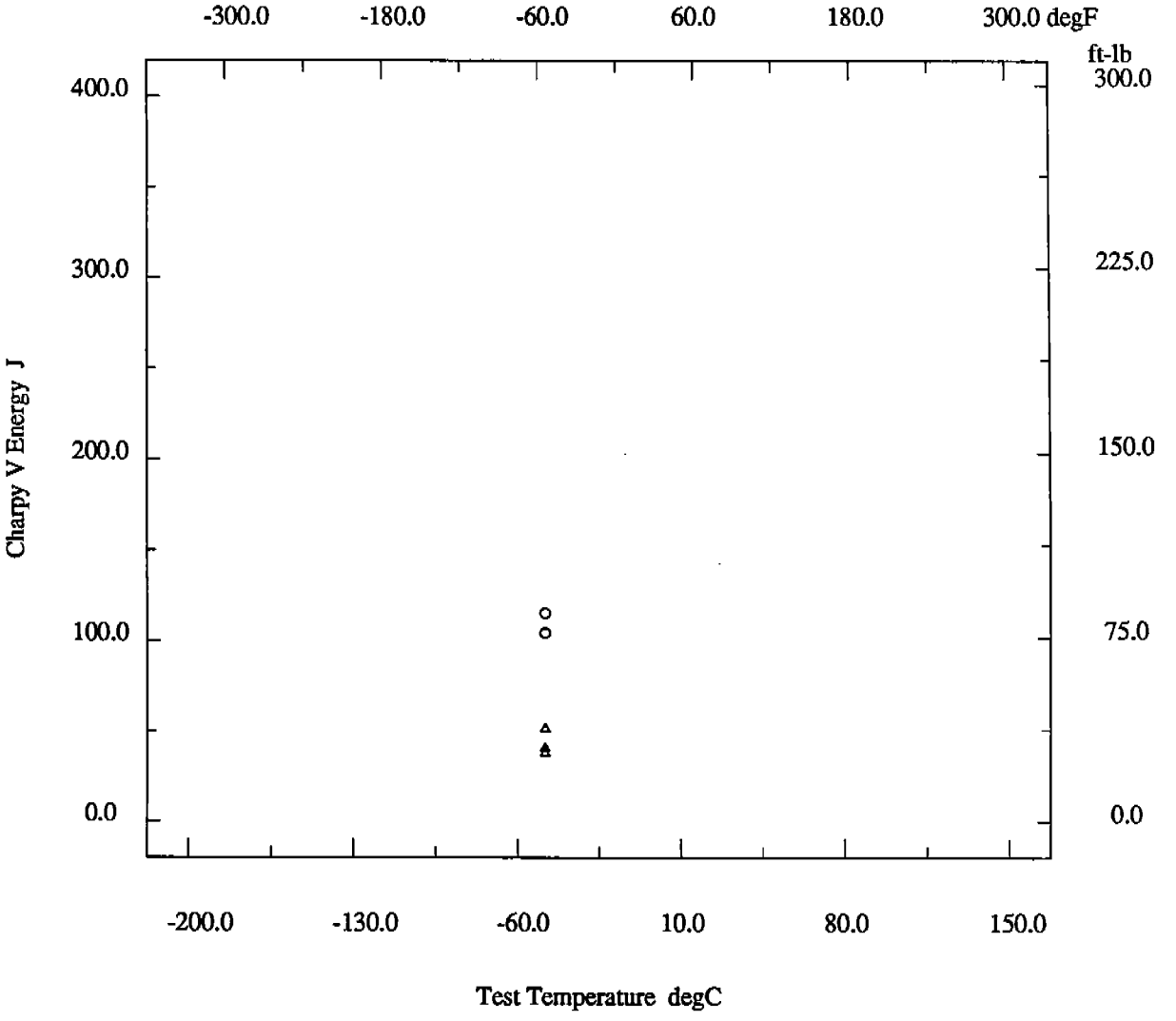
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T ○	-55	77	78
L-T ○	-55	85	82
L-T ○	-55	85	84
T-L △	-55	28	24
T-L △	-55	30	32
T-L △	-55	38	41

* - not reported

Material A710

Description

Material Code	002.003.01A1	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	3/8 in	Composition Type	Actual
Composition Position	*	Lot ID	48160
Reference	*		



* - not reported

Material A710

Description

Material Code	002.003.01A2	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	5/8 in	Composition Type	Actual
Composition Position	*	Lot ID	48160
Reference	*		

Composition See Page 9900.1

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1200 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	5/8 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	93.2	82.2	*	31	68

* - not reported

Material A710

Description

Material Code	002.003.01A2	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	5/8 in	Composition Type	Actual
Composition Position	*	Lot ID	48160
Reference	*		

Composition See Page 9900.1

Fabrication History See Page 9900.4

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	3/4	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

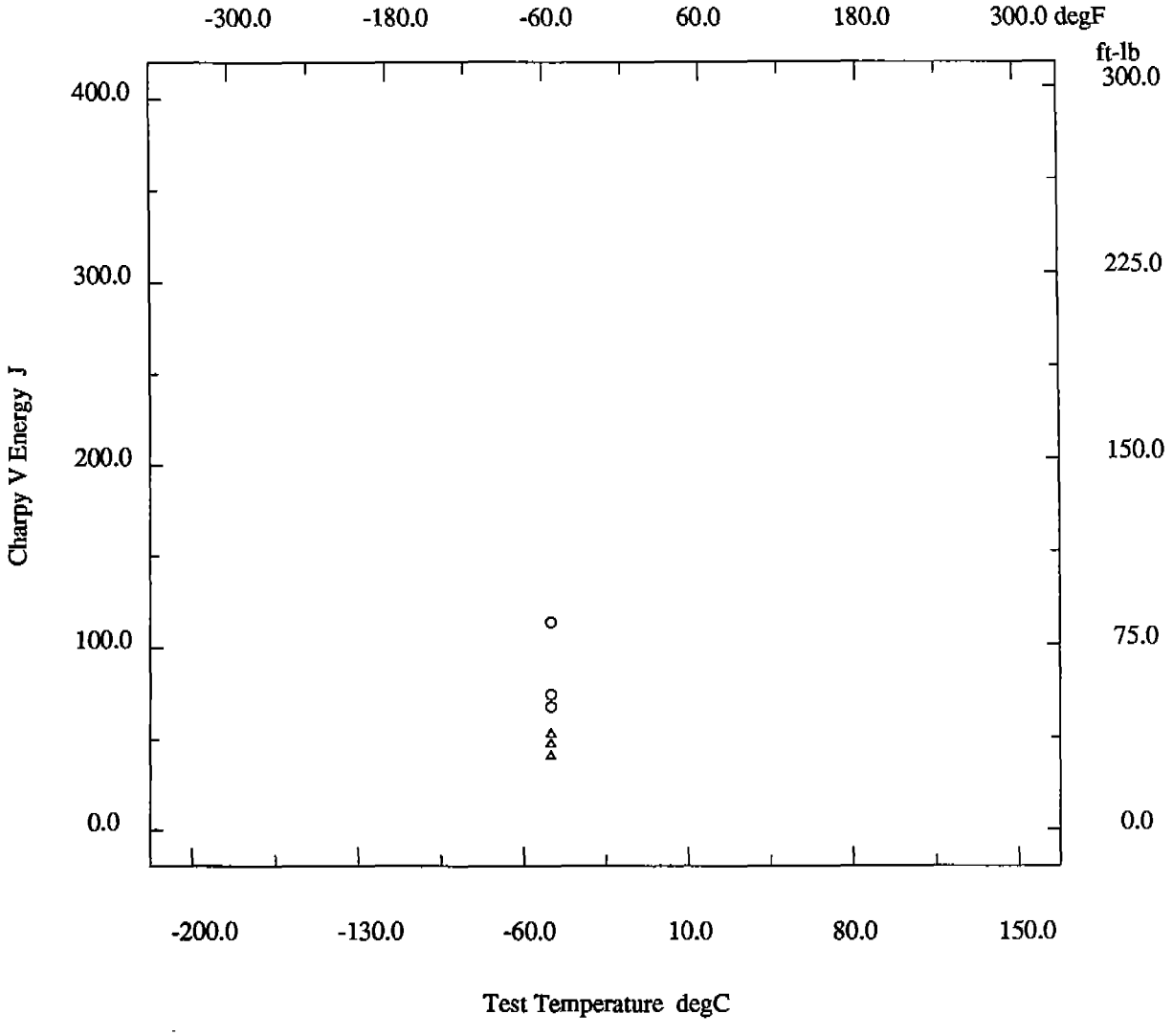
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T o	-55	50	44
L-T o	-55	55	59
L-T o	-55	84	84
T-L ▵	-55	30	27
T-L ▵	-55	35	37
T-L ▵	-55	39	41

* - not reported

Material A710

Description

Material Code	002.003.01A2	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	5/8 in	Composition Type	Actual
Composition Position	*	Lot ID	48160
Reference	*		



* - not reported

Material A710

Description

Material Code	002.003.09A1	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Welded Joint	Form	Plate
Thickness	3/8 in	Composition Type	Actual
Composition Position	*	Lot ID	48160
Reference	*		

Composition

See Page 9900.1

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1100 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Weld

Weld Code	002.003.09A	Weld Type	SMAW/SAW
Base Metal Thickness	3/8 in	Welding Position	Flat
Preheat Temperature	None degF	Metal Gap	3/32 in
Interpass Temperature	400 degF	Passes	3
Filler Specification	E11018-M	Filler Name	Armco W25
Filler Carbon Content	*	Filler Metal Size	5/32 in
Shielding Gas	*	Voltage	23 volts
Amperage	300 amps	Polarity	DCRP
Travel Speed	21 in/min	Heat Input/Pass	26 KJ/in
Joint Preparation	V Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Linde709-5
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	3/4	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

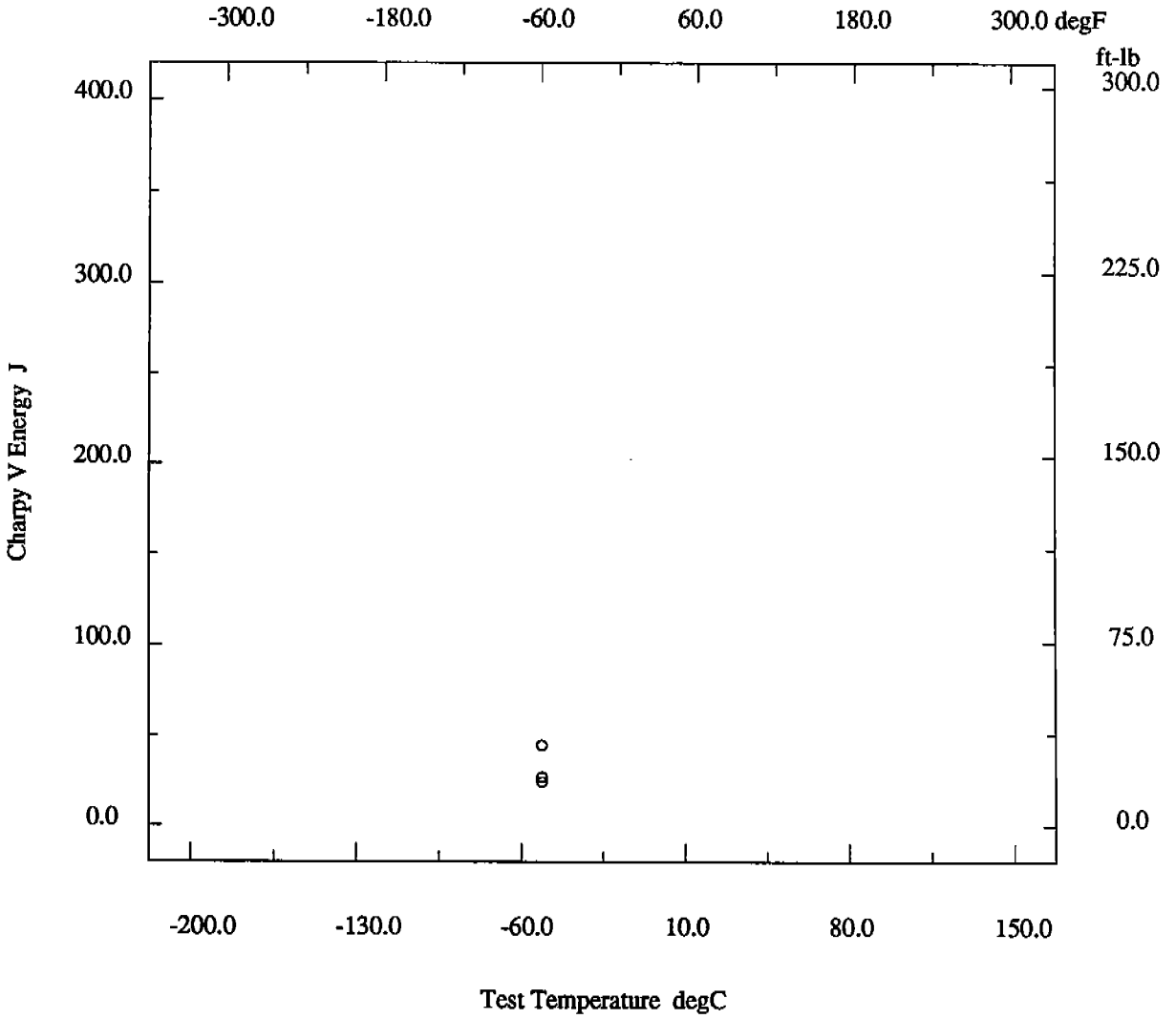
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L °	-60	18	16
T-L °	-60	20	17
T-L °	-60	33	29

* - not reported

Material A710

Description

Material Code	002.003.09A1	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Welded Joint	Form	Plate
Thickness	3/8 in	Composition Type	Actual
Composition Position	*	Lot ID	48160
Reference	*		



* - not reported

Material A710

Description

Material Code	002.003.02A1	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Welded Joint	Form	Plate
Thickness	3/8 in	Composition Type	Actual
Composition Position	*	Lot ID	48160
Reference	*		

Composition See Page 9900.1

Fabrication History See Page 9900.7

Weld

Weld Code	002.003.02A	Weld Type	SMAW/SAW
Base Metal Thickness	3/8 in	Welding Position	Flat
Preheat Temperature	None degF	Metal Gap	3/32 in
Interpass Temperature	400 degF	Passes	3
Filler Specification	E11018-M	Filler Name	Armco W25
Filler Carbon Content	*	Filler Metal Size	5/32 in
Shielding Gas	*	Voltage	23 volts
Amperage	300 amps	Polarity	DCRP
Travel Speed	21 in/min	Heat Input/Pass	26 KJ/in
Joint Preparation	V Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Linde709-5
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	3/4	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

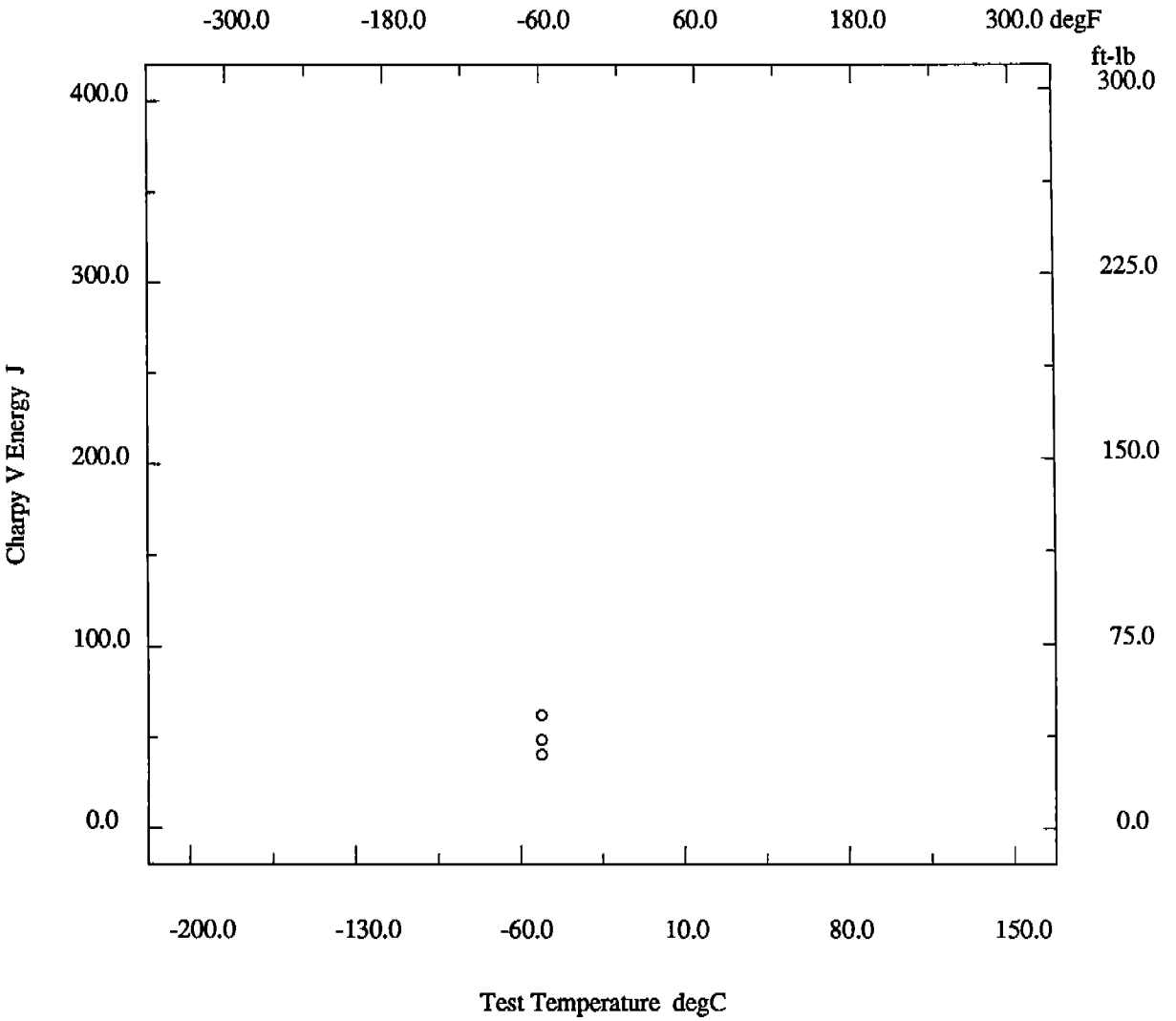
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L ○	-60	30	31
T-L ○	-60	36	37
T-L ○	-60	46	45

* - not reported

Material A710

Description

Material Code	002.003.02A1	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Welded Joint	Form	Plate
Thickness	3/8 in	Composition Type	Actual
Composition Position	*	Lot ID	48160
Reference	*		



* - not reported

Material A710

Description

Material Code	002.003.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	5/8 in	Composition Type	Actual
Composition Position	*	Lot ID	48160
Reference	*		

Composition

C	0.04 %	Mn	0.60 %
P	0.01 %	S	0.007 %
Si	0.24 %	Cr	0.80 %
Ni	0.90 %	Mo	0.18 %
V	*	Cu	1.16 %
Cb	0.041 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1100 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	5/8 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	88.7	75.3	*	38	69

* - not reported

Material A710

Description

Material Code	002.003.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	5/8 in	Composition Type	Actual
Composition Position	*	Lot ID	48160
Reference	*		

Composition See Page 10000.1

Fabrication History See Page 10000.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Shear Fracture	*	Did Specimen Split?	*
Standard Method	*	Standard Year	*

Spec Type	Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Fracture?
Full	L-T ○	-150	48	30	Assumed
Full	L-T ○	-150	88	59	Assumed
Full	L-T ○	-125	145	86	Assumed
Full	L-T ○	-100	124	74	Assumed
Full	L-T ○	-100	131	79	Assumed
Full	L-T ○	-100	142	*	Assumed
3/4	L-T ○	-55	138	92	Assumed
3/4	L-T ○	-55	140	96	Assumed
3/4	L-T ○	-55	142	99	Assumed
Full	L-T ○	-50	150	76	Assumed
Full	L-T ○	-50	158	80	Assumed
Full	L-T ○	-50	206	92	Assumed
Full	L-T ○	0	204	90	Assumed
Full	L-T ○	0	208	86	Assumed
Full	L-T ○	0	208	86	Assumed
Full	L-T ○	75	190	93	Assumed
Full	L-T ○	75	212	86	Assumed
Full	L-T ○	75	240	*	No
Full	T-L △	-150	8	2	Assumed
Full	T-L △	-150	8	2	Assumed
Full	T-L △	-125	61	40	Assumed
Full	T-L △	-100	70	44	Assumed
Full	T-L △	-100	88	56	Assumed
Full	T-L △	-100	93	57	Assumed
3/4	T-L △	-55	80	76	Assumed
3/4	T-L △	-55	82	78	Assumed
3/4	T-L △	-55	84	79	Assumed
Full	T-L △	-50	120	70	Assumed
Full	T-L △	-50	123	70	Assumed
Full	T-L △	-50	129	80	Assumed
Full	T-L △	0	132	82	Assumed
Full	T-L △	0	150	85	Assumed
Full	T-L △	0	154	88	Assumed
Full	T-L △	75	147	84	Assumed
Full	T-L △	75	148	84	Assumed

(continued)

* - not reported

Material A710

(continued)

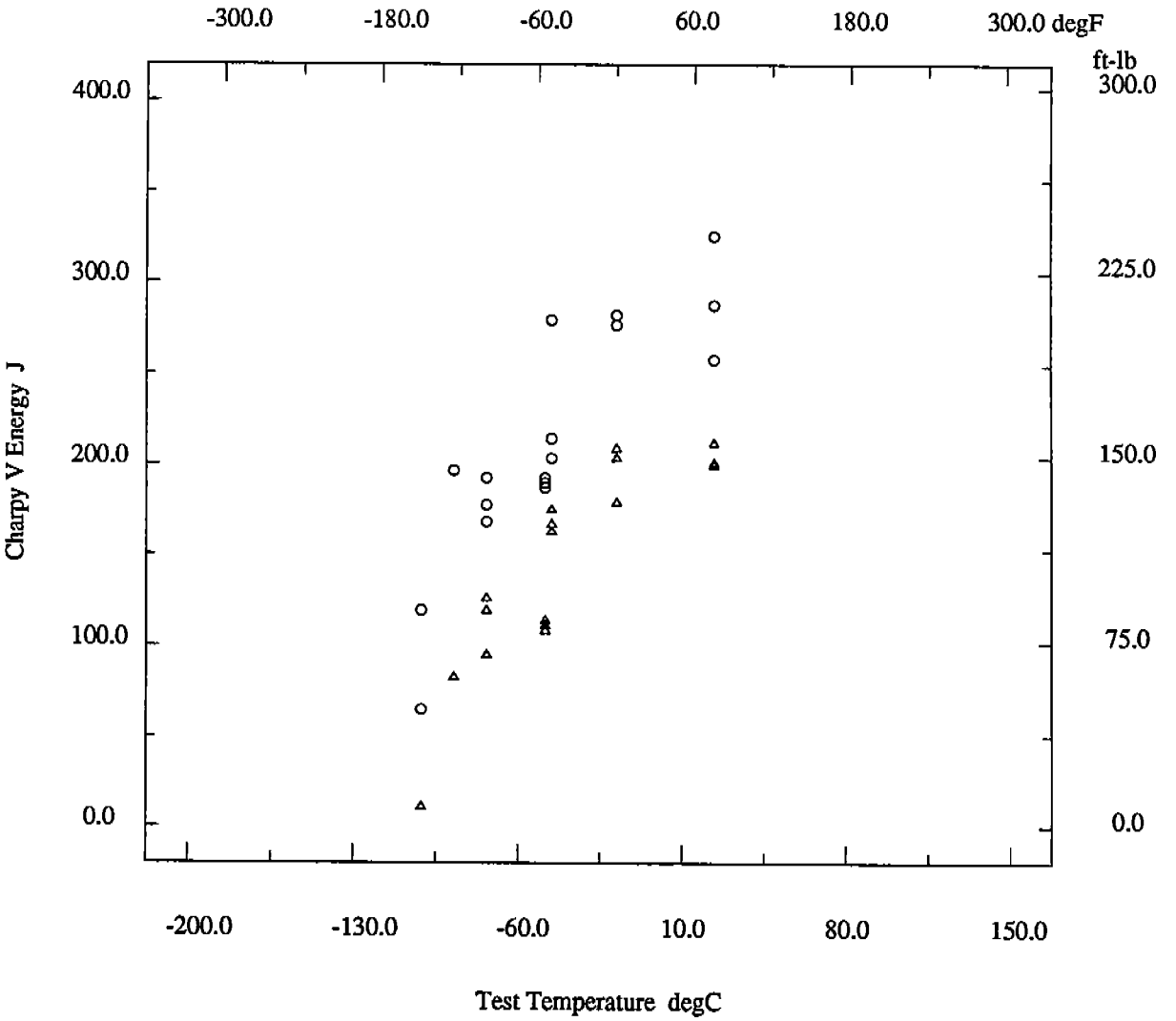
Spec Type	Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Fracture?
Full	T-L ^	75	156	87	Assumed

* - not reported

Material A710

Description

Material Code	002.003.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	5/8 in	Composition Type	Actual
Composition Position	*	Lot ID	48160
Reference	*		



* - not reported

Material A710

Description

Material Code	002.003.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	5/8 in	Composition Type	Actual
Composition Position	*	Lot ID	48160
Reference	*		

Composition See Page 10000.1

Fabrication History See Page 10000.1

Property Measurements

Test Type	Nil Ductilty Transition	Position	*
Specimen Type	P-3	Filler Alloy	*
Passes	*	Orientation	*
Standard Method	*	Standard Year	*

Test Temp degF	Break?	NDTT
-120	Yes	Yes
-110	No	No

* - not reported

Material A710

Description

Material Code	002.003.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	5/8 in	Composition Type	Actual
Composition Position	*	Lot ID	48160
Reference	*		

Composition

C	0.04 %	Mn	0.60 %
P	0.01 %	S	0.007 %
Si	0.24 %	Cr	0.80 %
Ni	0.90 %	Mo	0.18 %
V	*	Cu	1.16 %
Cb	0.041 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1200 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	5/8 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Tensile Yield Point	*
Uniform Elongation	*	Tensile Modulus	*
Standard Method	*	Standard Year	*

Orient	Test Temp degF	UTS ksi	TYS ksi	Elongation %	RA %
T	Room	90.2	79.2	27	76
T	Room	90.8	79.8	24	75

* - not reported

Material A710

Description

Material Code	002.003.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	5/8 in	Composition Type	Actual
Composition Position	*	Lot ID	48160
Reference	*		

Composition See Page 10100.1

Fabrication History See Page 10100.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T ○	-200	3	1
L-T ○	-200	9	3
L-T ○	-180	114	72
L-T ○	-180	50	32
L-T ○	-160	57	34
L-T ○	-160	71	43
L-T ○	-130	106	68
L-T ○	-130	142	88
L-T ○	-100	113	63
L-T ○	-80	157	91
L-T ○	-80	157	91
L-T ○	-80	193	95
L-T ○	-80	193	95
L-T ○	-50	183	94
L-T ○	-50	186	103
L-T ○	75	178	93
L-T ○	75	204	92
T-L △	-200	6	1
T-L △	-200	7	2
T-L △	-180	12	6
T-L △	-180	20	10
T-L △	-160	10	3
T-L △	-160	43	24
T-L △	-130	59	40
T-L △	-130	94	58
T-L △	-100	111	66
T-L △	-100	115	71
T-L △	-100	90	68
T-L △	-100	>120	*
T-L △	-80	114	73
T-L △	-80	114	73
T-L △	-80	134	74
T-L △	-80	134	74
T-L △	-50	149	80

(continued)

* - not reported

Material A710

(continued)

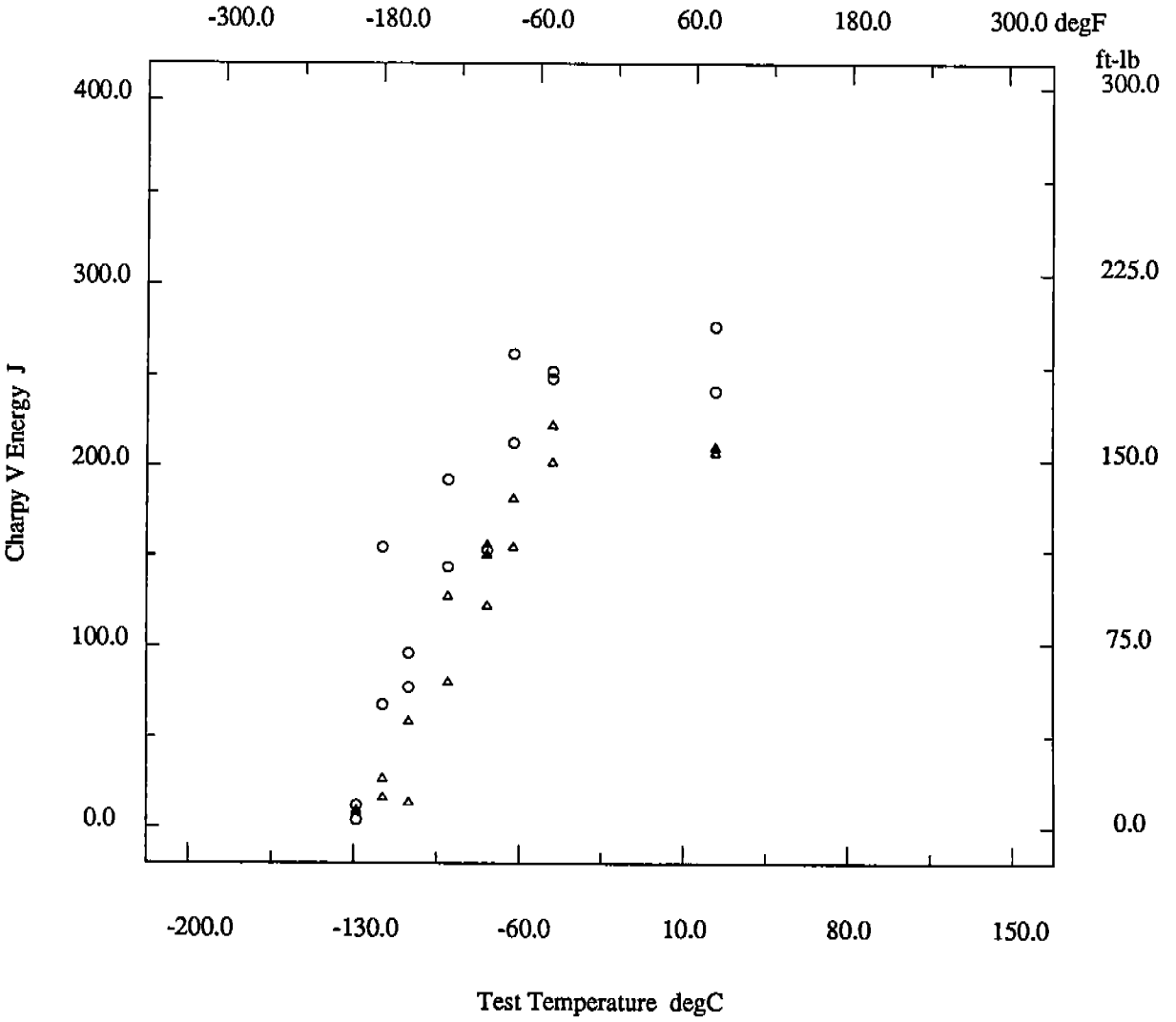
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L ▵	-50	164	92
T-L ▵	75	153	90
T-L ▵	75	155	94

* - not reported

Material A710

Description

Material Code	002.003.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	5/8 in	Composition Type	Actual
Composition Position	*	Lot ID	48160
Reference	*		



* - not reported

Material A710

Description

Material Code	002.003.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	5/8 in	Composition Type	Actual
Composition Position	*	Lot ID	48160
Reference	*		

Composition See Page 10100.1

Fabrication History See Page 10100.1

Property Measurements

Test Type	Nil Ductilty Transition	Position	*
Specimen Type	P-3	Filler Alloy	*
Passes	*	Orientation	*
Standard Method	*	Standard Year	*

Test Temp degF	Break?	NDTT
-140	Yes	Yes
-130	No	No

* - not reported

Material A710

Description

Material Code	002.004.01A1	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	3/8 in	Composition Type	Actual
Composition Position	*	Lot ID	41509
Reference	*		

Composition

C	0.05 %	Mn	0.54 %
P	0.01 %	S	0.009 %
Si	0.32 %	Cr	0.72 %
Ni	0.93 %	Mo	0.19 %
V	*	Cu	1.20 %
Cb	0.042 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1100 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	3/8 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	105	92.2	*	29	*

* - not reported

Material A710

Description

Material Code	002.004.01A1	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	3/8 in	Composition Type	Actual
Composition Position	*	Lot ID	41509
Reference	*		

Composition See Page 10200.1

Fabrication History See Page 10200.1

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	3/4	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

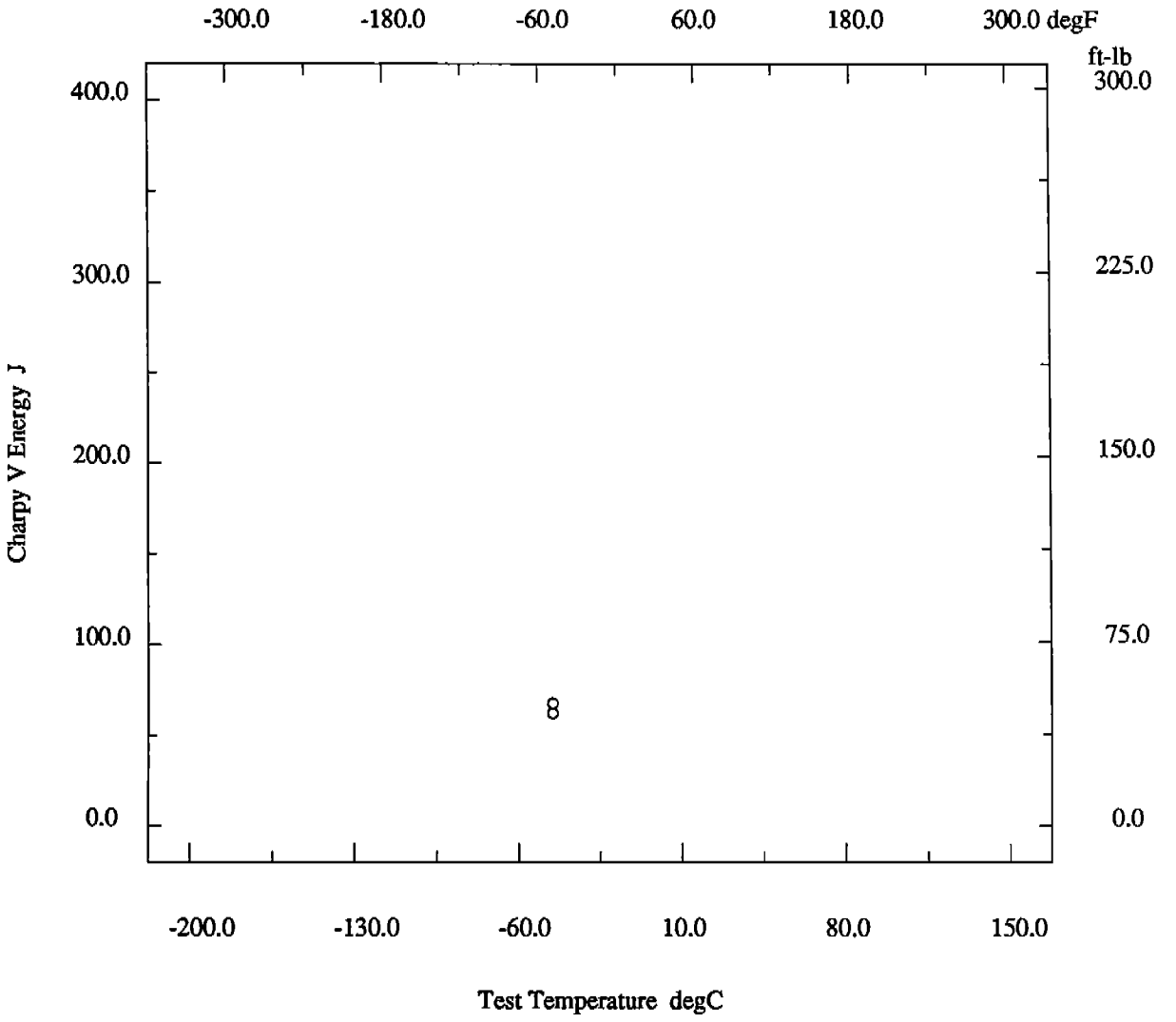
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L ○	-50	46	42
T-L ○	-50	50	48

* - not reported

Material A710

Description

Material Code	002.004.01A1	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	3/8 in	Composition Type	Actual
Composition Position	*	Lot ID	41509
Reference	*		



* - not reported

Material A710

Description

Material Code	002.004.09ABA	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Welded Joint	Form	Plate
Thickness	3/8 in	Composition Type	Actual
Composition Position	*	Lot ID	41509
Reference	*		

Composition See Page 10200.1

Fabrication History See Page 10200.1

Weld

Weld Code	002.004.09ABA	Weld Type	SAW
Base Metal Thickness	3/8 in	Welding Position	Flat
Preheat Temperature	None degF	Metal Gap	None in
Interpass Temperature	200 degF	Passes	2
Filler Specification	*	Filler Name	Armco W24
Filler Carbon Content	*	Filler Metal Size	5/32 in
Shielding Gas	*	Voltage	30 volts
Amperage	500 amps	Polarity	DCRP
Travel Speed	18 in/min	Heat Input/Pass	50 KJ/in
Joint Preparation	Smooth Butt	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Linde166p
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	3/4	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

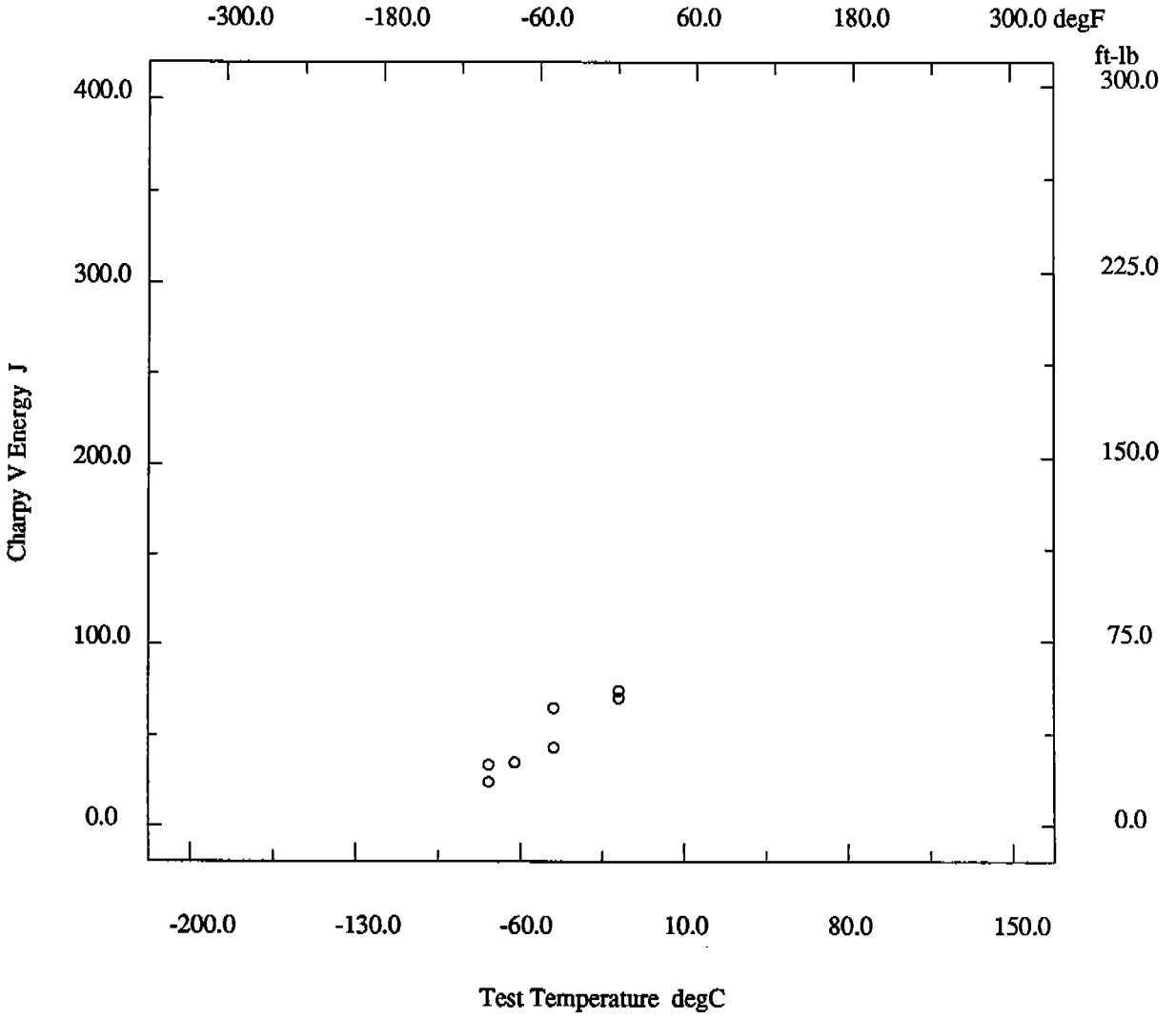
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L °	-100	18	18
T-L °	-100	25	22
T-L °	-80	26	23
T-L °	-80	26	25
T-L °	-50	32	21
T-L °	-50	48	43
T-L °	0	52	48
T-L °	0	55	52

* - not reported

Material A710

Description

Material Code	002.004.09ABA	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Welded Joint	Form	Plate
Thickness	3/8 in	Composition Type	Actual
Composition Position	*	Lot ID	41509
Reference	*		



* - not reported

Material A710

Description

Material Code	002.004.02ABA	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Welded Joint	Form	Plate
Thickness	3/8 in	Composition Type	Actual
Composition Position	*	Lot ID	41509
Reference	*		

Composition See Page 10200.1

Fabrication History See Page 10200.1

Weld

Weld Code	002.004.02ABA	Weld Type	SAW
Base Metal Thickness	3/8 in	Welding Position	Flat
Preheat Temperature	None degF	Metal Gap	None in
Interpass Temperature	200 degF	Passes	2
Filler Specification	*	Filler Name	Armco W24
Filler Carbon Content	*	Filler Metal Size	5/32 in
Shielding Gas	*	Voltage	30 volts
Amperage	500 amps	Polarity	DCRP
Travel Speed	18 in/min	Heat Input/Pass	50 KJ/in
Joint Preparation	Smooth Butt	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness at root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Linde166p
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	3/4	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

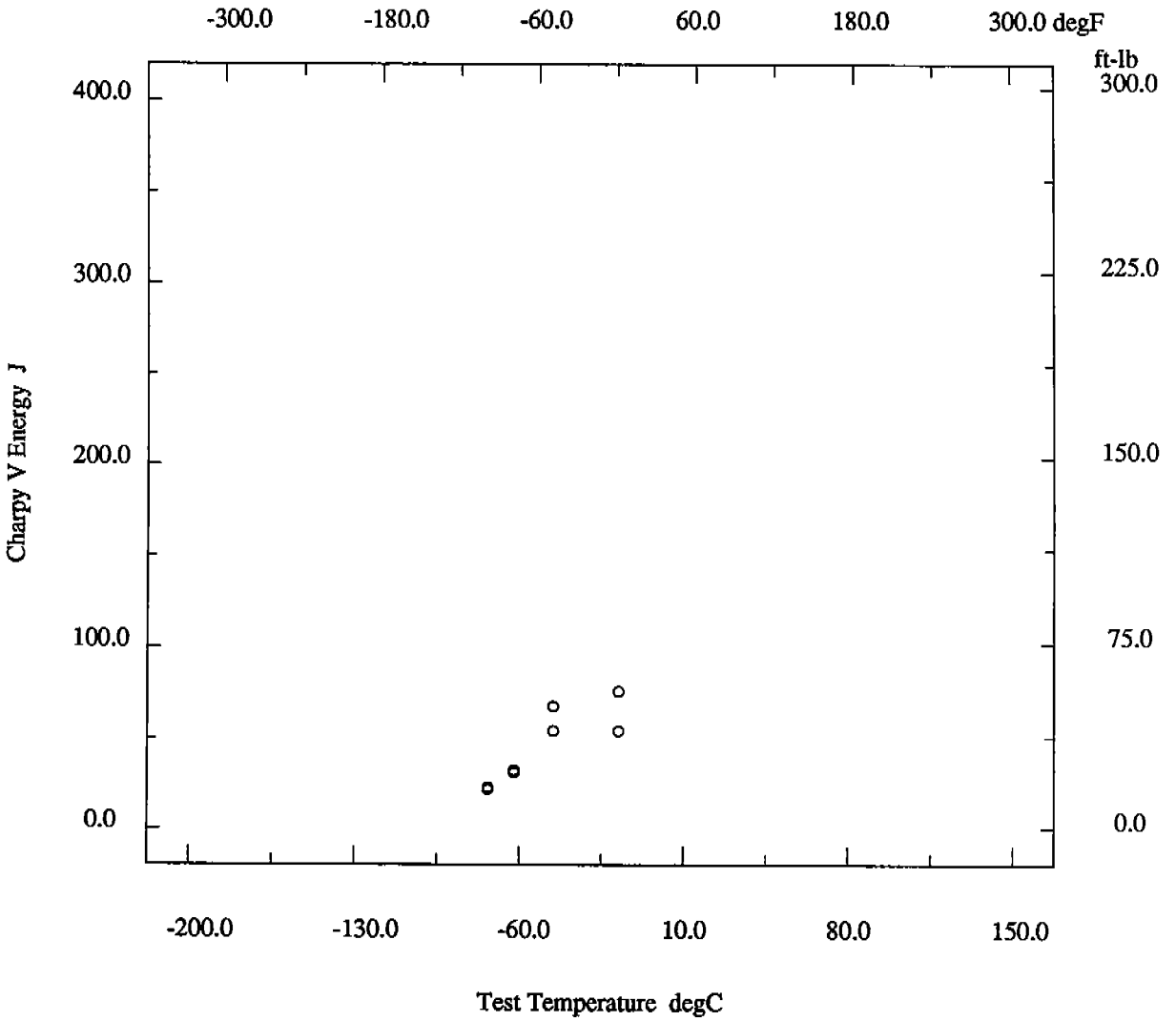
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L °	-100	16	16
T-L °	-100	17	16
T-L °	-80	23	22
T-L °	-80	24	26
T-L °	-50	40	38
T-L °	-50	50	46
T-L °	0	40	45
T-L °	0	56	54

* - not reported

Material A710

Description

Material Code	002.004.02ABA	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Welded Joint	Form	Plate
Thickness	3/8 in	Composition Type	Actual
Composition Position	*	Lot ID	41509
Reference	*		



* - not reported

Material A710

Description

Material Code	002.004.09AAA	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Welded Joint	Form	Plate
Thickness	3/8 in	Composition Type	Actual
Composition Position	*	Lot ID	41509
Reference	*		

Composition See Page 10200.1

Fabrication History See Page 10200.1

Weld

Weld Code	002.004.09AAA	Weld Type	SMAW
Base Metal Thickness	3/8 in	Welding Position	Flat
Preheat Temperature	None degF	Metal Gap	3/32 in
Interpass Temperature	400 degF	Passes	*
Filler Specification	E11018-M	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	5/32 in
Shielding Gas	*	Voltage	23 volts
Amperage	170 amps	Polarity	DCRP
Travel Speed	11 in/min	Heat Input/Pass	22 KJ/in
Joint Preparation	V Groove	Number of Sides	1
Location wrt Weld	11mm in HAZ	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	3/4	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

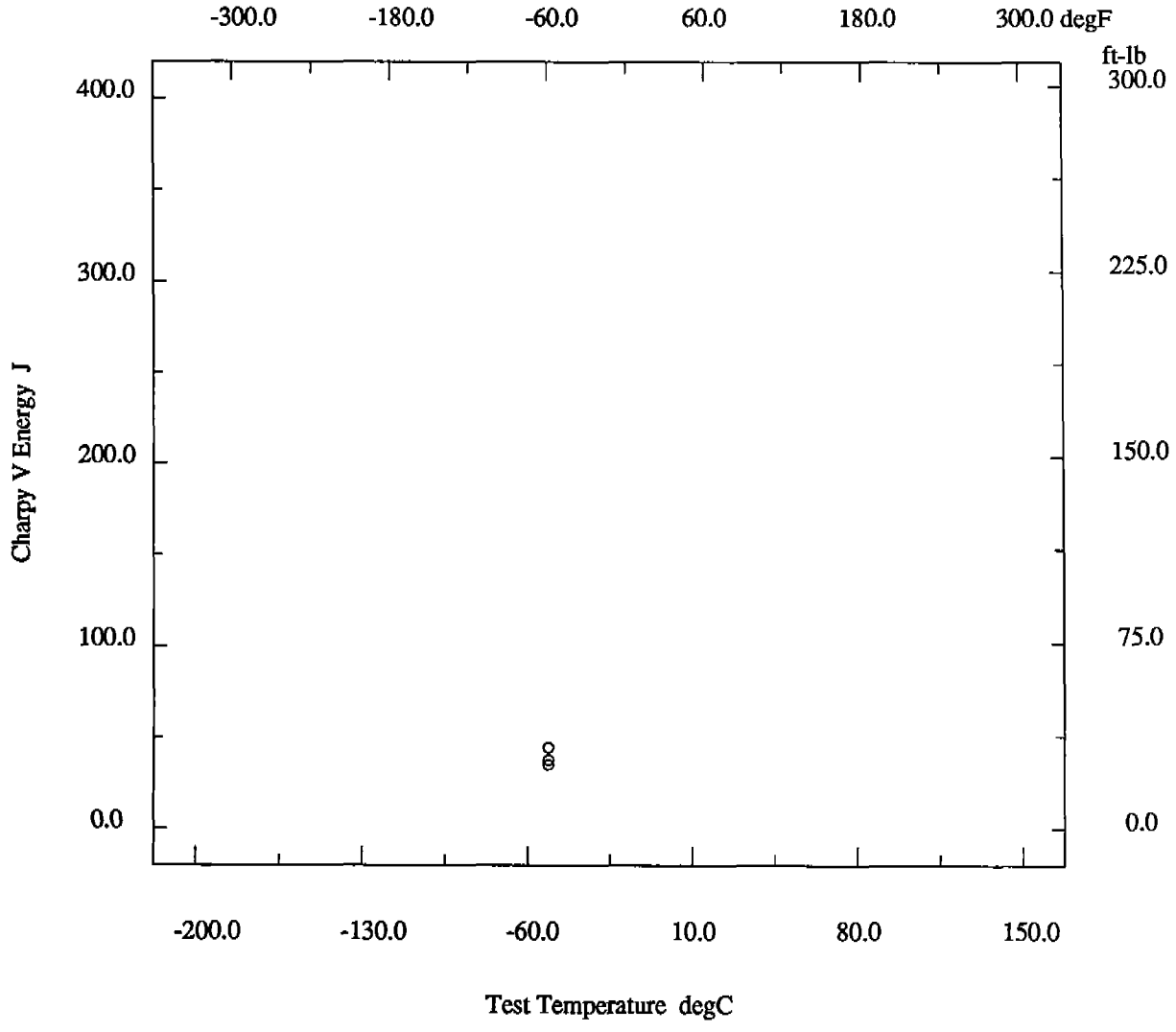
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L ○	-60	26	29
T-L ○	-60	28	29
T-L ○	-60	33	34

* - not reported

Material A710

Description

Material Code	002.004.09AAA	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Welded Joint	Form	Plate
Thickness	3/8 in	Composition Type	Actual
Composition Position	*	Lot ID	41509
Reference	*		



* - not reported

Material A710

Description

Material Code	002.004.02AAA	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Welded Joint	Form	Plate
Thickness	3/8 in	Composition Type	Actual
Composition Position	*	Lot ID	41509
Reference	*		

Composition See Page 10200.1

Fabrication History See Page 10200.1

Weld

Weld Code	002.004.02AAA	Weld Type	SMAW
Base Metal Thickness	3/8 in	Welding Position	Flat
Preheat Temperature	None degF	Metal Gap	3/32 in
Interpass Temperature	400 degF	Passes	*
Filler Specification	E11018-M	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	5/32 in
Shielding Gas	*	Voltage	23 volts
Amperage	170 amps	Polarity	DCRP
Travel Speed	11 in/min	Heat Input/Pass	22 KJ/in
Joint Preparation	V Groove	Number of Sides	1
Location wrt Weld	Fusion line	Location wrt Surface	Mid thickness not root
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	3/4	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

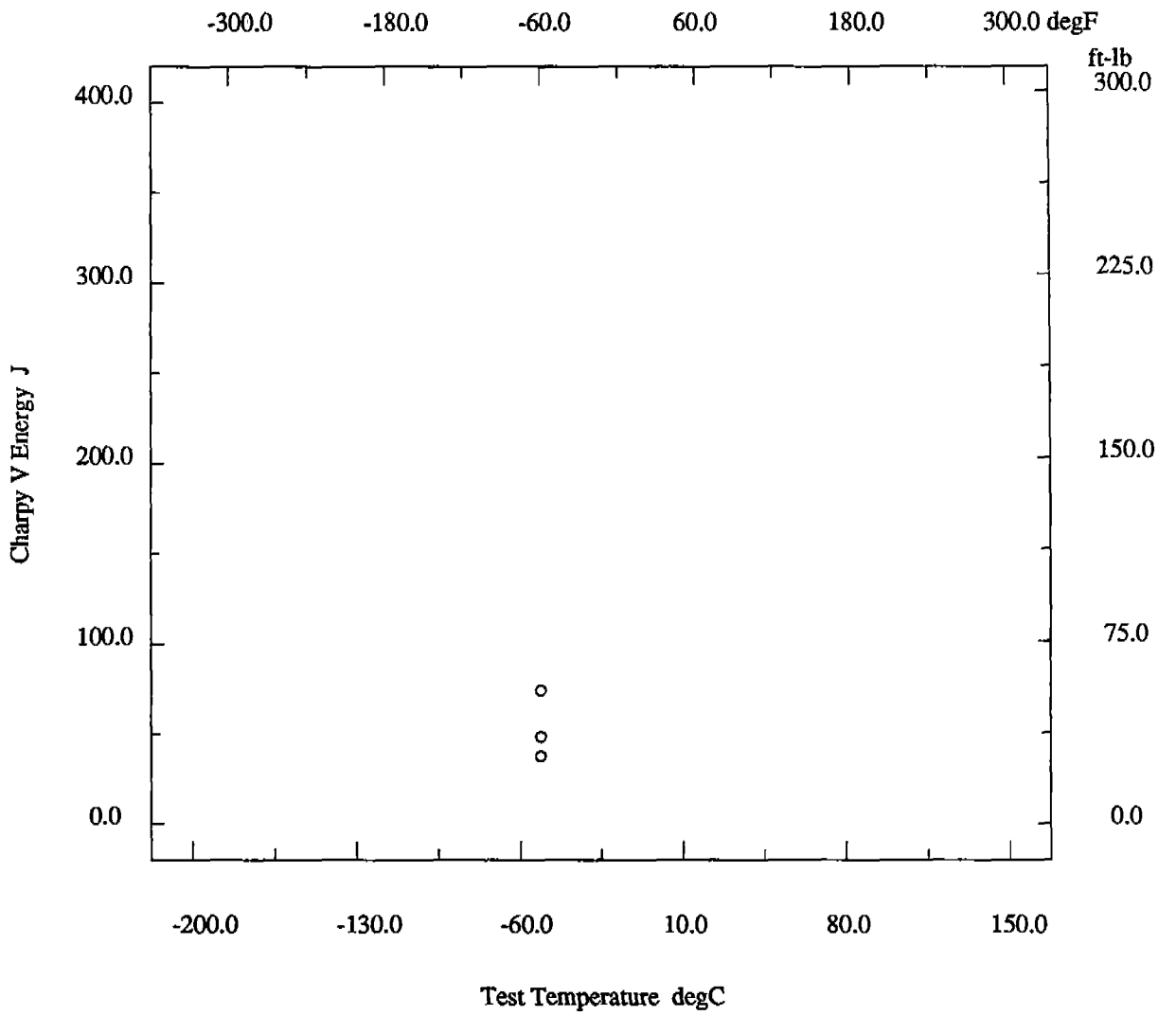
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L ○	-60	28	31
T-L ○	-60	36	38
T-L ○	-60	55	54

* - not reported

Material A710

Description

Material Code	002.004.02AAA	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Welded Joint	Form	Plate
Thickness	3/8 in	Composition Type	Actual
Composition Position	*	Lot ID	41509
Reference	*		



* - not reported

Material A710

Description

Material Code	002.005.01A1	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	1/2 in	Composition Type	Actual
Composition Position	*	Lot ID	50054
Reference	*		

Composition

C	0.060 %	Mn	0.70 %
P	0.01 %	S	0.009 %
Si	0.26 %	Cr	0.73 %
Ni	0.82 %	Mo	0.18 %
V	*	Cu	1.28 %
Cb	0.041 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1100 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	1/2 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	108.8	90.6	*	38.0	*

* - not reported

Material A710

Description

Material Code	002.005.01A1	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	1/2 in	Composition Type	Actual
Composition Position	*	Lot ID	50054
Reference	*		

Composition See Page 10300.1

Fabrication History See Page 10300.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

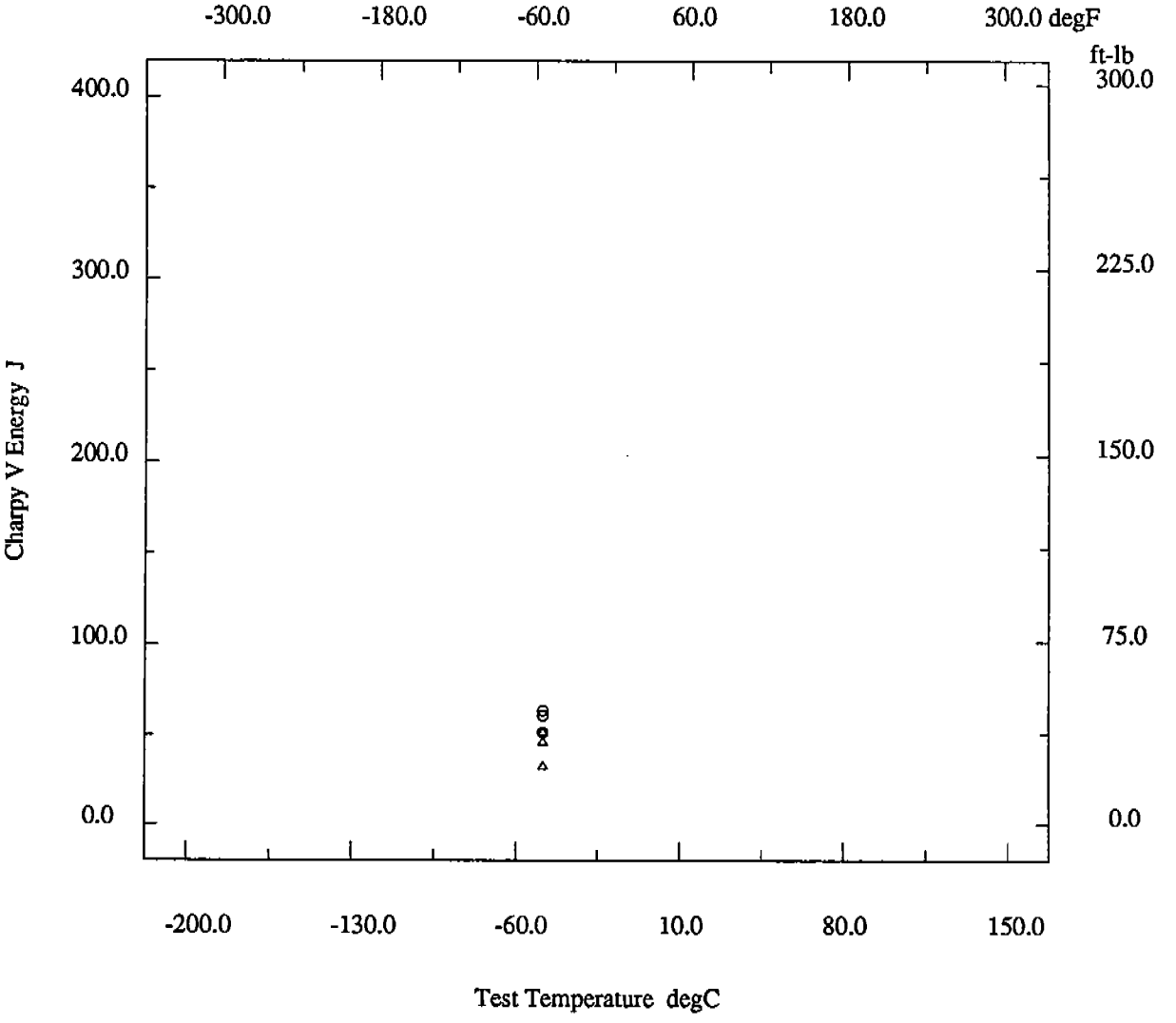
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T ○	-55	38	30
L-T ○	-55	45	34
L-T ○	-55	47	36
T-L △	-55	24	23
T-L △	-55	34	23
T-L △	-55	38	26

* - not reported

Material A710

Description

Material Code	002.005.01A1	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	1/2 in	Composition Type	Actual
Composition Position	*	Lot ID	50054
Reference	*		



* - not reported

Material A710

Description

Material Code	002.006.01A1	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	1/2 in	Composition Type	Actual
Composition Position	*	Lot ID	59609
Reference	*		

Composition

C	0.035 %	Mn	0.44 %
P	0.01 %	S	0.015 %
Si	0.28 %	Cr	0.68 %
Ni	0.89 %	Mo	0.21 %
V	*	Cu	1.16 %
Cb	0.045 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1150 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	1/2 in
Gage Length	1 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	101.2	86.6	*	30.5	72

* - not reported

Material A710

Description

Material Code	002.006.01A1	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	1/2 in	Composition Type	Actual
Composition Position	*	Lot ID	59609
Reference	*		

Composition See Page 10300.4

Fabrication History See Page 10300.4

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

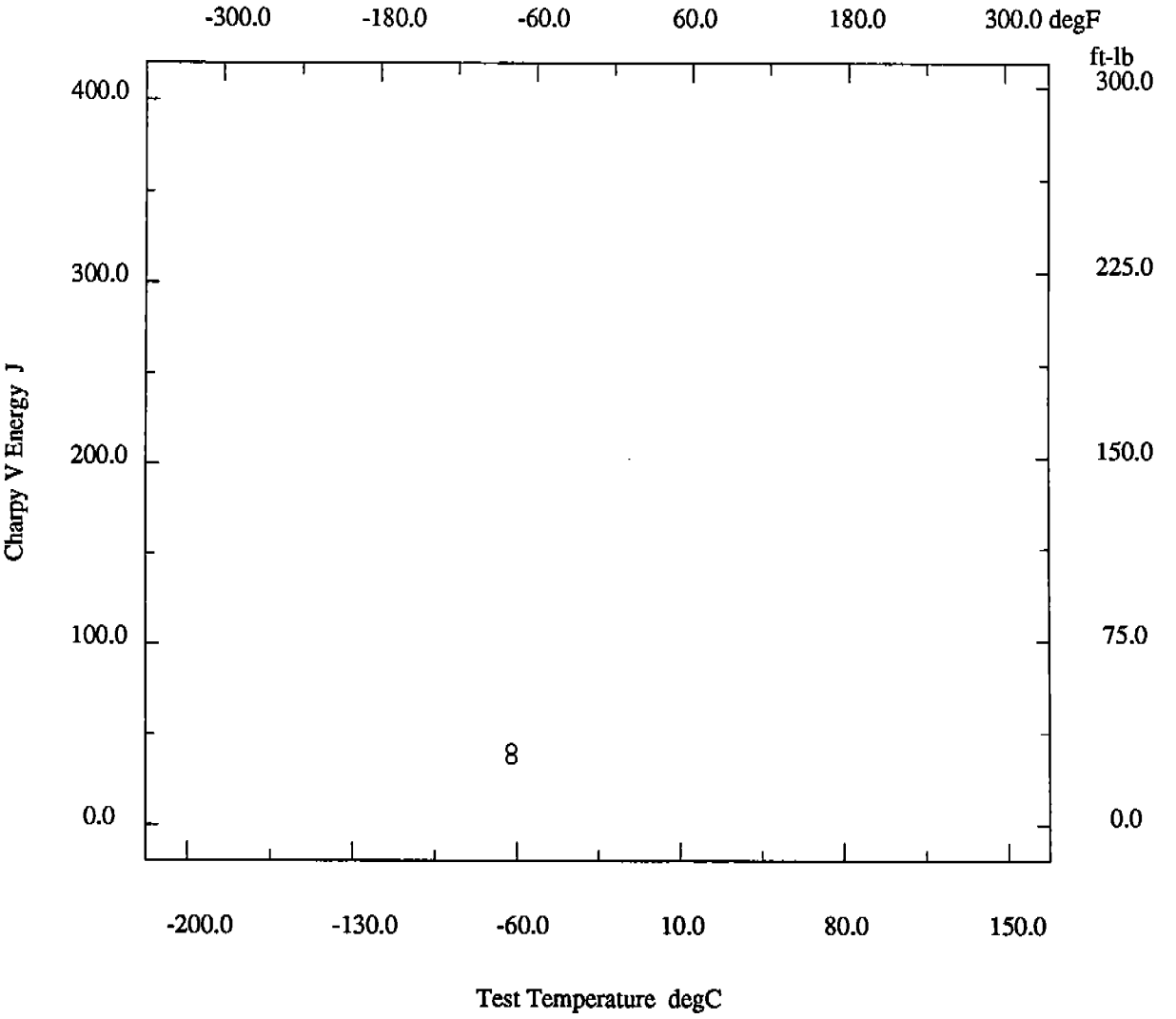
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L °	-80	27	16
T-L °	-80	31	22

* - not reported

Material A710

Description

Material Code	002.006.01A1	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	1/2 in	Composition Type	Actual
Composition Position	*	Lot ID	59609
Reference	*		



* - not reported

Material A710

Description

Material Code	002.005.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	1.25 in	Composition Type	Actual
Composition Position	*	Lot ID	50054
Reference	*		

Composition

C	0.06 %	Mn	0.70 %
P	0.01 %	S	0.009 %
Si	0.26 %	Cr	0.73 %
Ni	0.82 %	Mo	0.18 %
V	*	Cu	1.28 %
Cb	0.041 %	Ti	*
B	*	Al	*
N	*	Other Components	*

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1100 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	1.25 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	89.1	72.9	*	28	*

* - not reported

Material A710

Description

Material Code	002.005.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	1.25 in	Composition Type	Actual
Composition Position	*	Lot ID	50054
Reference	*		

Composition See Page 10400.1

Fabrication History See Page 10400.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

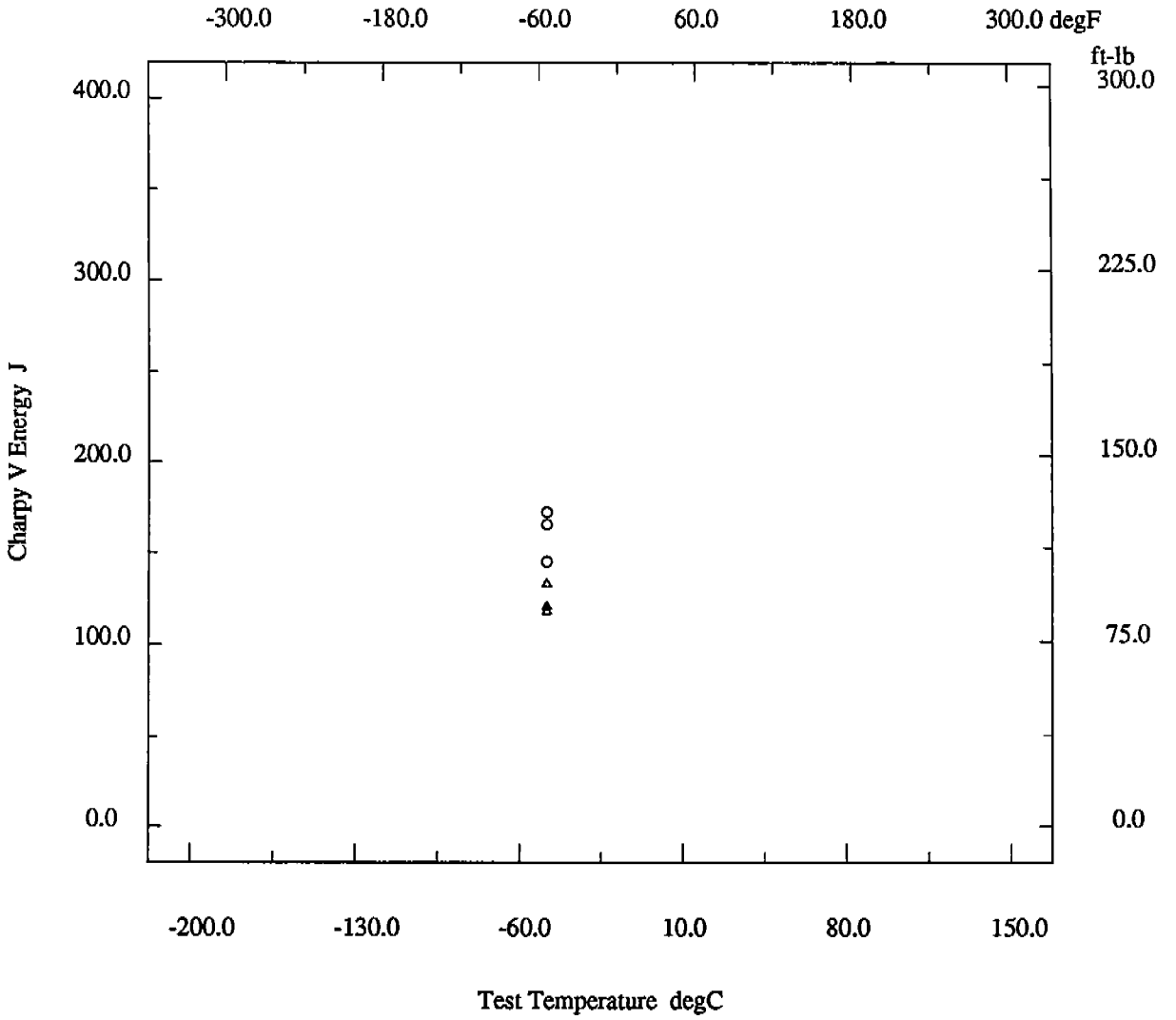
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T ○	-55	107	73
L-T ○	-55	122	80
L-T ○	-55	127	80
T-L △	-55	87	64
T-L △	-55	89	65
T-L △	-55	98	75

* - not reported

Material A710

Description

Material Code	002.005.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	1.25 in	Composition Type	Actual
Composition Position	*	Lot ID	50054
Reference	*		



* - not reported

Material A710

Description

Material Code	002.005.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.25 in	Composition Type	Actual
Composition Position	*	Lot ID	50054
Reference	*		

Composition

C	0.06 %	Mn	0.70 %
P	0.01 %	S	0.009 %
Si	0.26 %	Cr	0.73 %
Ni	0.82 %	Mo	0.18 %
V	*	Cu	1.28 %
Cb	0.041 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1200 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	1.25 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	92.9	82.9	*	27	*

* - not reported

Material A710

Description

Material Code	002.005.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.25 in	Composition Type	Actual
Composition Position	*	Lot ID	50054
Reference	*		

Composition See Page 10500.1

Fabrication History See Page 10500.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

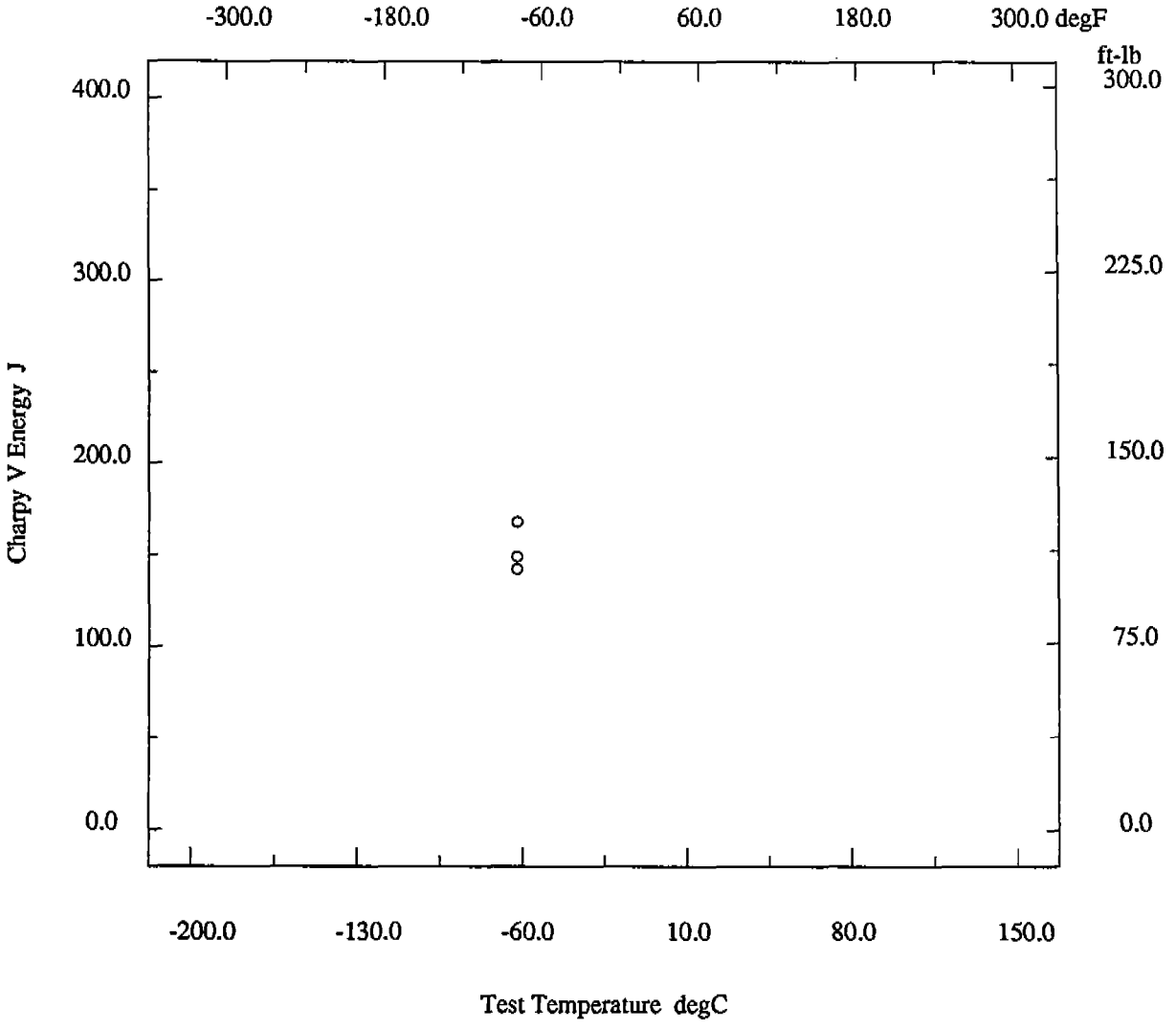
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T ○	-80	105	72
L-T ○	-80	110	75
L-T ○	-80	124	77

* - not reported

Material A710

Description

Material Code	002.005.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.25 in	Composition Type	Actual
Composition Position	*	Lot ID	50054
Reference	*		



* - not reported

Material A710

Description

Material Code	002.005.09C	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Welded Joint	Form	Plate
Thickness	1.25 in	Composition Type	Actual
Composition Position	*	Lot ID	50054
Reference	*		

Composition See Page 10500.1

Fabrication History See Page 10500.1

Weld

Weld Code	002.005.09C	Weld Type	SMAW
Base Metal Thickness	1 in	Welding Position	Vert-Up
Preheat Temperature	70 degF	Metal Gap	3/16 in
Interpass Temperature	300 degF	Passes	7
Filler Specification	E8018	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	1/8 in
Shielding Gas	None	Voltage	22 volts
Amperage	140 amps	Polarity	DCRP
Travel Speed	*	Heat Input/Pass	*
Joint Preparation	Double V-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	*
Post-Weld Heat Temp	1150 degF	Post-Weld Heat Time	5 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

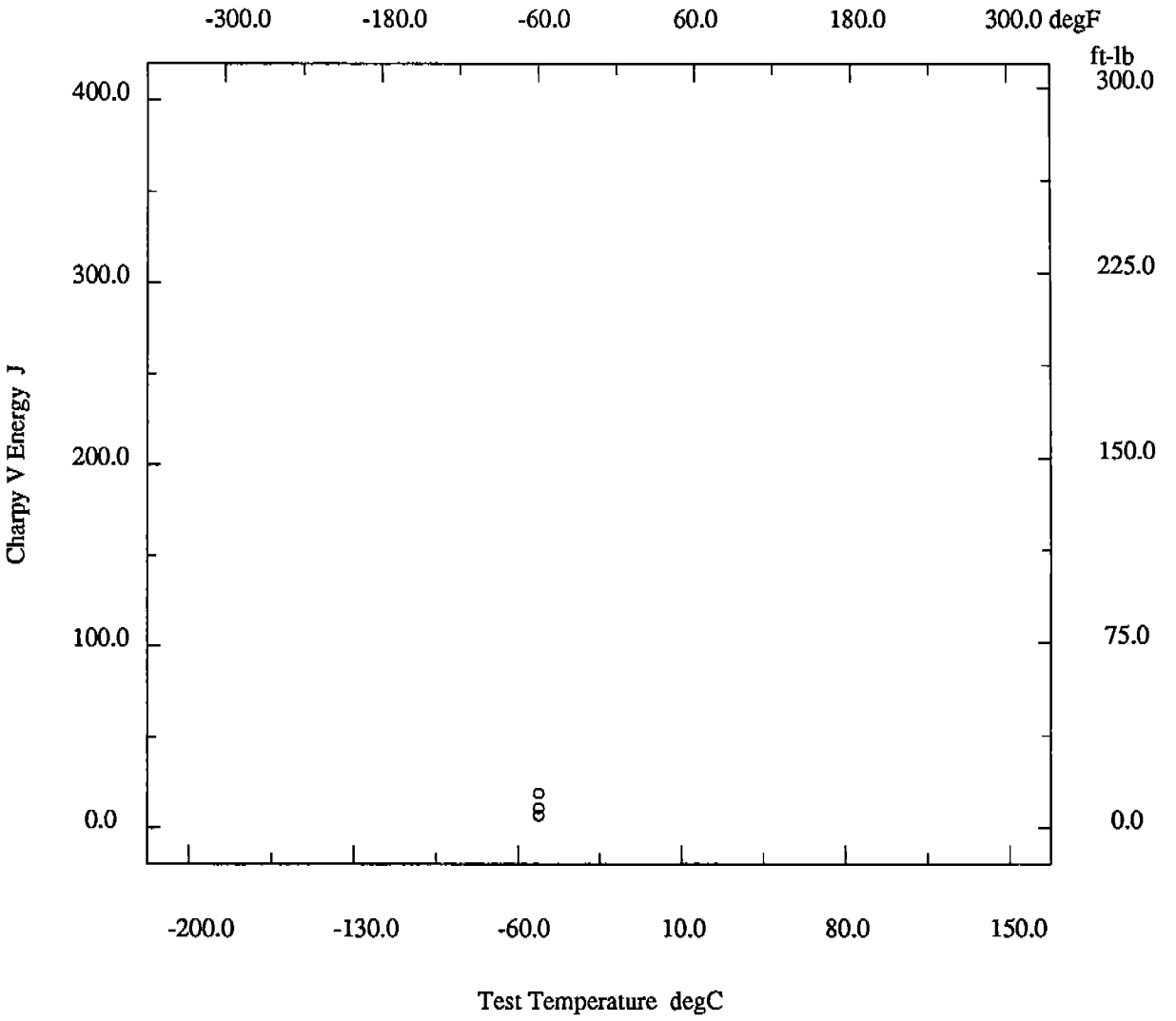
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T °	-60	14	15
L-T °	-60	5	5
L-T °	-60	8	7

* - not reported

Material A710

Description

Material Code	002.005.09C	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Welded Joint	Form	Plate
Thickness	1.25 in	Composition Type	Actual
Composition Position	*	Lot ID	50054
Reference	*		



* - not reported

Material A710

Description

Material Code	002.005.02C	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Welded Joint	Form	Plate
Thickness	1.25 in	Composition Type	Actual
Composition Position	*	Lot ID	50054
Reference	*		

Composition See Page 10500.1

Fabrication History See Page 10500.1

Weld

Weld Code	002.005.02C	Weld Type	SMAW
Base Metal Thickness	1 in	Welding Position	Vert-Up
Preheat Temperature	70 degF	Metal Gap	3/16 in
Interpass Temperature	300 degF	Passes	7
Filler Specification	E8018	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	1/8 in
Shielding Gas	None	Voltage	22 volts
Amperage	140 amps	Polarity	DCRP
Travel Speed	*	Heat Input/Pass	*
Joint Preparation	Double V-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	*
Post-Weld Heat Temp	1150 degF	Post-Weld Heat Time	5 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

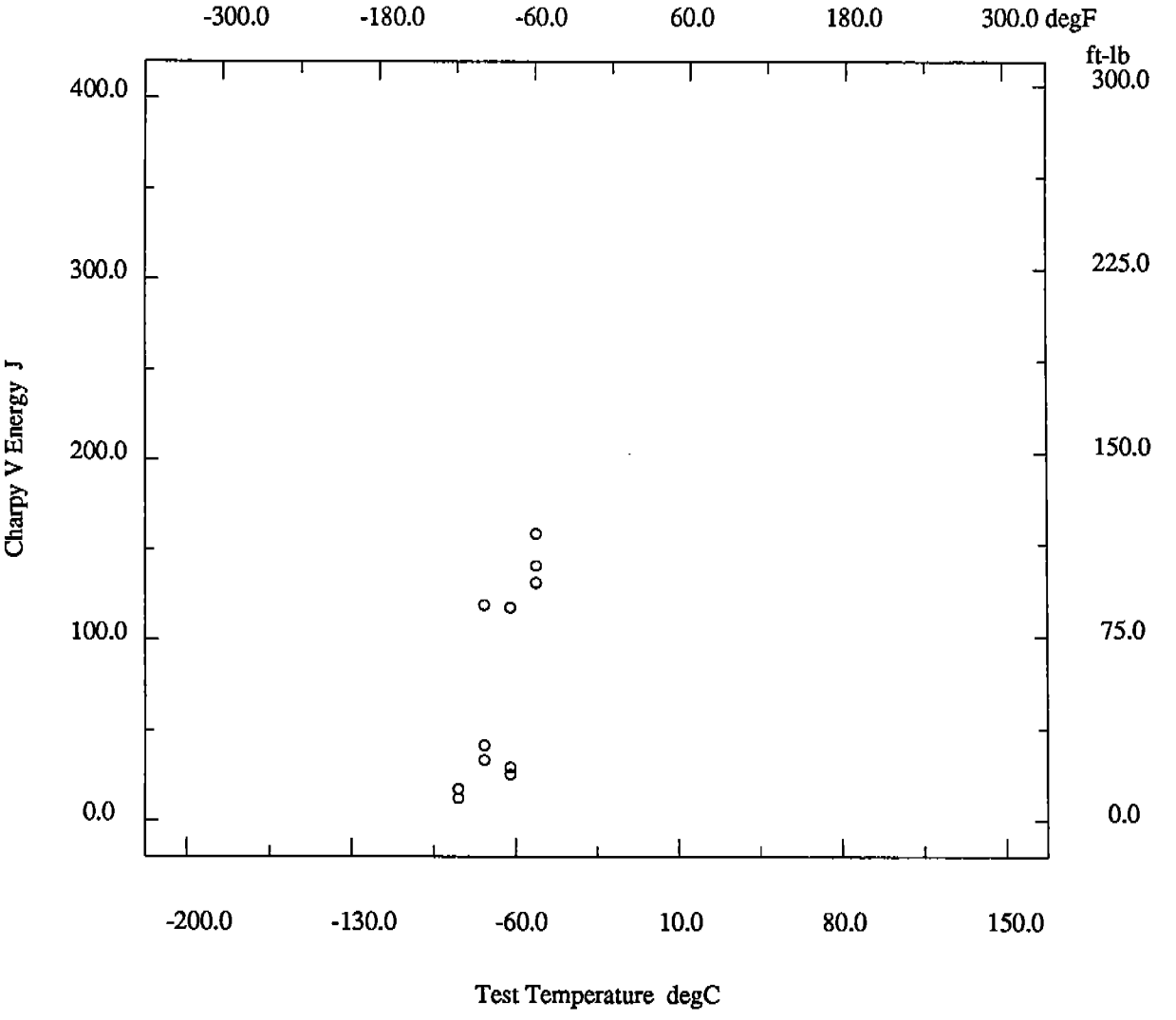
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T o	-120	13	13
L-T o	-120	9	11
L-T o	-120	9	11
L-T o	-100	25	23
L-T o	-100	31	31
L-T o	-100	88	72
L-T o	-80	19	20
L-T o	-80	22	20
L-T o	-80	87	68
L-T o	-60	104	80
L-T o	-60	117	81
L-T o	-60	97	71

* - not reported

Material A710

Description

Material Code	002.005.02C	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Welded Joint	Form	Plate
Thickness	1.25 in	Composition Type	Actual
Composition Position	*	Lot ID	50054
Reference	*		



* - not reported

Material A710

Description

Material Code	002.006.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	59609
Reference	*		

Composition

C	0.035 %	Mn	0.44 %
P	0.01 %	S	0.015 %
Si	0.28 %	Cr	0.68 %
Ni	0.89 %	Mo	0.21 %
V	*	Cu	1.16 %
Cb	0.045 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1100 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T ○	-150	13	6
L-T ○	-150	70	49
L-T ○	-150	71	49
L-T ○	-100	124	76
L-T ○	-100	145	88
L-T ○	-100	86	59
L-T ○	-50	144	79
L-T ○	-50	152	80
L-T ○	-50	163	84
L-T ○	0	173	90
L-T ○	0	178	86
L-T ○	0	186	90
L-T ○	75	185	89
L-T ○	75	186	88
L-T ○	75	190	90
T-L △	-150	11	5
T-L △	-150	73	50

(continued)

* - not reported

Material A710

(continued)

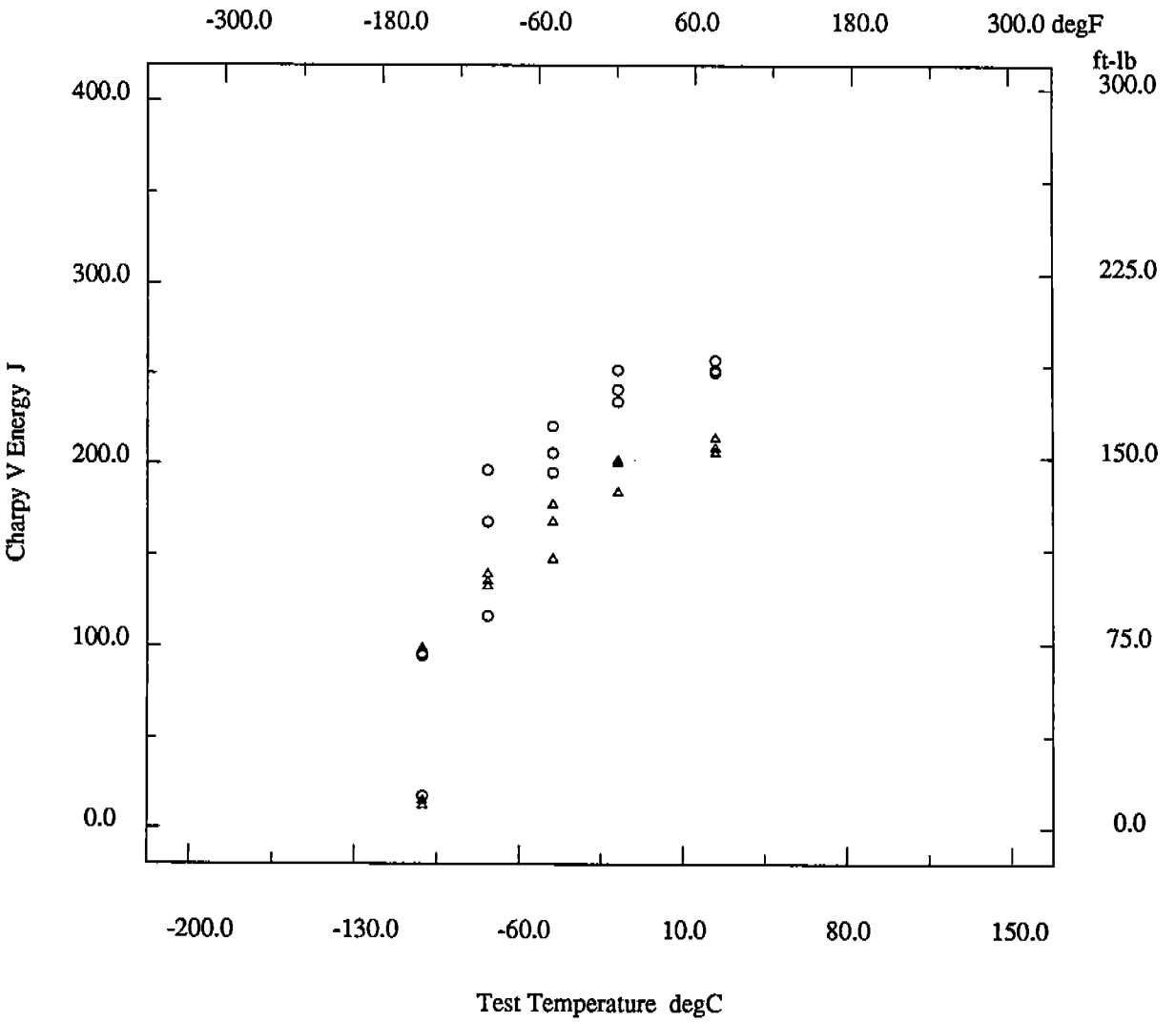
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L ▵	-150	9	3
T-L ▵	-100	100	64
T-L ▵	-100	103	65
T-L ▵	-100	98	65
T-L ▵	-50	109	68
T-L ▵	-50	124	74
T-L ▵	-50	131	76
T-L ▵	0	136	83
T-L ▵	0	148	83
T-L ▵	0	149	81
T-L ▵	75	152	82
T-L ▵	75	154	88
T-L ▵	75	158	89

* - not reported

Material A710

Description

Material Code	002.006.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	59609
Reference	*		



* - not reported

Material A710

Description

Material Code	002.006.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	59609
Reference	*		

Composition See Page 10600.1

Fabrication History See Page 10600.1

Property Measurements

Test Type	Nil Ductilty Transition	Position	*
Specimen Type	P-2	Filler Alloy	*
Passes	*	Orientation	*
Standard Method	*	Standard Year	*

Test Temp degF	Break?	NDTT
-120	Yes	Yes
-110	No	No

* - not reported

Material A710

Description

Material Code	002.006.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	59609
Reference	*		

Composition

C	0.035 %	Mn	0.44 %
P	0.01 %	S	0.015 %
Si	0.28 %	Cr	0.68 %
Ni	0.89 %	Mo	0.21 %
V	*	Cu	1.16 %
Cb	0.045 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1150 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	0.75 in
Gage Length	1 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	103.6	89.6	*	32	75

* - not reported

Material A710

Description

Material Code	002.006.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	59609
Reference	*		

Composition See Page 10700.1

Fabrication History See Page 10700.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	68 mils
Shear Fracture	*	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

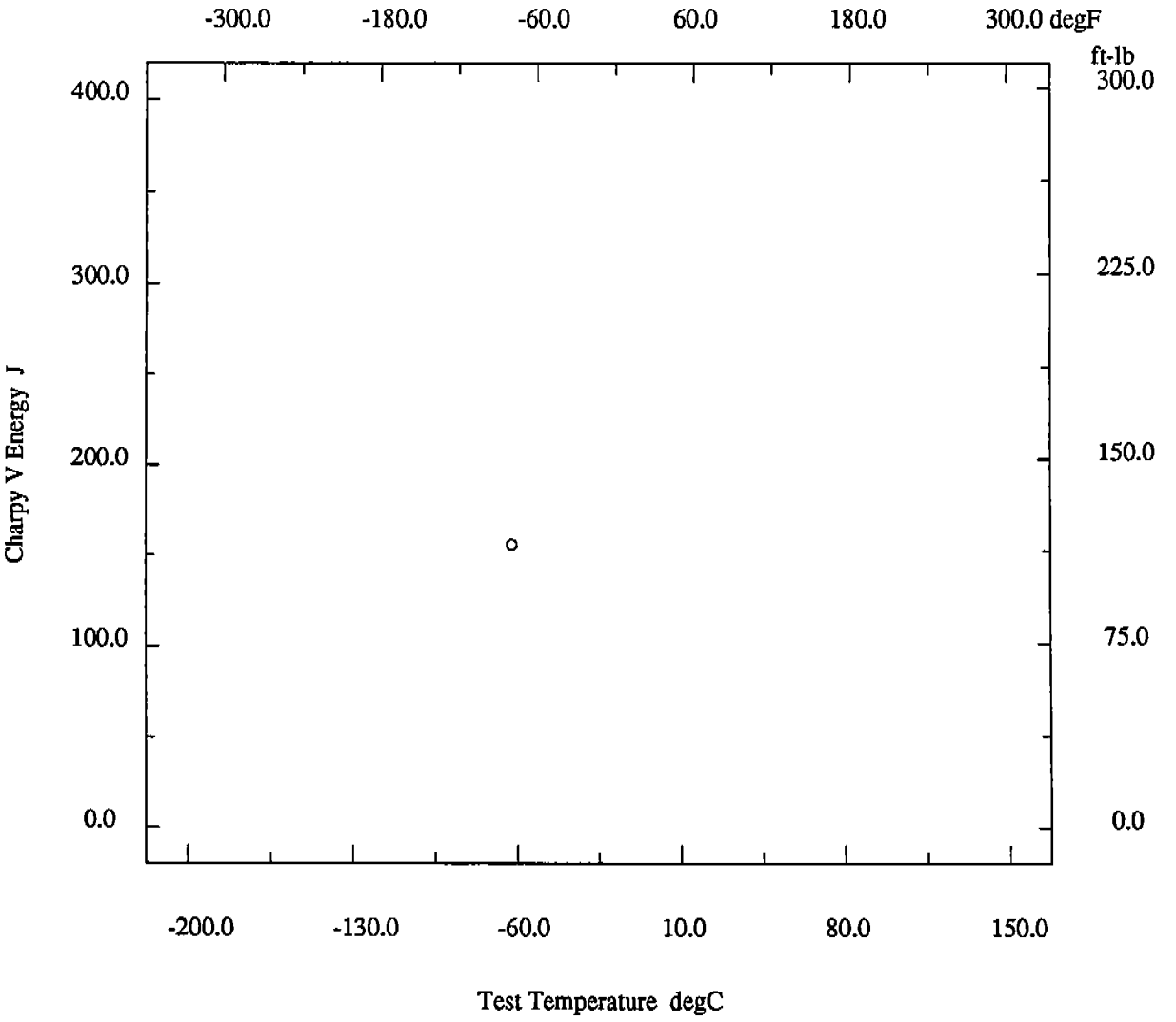
Orien	Test Temp degF	CVN Energy ft-lb
L-T °	-80	115

* - not reported

Material A710

Description

Material Code	002.006.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	59609
Reference	*		



* - not reported

Material A710

Description

Material Code	002.006.01C2	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	59609
Reference	*		

Composition See Page 10700.1

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1100 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T ○	-150	36	18
L-T ○	-150	68	33
L-T ○	-80	117	73
L-T ○	-80	124	70
L-T ○	-80	80	49
L-T ○	-50	128	70
L-T ○	-50	152	78
L-T ○	-50	163	88
L-T ○	0	156	84
L-T ○	0	159	88
L-T ○	0	160	91
L-T ○	75	148	84
L-T ○	75	156	86
L-T ○	75	158	89
T-L △	-150	10	2
T-L △	-150	23	10
T-L △	-150	6	2
T-L △	-80	58	40
T-L △	-80	65	43
T-L △	-80	80	48
T-L △	-50	100	65
T-L △	-50	84	50
T-L △	-50	98	61
T-L △	0	108	72
T-L △	0	111	74

(continued)

* - not reported

Material A710

(continued)

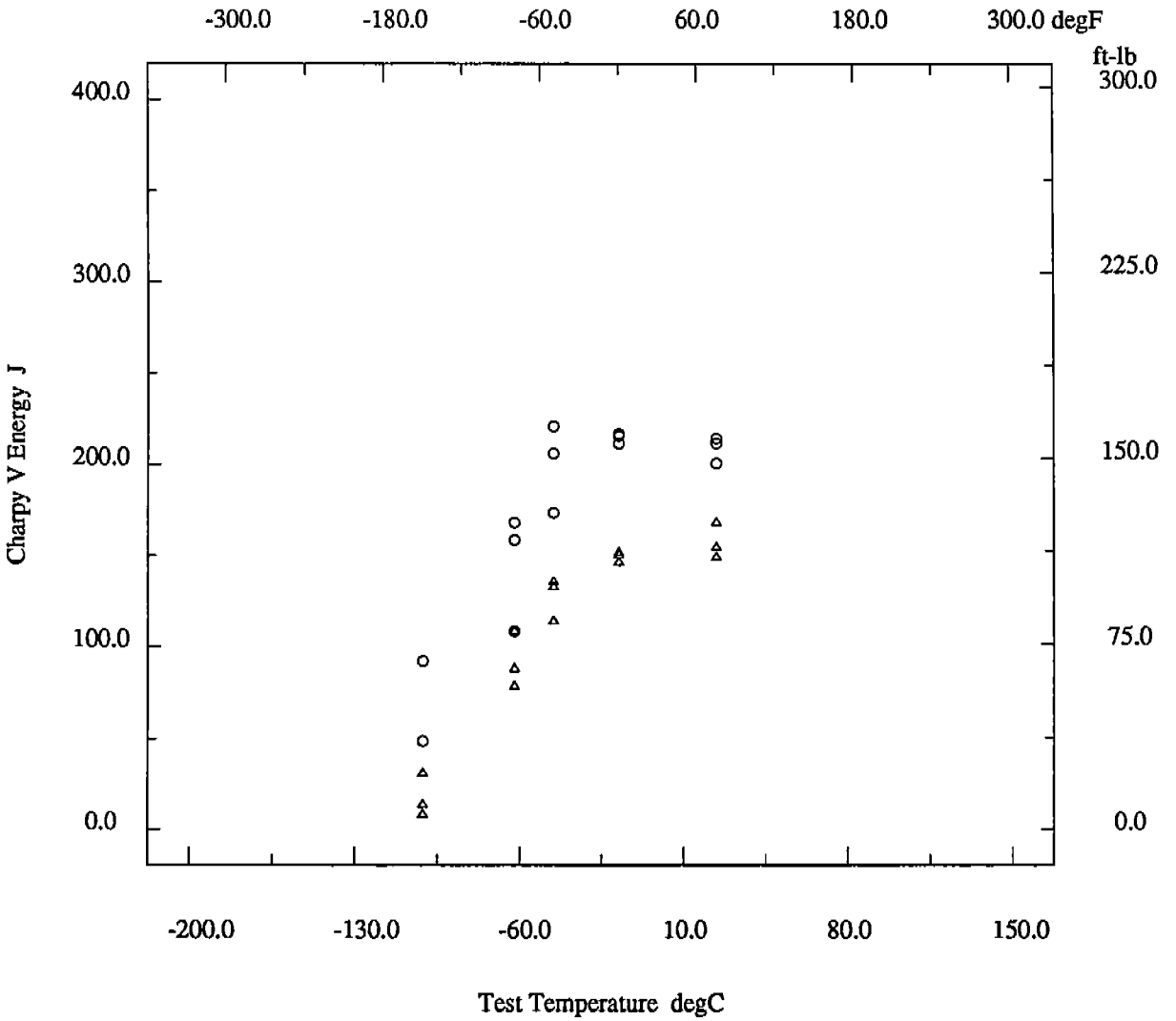
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L ▵	0	112	63
T-L ▵	75	110	76
T-L ▵	75	114	74
T-L ▵	75	124	80

* - not reported

Material A710

Description

Material Code	002.006.01C2	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	59609
Reference	*		



* - not reported

Material A710

Description

Material Code	002.006.01C2	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	59609
Reference	*		

Composition See Page 10700.1

Fabrication History See Page 10700.4

Property Measurements

Test Type	Nil Ductilty Transition	Position	*
Specimen Type	P-2	Filler Alloy	*
Passes	*	Orientation	*
Standard Method	*	Standard Year	*

Test Temp degF	Break?	NDTT
-130	Yes	Yes
-120	No	No

* - not reported

Material A710

Description

Material Code	002.007.01A1	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	42252
Reference	*		

Composition

C	0.04 %	Mn	0.48 %
P	0.01 %	S	0.009 %
Si	0.28 %	Cr	0.70 %
Ni	0.90 %	Mo	0.19 %
V	*	Cu	1.16 %
Cb	0.038 %	Ti	*
B	*	Al	*
N	*	Other Components	*

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1100 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	3/4 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	100.6	84.3	*	27.5	67

* - not reported

Material A710

Description

Material Code	002.007.01A1	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	42252
Reference	*		

Composition See Page 10800.1

Fabrication History See Page 10800.1

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

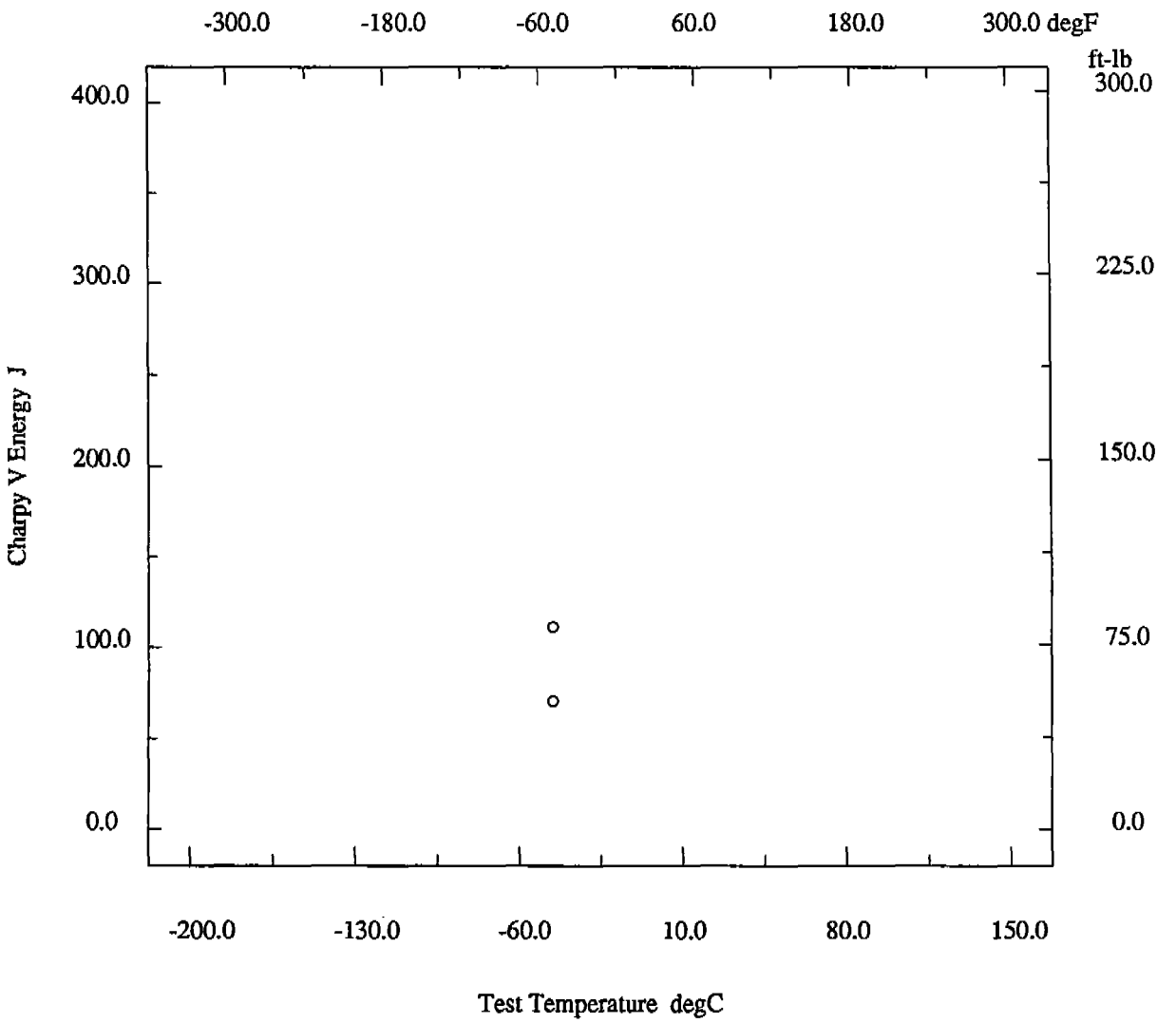
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L °	-50	52	36
T-L °	-50	82	59

* - not reported

Material A710

Description

Material Code	002.007.01A1	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	42252
Reference	*		



* - not reported

Material A710

Description

Material Code	002.007.09AAA	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Welded Joint	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	42252
Reference	*		

Composition See Page 10800.1

Fabrication History See Page 10800.1

Weld

Weld Code	002.007.09AAA	Weld Type	SAW
Base Metal Thickness	3/4 in	Welding Position	Flat
Preheat Temperature	75 degF	Metal Gap	None in
Interpass Temperature	200 degF	Passes	10
Filler Specification	*	Filler Name	Armco W24
Filler Carbon Content	*	Filler Metal Size	5/32 in
Shielding Gas	*	Voltage	28 volts
Amperage	500 amps	Polarity	DCRP
Travel Speed	18 in/min	Heat Input/Pass	47 KJ/in
Joint Preparation	Double U-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	*
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Linde166p
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	Full	Orientation	*
Shear Fracture	*	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

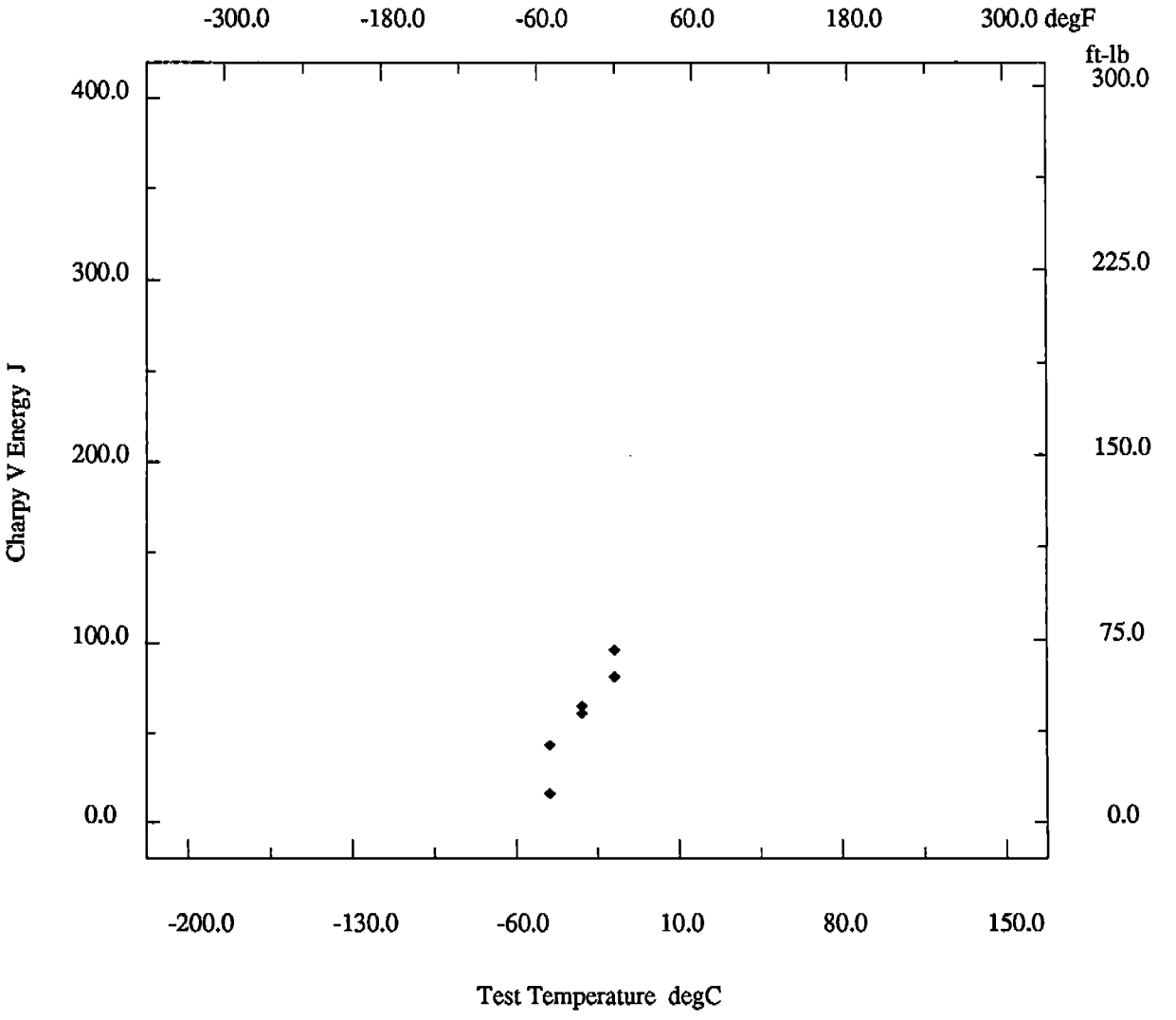
Test Temp degF	CVN Energy ft-lb	Lat Expans mils
-50	12	10
-50	32	21
-25	45	28
-25	48	33
0	60	44
0	71	45

* - not reported

Material A710

Description

Material Code	002.007.09AAA	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Welded Joint	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	42252
Reference	*		



* - not reported

Material A710

Description

Material Code	002.007.02AAA	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Welded Joint	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	42252
Reference	*		

Composition

See Page 10800.1

Fabrication History

See Page 10800.1

Weld

Weld Code	002.007.02AAA	Weld Type	SAW
Base Metal Thickness	3/4 in	Welding Position	Flat
Preheat Temperature	75 degF	Metal Gap	None in
Interpass Temperature	200 degF	Passes	10
Filler Specification	*	Filler Name	Armco W24
Filler Carbon Content	*	Filler Metal Size	5/32 in
Shielding Gas	*	Voltage	28 volts
Amperage	500 amps	Polarity	DCRP
Travel Speed	18 in/min	Heat Input/Pass	47 KJ/in
Joint Preparation	Double U-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	*
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Linde166p
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	Full	Orientation	*
Shear Fracture	*	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

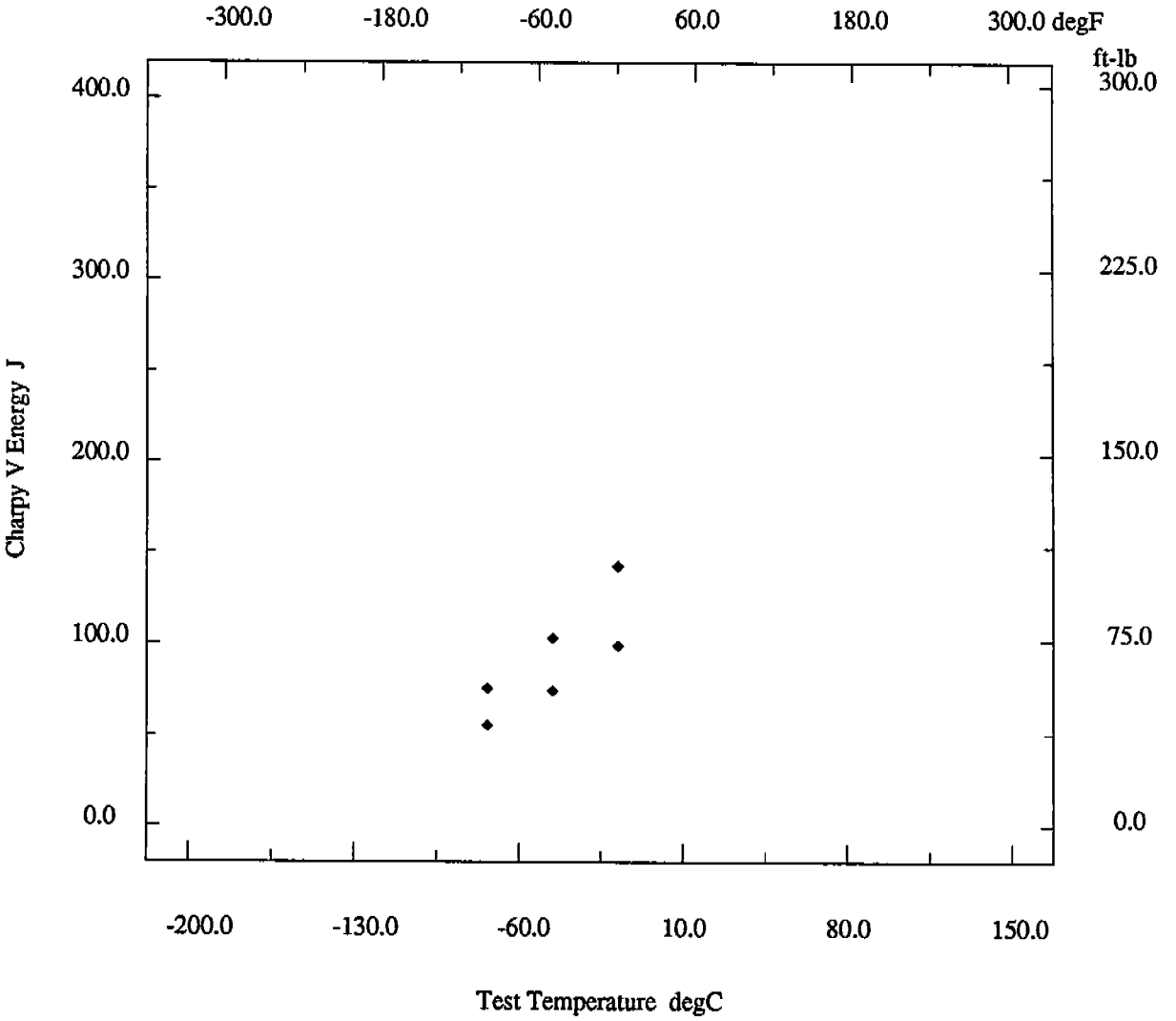
Test Temp degF	CVN Energy ft-lb	Lat Expans mils
-100	41	27
-100	56	32
-50	55	44
-50	76	54
0	105	73
0	73	51

* - not reported

Material A710

Description

Material Code	002.007.02AAA	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Welded Joint	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	42252
Reference	*		



* - not reported

Material A710

Description

Material Code	002.007.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	42252
Reference	*		

Composition

C	0.04 %	Mn	0.48 %
P	0.01 %	S	0.009 %
Si	0.28 %	Cr	0.70 %
Ni	0.90 %	Mo	0.19 %
V	*	Cu	1.16 %
Cb	0.038 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1100 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	3/4 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	88.5	75.7	*	31	74

* - not reported

Material A710

Description

Material Code	002.007.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	42252
Reference	*		

Composition See Page 10900.1

Fabrication History See Page 10900.1

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

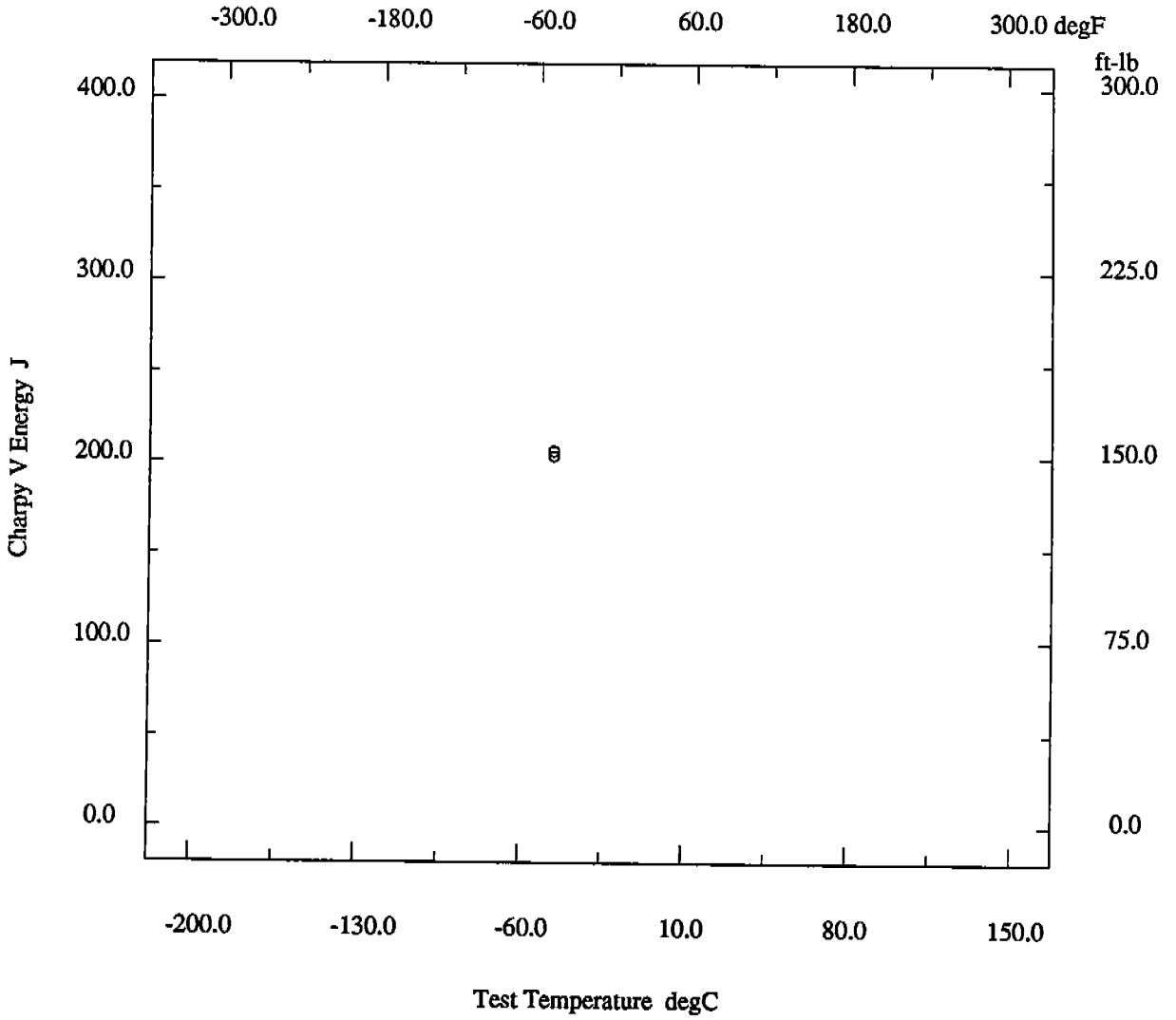
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L °	-50	150	86
T-L °	-50	152	88

* - not reported

Material A710

Description

Material Code	002.007.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	42252
Reference	*		



* - not reported

Material A710

Description

Material Code	002.007.09BAA	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Welded Joint	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	42252
Reference	*		

Composition

See Page 10900.1

Fabrication History

See Page 10900.1

Weld

Weld Code	002.007.09BAA	Weld Type	SAW
Base Metal Thickness	3/4 in	Welding Position	Flat
Preheat Temperature	75 degF	Metal Gap	None in
Interpass Temperature	200 degF	Passes	10
Filler Specification	*	Filler Name	Armco W18
Filler Carbon Content	*	Filler Metal Size	5/32 in
Shielding Gas	*	Voltage	28 volts
Amperage	500 amps	Polarity	Flat
Travel Speed	18 in/min	Heat Input/Pass	47 KJ/in
Joint Preparation	Double U-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	*
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Linc.882
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

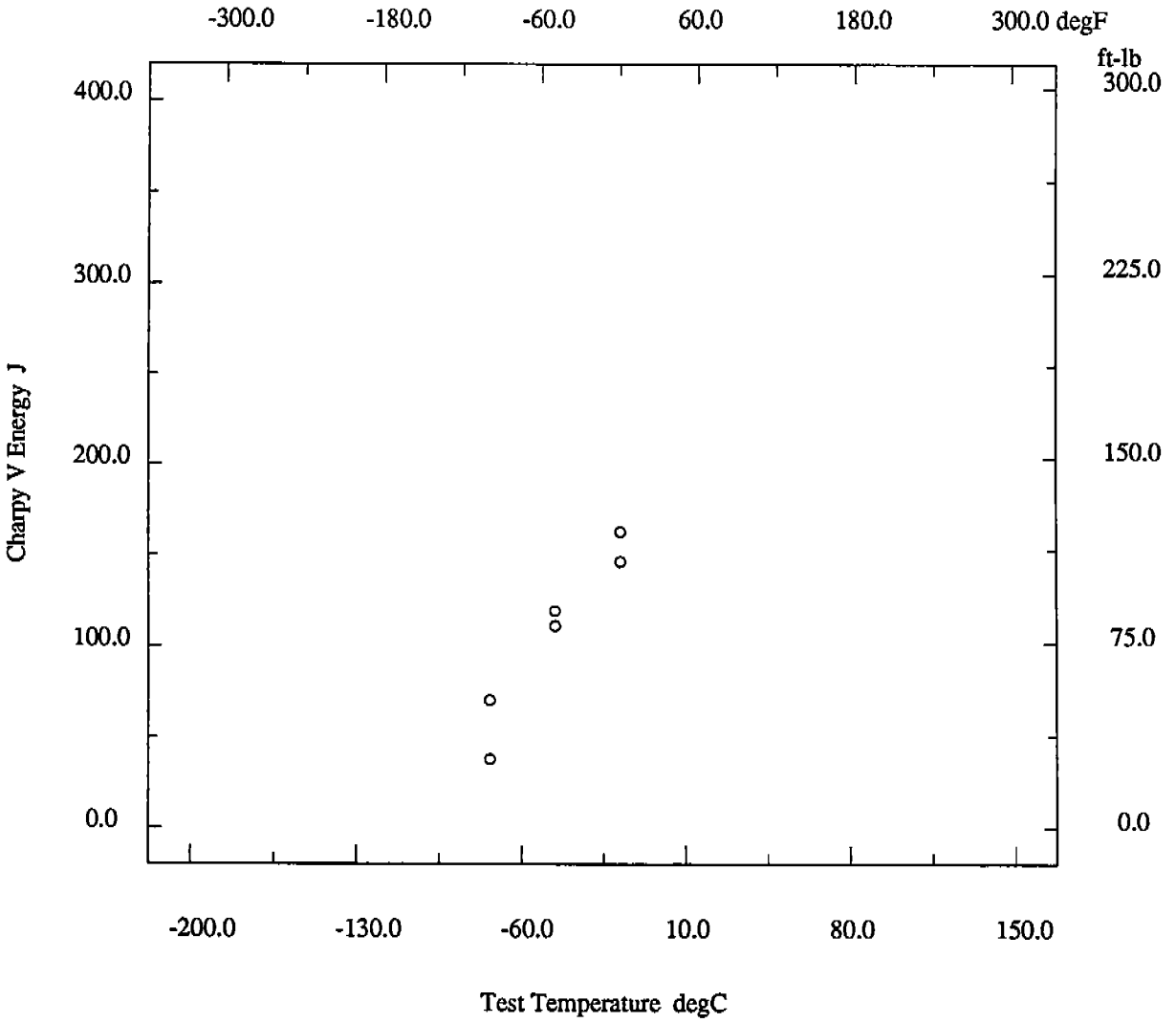
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L °	-100	28	18
T-L °	-100	52	30
T-L °	-50	82	52
T-L °	-50	88	57
T-L °	0	108	72
T-L °	0	120	74

* - not reported

Material A710

Description

Material Code	002.007.09BAA	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Welded Joint	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	42252
Reference	*		



* - not reported

Material A710

Description

Material Code	002.007.02BAA	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Welded Joint	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	42252
Reference	*		

Composition

See Page 10900.1

Fabrication History

See Page 10900.1

Weld

Weld Code	002.007.02BAA	Weld Type	SAW
Base Metal Thickness	3/4 in	Welding Position	Flat
Preheat Temperature	75 degF	Metal Gap	None in
Interpass Temperature	200 degF	Passes	10
Filler Specification	*	Filler Name	Armco W18
Filler Carbon Content	*	Filler Metal Size	5/32 in
Shielding Gas	*	Voltage	28 volts
Amperage	500 amps	Polarity	Flat
Travel Speed	18 in/min	Heat Input/Pass	47 KJ/in
Joint Preparation	Double U-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	*
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Linc.882
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

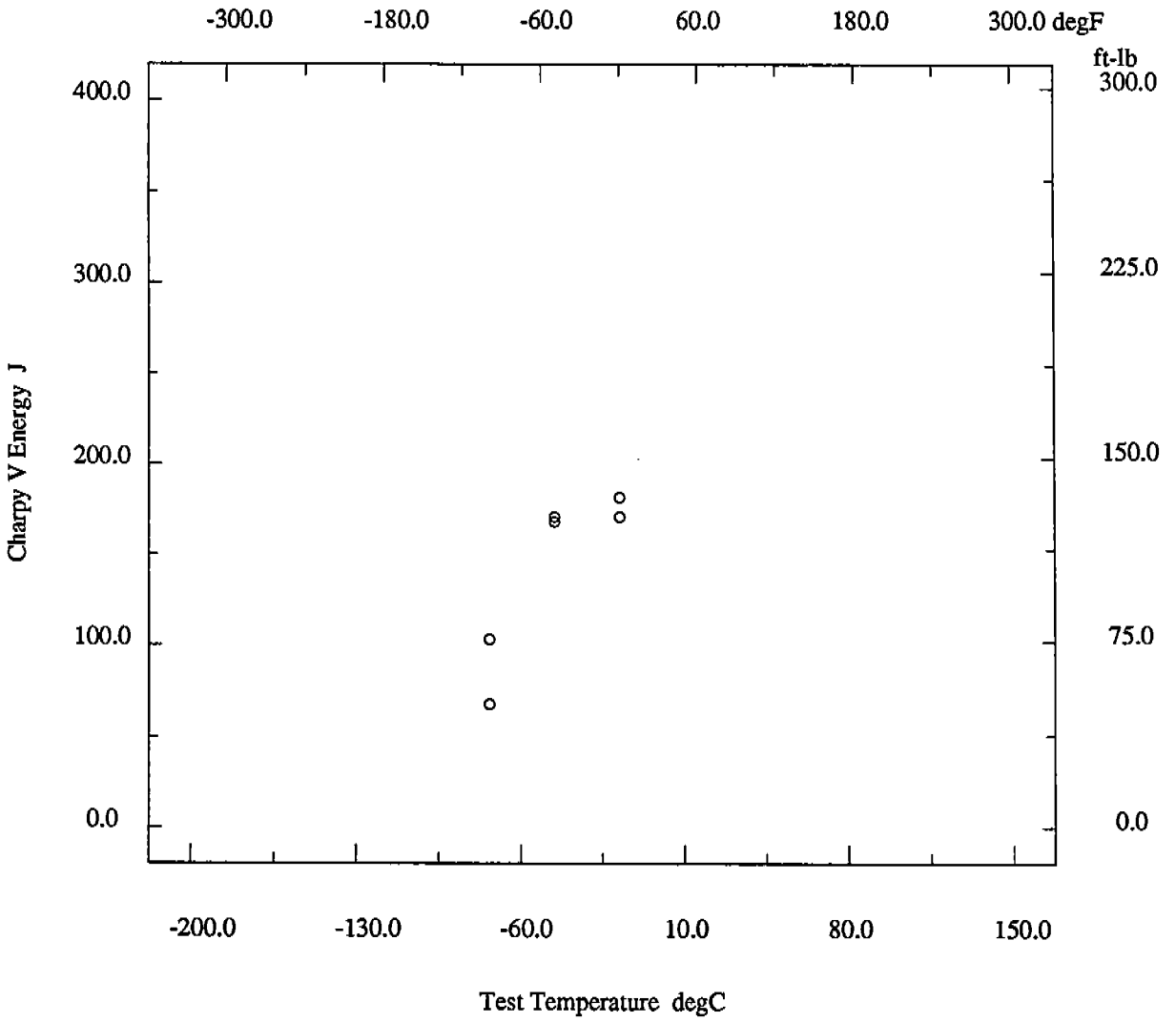
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L °	-100	50	29
T-L °	-100	76	43
T-L °	-50	124	78
T-L °	-50	126	81
T-L °	0	126	80
T-L °	0	134	90

* - not reported

Material A710

Description

Material Code	002.007.02BAA	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Welded Joint	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	42252
Reference	*		



* - not reported

Material A710

Description

Material Code	002.007.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	42252
Reference	*		

Composition

C	0.04 %	Mn	0.48 %
P	0.01 %	S	0.009 %
Si	0.28 %	Cr	0.70 %
Ni	0.90 %	Mo	0.19 %
V	*	Cu	1.16 %
Cb	0.038 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1200 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	0.75 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	94.2	85.6	*	28.5	73

* - not reported

Material A710

Description

Material Code	002.007.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	42252
Reference	*		

Composition See Page 11000.1

Fabrication History See Page 11000.1

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

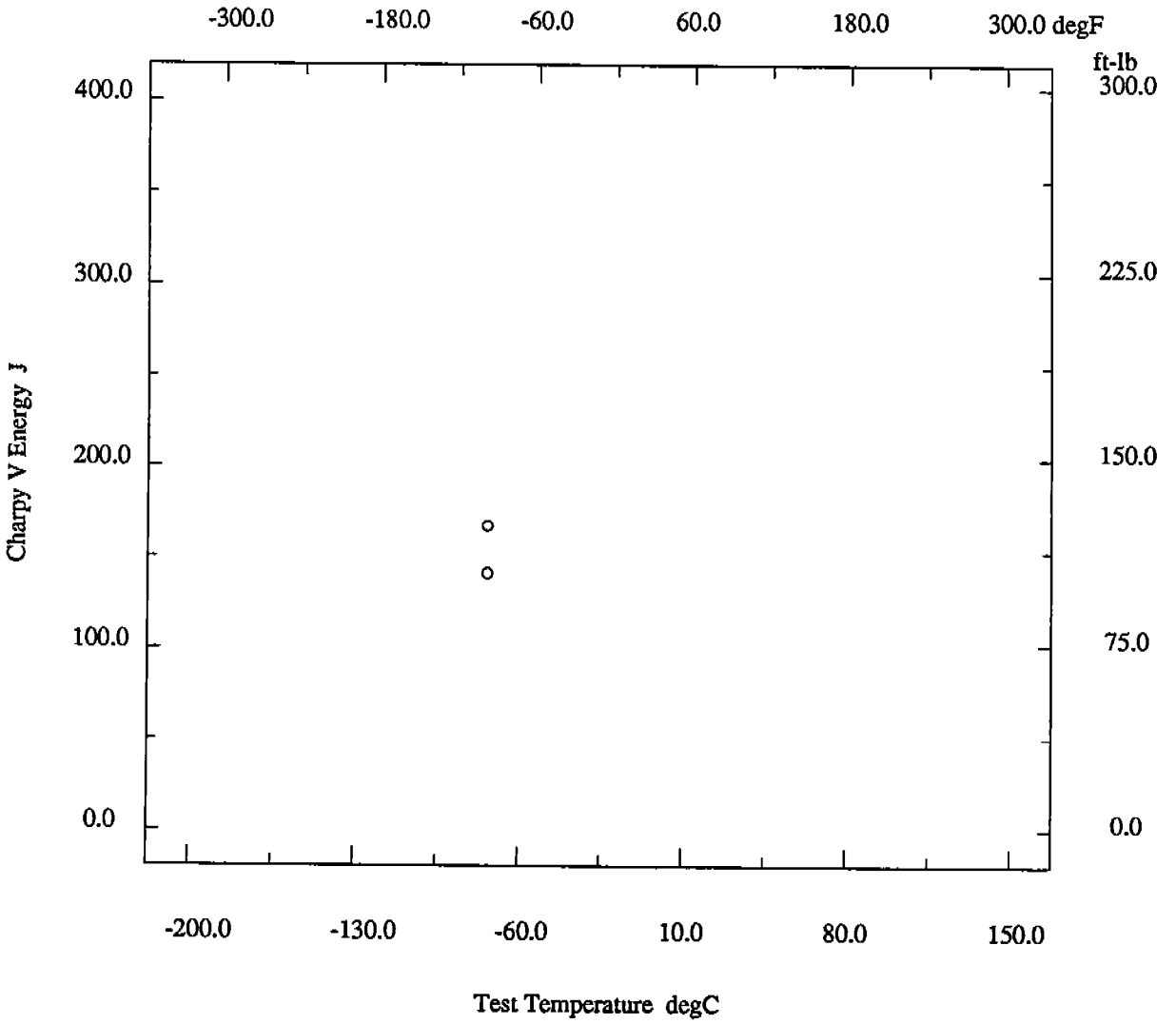
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L °	-100	104	68
T-L °	-100	123	74

* - not reported

Material A710

Description

Material Code	002.007.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	42252
Reference	*		



* - not reported

Material A710

Description

Material Code	002.007.09CAA	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Welded Joint	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	42252
Reference	*		

Composition

See Page 11000.1

Fabrication History

See Page 11000.1

Weld

Weld Code	002.007.09CAA	Weld Type	SAW
Base Metal Thickness	3/4 in	Welding Position	Flat
Preheat Temperature	75 degF	Metal Gap	None in
Interpass Temperature	200 degF	Passes	6
Filler Specification	*	Filler Name	Armco W24
Filler Carbon Content	*	Filler Metal Size	5/32 in
Shielding Gas	*	Voltage	28 volts
Amperage	500 amps	Polarity	DCRP
Travel Speed	11 in/min	Heat Input/Pass	76 KJ/in
Joint Preparation	Double U-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	*
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Linde166p
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

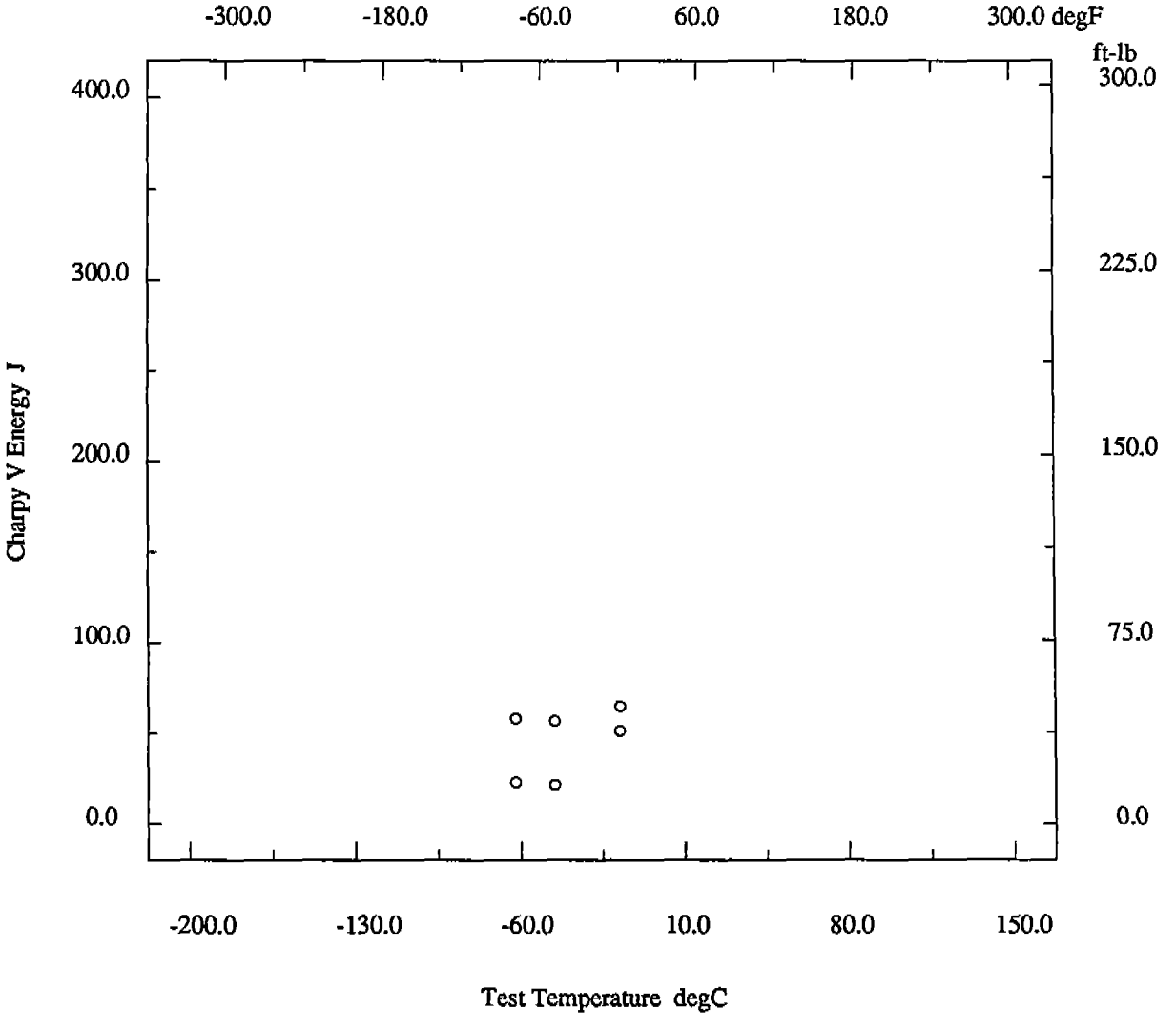
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L o	-80	17	8
T-L o	-80	43	26
T-L o	-50	16	8
T-L o	-50	42	26
T-L o	0	38	28
T-L o	0	48	32

* - not reported

Material A710

Description

Material Code	002.007.09CAA	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Welded Joint	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	42252
Reference	*		



* - not reported

Material A710

Description

Material Code	002.007.02CAA	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Welded Joint	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	42252
Reference	*		

Composition

See Page 11000.1

Fabrication History

See Page 11000.1

Weld

Weld Code	002.007.02CAA	Weld Type	SAW
Base Metal Thickness	3/4 in	Welding Position	Flat
Preheat Temperature	75 degF	Metal Gap	None in
Interpass Temperature	200 degF	Passes	6
Filler Specification	*	Filler Name	Armco W24
Filler Carbon Content	*	Filler Metal Size	5/32 in
Shielding Gas	*	Voltage	28 volts
Amperage	500 amps	Polarity	DCRP
Travel Speed	11 in/min	Heat Input/Pass	76 KJ/in
Joint Preparation	Double U-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	*
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Linde166p
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

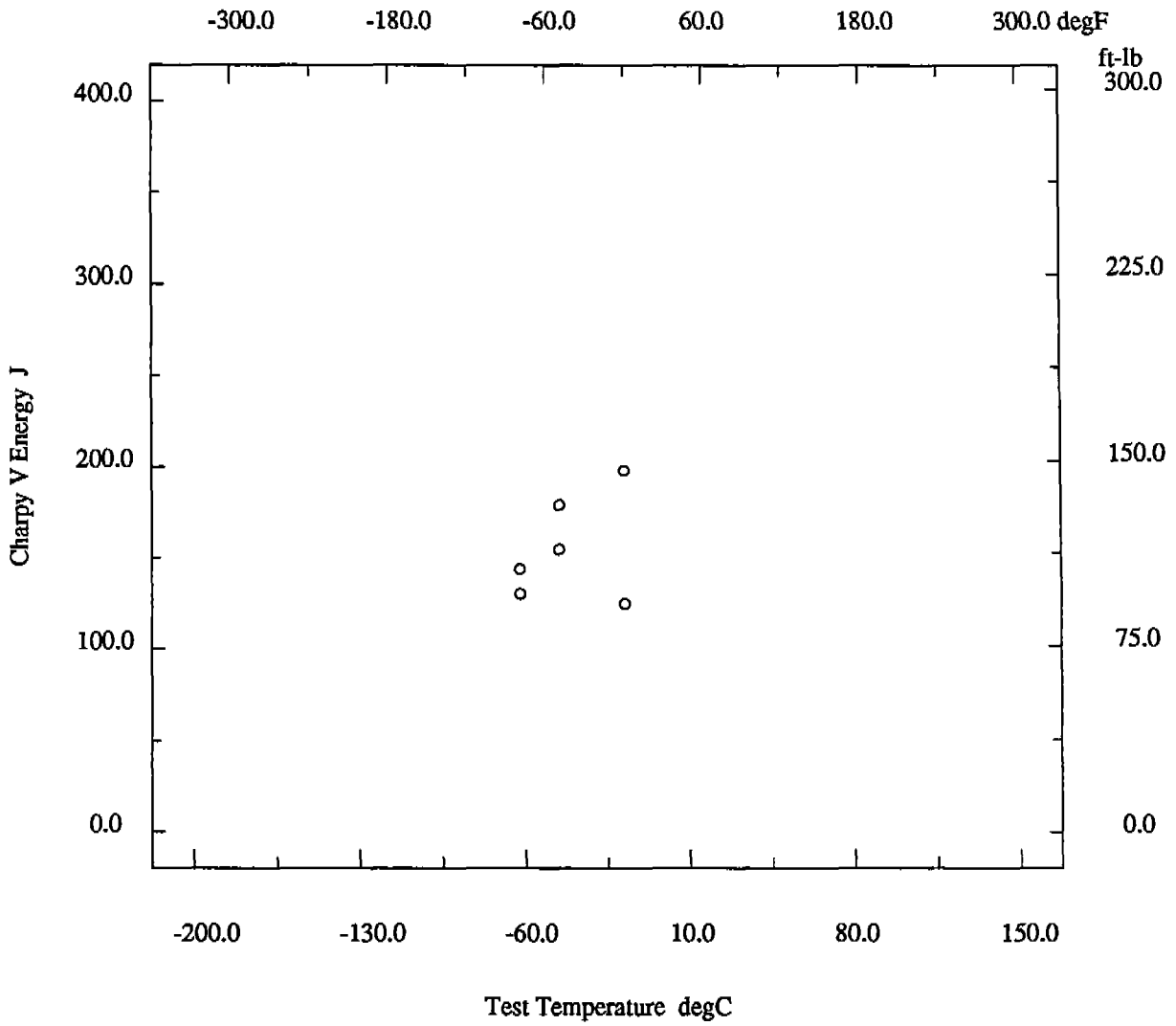
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L °	-80	106	76
T-L °	-80	96	66
T-L °	-50	114	76
T-L °	-50	132	85
T-L °	0	146	90
T-L °	0	92	60

* - not reported

Material A710

Description

Material Code	002.007.02CAA	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Welded Joint	Form	Plate
Thickness	3/4 in	Composition Type	Actual
Composition Position	*	Lot ID	42252
Reference	*		



* - not reported

Material A710

Description

Material Code	002.008.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	54614
Reference	*		

Composition

C	0.05 %	Mn	0.54 %
P	0.01 %	S	0.006 %
Si	0.26 %	Cr	0.72 %
Ni	0.91 %	Mo	0.20 %
V	*	Cu	1.20 %
Cb	0.036 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1100 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T ○	-80	117	68
L-T ○	-80	133	75
L-T ○	-80	138	77
L-T ○	-50	160	79
L-T ○	-50	160	90
L-T ○	-50	170	94
L-T ○	-20	160	86
L-T ○	-20	161	87
L-T ○	-20	162	91
L-T ○	0	160	89
L-T ○	0	170	91
L-T ○	0	177	94
L-T ○	32	166	83
L-T ○	32	166	87
L-T ○	32	167	88
T-L △	-80	125	70
T-L △	-80	131	76

(continued)

* - not reported

Material A710

(continued)

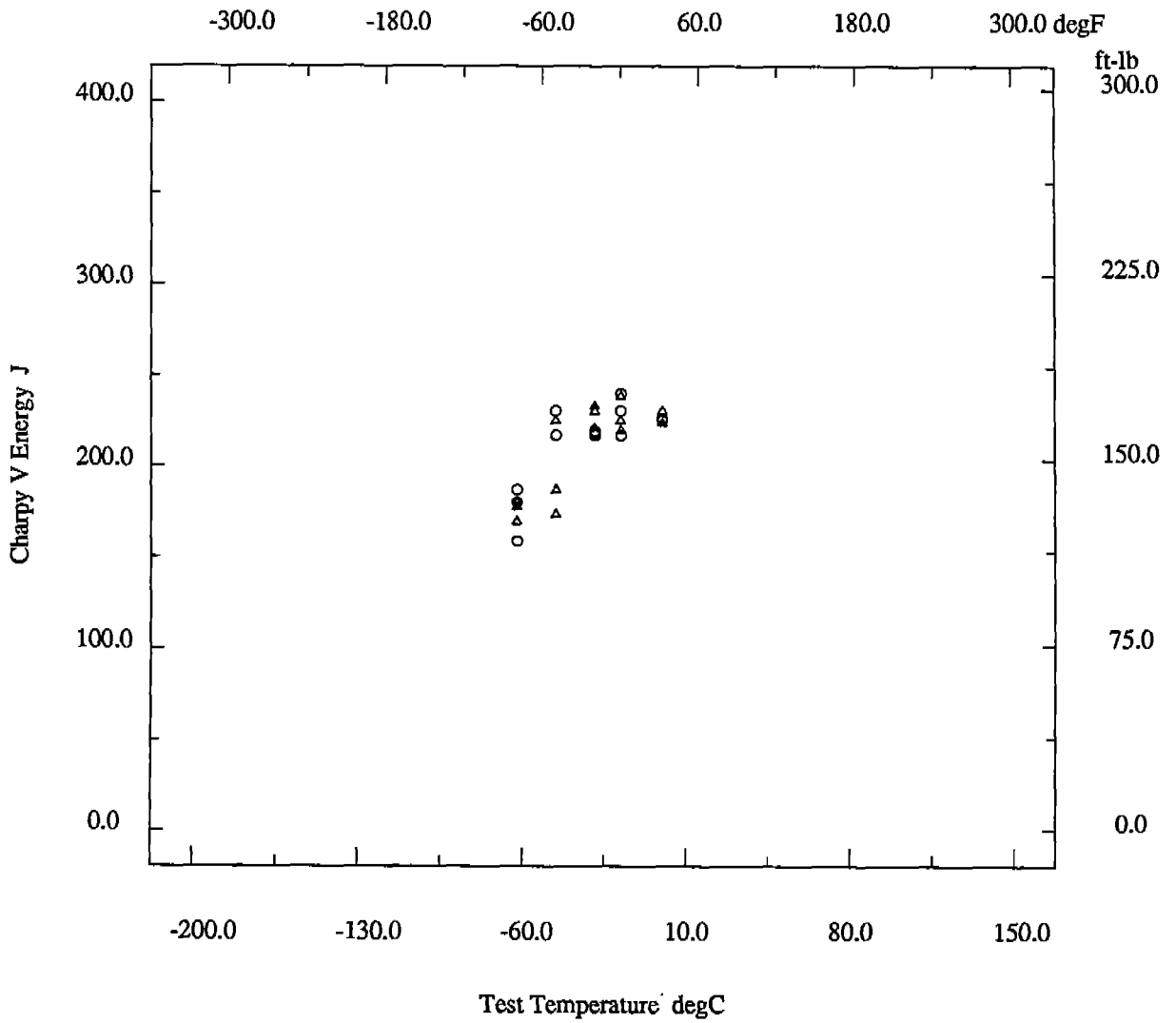
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L ▵	-80	133	81
T-L ▵	-50	128	72
T-L ▵	-50	138	80
T-L ▵	-50	166	81
T-L ▵	-20	163	84
T-L ▵	-20	170	87
T-L ▵	-20	172	88
T-L ▵	0	162	83
T-L ▵	0	166	84
T-L ▵	0	176	85
T-L ▵	32	165	70
T-L ▵	32	165	73
T-L ▵	32	170	76

* - not reported

Material A710

Description

Material Code	002.008.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	54614
Reference	*		



* - not reported

Material A710

Description

Material Code	002.008.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	54614
Reference	*		

Composition See Page 11100.1

Fabrication History See Page 11100.1

Property Measurements

Test Type	Nil Ductilty Transition	Position	*
Specimen Type	P-2	Filler Alloy	*
Passes	*	Orientation	*
Standard Method	*	Standard Year	*

Test Temp degF	Break?	NDTT
<-120	No	No
<-130	Yes	Yes

* - not reported

Material A710

Description

Material Code	002.009.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	47444
Reference	*		

Composition

C	0.05 %	Mn	0.53 %
P	0.011 %	S	0.009 %
Si	0.26 %	Cr	0.61 %
Ni	0.94 %	Mo	0.19 %
V	*	Cu	1.18 %
Cb	0.045 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1200 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	1 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	75.1	68.0	*	27.5	*

* - not reported

Material A710

Description

Material Code	002.009.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	47444
Reference	*		

Composition See Page 11200.1

Fabrication History See Page 11200.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

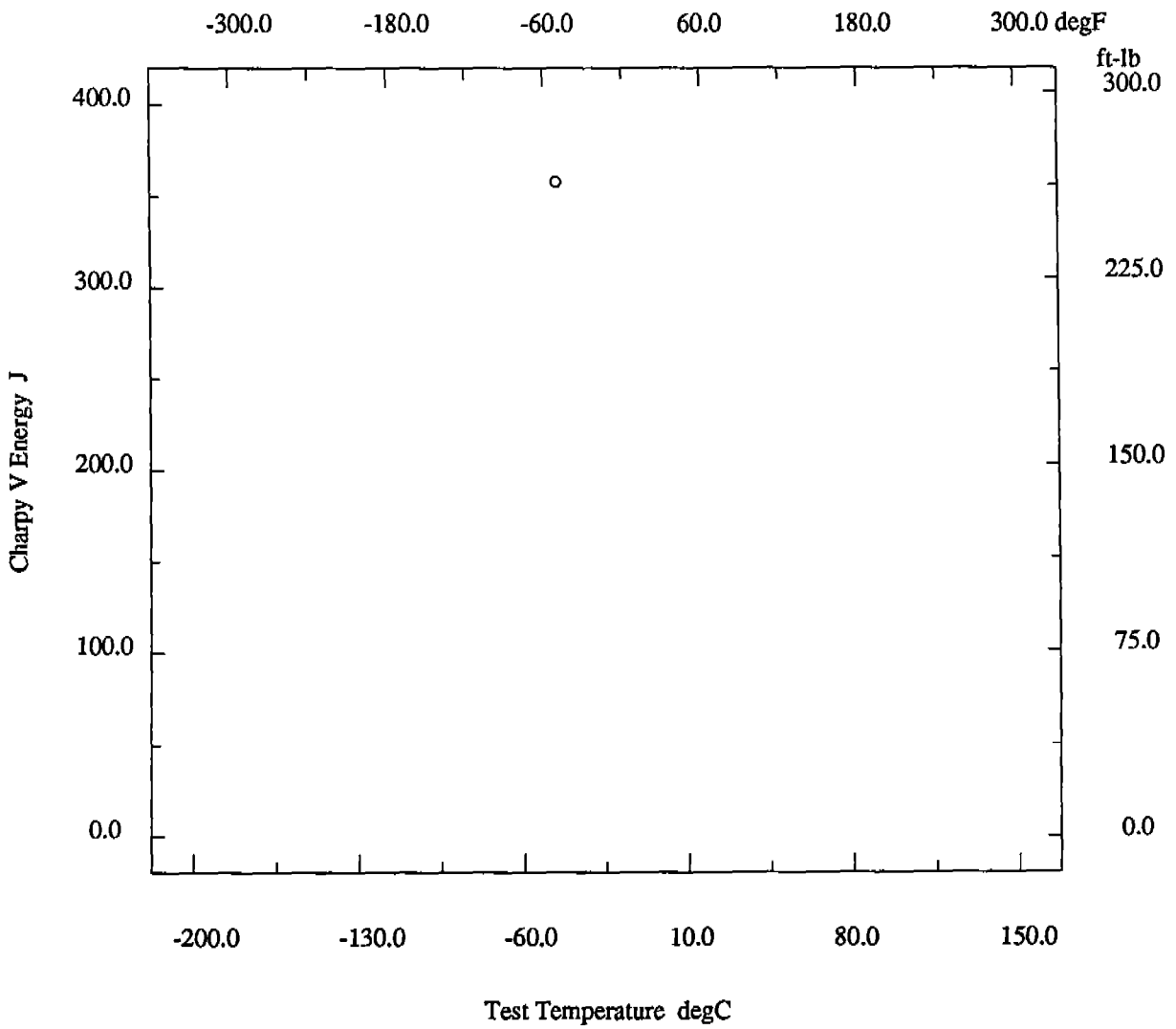
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T o	-50	264	91
L-T o	-50	264	92
L-T o	-50	264	92

* - not reported

Material A710

Description

Material Code	002.009.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	47444
Reference	*		



* - not reported

Material A710

Description

Material Code	002.009.01B2	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	*	Lot ID	47444
Reference	*		

Composition See Page 11200.1

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1150 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	4 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	77.8	66.5	*	28.0	*

* - not reported

Material A710

Description

Material Code	002.009.01B2	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	*	Lot ID	47444
Reference	*		

Composition See Page 11200.1

Fabrication History See Page 11200.4

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

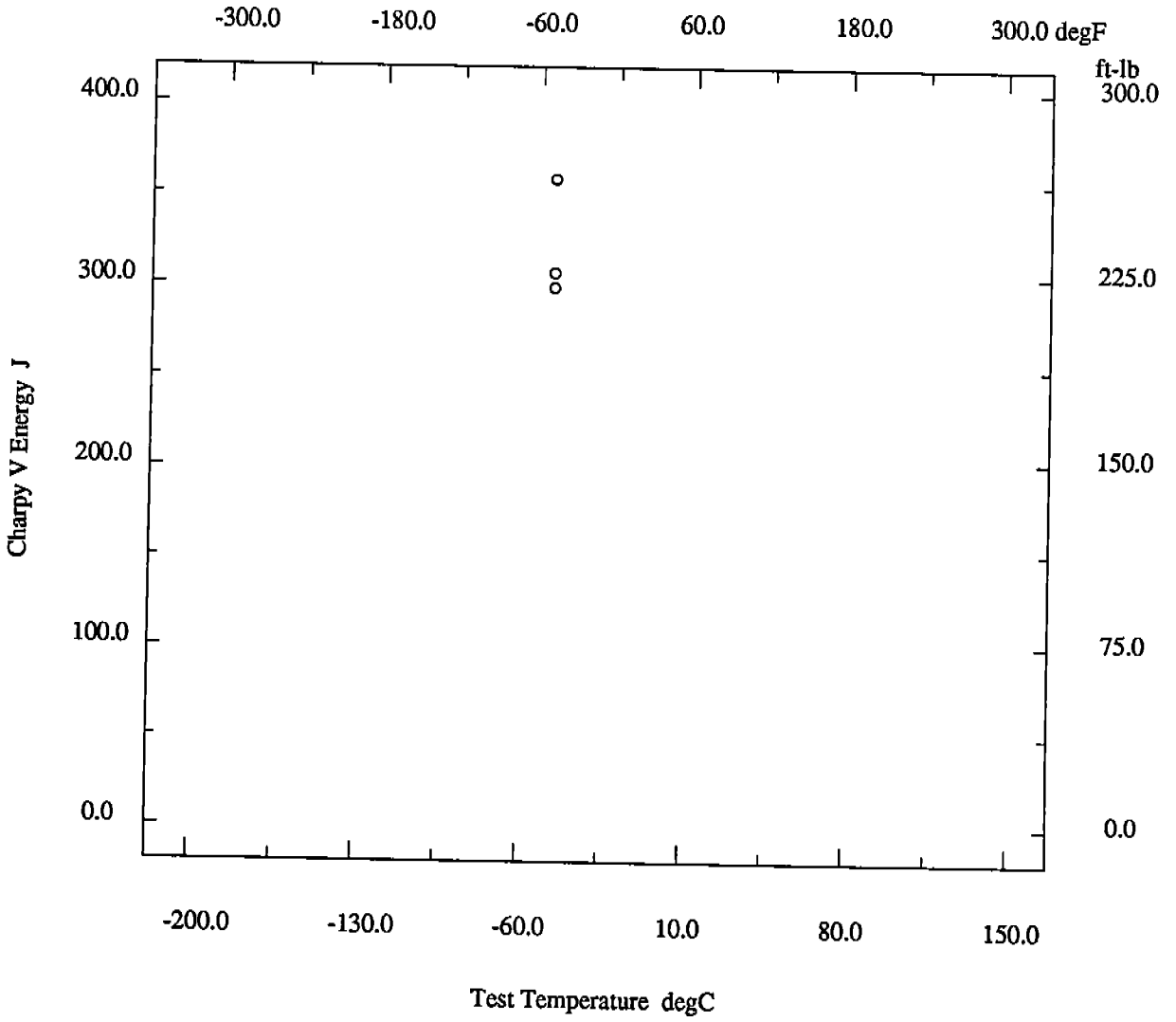
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T o	-50	220	86
L-T o	-50	226	90
L-T o	-50	264	104

* - not reported

Material A710

Description

Material Code	002.009.01B2	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	*	Lot ID	47444
Reference	*		



* - not reported

Material A710

Description

Material Code	002.010.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	1.25 in	Composition Type	Actual
Composition Position	*	Lot ID	58568
Reference	*		

Composition

C	0.03 %	Mn	0.54 %
P	0.01 %	S	0.01 %
Si	0.30 %	Cr	0.78 %
Ni	0.97 %	Mo	0.20 %
V	*	Cu	1.26 %
Cb	0.04 %	Ti	*
B	*	Al	*
N	*	Other Components	*

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1100 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	1.25 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	86.8	70.3	*	34	72

* - not reported

Material A710

Description

Material Code	002.010.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	1.25 in	Composition Type	Actual
Composition Position	*	Lot ID	58568
Reference	*		

Composition See Page 11300.1

Fabrication History See Page 11300.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	3/4	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

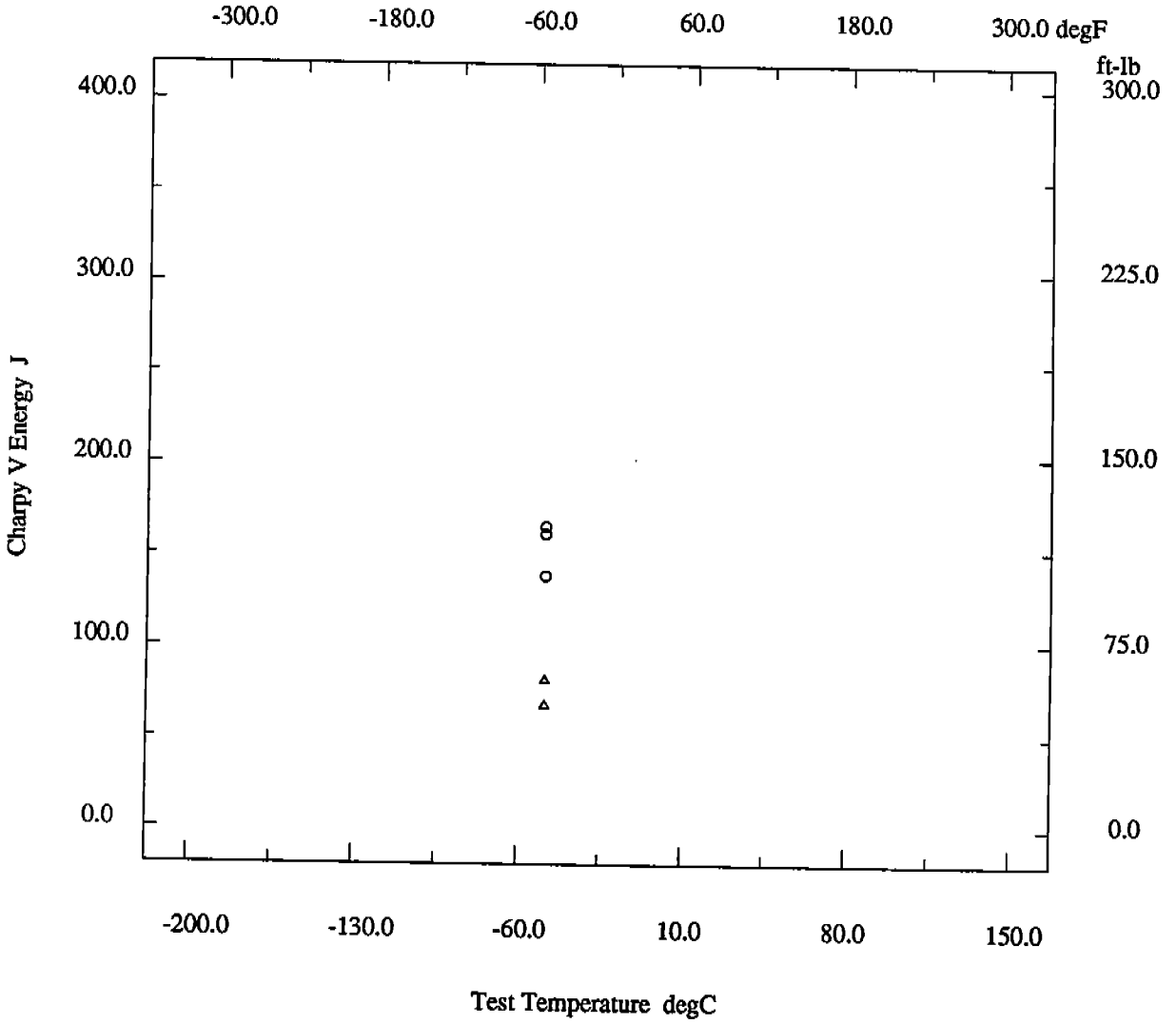
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T ○	-55	102	90
L-T ○	-55	119	94
L-T ○	-55	122	96
T-L △	-55	50	54
T-L △	-55	60	63
T-L △	-55	60	64

* - not reported

Material A710

Description

Material Code	002.010.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	1.25 in	Composition Type	Actual
Composition Position	*	Lot ID	58568
Reference	*		



* - not reported

Material A710

Description

Material Code	002.010.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.25 in	Composition Type	Actual
Composition Position	*	Lot ID	58568
Reference	*		

Composition

C	0.03 %	Mn	0.54 %
P	0.01 %	S	0.01 %
Si	0.30 %	Cr	0.78 %
Ni	0.97 %	Mo	0.20 %
V	*	Cu	1.26 %
Cb	0.04 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1200 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	1.25 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	90.5	83.2	*	45	68

* - not reported

Material A710

Description

Material Code	002.010.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.25 in	Composition Type	Actual
Composition Position	*	Lot ID	58568
Reference	*		

Composition

See Page 11400.1

Fabrication History

See Page 11400.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	3/4	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

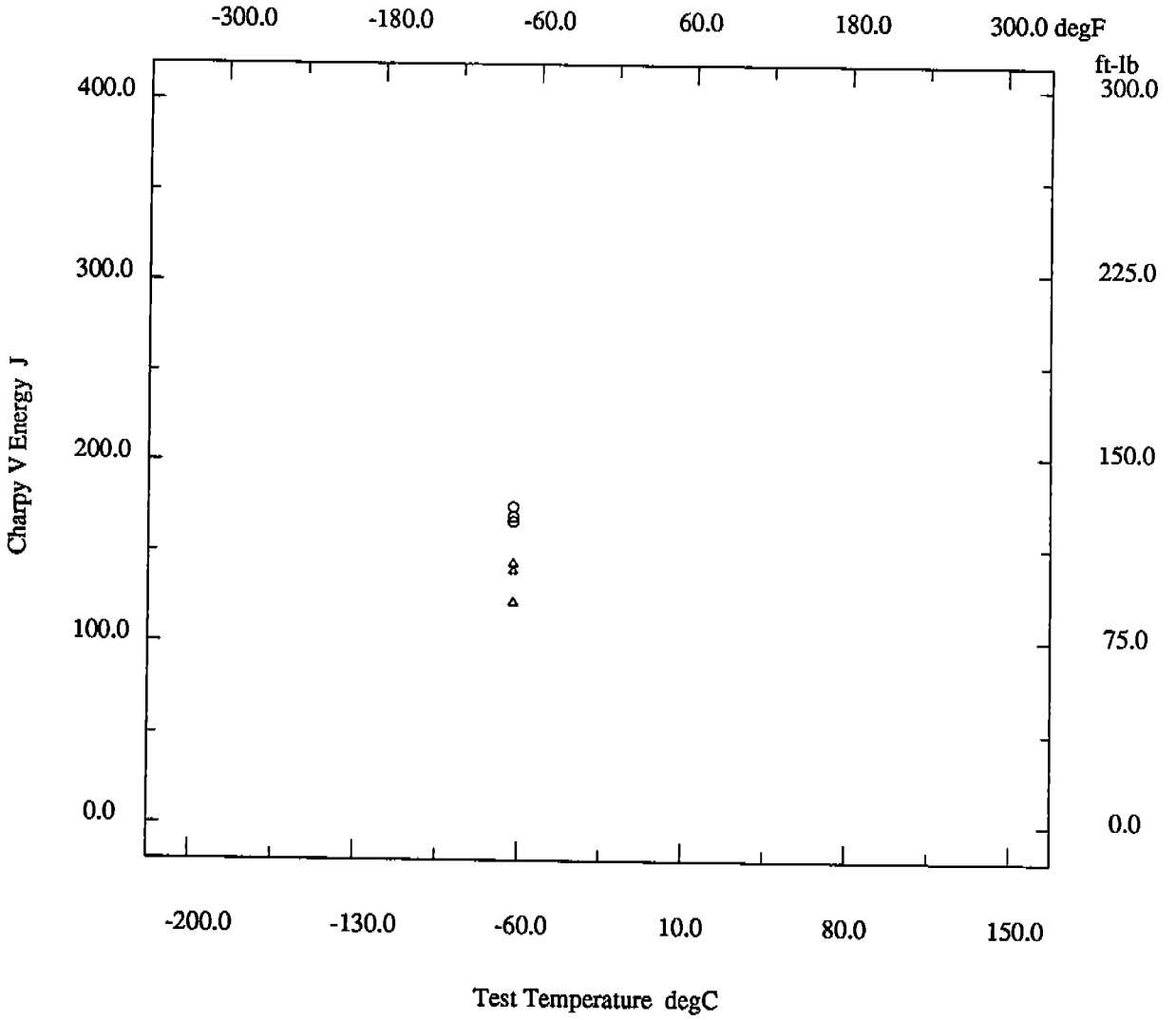
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T ○	-80	123	92
L-T ○	-80	125	94
L-T ○	-80	129	96
T-L △	-80	103	92
T-L △	-80	106	93
T-L △	-80	90	84

* - not reported

Material A710

Description

Material Code	002.010.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.25 in	Composition Type	Actual
Composition Position	*	Lot ID	58568
Reference	*		



* - not reported

Material A710

Description

Material Code	002.011.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	1.5 in	Composition Type	Actual
Composition Position	*	Lot ID	48682
Reference	*		

Composition

C	0.06 %	Mn	0.53 %
P	0.01 %	S	0.008 %
Si	0.28 %	Cr	0.80 %
Ni	0.92 %	Mo	0.20 %
V	*	Cu	1.14 %
Cb	0.041 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1100 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	1.5 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	88.4	75.0	*	26	68

* - not reported

Material A710

Description

Material Code	002.011.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	1.5 in	Composition Type	Actual
Composition Position	*	Lot ID	48682
Reference	*		

Composition See Page 11500.1

Fabrication History See Page 11500.1

Property Measurements

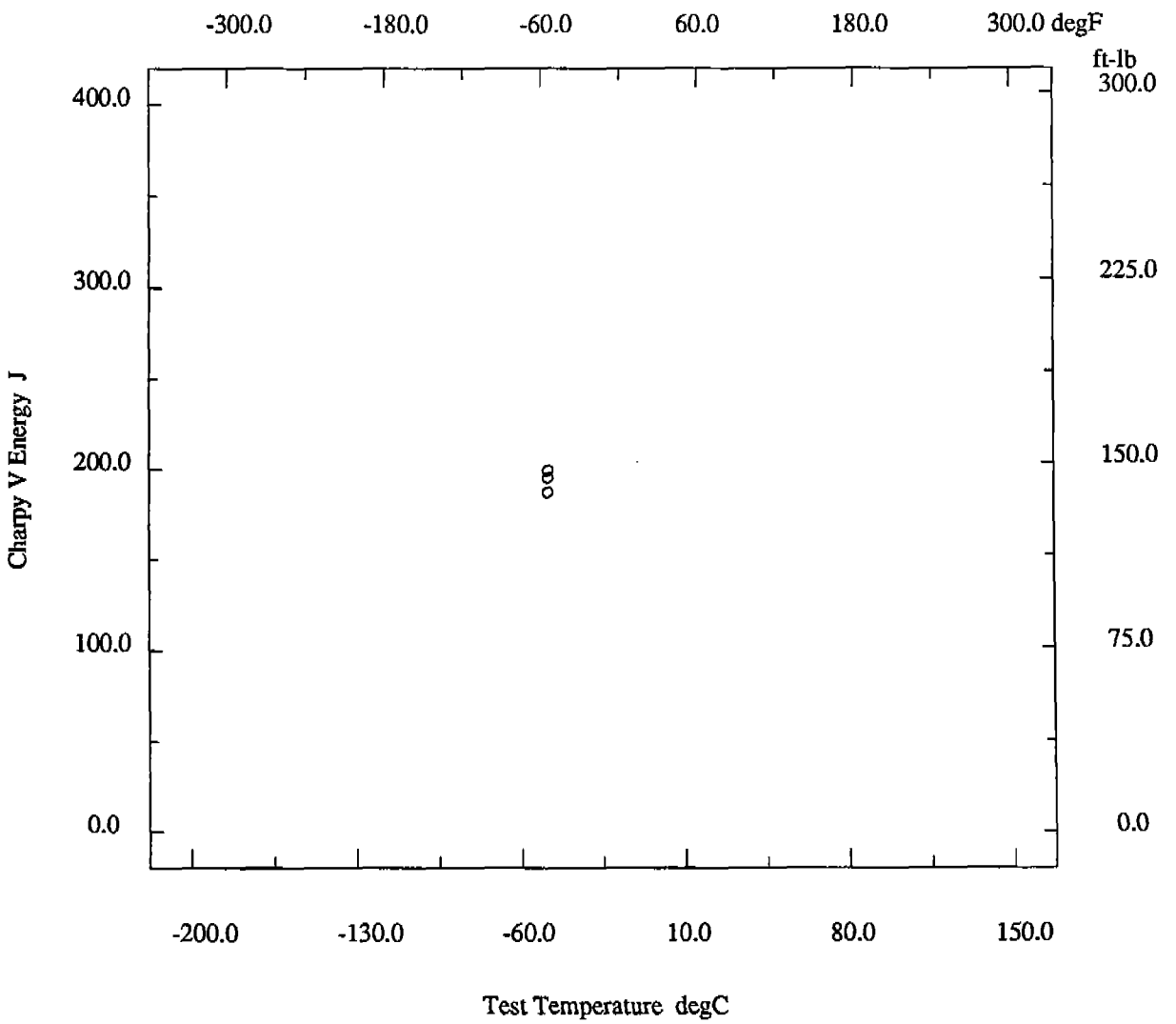
Test Type	Charpy V Impact	Position	*
Specimen Type	3/4	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T o	-55	138	86
L-T o	-55	144	90
L-T o	-55	147	97

* - not reported

Material A710

Description			
Material Code	002.011.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	1.5 in	Composition Type	Actual
Composition Position	*	Lot ID	48682
Reference	*		



* - not reported

Material A710

Description

Material Code	002.011.09B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Welded Joint	Form	Plate
Thickness	1.5 in	Composition Type	Actual
Composition Position	*	Lot ID	48682
Reference	*		

Composition

See Page 11500.1

Fabrication History

See Page 11500.1

Weld

Weld Code	002.011.09B1	Weld Type	SAW
Base Metal Thickness	1.5 in	Welding Position	Flat
Preheat Temperature	None degF	Metal Gap	None in
Interpass Temperature	375 degF	Passes	*
Filler Specification	*	Filler Name	Armco W18
Filler Carbon Content	*	Filler Metal Size	5/64 in
Shielding Gas	*	Voltage	30 volts
Amperage	400 amps	Polarity	DCRP
Travel Speed	*	Heat Input/Pass	*
Joint Preparation	Double V-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	Final surface
Post-Weld Heat Temp	1025 degF	Post-Weld Heat Time	1.75 hr
Flux Type	*	Flux Name	Linc.880
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

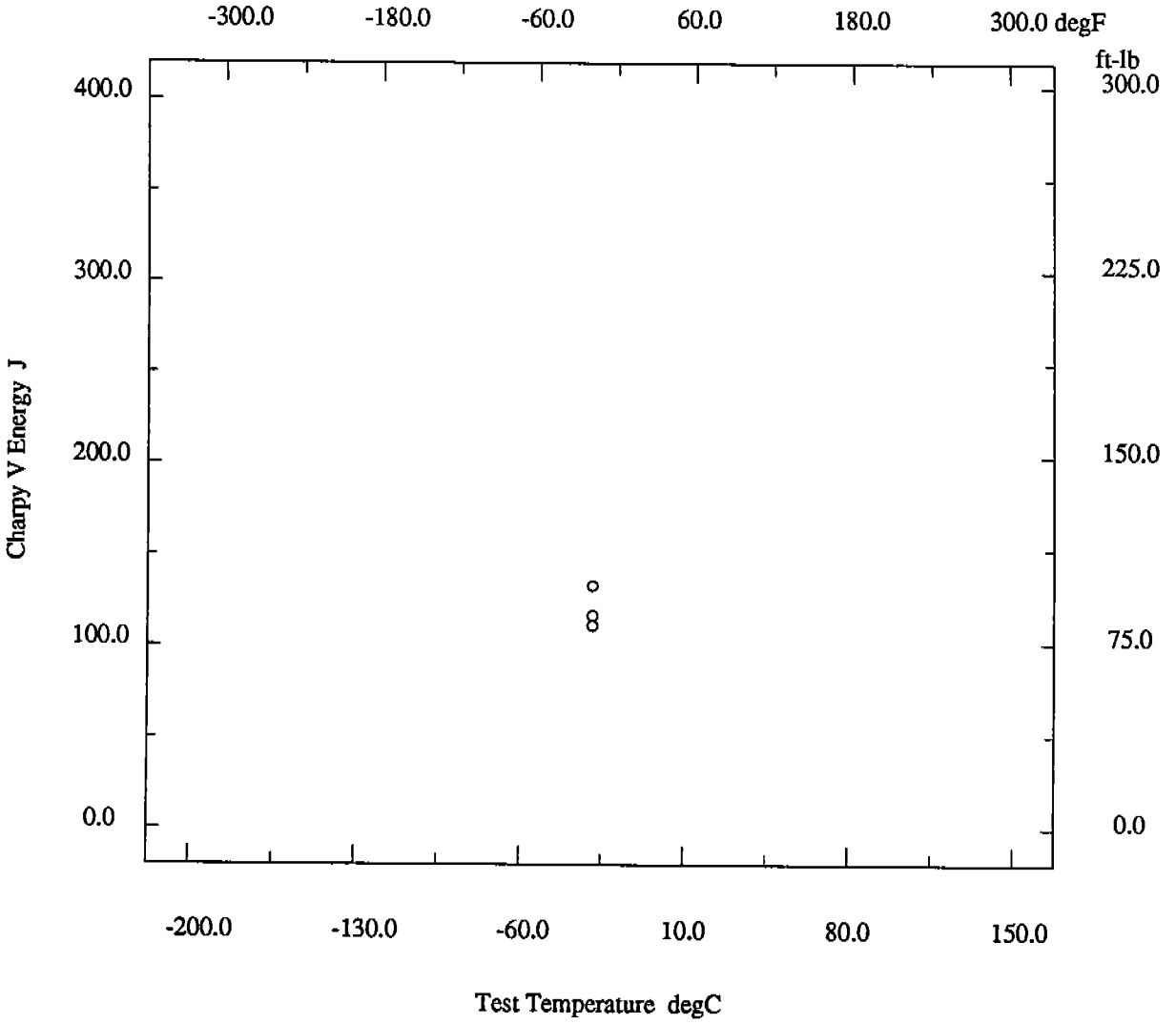
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-20	82
T-L °	-20	86
T-L °	-20	98

* - not reported

Material A710

Description

Material Code	002.011.09B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Welded Joint	Form	Plate
Thickness	1.5 in	Composition Type	Actual
Composition Position	*	Lot ID	48682
Reference	*		



* - not reported

Material A710

Description

Material Code	002.011.02B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Welded Joint	Form	Plate
Thickness	1.5 in	Composition Type	Actual
Composition Position	*	Lot ID	48682
Reference	*		

Composition

See Page 11500.1

Fabrication History

See Page 11500.1

Weld

Weld Code	002.011.02B1	Weld Type	SAW
Base Metal Thickness	1.5 in	Welding Position	Flat
Preheat Temperature	None degF	Metal Gap	None in
Interpass Temperature	375 degF	Passes	*
Filler Specification	*	Filler Name	Armco W18
Filler Carbon Content	*	Filler Metal Size	5/64 in
Shielding Gas	*	Voltage	30 volts
Amperage	400 amps	Polarity	DCRP
Travel Speed	*	Heat Input/Pass	*
Joint Preparation	Double V-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Final surface
Post-Weld Heat Temp	1025 degF	Post-Weld Heat Time	1.75 hr
Flux Type	*	Flux Name	Linc.880
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

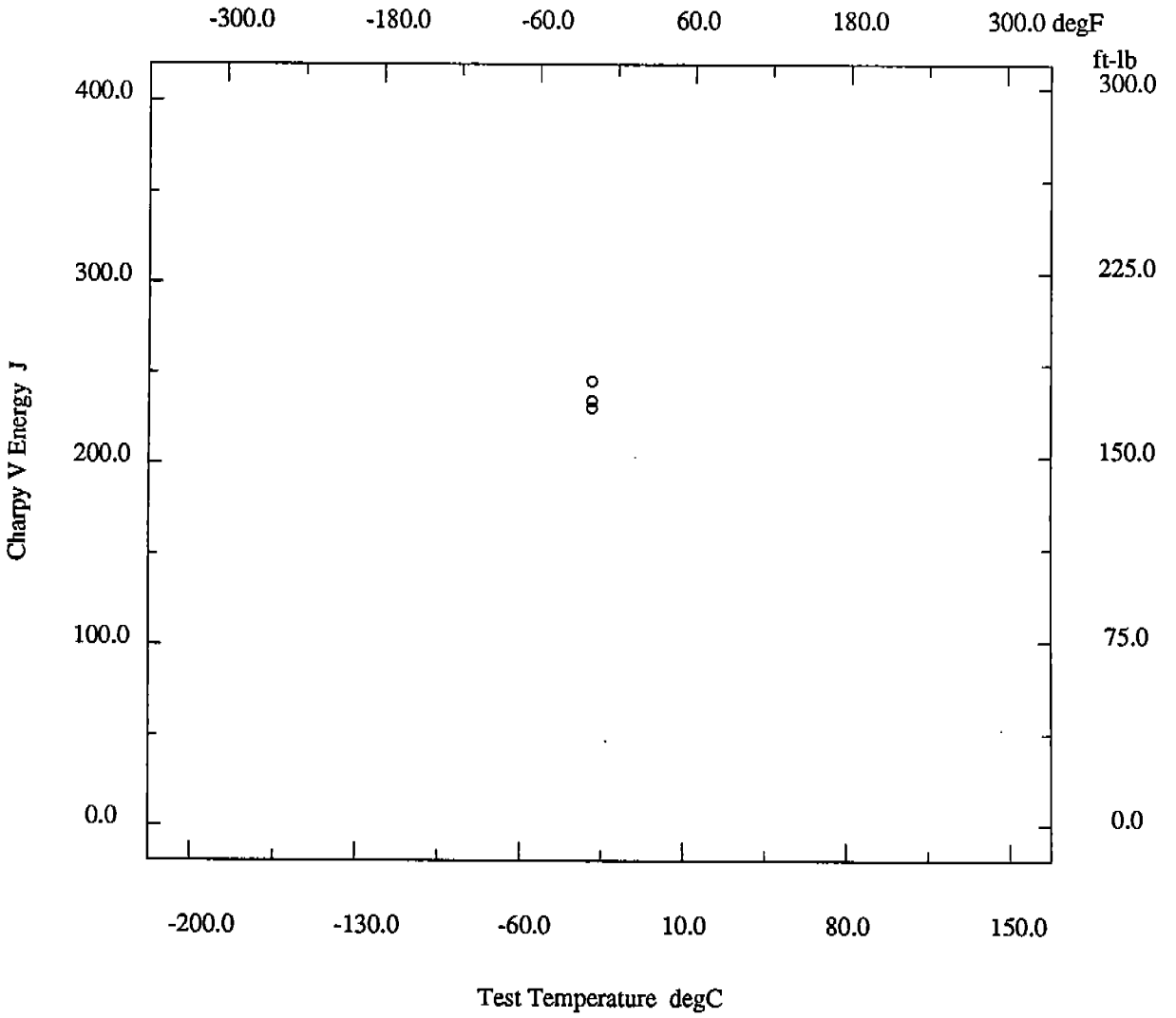
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-20	170
T-L °	-20	173
T-L °	-20	181

* - not reported

Material A710

Description

Material Code	002.011.02B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Welded Joint	Form	Plate
Thickness	1.5 in	Composition Type	Actual
Composition Position	*	Lot ID	48682
Reference	*		



* - not reported

Material A710

Description

Material Code	002.011.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.50 in	Composition Type	Actual
Composition Position	*	Lot ID	48682
Reference	*		

Composition

C	0.06 %	Mn	0.53 %
P	0.01 %	S	0.008 %
Si	0.28 %	Cr	0.80 %
Ni	0.92 %	Mo	0.20 %
V	*	Cu	1.14 %
Cb	0.041 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1200 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	1.50 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	97.9	87.9	*	24	66

* - not reported

Material A710

Description

Material Code	002.011.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.50 in	Composition Type	Actual
Composition Position	*	Lot ID	48682
Reference	*		

Composition See Page 11600.1

Fabrication History See Page 11600.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	3/4	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

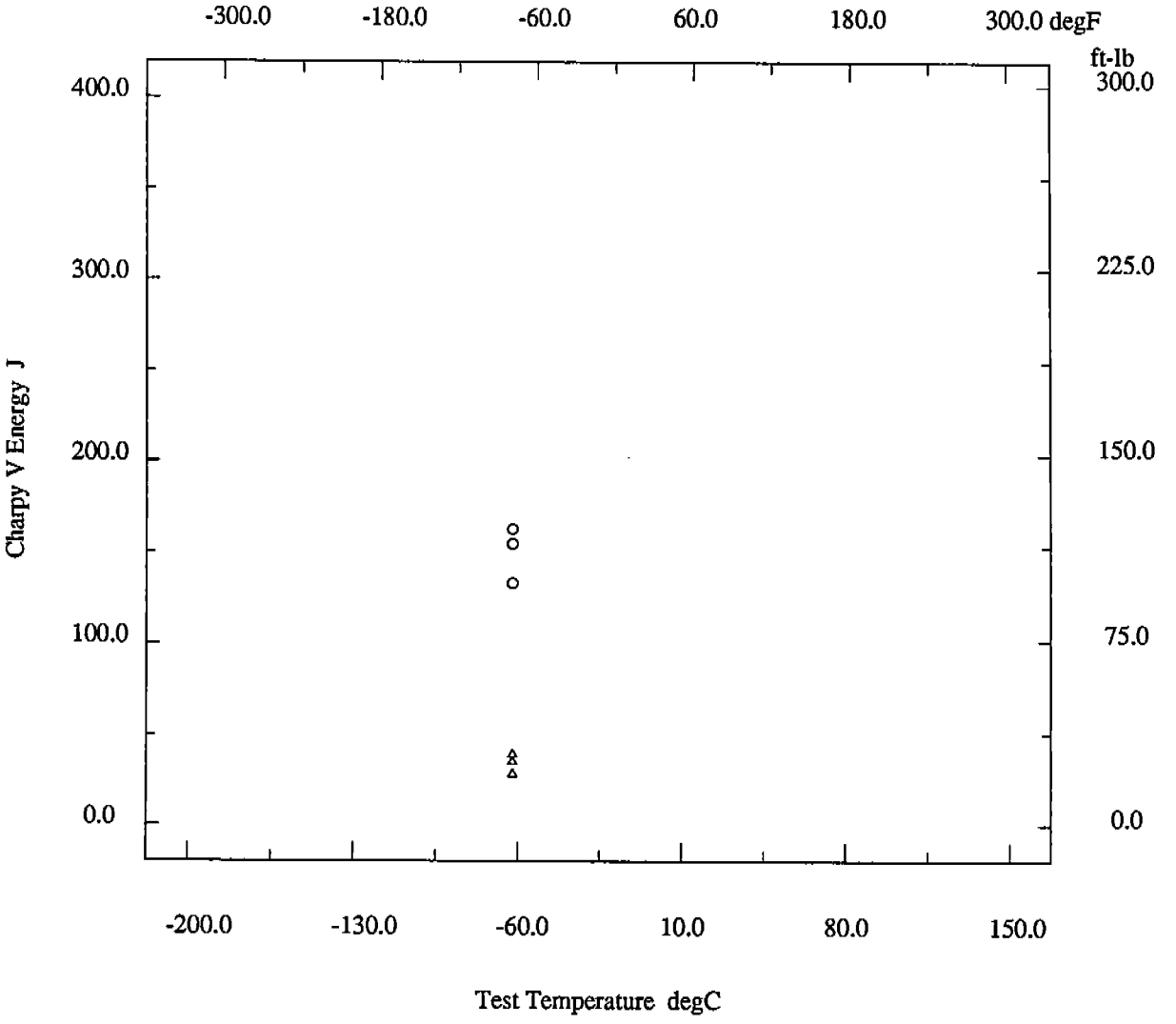
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T ○	-80	114	91
L-T ○	-80	120	93
L-T ○	-80	98	80
T-L △	-80	21	22
T-L △	-80	26	30
T-L △	-80	29	30

* - not reported

Material A710

Description

Material Code	002.011.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.50 in	Composition Type	Actual
Composition Position	*	Lot ID	48682
Reference	*		



* - not reported

Material A710

Description

Material Code	002.012.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	*	Lot ID	57053
Reference	*		

Composition

C	0.05 %	Mn	0.66 %
P	0.01 %	S	0.01 %
Si	0.30 %	Cr	0.72 %
Ni	0.86 %	Mo	0.20 %
V	*	Cu	1.19 %
Cb	0.045 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1100 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	2.75 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	81.7	66.7	*	29	*

* - not reported

Material A710

Description

Material Code	002.012.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	*	Lot ID	57053
Reference	*		

Composition See Page 11700.1

Fabrication History See Page 11700.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	3/4	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

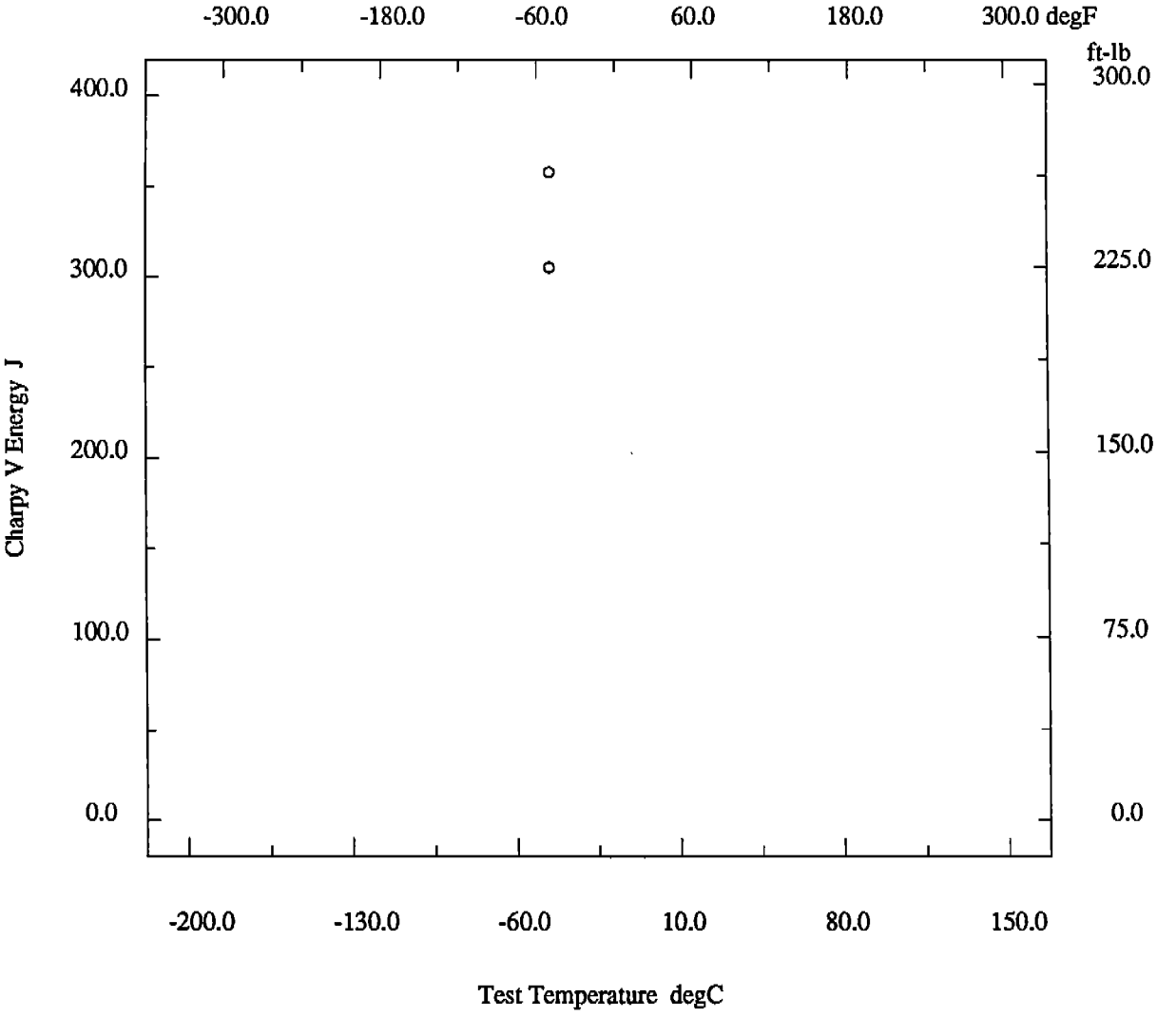
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T °	-50	225	82
L-T °	-50	264	88
L-T °	-50	264	95

* - not reported

Material A710

Description

Material Code	002.012.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	*	Lot ID	57053
Reference	*		



* - not reported

Material A710

Description

Material Code	002.012.01B2	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	*	Lot ID	57053
Reference	*		

Composition See Page 11700.1

Fabrication History See Page 11700.1

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	3.25 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	79.3	63.5	*	29	*

* - not reported

Material A710

Description

Material Code	002.012.01B2	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	*	Lot ID	57053
Reference	*		

Composition See Page 11700.1

Fabrication History See Page 11700.1

Property Measurements

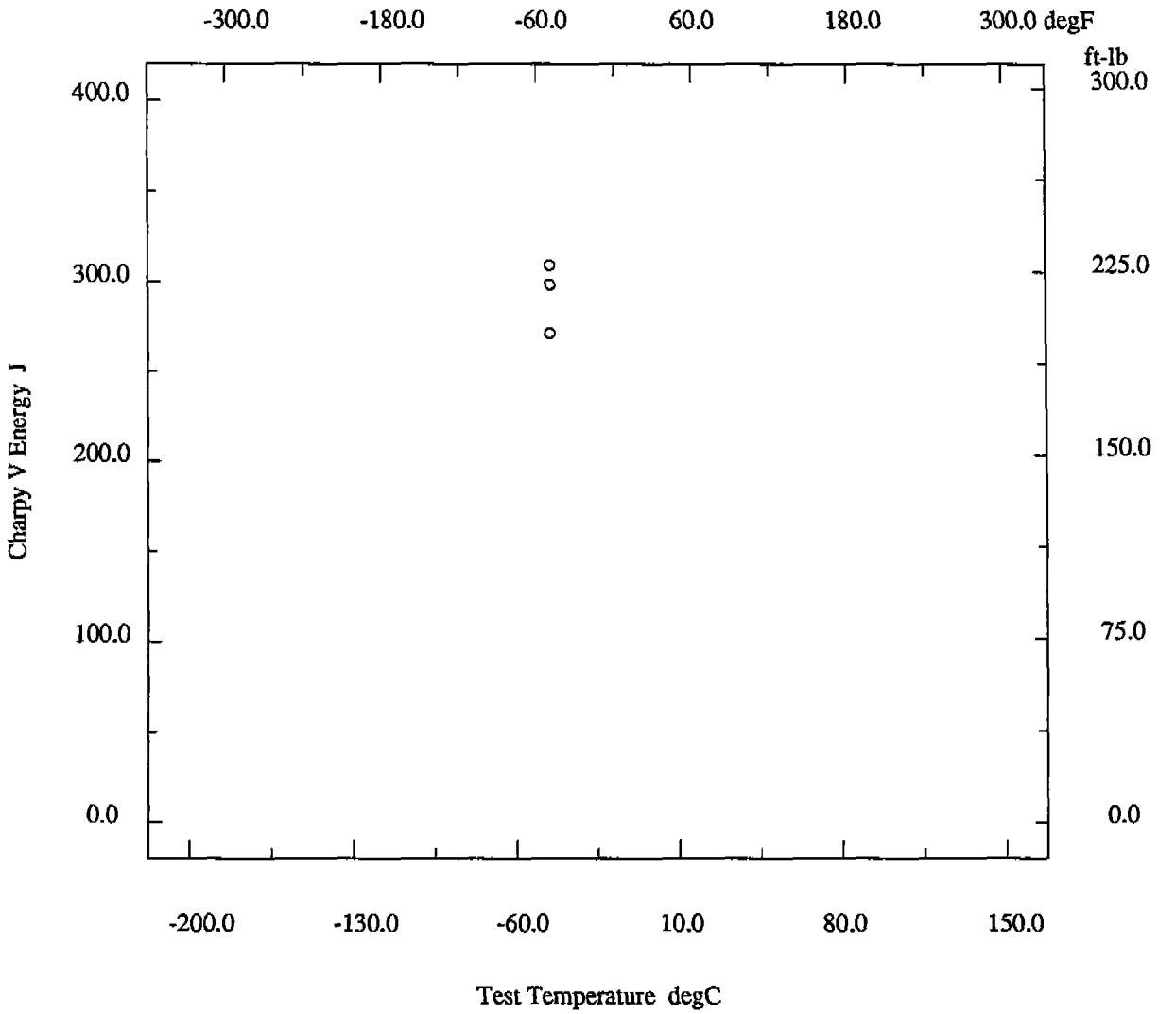
Test Type	Charpy V Impact	Position	*
Specimen Type	3/4	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T o	-50	200	83
L-T o	-50	220	87
L-T o	-50	228	88

* - not reported

Material A710

Description			
Material Code	002.012.01B2	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	*	Lot ID	57053
Reference	*		



* - not reported

Material A710

Description

Material Code	002.013.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	*	Lot ID	55946
Reference	*		

Composition

C	0.04 %	Mn	0.55 %
P	0.01 %	S	0.01 %
Si	0.22 %	Cr	0.60 %
Ni	0.90 %	Mo	0.24 %
V	*	Cu	1.17 %
Cb	0.031 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1100 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	3.25 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	79.7	64.3	*	29.5	72

* - not reported

Material A710

Description

Material Code	002.013.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	*	Lot ID	55946
Reference	*		

Composition See Page 11800.1

Fabrication History See Page 11800.1

Property Measurements

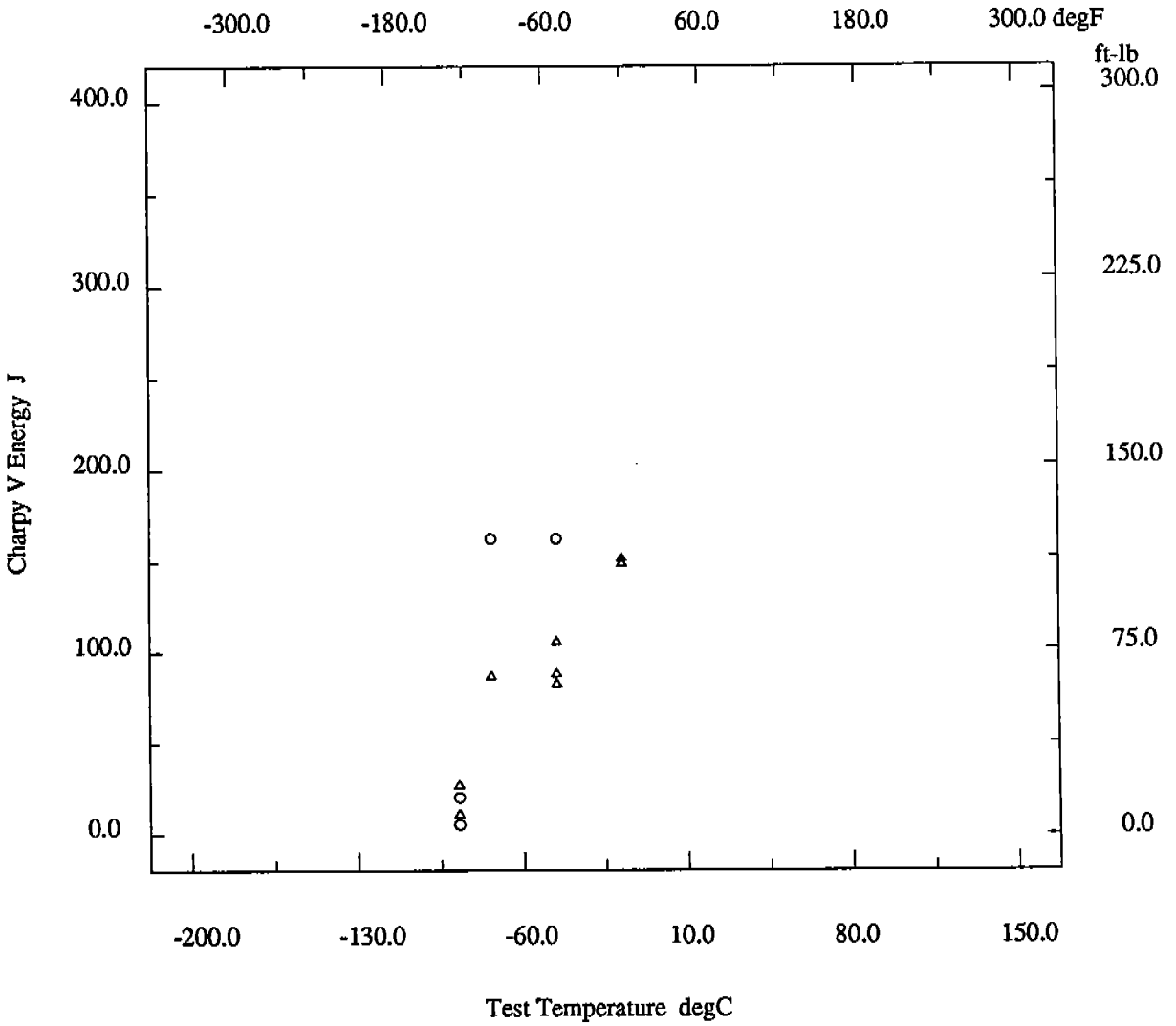
Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Shear Fracture	*
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Fracture?
L-T ○	-125	15	14	Assumed
L-T ○	-125	4	4	Assumed
L-T ○	-100	120	*	No
L-T ○	-50	120	*	No
L-T ○	-50	120	*	No
T-L △	-125	20	13	Assumed
T-L △	-125	8	5	Assumed
T-L △	-100	64	48	Assumed
T-L △	-100	64	52	Assumed
T-L △	-50	61	52	Assumed
T-L △	-50	65	56	Assumed
T-L △	-50	78	64	Assumed
T-L △	-50	78	65	Assumed
T-L △	0	110	76	Assumed
T-L △	0	112	76	Assumed

* - not reported

Material A710

Description			
Material Code	002.013.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	*	Lot ID	55946
Reference	*		



* - not reported

Material A710

Description

Material Code	002.013.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	*	Lot ID	55946
Reference	*		

Composition See Page 11800.1

Fabrication History See Page 11800.1

Property Measurements

Test Type	Nil Ductilty Transition	Position	*
Specimen Type	P-2	Filler Alloy	*
Passes	*	Orientation	*
Standard Method	*	Standard Year	*

Test Temp degF	Break?	NDTT
-80	Yes	Yes
-70	No	No

* - not reported

Material A710

Description

Material Code	002.013.01B2	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	*	Lot ID	55946
Reference	*		

Composition

See Page 11800.1

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1200 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Shear Fracture	*
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

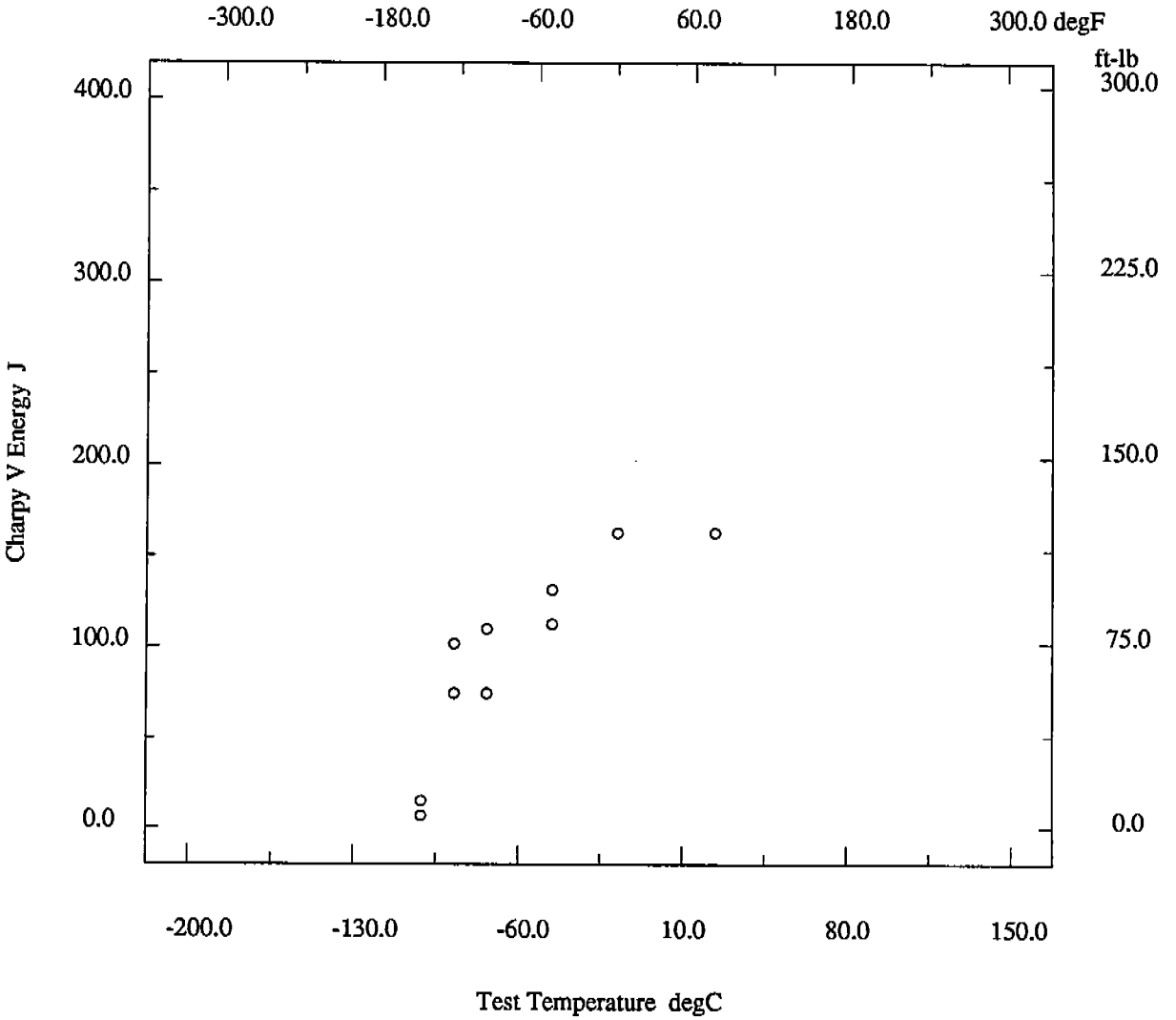
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Fracture?
T-L °	-150	11	10	Assumed
T-L °	-150	5	6	Assumed
T-L °	-125	55	53	Assumed
T-L °	-125	75	64	Assumed
T-L °	-100	55	36	Assumed
T-L °	-100	81	71	Assumed
T-L °	-50	83	67	Assumed
T-L °	-50	97	85	Assumed
T-L °	0	120	80	Assumed
T-L °	0	120	*	No
T-L °	75	120	*	No
T-L °	75	120	*	No

* - not reported

Material A710

Description

Material Code	002.013.01B2	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	*	Lot ID	55946
Reference	*		



* - not reported

Material A710

Description

Material Code	002.013.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	*	Lot ID	55946
Reference	*		

Composition

C	0.04 %	Mn	0.55 %
P	0.01 %	S	0.01 %
Si	0.22 %	Cr	0.60 %
Ni	0.90 %	Mo	0.24 %
V	*	Cu	1.17 %
Cb	0.031 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1100 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	3.25 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	88.3	74.8	*	28	72

* - not reported

Material A710

Description

Material Code	002.013.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	*	Lot ID	55946
Reference	*		

Composition See Page 11900.1

Fabrication History See Page 11900.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

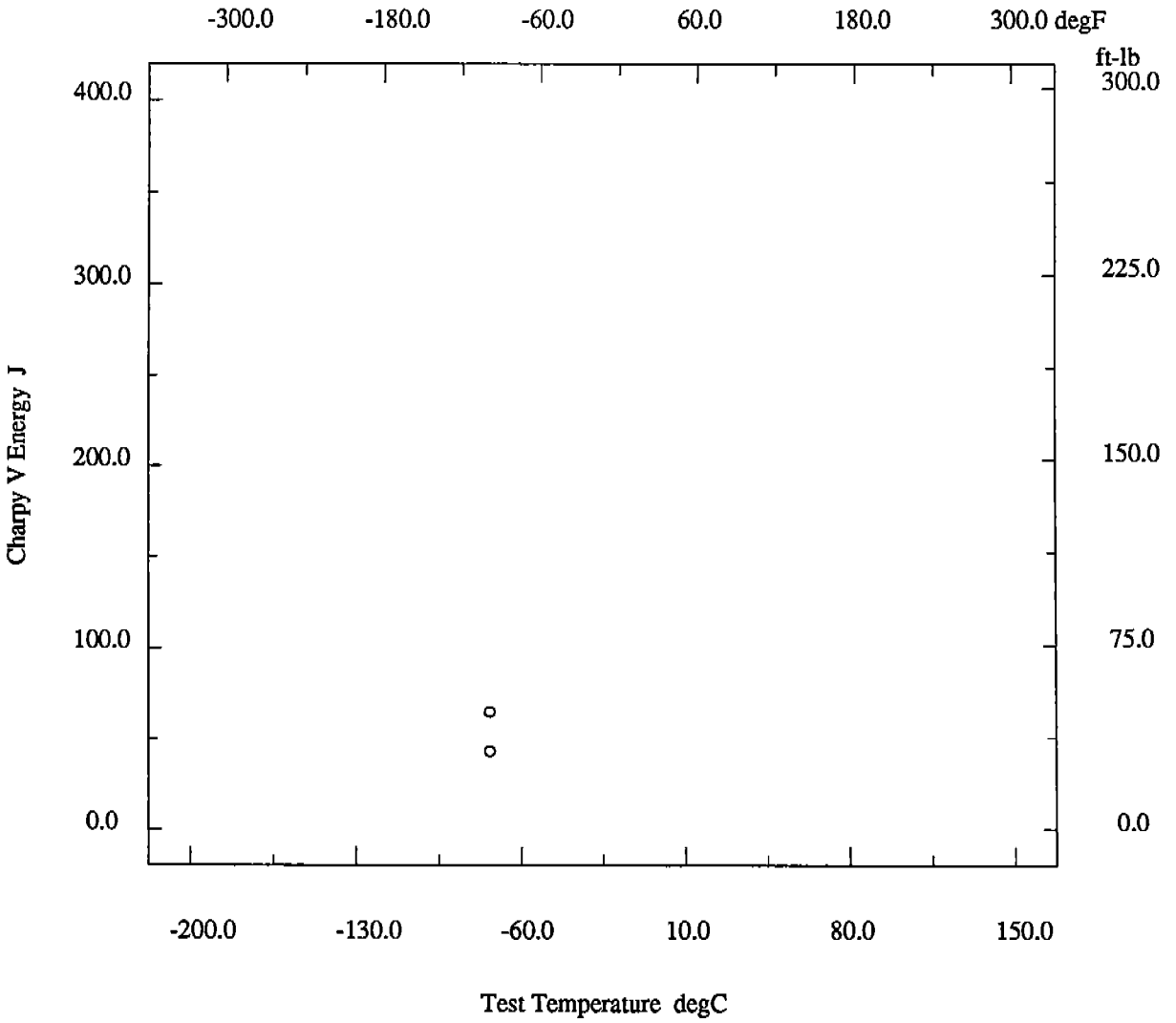
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L °	-100	32	23
T-L °	-100	48	33

* - not reported

Material A710

Description

Material Code	002.013.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	*	Lot ID	55946
Reference	*		



* - not reported

Material A710

Description

Material Code	002.013.01C2	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	*	Lot ID	55946
Reference	*		

Composition

See Page 11900.1

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1200 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Shear Fracture	*
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

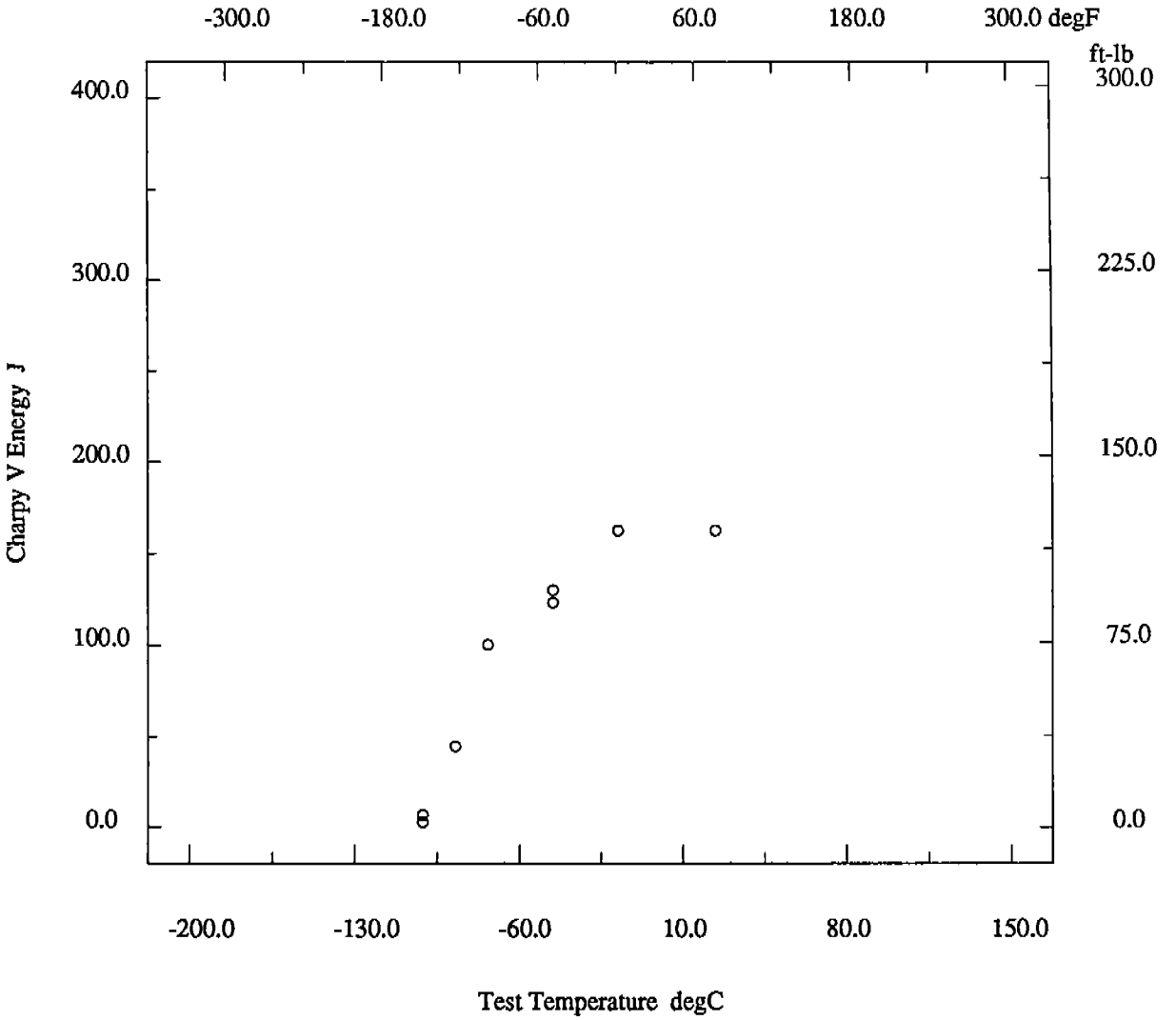
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Fracture?
T-L o	-150	2	1	Assumed
T-L o	-150	5	2	Assumed
T-L o	-125	33	24	Assumed
T-L o	-125	33	24	Assumed
T-L o	-100	74	57	Assumed
T-L o	-50	91	69	Assumed
T-L o	-50	96	72	Assumed
T-L o	0	120	*	No
T-L o	0	120	*	No
T-L o	75	120	*	No
T-L o	75	120	*	No

* - not reported

Material A710

Description

Material Code	002.013.01C2	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	*	Lot ID	55946
Reference	*		



* - not reported

Material A710

Description

Material Code	002.013.01C2	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	*	Lot ID	55946
Reference	*		

Composition See Page 11900.1

Fabrication History See Page 11900.4

Property Measurements

Test Type	Nil Ductilty Transition	Position	*
Specimen Type	P-2	Filler Alloy	*
Passes	*	Orientation	*
Standard Method	*	Standard Year	*

Test Temp degF	Break?	NDTT
-100	Yes	Yes
-90	No	No

* - not reported

Material A710

Description

Material Code	002.014.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	*	Lot ID	40574
Reference	*		

Composition

C	0.04 %	Mn	0.70 %
P	0.01 %	S	0.009 %
Si	0.35 %	Cr	0.71 %
Ni	0.99 %	Mo	0.20 %
V	*	Cu	1.20 %
Cb	0.041 %	Ti	*
B	*	Al	*
N	*	Other Components	*

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1100 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	8 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	81.4	59.9	*	30	78

* - not reported

Material A710

Description

Material Code	002.014.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	*	Lot ID	40574
Reference	*		

Composition See Page 12000.1

Fabrication History See Page 12000.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

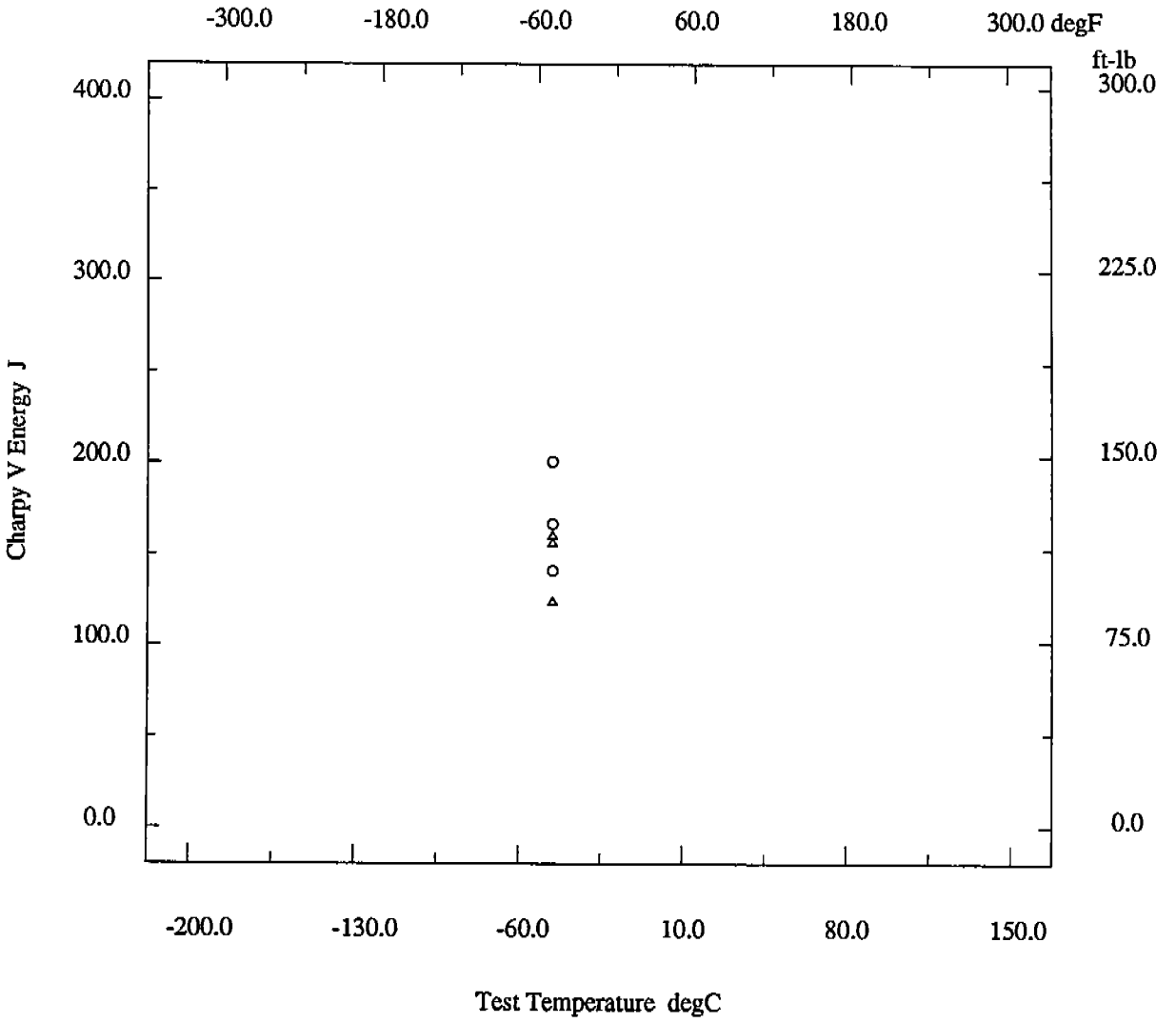
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T ○	-50	104	80
L-T ○	-50	123	85
L-T ○	-50	148	94
T-L △	-50	115	85
T-L △	-50	118	90
T-L △	-50	91	81

* - not reported

Material A710

Description

Material Code	002.014.01B1	Material Name	A710
UNS	*	Other Designation	Class 2
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	*	Lot ID	40574
Reference	*		



* - not reported

Material A710

Description

Material Code	002.014.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	*	Lot ID	40574
Reference	*		

Composition

C	0.04 %	Mn	0.70 %
P	0.01 %	S	0.009 %
Si	0.35 %	Cr	0.71 %
Ni	0.99 %	Mo	0.20 %
V	*	Cu	1.20 %
Cb	0.041 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1100 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	8 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	84.5	69.6	*	27	73

* - not reported

Material A710

Description

Material Code	002.014.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	*	Lot ID	40574
Reference	*		

Composition See Page 12100.1

Fabrication History See Page 12100.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

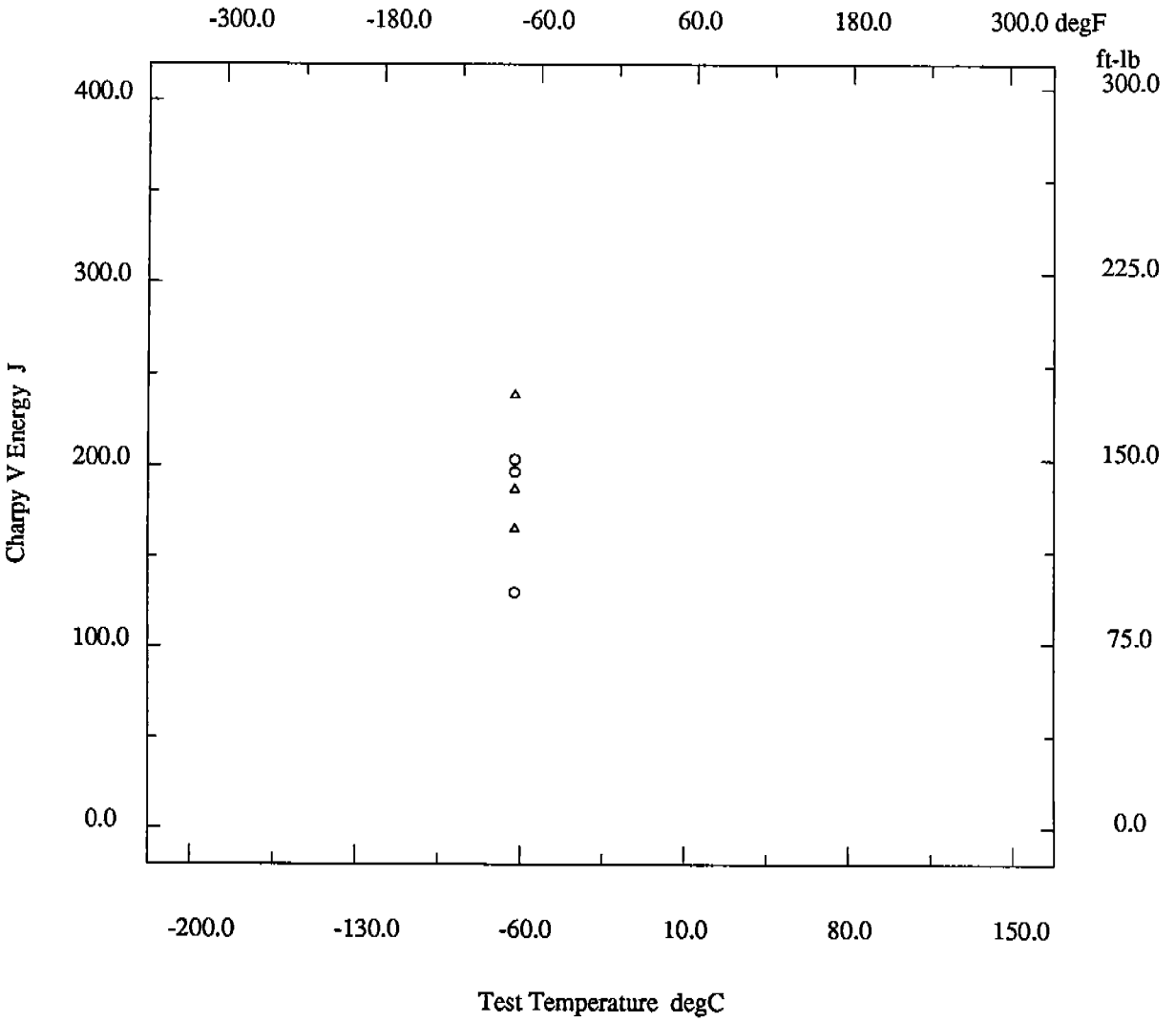
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T ○	-80	145	95
L-T ○	-80	150	101
L-T ○	-80	96	77
T-L △	-80	122	86
T-L △	-80	138	86
T-L △	-80	176	95

* - not reported

Material A710

Description

Material Code	002.014.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	*	Lot ID	40574
Reference	*		



* - not reported

Material A710

Description

Material Code	002.015.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.75 in	Composition Type	Actual
Composition Position	*	Lot ID	40574
Reference	*		

Composition

C	0.04 %	Mn	0.70 %
P	0.01 %	S	0.009 %
Si	0.35 %	Cr	0.71 %
Ni	0.99 %	Mo	0.20 %
V	*	Cu	1.20 %
Cb	0.041 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1200 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	1.75 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	86.4	75.9	*	28	*

* - not reported

Material A710

Description

Material Code	002.015.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.75 in	Composition Type	Actual
Composition Position	*	Lot ID	40574
Reference	*		

Composition See Page 12200.1

Fabrication History See Page 12200.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

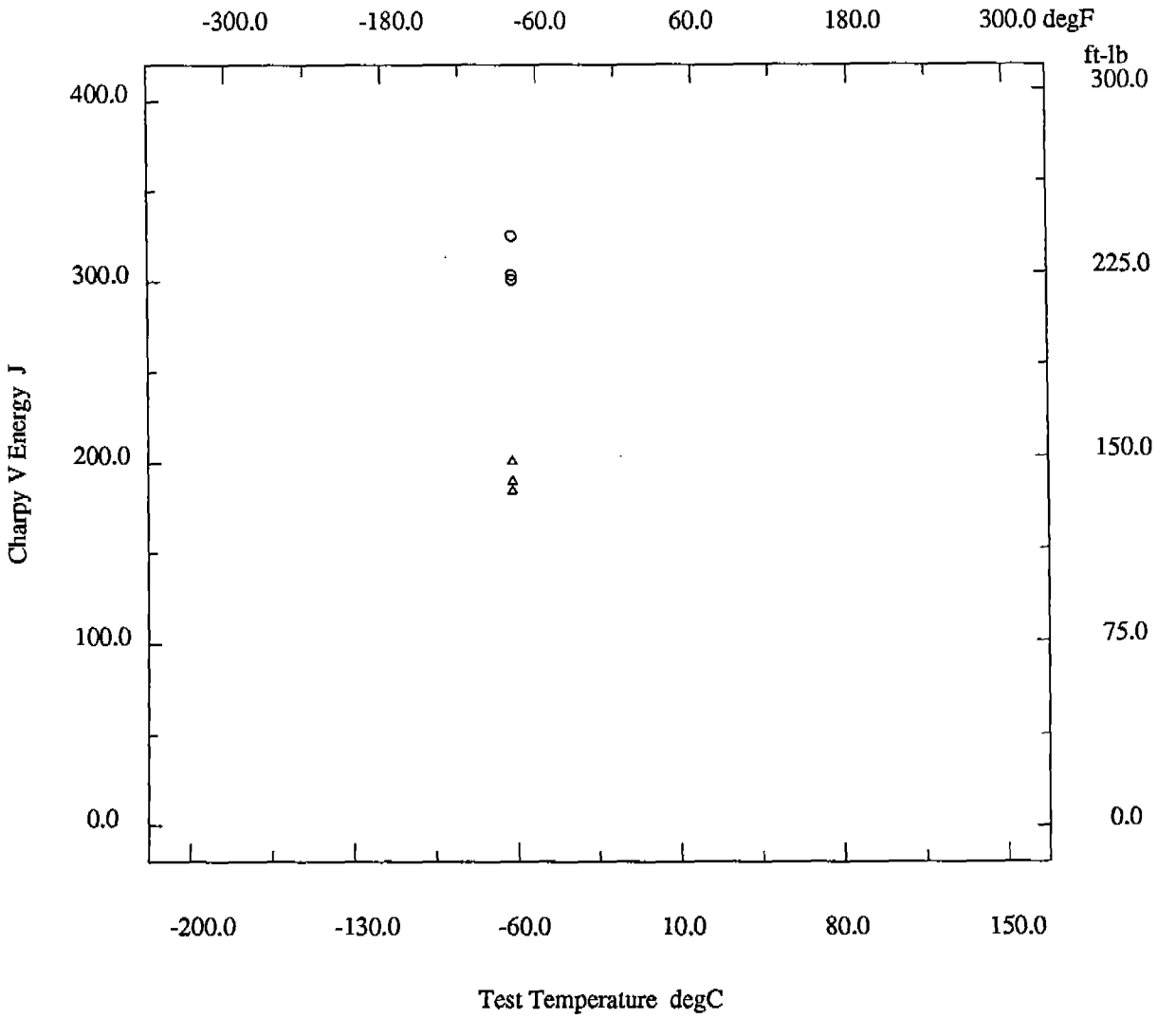
Orien	Test Temp degF	CVN Energy ft-lb
L-T o	-80	222
L-T o	-80	224
L-T o	-80	240
T-L ▵	-80	136
T-L ▵	-80	140
T-L ▵	-80	148

* - not reported

Material A710

Description

Material Code	002.015.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.75 in	Composition Type	Actual
Composition Position	*	Lot ID	40574
Reference	*		



* - not reported

Material A710

Description

Material Code	002.016.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	*	Lot ID	52110
Reference	*		

Composition

C	0.05 %	Mn	0.51 %
P	0.01 %	S	0.01 %
Si	0.30 %	Cr	0.72 %
Ni	0.93 %	Mo	0.20 %
V	*	Cu	1.19 %
Cb	0.04 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1200 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	2.25 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	84.4	70.2	*	31	74

* - not reported

Material A710

Description

Material Code	002.016.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	*	Lot ID	52110
Reference	*		

Composition See Page 12300.1

Fabrication History See Page 12300.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

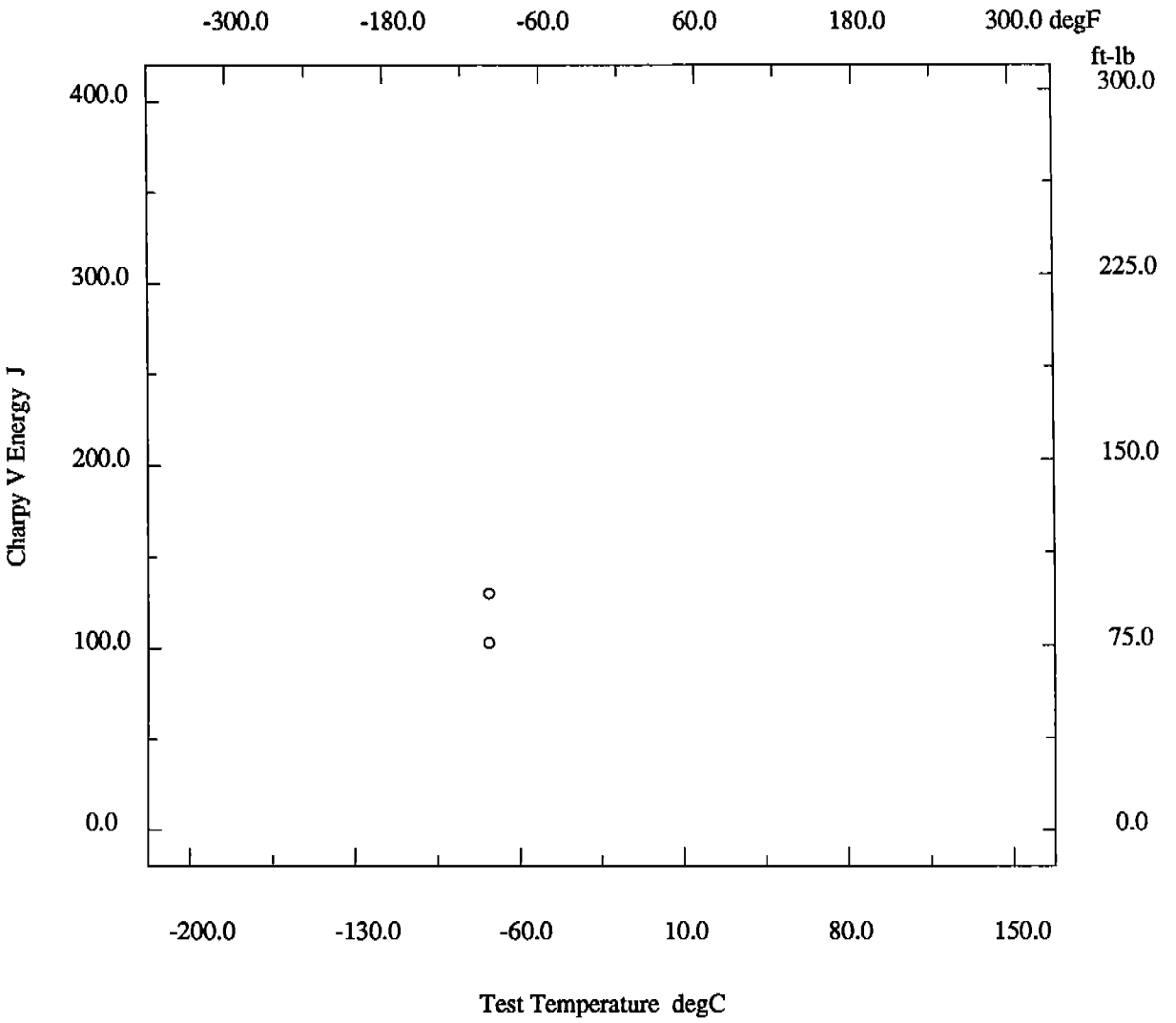
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L ○	-100	76	56
T-L ○	-100	96	66

* - not reported

Material A710

Description

Material Code	002.016.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	*	Lot ID	52110
Reference	*		



* - not reported

Material A710

Description

Material Code	002.016.09CBA	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Welded Joint	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	*	Lot ID	52110
Reference	*		

Composition

See Page 12300.1

Fabrication History

See Page 12300.1

Weld

Weld Code	002.016.09CBA	Weld Type	SAW
Base Metal Thickness	2.25 in	Welding Position	Flat
Preheat Temperature	None degF	Metal Gap	None in
Interpass Temperature	200 degF	Passes	12
Filler Specification	*	Filler Name	Armco W24
Filler Carbon Content	*	Filler Metal Size	5/32 in
Shielding Gas	*	Voltage	32 volts
Amperage	800 amps	Polarity	DCRP
Travel Speed	12 in/min	Heat Input/Pass	128 KJ/in
Joint Preparation	Double U-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	Final surface
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Linde166p
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

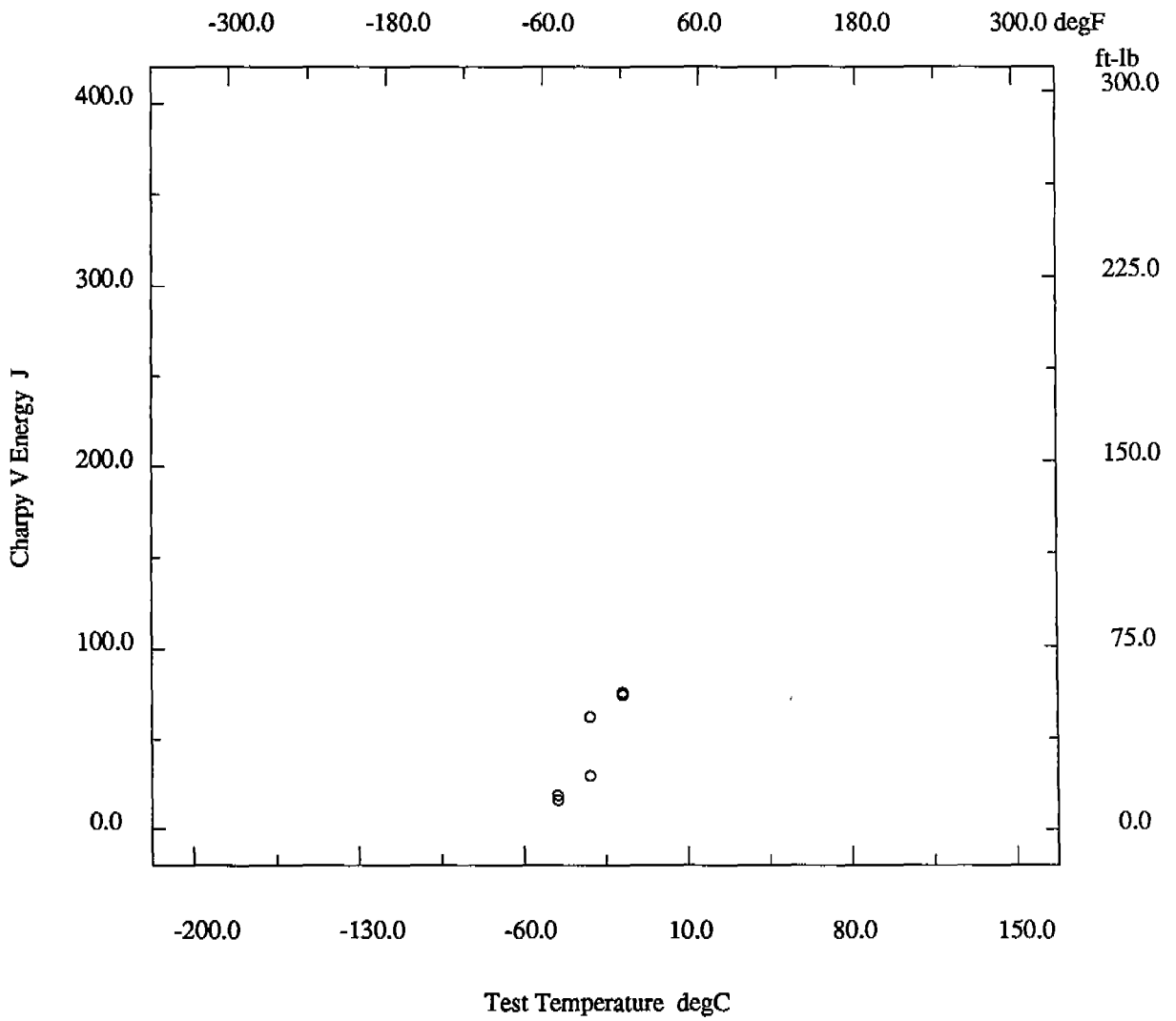
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L °	-50	12	6
T-L °	-50	14	8
T-L °	-25	22	15
T-L °	-25	46	32
T-L °	0	55	38
T-L °	0	56	40

* - not reported

Material A710

Description

Material Code	002.016.09CBA	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Welded Joint	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	*	Lot ID	52110
Reference	*		



* - not reported

Material A710

Description

Material Code	002.016.02CBA	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Welded Joint	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	*	Lot ID	52110
Reference	*		

Composition See Page 12300.1

Fabrication History See Page 12300.1

Weld

Weld Code	002.016.02CBA	Weld Type	SAW
Base Metal Thickness	2.25 in	Welding Position	Flat
Preheat Temperature	None degF	Metal Gap	None in
Interpass Temperature	200 degF	Passes	12
Filler Specification	*	Filler Name	Armco W24
Filler Carbon Content	*	Filler Metal Size	5/32 in
Shielding Gas	*	Voltage	32 volts
Amperage	800 amps	Polarity	DCRP
Travel Speed	12 in/min	Heat Input/Pass	128 KJ/in
Joint Preparation	Double U-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Final surface
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	Linde166p
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

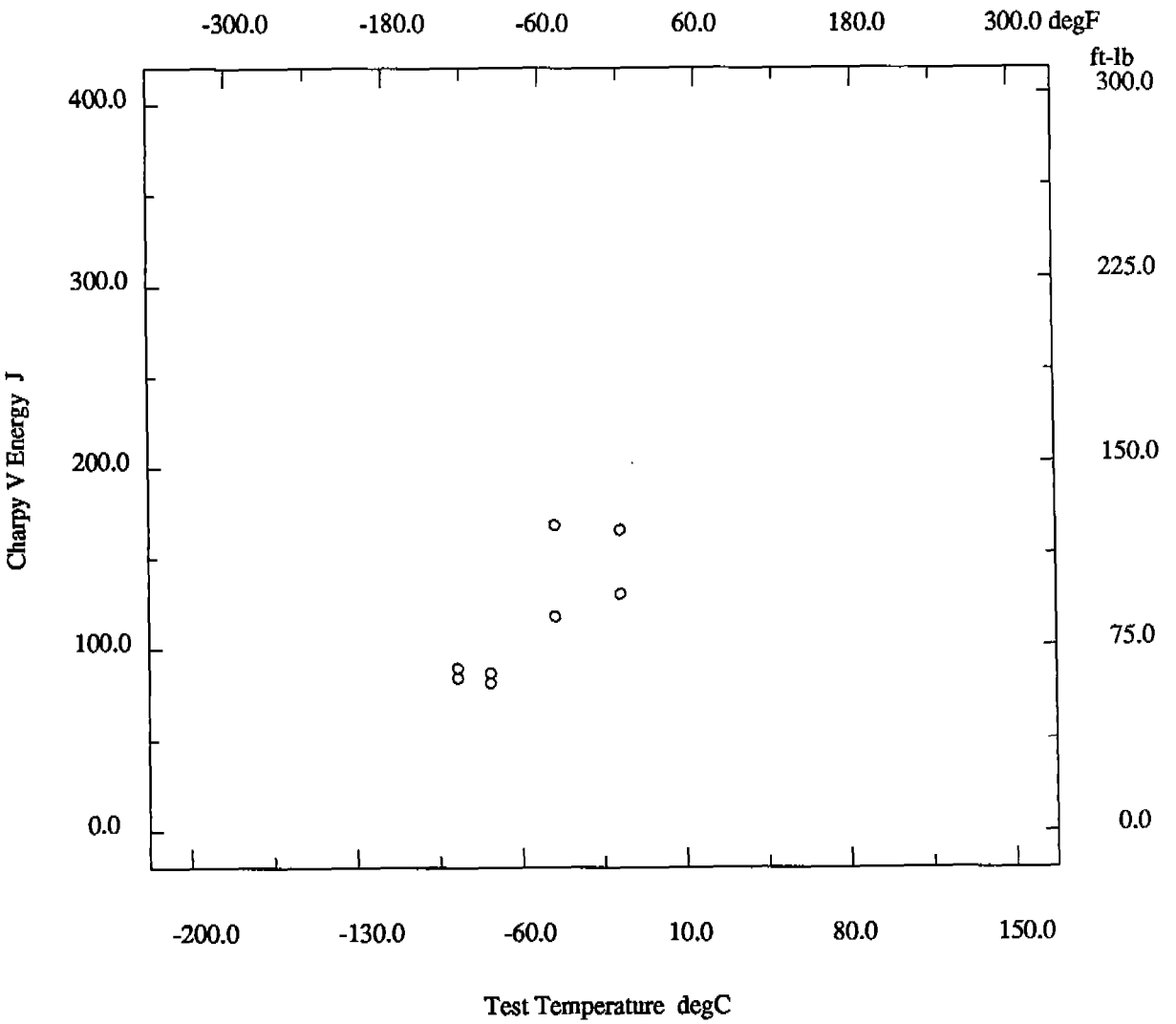
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L °	-125	62	45
T-L °	-125	66	49
T-L °	-100	60	42
T-L °	-100	64	46
T-L °	-50	124	84
T-L °	-50	87	56
T-L °	0	122	86
T-L °	0	96	66

* - not reported

Material A710

Description

Material Code	002.016.02CBA	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Welded Joint	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	*	Lot ID	52110
Reference	*		



* - not reported

Material A710

Description

Material Code	002.016.09CAS	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Welded Joint	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	*	Lot ID	52110
Reference	*		

Composition

See Page 12300.1

Fabrication History

See Page 12300.1

Weld

Weld Code	002.016.09CAS	Weld Type	SMAW
Base Metal Thickness	2.25 in	Welding Position	Vert-Up
Preheat Temperature	70 degF	Metal Gap	3/16 in
Interpass Temperature	100 degF	Passes	14
Filler Specification	E8018-C1	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	1/8 in
Shielding Gas	*	Voltage	22 volts
Amperage	140 amps	Polarity	DCRP
Travel Speed	*	Heat Input/Pass	*
Joint Preparation	Double V-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	Final surface
Post-Weld Heat Temp	1150 degF	Post-Weld Heat Time	5 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

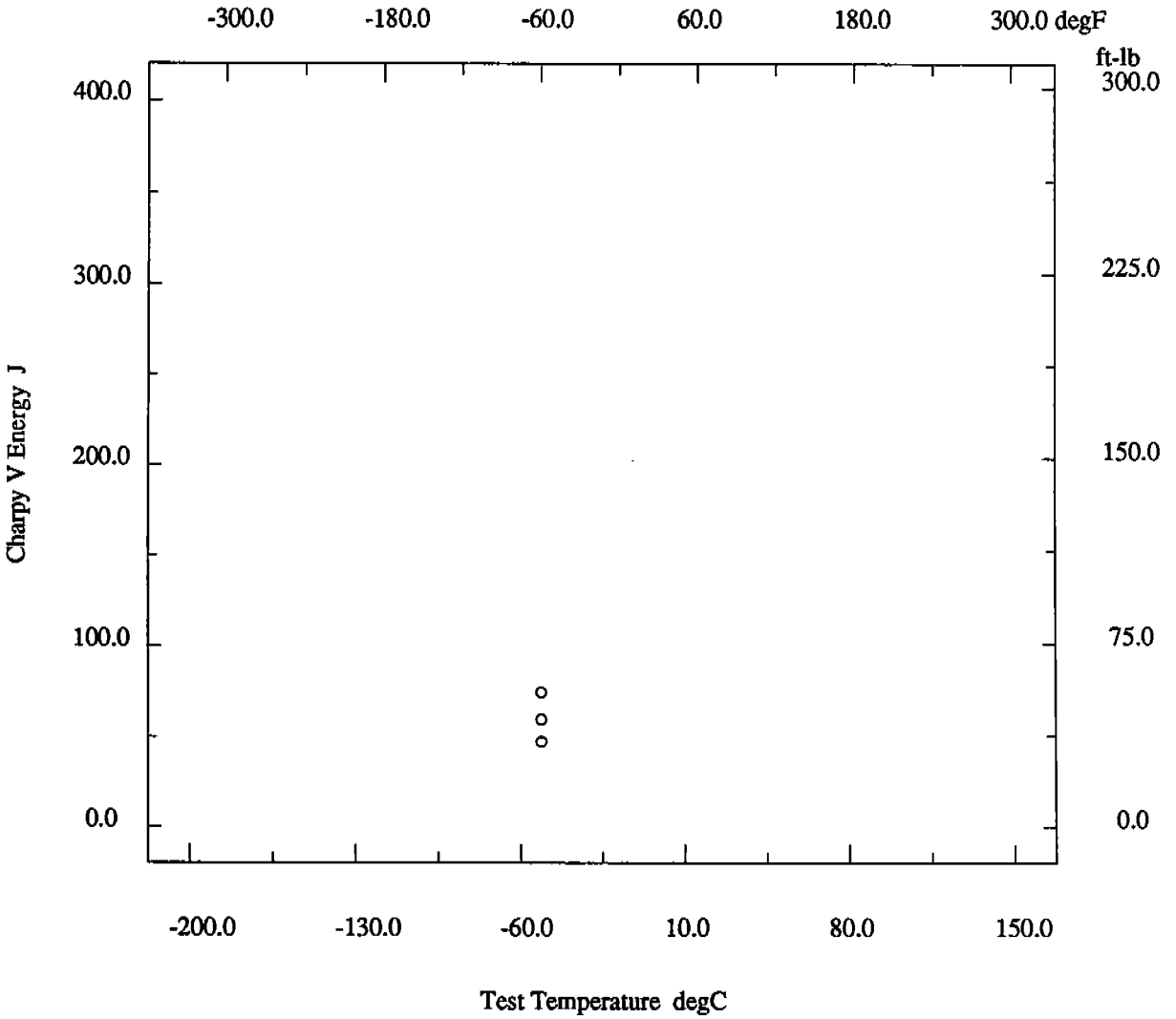
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L ○	-60	35	31
T-L ○	-60	44	37
T-L ○	-60	55	45

* - not reported

Material A710

Description

Material Code	002.016.09CAS	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Welded Joint	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	*	Lot ID	52110
Reference	*		



* - not reported

Material A710

Description

Material Code	002.016.02CAS	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Welded Joint	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	*	Lot ID	52110
Reference	*		

Composition

See Page 12300.1

Fabrication History

See Page 12300.1

Weld

Weld Code	002.016.02CAS	Weld Type	SMAW
Base Metal Thickness	2.25 in	Welding Position	Vert-Up
Preheat Temperature	70 degF	Metal Gap	3/16 in
Interpass Temperature	100 degF	Passes	14
Filler Specification	E8018-C1	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	1/8 in
Shielding Gas	*	Voltage	22 volts
Amperage	140 amps	Polarity	DCRP
Travel Speed	*	Heat Input/Pass	*
Joint Preparation	Double V-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Final surface
Post-Weld Heat Temp	1150 degF	Post-Weld Heat Time	5 hr
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

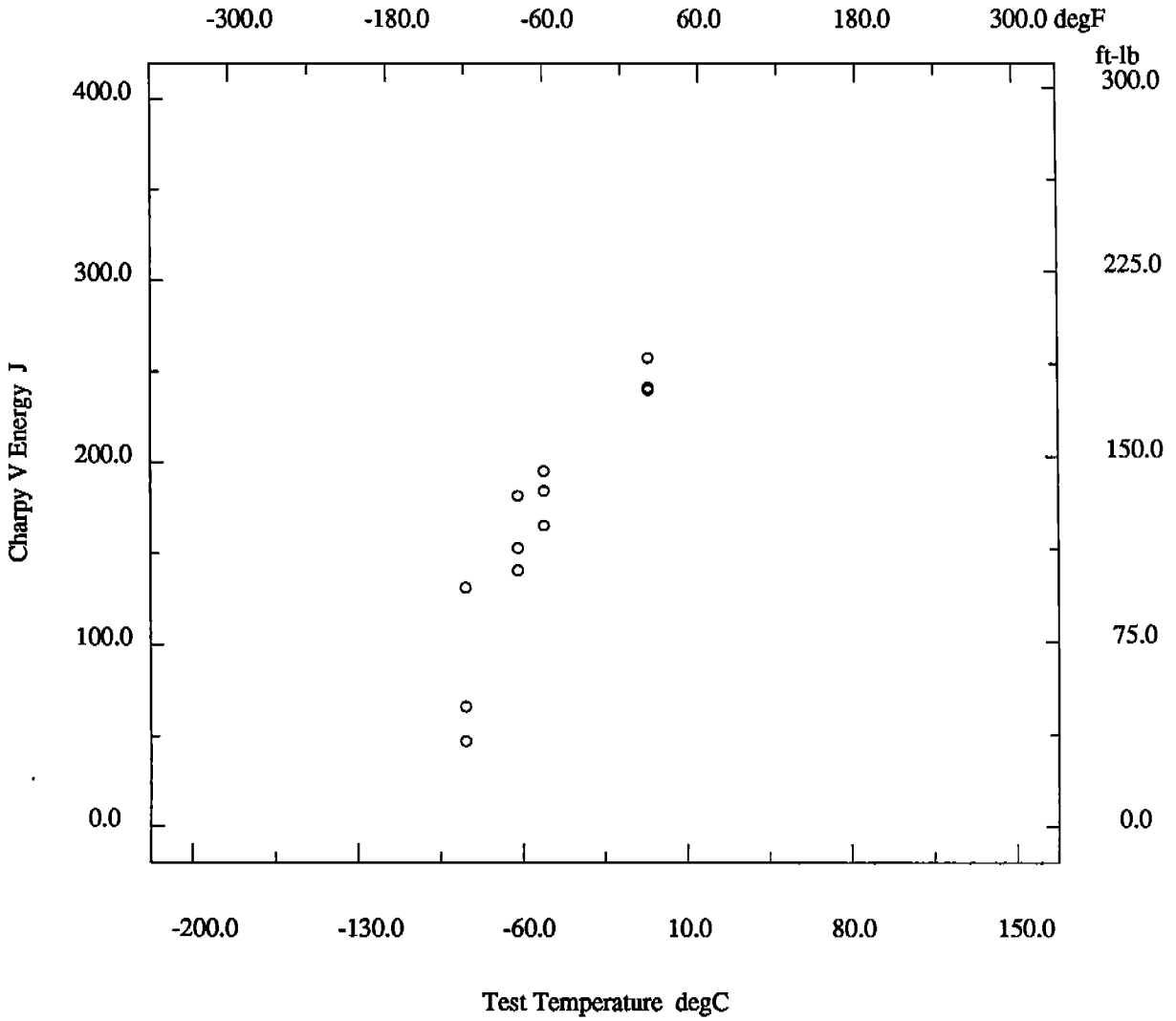
Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L °	-120	35	31
T-L °	-120	49	40
T-L °	-120	97	76
T-L °	-80	104	80
T-L °	-80	113	82
T-L °	-80	134	93
T-L °	-60	122	91
T-L °	-60	136	91
T-L °	-60	144	92
T-L °	20	177	76
T-L °	20	178	77
T-L °	20	190	88

* - not reported

Material A710

Description			
Material Code	002.016.02CAS	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Welded Joint	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	*	Lot ID	52110
Reference	*		



* - not reported

Material A710

Description

Material Code	002.016.09CAA	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Welded Joint	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	*	Lot ID	52110
Reference	*		

Composition

See Page 12300.1

Fabrication History

See Page 12300.1

Weld

Weld Code	002.016.09CAA	Weld Type	SMAW
Base Metal Thickness	2.25 in	Welding Position	Vert-Up
Preheat Temperature	70 degF	Metal Gap	3/16 in
Interpass Temperature	100 degF	Passes	16
Filler Specification	E8018-C1	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	1/8 in
Shielding Gas	*	Voltage	22 volts
Amperage	140 amps	Polarity	DCRP
Travel Speed	*	Heat Input/Pass	*
Joint Preparation	Double V-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	Final surface
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

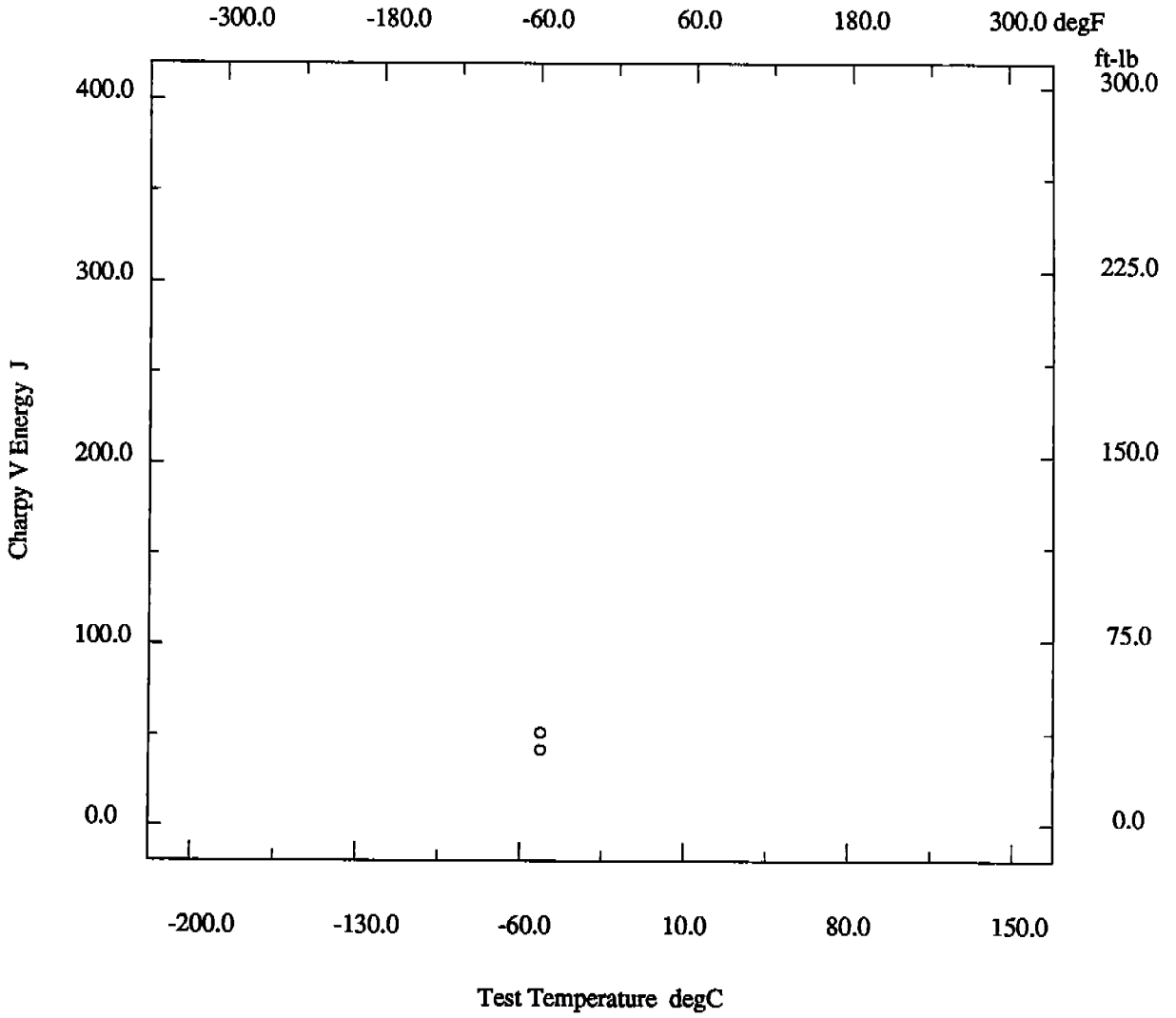
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L °	-60	31	26
T-L °	-60	31	27
T-L °	-60	38	28

* - not reported

Material A710

Description

Material Code	002.016.09CAA	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Welded Joint	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	*	Lot ID	52110
Reference	*		



* - not reported

Material A710

Description

Material Code	002.016.02CAA	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Welded Joint	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	*	Lot ID	52110
Reference	*		

Composition

See Page 12300.1

Fabrication History

See Page 12300.1

Weld

Weld Code	002.016.02CAA	Weld Type	SMAW
Base Metal Thickness	2.25 in	Welding Position	Vert-Up
Preheat Temperature	70 degF	Metal Gap	3/16 in
Interpass Temperature	100 degF	Passes	16
Filler Specification	E8018-C1	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	1/8 in
Shielding Gas	*	Voltage	22 volts
Amperage	140 amps	Polarity	DCRP
Travel Speed	*	Heat Input/Pass	*
Joint Preparation	Double V-Groove	Number of Sides	2
Location wrt Weld	Fusion line	Location wrt Surface	Final surface
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	*
Weld Composition Reported?	No		

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

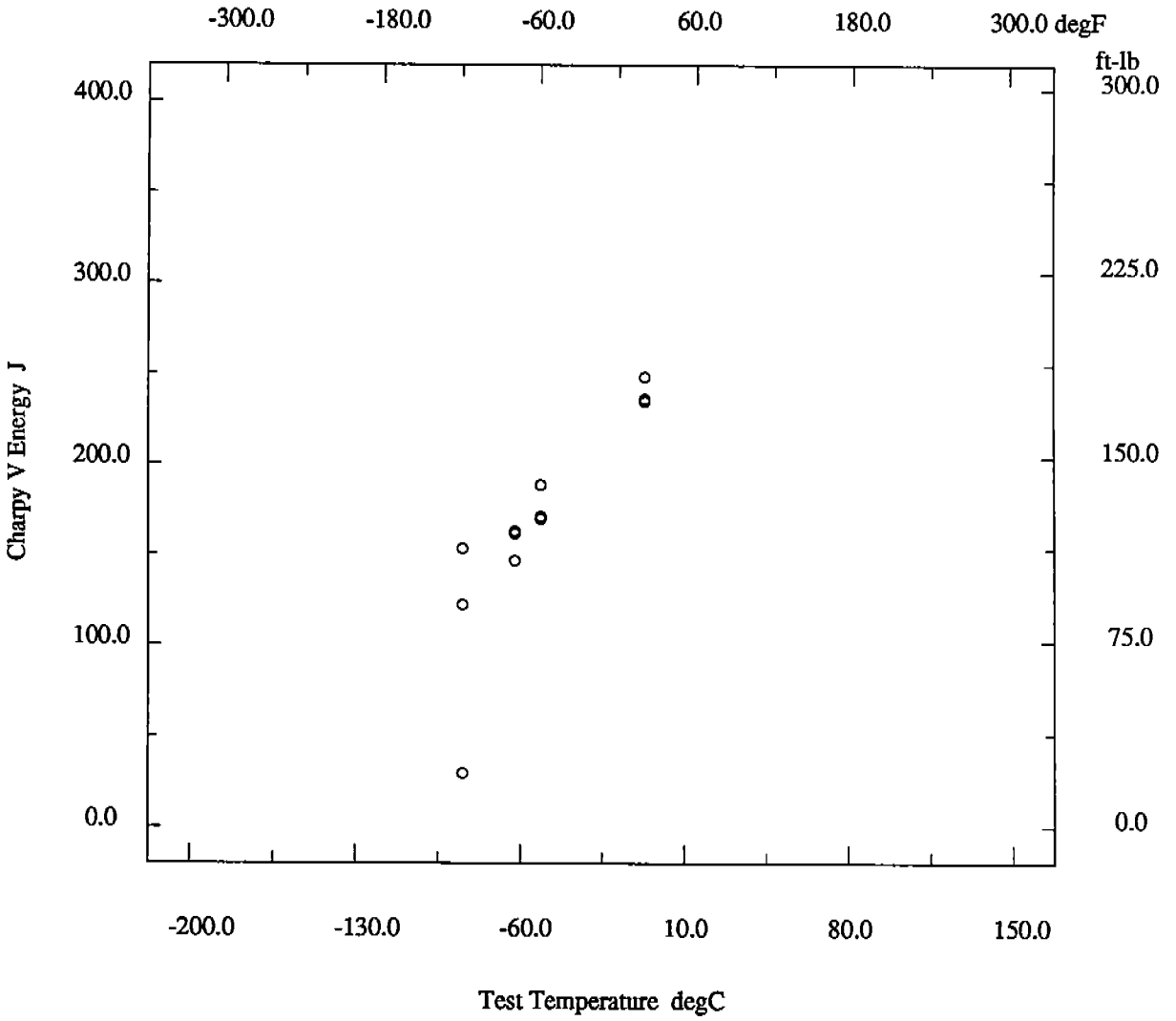
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
T-L ○	-120	113	79
T-L ○	-120	22	20
T-L ○	-120	90	70
T-L ○	-80	108	81
T-L ○	-80	119	83
T-L ○	-80	120	84
T-L ○	-60	125	83
T-L ○	-60	126	86
T-L ○	-60	139	93
T-L ○	20	173	93
T-L ○	20	174	96
T-L ○	20	183	96

* - not reported

Material A710

Description

Material Code	002.016.02CAA	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Welded Joint	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	*	Lot ID	52110
Reference	*		



* - not reported

Material A710

Description

Material Code	002.017.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	4.5 in	Composition Type	Actual
Composition Position	*	Lot ID	52100
Reference	*		

Composition

C	0.05 %	Mn	0.59 %
P	0.01 %	S	0.009 %
Si	0.35 %	Cr	0.76 %
Ni	0.90 %	Mo	0.19 %
V	*	Cu	1.21 %
Cb	0.04 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	*
Year Produced	*	Addl Info	None
Source	*	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	K
Final Temperature	1200 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	4.5 in
Gage Length	2 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	86.2	75.2	*	26.5	75

* - not reported

Material A710

Description

Material Code	002.017.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	4.5 in	Composition Type	Actual
Composition Position	*	Lot ID	52100
Reference	*		

Composition See Page 12400.1

Fabrication History See Page 12400.1

Property Measurements

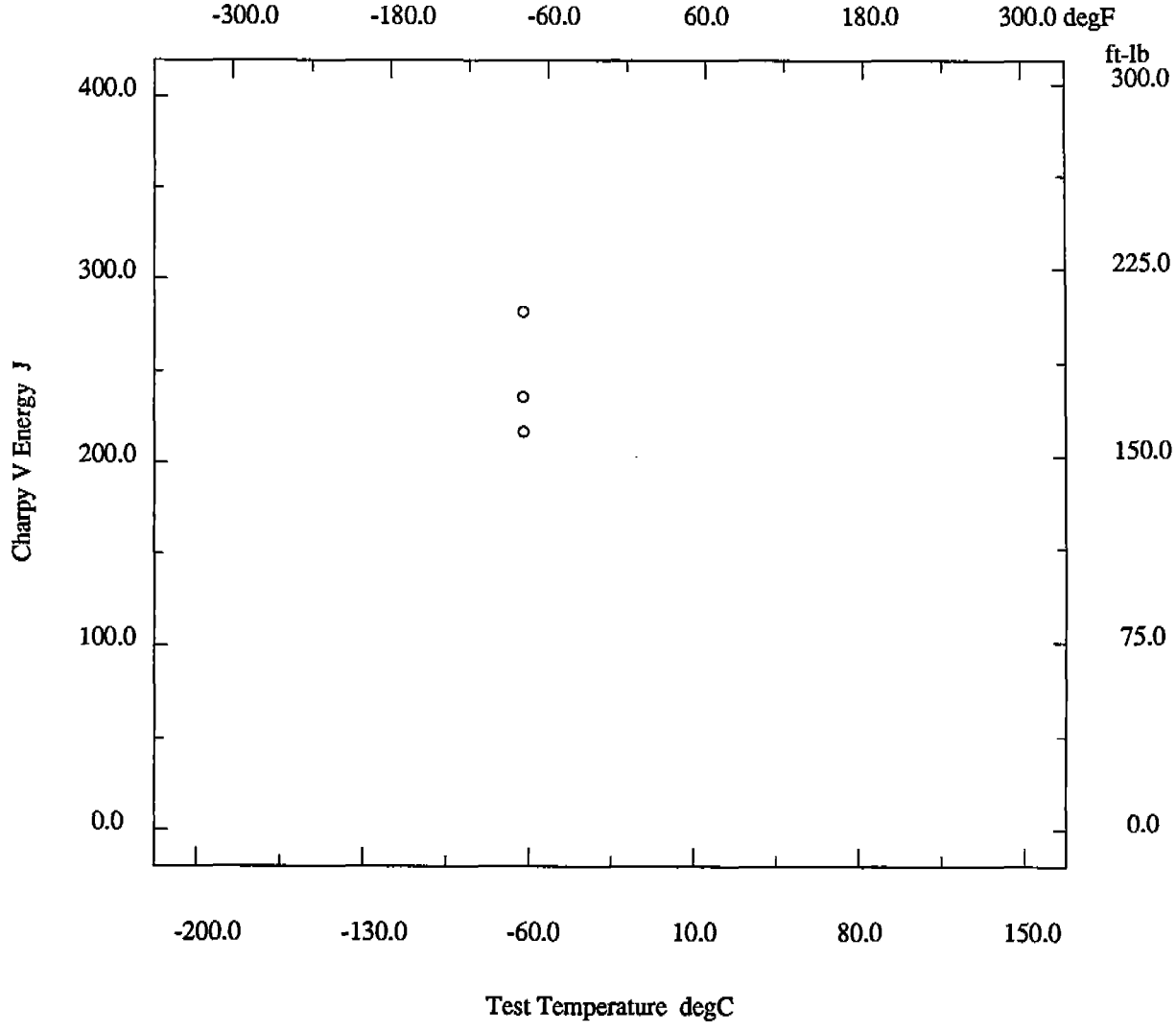
Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Shear Fracture	*
Did Specimen Fracture?	Assumed	Did Specimen Split?	*
Standard Method	*	Standard Year	*

Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils
L-T °	-80	160	89
L-T °	-80	174	92
L-T °	-80	208	96

* - not reported

Material A710

Description			
Material Code	002.017.01C1	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	4.5 in	Composition Type	Actual
Composition Position	*	Lot ID	52100
Reference	*		



* - not reported

Material A710-A

Description

Material Code	002.018.01	Material Name	A710-A
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	D6873-1A
Reference	3400		

Composition

C	0.06 %	Mn	0.50 %
P	0.013 %	S	0.004 %
Si	0.28 %	Cr	0.75 %
Ni	0.88 %	Mo	0.21 %
V	*	Cu	1.16 %
Cb	0.03 %	Ti	*
B	*	Al	0.03 %
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	Lukens
Year Produced	1984	Addl Info	None
Source	Lukens	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	Q,K
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	1/2T
Specimen Type	Cylindrical	Specimen Thickness	0.252 in
Gage Length	1 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
L	75	96.5	87.5	89.5	28.0	79.0
L	75	97.2	88.0	89.6	27.0	79.0
L	75	98.0	88.5	89.7	26.0	79.0
L	75	98.4	89.8	90.9	26.5	78.6
L	75	98.5	89.8	90.9	26.8	78.4
L	75	98.5	*	90.9	27.0	78.3

* - not reported

Material A710-A

Description

Material Code	002.018.01	Material Name	A710-A
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	D6873-1A
Reference	3400		

Composition See Page 12500.1

Fabrication History See Page 12500.1

Property Measurements

Test Type	Fracture Toughness	Position	1/2T
Specimen Type	Compact	Specimen Thickness	1.0 in
Crack Length	*	Loading Type	*
Loading Rate	*	KQ	*
KIc	*	Valid KIc?	*
Reason for Invalid	*	JIc	*
KJc	*	JIcpr	Per Standard
Curve Shape	*	Standard Method	E813
Standard Year	1987		

Orien	Test Temp degF	CODi in	CODIc in	JI in-lb/in2	Jmax in-lb/in2	Tear Mod in-lb/in**2
L-T	72	0.0258	0.0287	8209	4676	277.1
L-T	72	0.0303	0.0265	8220	4220	235.4
T-L	0	0.0184	0.0210	4727	3205	210.5
T-L	0	0.0203	0.0180	4986	2751	197.0
T-L	72	0.0185	0.0225	4407	3423	203.0
T-L	72	0.0192	0.0199	4350	2963	198.8

* - not reported

Material A710-A

Description

Material Code	002.018.01	Material Name	A710-A
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	D6873-1A
Reference	3400		

Composition See Page 12500.1

Fabrication History See Page 12500.1

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	Full	Did Specimen Fracture?	*
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

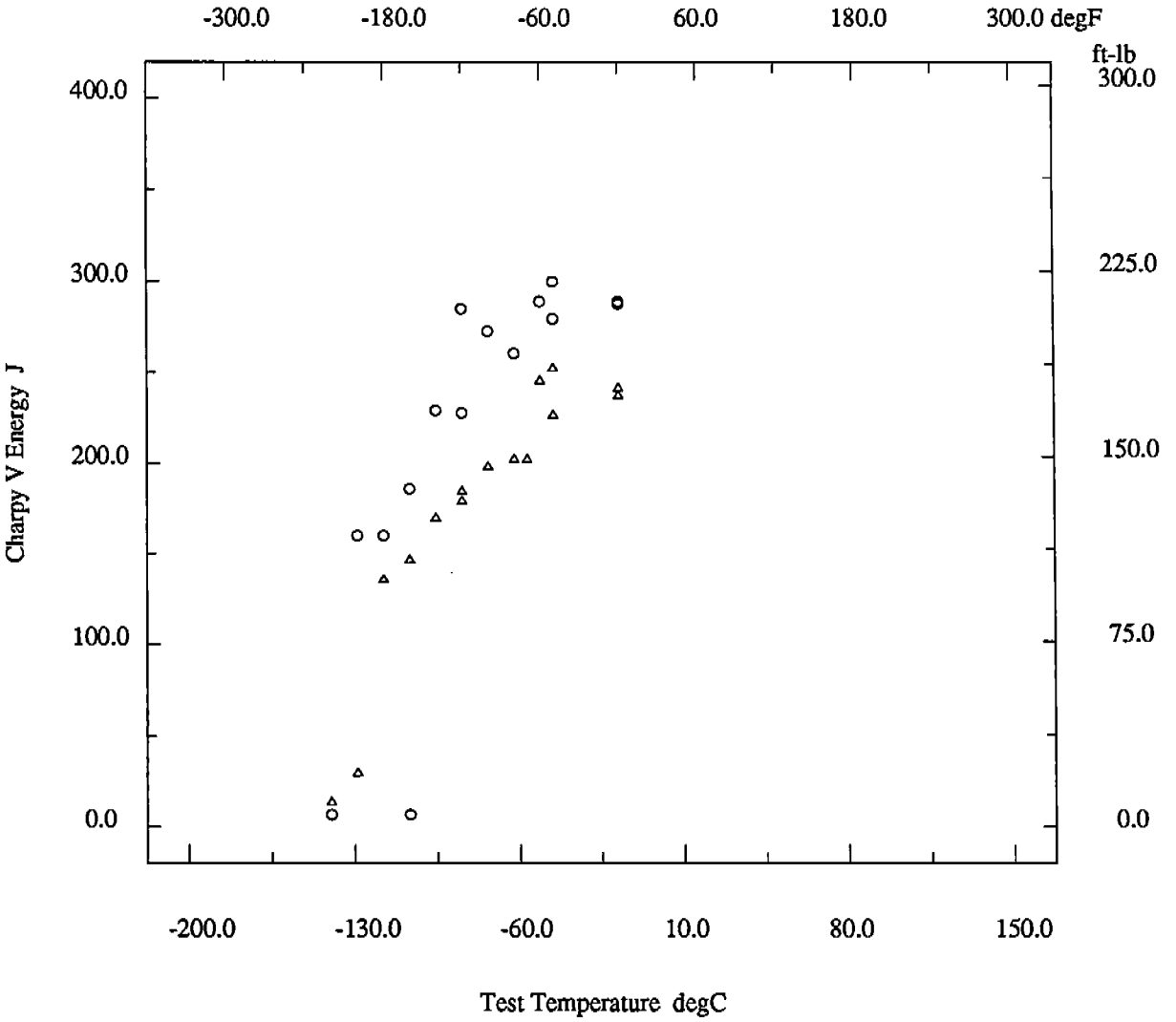
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T ○	-220	5	1	3
L-T ○	-200	118	76	41
L-T ○	-180	118	76	41
L-T ○	-160	137	84	56
L-T ○	-160	5	2	6
L-T ○	-140	169	86	76
L-T ○	-120	168	89	76
L-T ○	-120	210	100	100
L-T ○	-100	201	94	100
L-T ○	-80	192	95	100
L-T ○	-60	213	95	100
L-T ○	-50	206	98	100
L-T ○	-50	221	97	100
L-T ○	0	212	94	100
L-T ○	0	213	97	100
T-L △	-220	10	5	2
T-L △	-200	22	10	8
T-L △	-180	100	68	34
T-L △	-160	108	74	39
T-L △	-140	125	79	52
T-L △	-120	132	77	61
T-L △	-120	136	82	61
T-L △	-100	146	86	64
T-L △	-80	149	94	70
T-L △	-70	149	85	71
T-L △	-60	181	92	100
T-L △	-50	167	87	100
T-L △	-50	186	96	100
T-L △	0	175	88	100
T-L △	0	178	94	100

* - not reported

Material A710-A

Description

Material Code	002.018.01	Material Name	A710-A
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	D6873-1A
Reference	3400		



* - not reported

Material A710-A

Description

Material Code	002.018.01	Material Name	A710-A
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	D6873-1A
Reference	3400		

Composition See Page 12500.1

Fabrication History See Page 12500.1

Property Measurements

Test Type	Dynamic Tear	Position	1/2T
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Standard Method	*	Standard Year	*

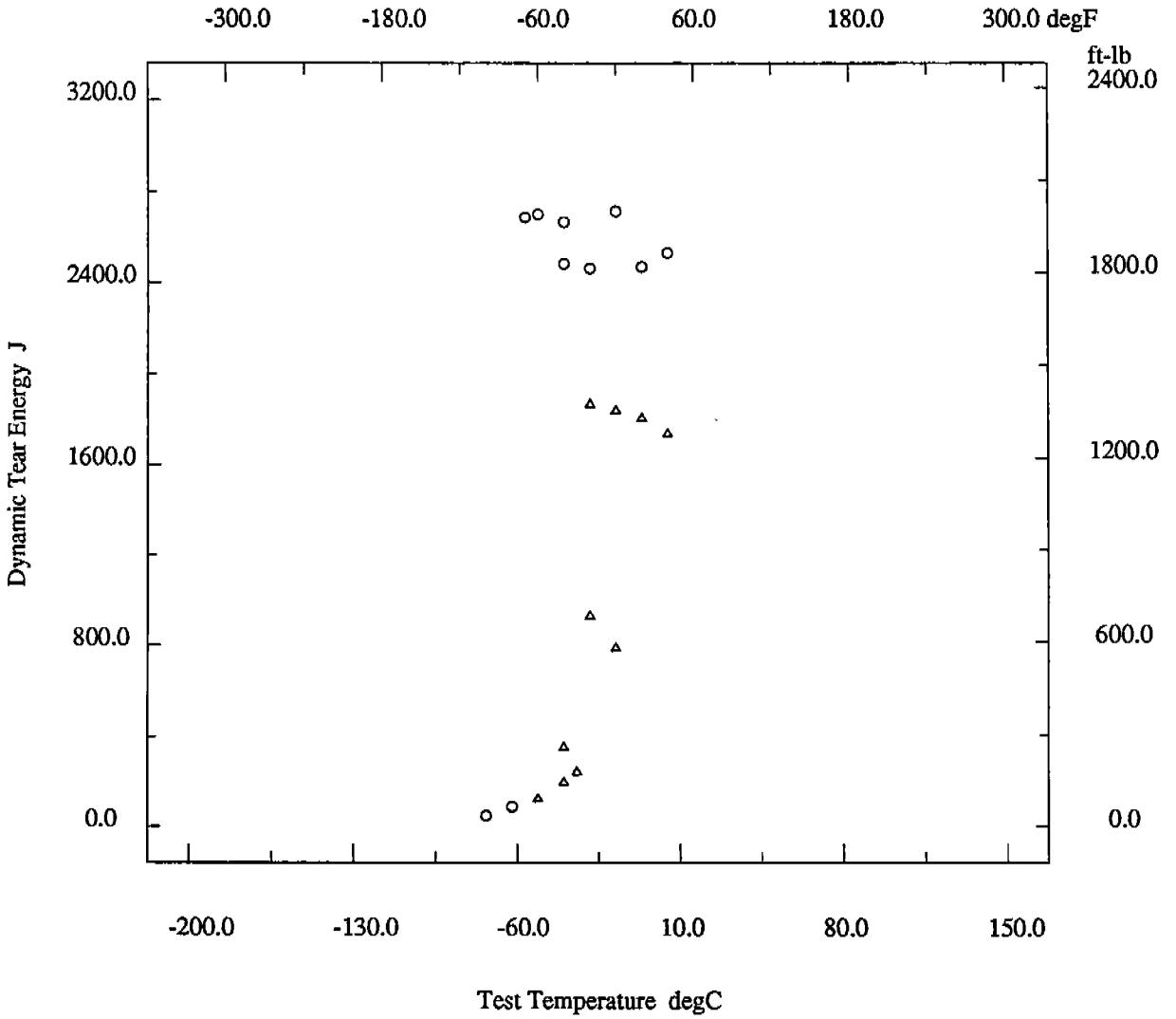
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
L-T ○	-100	35	13
L-T ○	-80	65	17
L-T ○	-70	1980	100
L-T ○	-60	1990	100
L-T ○	-40	1830	100
L-T ○	-40	1965	100
L-T ○	-20	1815	100
L-T ○	0	2000	100
L-T ○	20	1820	100
L-T ○	40	1865	100
T-L △	-60	90	25
T-L △	-40	145	30
T-L △	-40	260	33
T-L △	-30	180	30
T-L △	-20	1375	100
T-L △	-20	685	59
T-L △	0	1355	100
T-L △	0	580	49
T-L △	20	1330	100
T-L △	40	1280	100

* - not reported

Material A710-A

Description

Material Code	002.018.01	Material Name	A710-A
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	*	Lot ID	D6873-1A
Reference	3400		



* - not reported

Material A710-A

Description

Material Code	002.019.01	Material Name	A710-A
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B9671-1E
Reference	3200		

Composition

C	0.07 %	Mn	0.63 %
P	0.012 %	S	0.002 %
Si	0.25 %	Cr	0.78 %
Ni	0.85 %	Mo	0.22 %
V	*	Cu	1.14 %
Cb	0.031 %	Ti	*
B	*	Al	0.02 %
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,T	Producer	Lukens
Year Produced	1982	Addl Info	None
Source	Lukens	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	Q,T
Final Temperature	1100 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	1/2T
Specimen Type	Cylindrical	Specimen Thickness	0.252 in
Gage Length	1.0 in	Loading Rate	*
Tensile Strength Offset	*	Tensile Yield Point	*
Uniform Elongation	*	Tensile Modulus	*
Standard Method	*	Standard Year	*

Orient	Test Temp degF	UTS ksi	TYS ksi	Elongation %	RA %
L	75	101.4	92.0	26.4	78.2
L	75	93.5	83.4	30.0	81.0
T	75	103.3	92.4	23.4	73.9
T	75	104.3	93.8	28.1	74.2

* - not reported

Material A710-A

Description

Material Code	002.019.01	Material Name	A710-A
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B9671-1E
Reference	3200		

Composition See Page 12600.1

Fabrication History See Page 12600.1

Property Measurements

Test Type	Fracture Toughness	Position	1/2T
Specimen Type	Compact	Specimen Thickness	1.0 in
Crack Length	*	Loading Type	*
Loading Rate	*	KQ	*
KIc	*	Valid KIc?	*
Reason for Invalid	*	JIc	*
KJc	*	JIcpr	Per Standard
Curve Shape	*	Standard Method	E318
Standard Year	1987		

Orien	Test Temp degF	CODi in	CODIc in	JI in-lb/in2	Jmax in-lb/in**2	Tear Mod in-lb/in**2
L-T	72	0.0198	0.0230	5738	3751	215.2
L-T	72	0.0271	0.0239	8309	4217	218.0
T-L	0	0.0141	0.0137	3463	2163	186.5
T-L	72	0.0159	0.0155	3681	2403	169.3
T-L	72	0.0174	0.0181	4183	2788	183.1

* - not reported

Material A710-A

Description

Material Code	002.019.01T	Material Name	A710-A
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B9671-1E
Reference	3200		

Composition See Page 12600.1

Fabrication History See Page 12600.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Did Specimen Fracture?	*
Standard Method	*	Standard Year	*

Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %	Split?
L-T ○	-220	10	3	5	No
L-T ○	-200	34	18	10	No
L-T ○	-180	31	17	8	No
L-T ○	-160	45	29	11	No
L-T ○	-140	120	79	54	Yes
L-T ○	-140	129	82	52	No
L-T ○	-140	20	11	8	No
L-T ○	-120	103	72	41	No
L-T ○	-120	145	82	66	No
L-T ○	-120	183	93	100	Yes
L-T ○	-100	146	85	69	No
L-T ○	-80	158	87	78	Yes
L-T ○	-60	168	95	85	No
L-T ○	-60	186	99	100	Yes
L-T ○	-50	189	95	100	Yes
L-T ○	-50	192	96	100	Yes
L-T ○	-40	200	95	100	Yes
L-T ○	-20	204	98	100	Yes
L-T ○	0	191	89	100	Yes
L-T ○	0	206	96	100	Yes
T-L △	-220	5	2	3	No
T-L △	-200	18	8	8	No
T-L △	-180	10	6	6	No
T-L △	-160	26	15	9	No
T-L △	-140	56	36	23	No
T-L △	-120	58	35	25	No
T-L △	-120	74	51	28	No
T-L △	-100	116	80	54	No
T-L △	-80	110	73	60	No
T-L △	-60	155	85	100	No
T-L △	-50	109	68	67	No
T-L △	-50	138	88	76	No
T-L △	-50	150	83	100	No
T-L △	-40	171	95	100	No
T-L △	-20	127	82	83	No

(continued)

* - not reported

Material A710-A

(continued)

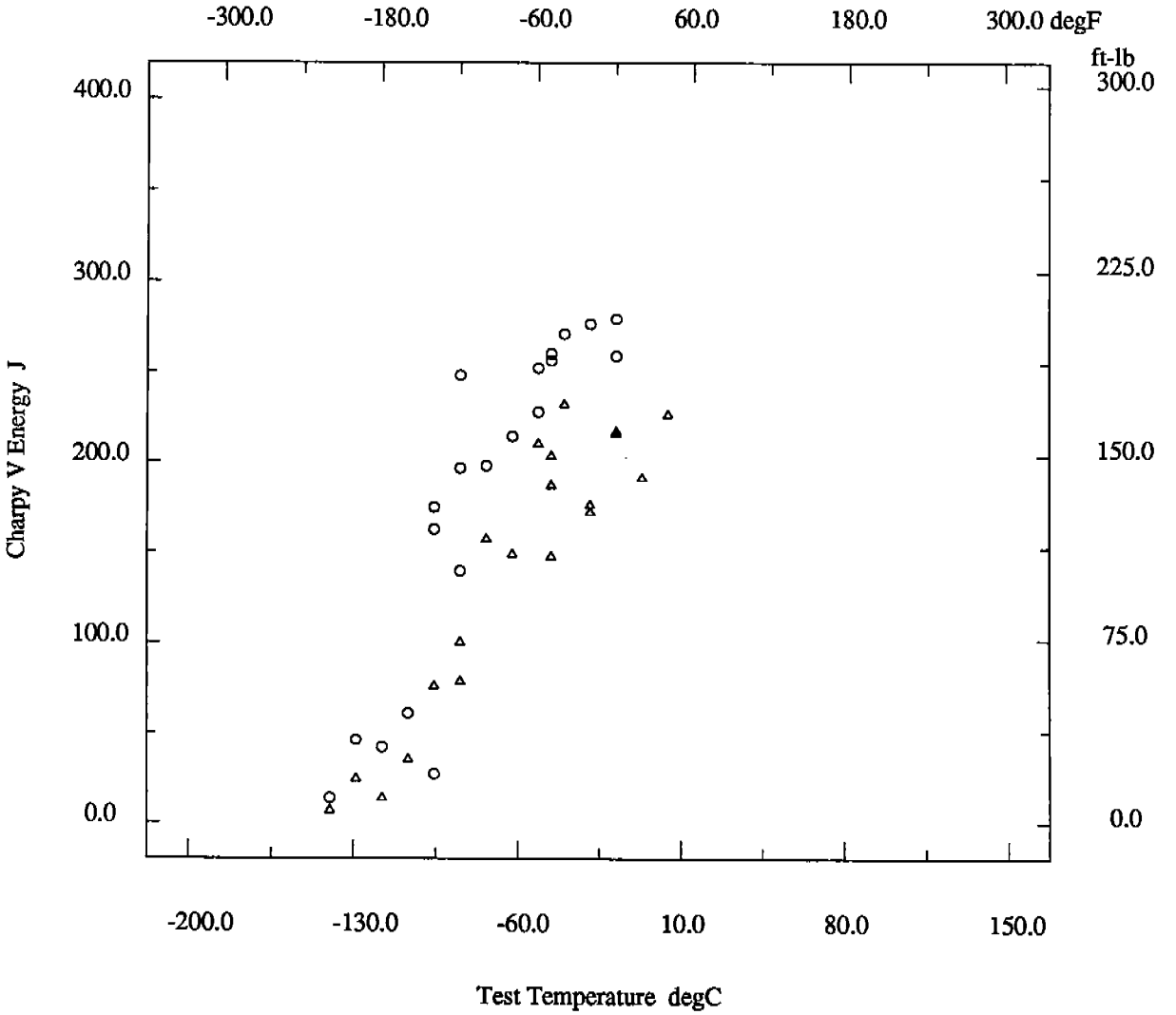
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %	Split?
T-L ▵	-20	130	83	82	No
T-L ▵	0	159	85	100	No
T-L ▵	0	160	89	100	No
T-L ▵	20	141	85	85	No
T-L ▵	40	167	94	100	No

* - not reported

Material A710-A

Description

Material Code	002.019.01T	Material Name	A710-A
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B9671-1E
Reference	3200		



* - not reported

Material A710-A

Description

Material Code	002.019.01B	Material Name	A710-A
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B9671-1E
Reference	3200		

Composition See Page 12600.1

Fabrication History See Page 12600.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Did Specimen Fracture?	*
Standard Method	*	Standard Year	*

Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %	Split?
L-T ○	-220	14	4	3	No
L-T ○	-200	8	2	3	No
L-T ○	-180	62	35	15	No
L-T ○	-160	104	67	35	No
L-T ○	-140	109	74	45	Yes
L-T ○	-140	26	16	11	No
L-T ○	-140	85	54	39	Yes
L-T ○	-120	104	70	46	Yes
L-T ○	-120	112	69	51	No
L-T ○	-120	84	58	32	Yes
L-T ○	-100	107	70	55	No
L-T ○	-80	140	84	72	Yes
L-T ○	-80	77	51	49	Yes
L-T ○	-60	151	88	79	Yes
L-T ○	-50	156	90	88	Yes
L-T ○	-40	174	89	100	No
L-T ○	-20	173	93	100	Yes
L-T ○	0	194	98	100	Yes
L-T ○	0	195	94	100	No
L-T ○	20	193	93	100	Yes
T-L △	-220	8	2	5	No
T-L △	-200	8	2	5	No
T-L △	-180	20	9	10	No
T-L △	-160	65	38	19	No
T-L △	-140	48	29	19	No
T-L △	-120	46	28	24	No
T-L △	-120	81	52	42	No
T-L △	-120	87	61	38	No
T-L △	-100	10	7	23	No
T-L △	-100	37	25	24	No
T-L △	-100	84	57	38	No
T-L △	-80	63	41	45	No
T-L △	-60	110	72	60	No
T-L △	-50	95	60	65	No
T-L △	-40	113	75	83	No

(continued)

* - not reported

Material A710-A

(continued)

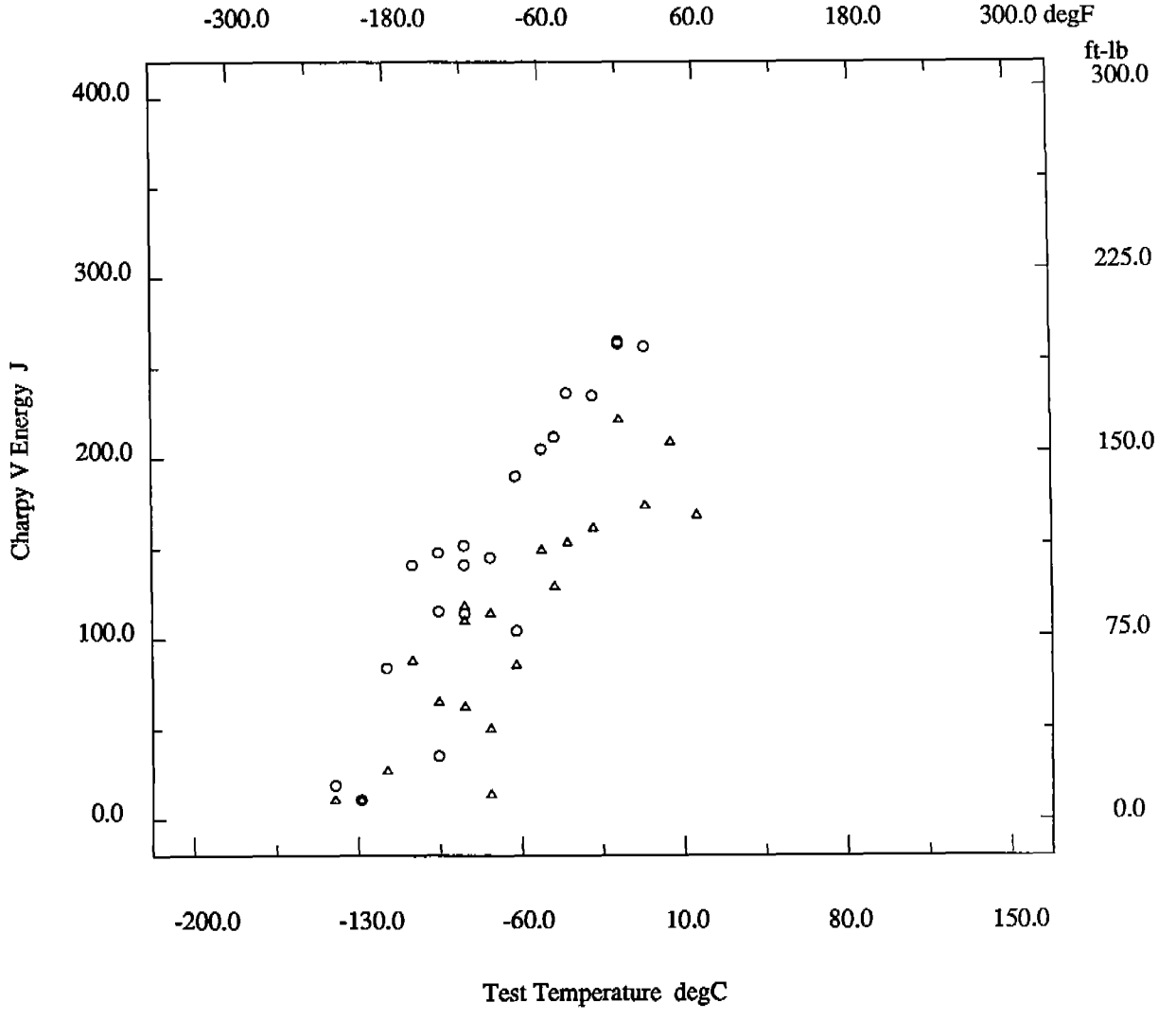
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %	Split?
T-L Δ	-20	119	76	79	No
T-L Δ	0	163	90	100	No
T-L Δ	20	128	82	100	No
T-L Δ	40	154	85	100	No
T-L Δ	60	124	79	93	No

* - not reported

Material A710-A

Description

Material Code	002.019.01B	Material Name	A710-A
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B9671-1E
Reference	3200		



* - not reported

Material A710-A

Description

Material Code	002.019.01T	Material Name	A710-A
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B9671-1E
Reference	3200		

Composition See Page 12600.1

Fabrication History See Page 12600.1

Property Measurements

Test Type	Dynamic Tear	Position	1/2T
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Standard Method	*	Standard Year	*

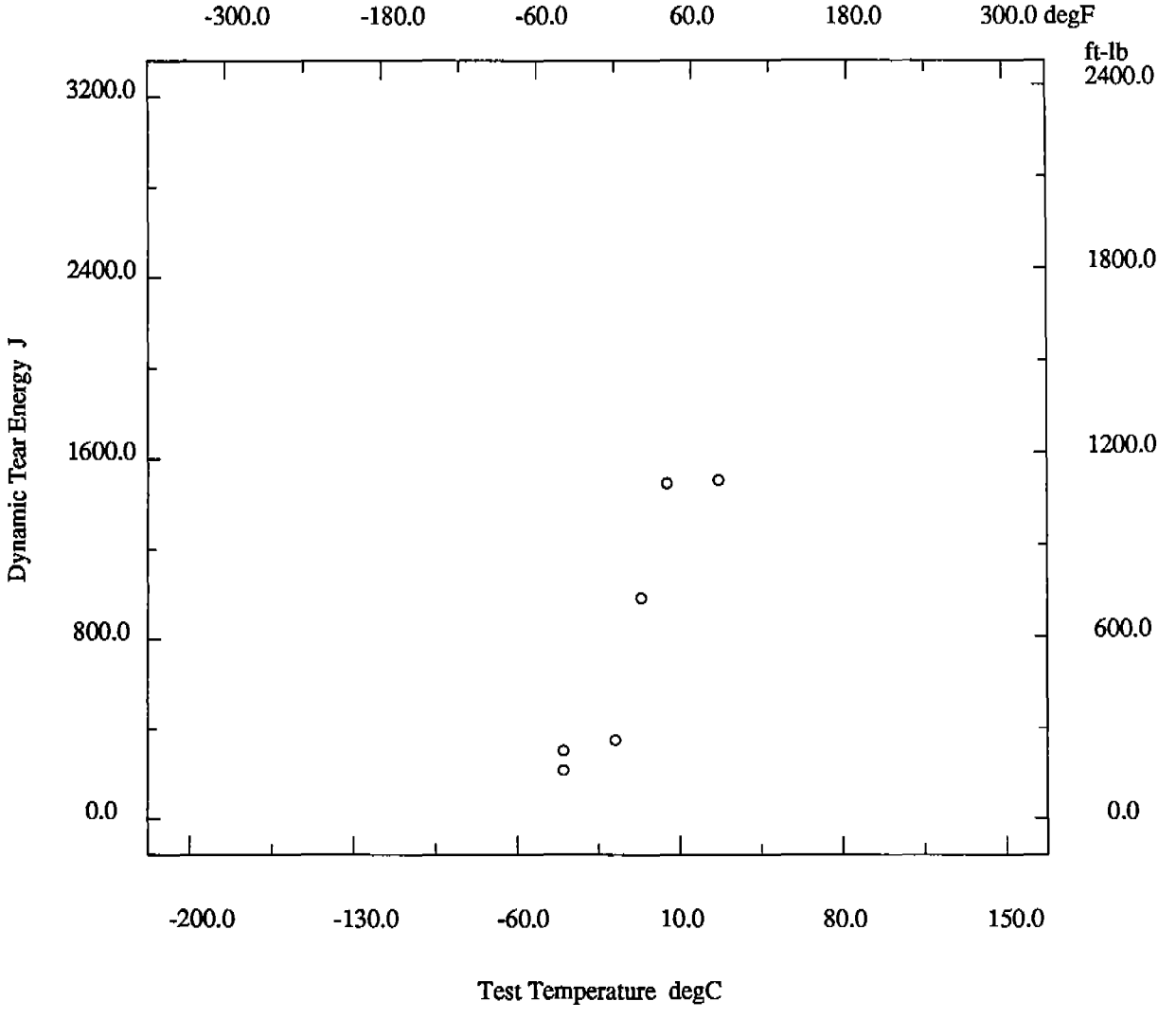
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L °	-40	160	31
T-L °	-40	225	24
T-L °	0	260	38
T-L °	20	725	73
T-L °	40	1100	100
T-L °	80	1110	100

* - not reported

Material A710-A

Description

Material Code	002.019.01T	Material Name	A710-A
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B9671-1E
Reference	3200		



* - not reported

Material A710-A

Description

Material Code	002.019.01B	Material Name	A710-A
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B9671-1E
Reference	3200		

Composition See Page 12600.1

Fabrication History See Page 12600.1

Property Measurements

Test Type	Dynamic Tear	Position	1/2T
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Standard Method	*	Standard Year	*

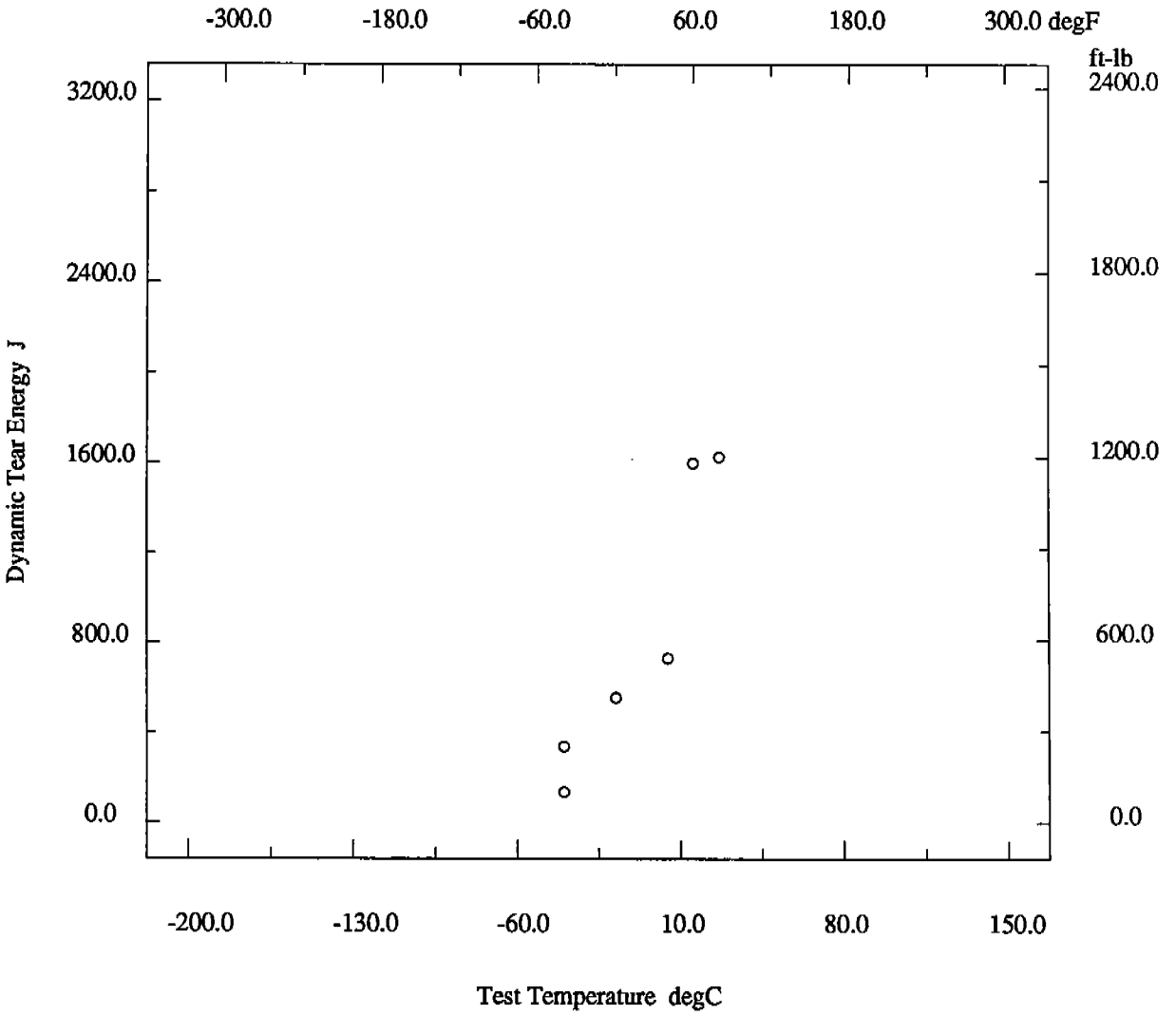
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L °	-40	100	17
T-L °	-40	250	22
T-L °	0	410	44
T-L °	40	540	57
T-L °	60	1180	100
T-L °	80	1200	100

* - not reported

Material A710-A

Description

Material Code	002.019.01B	Material Name	A710-A
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B9671-1E
Reference	3200		



* - not reported

Material A710-A

Description

Material Code	002.019.01	Material Name	A710-A
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B9671-1E
Reference	3200		

Composition See Page 12600.1

Fabrication History See Page 12600.1

Property Measurements

Test Type	Dynamic Tear	Position	1/2T
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Standard Method	*	Standard Year	*

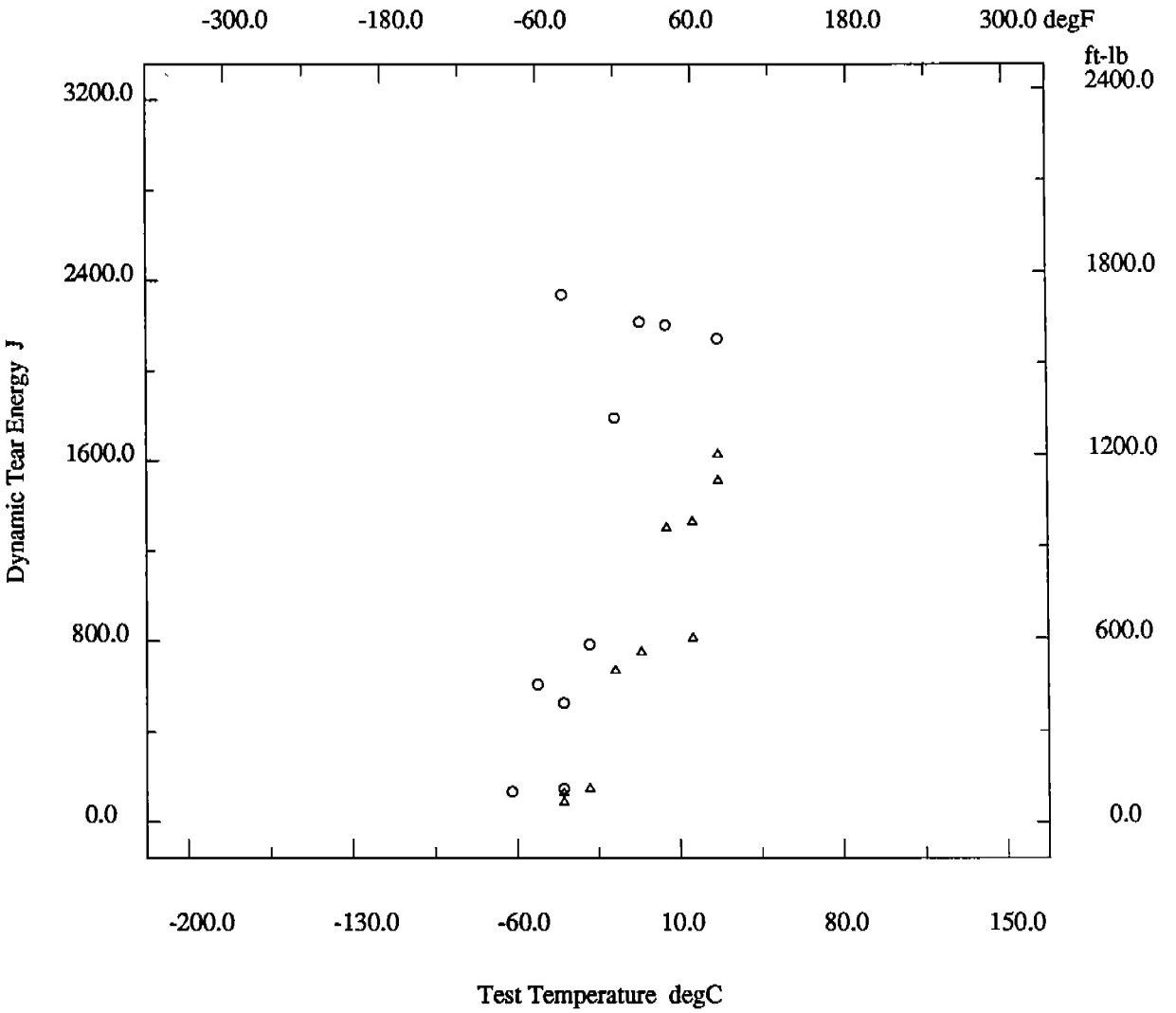
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
L-T ○	-80	100	8
L-T ○	-60	450	17
L-T ○	-40	110	22
L-T ○	-40	1725	100
L-T ○	-40	390	20
L-T ○	-20	580	36
L-T ○	0	1320	78
L-T ○	20	1635	100
L-T ○	40	1625	94
L-T ○	80	1580	100
T-L △	-40	65	13
T-L △	-40	95	20
T-L △	-20	110	26
T-L △	0	495	42
T-L △	20	555	52
T-L △	40	960	82
T-L △	60	600	59
T-L △	60	980	80
T-L △	80	1115	100
T-L △	80	1200	100

* - not reported

Material A710-A

Description

Material Code	002.019.01	Material Name	A710-A
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B9671-1E
Reference	3200		



* - not reported

Material A710

Description

Material Code	002.020.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	2 in	Composition Type	Actual
Composition Position	*	Lot ID	D6873-1B
Reference	3400		

Composition

C	0.06 %	Mn	0.50 %
P	0.013 %	S	0.004 %
Si	0.28 %	Cr	0.75 %
Ni	0.88 %	Mo	0.21 %
V	*	Cu	1.16 %
Cb	0.03 %	Ti	*
B	*	Al	0.03 %
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,K	Producer	Lukens
Year Produced	1984	Addl Info	None
Source	Lukens	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	Q,K
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	1/2T
Specimen Type	Cylindrical	Specimen Thickness	0.252 in
Gage Length	1 in	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
L	75	103.4	90.5	91.5	27.9	77.9
L	75	105.8	93.4	95.4	27.2	77.0
T	75	104.3	91.4	91.9	25.8	76.7
T	75	105.4	92.0	93.5	26.9	76.7
S	75	103.4	90.7	91.7	23.8	74.6
S	75	103.8	*	90.2	24.0	74.2
S	75	103.8	*	90.7	24.5	73.8
S	75	104.1	*	91.4	24.6	72.8

* - not reported

Material A710

Description

Material Code	002.020.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	2 in	Composition Type	Actual
Composition Position	*	Lot ID	D6873-1B
Reference	3400		

Composition See Page 12700.1

Fabrication History See Page 12700.1

Property Measurements

Test Type	Fracture Toughness	Position	1/2T
Specimen Type	Compact	Specimen Thickness	1 in
Crack Length	*	Loading Type	*
Loading Rate	*	KQ	*
KIc	*	Valid KIc?	*
Reason for Invalid	*	JIc	*
KJc	*	JIcpr	Per Standard
Curve Shape	*	Standard Method	E813
Standard Year	1987		

Orien	Test Temp degF	CODi in	CODIc in	JI in-lb/in2	Jmax in-lb/in2	Tear Mod in-lb/in**2
L-T	72	0.0273	0.0309	7102	4912	226.6
L-T	72	0.0276	0.0283	6869	4500	209.1
T-L	-40	0.0198	0.0271	6741	4467	427.9
T-L	0	0.0214	0.0264	6152	4292	208.3
T-L	0	0.0294	0.0289	6708	4615	202.5
T-L	72	0.0221	0.0267	5085	4149	182.6
T-L	72	0.0258	0.0263	5899	4134	177.9

* - not reported

Material A710

Description

Material Code	002.020.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	2 in	Composition Type	Actual
Composition Position	*	Lot ID	D6873-1B
Reference	3400		

Composition See Page 12700.1

Fabrication History See Page 12700.1

Property Measurements

Test Type	Charpy V Impact	Position	1/2T
Specimen Type	Full	Did Specimen Fracture?	*
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T ○	-200	10	3	0
L-T ○	-180	46	26	9
L-T ○	-160	83	57	19
L-T ○	-140	91	62	28
L-T ○	-120	124	80	52
L-T ○	-120	126	80	52
L-T ○	-100	196	96	100
L-T ○	-100	197	98	100
L-T ○	-75	153	89	66
L-T ○	-75	158	83	68
L-T ○	-50	190	94	100
L-T ○	-50	200	96	100
L-T ○	-25	206	94	100
L-T ○	0	191	94	100
L-T ○	0	194	95	100
L-T ○	25	207	92	100
T-L △	-200	4	2	0
T-L △	-180	18	10	6
T-L △	-160	83	55	24
T-L △	-140	88	60	27
T-L △	-120	102	70	33
T-L △	-120	108	74	33
T-L △	-100	100	68	38
T-L △	-75	119	81	58
T-L △	-50	135	79	66
T-L △	-50	135	85	68
T-L △	-40	179	93	100
T-L △	-25	200	95	100
T-L △	0	170	84	100
T-L △	0	181	95	100
T-L △	25	187	96	100
T-L △	50	196	96	100
S-L ×	-160	20	11	8
S-L ×	-140	30	18	11

(continued)

* - not reported

Material A710

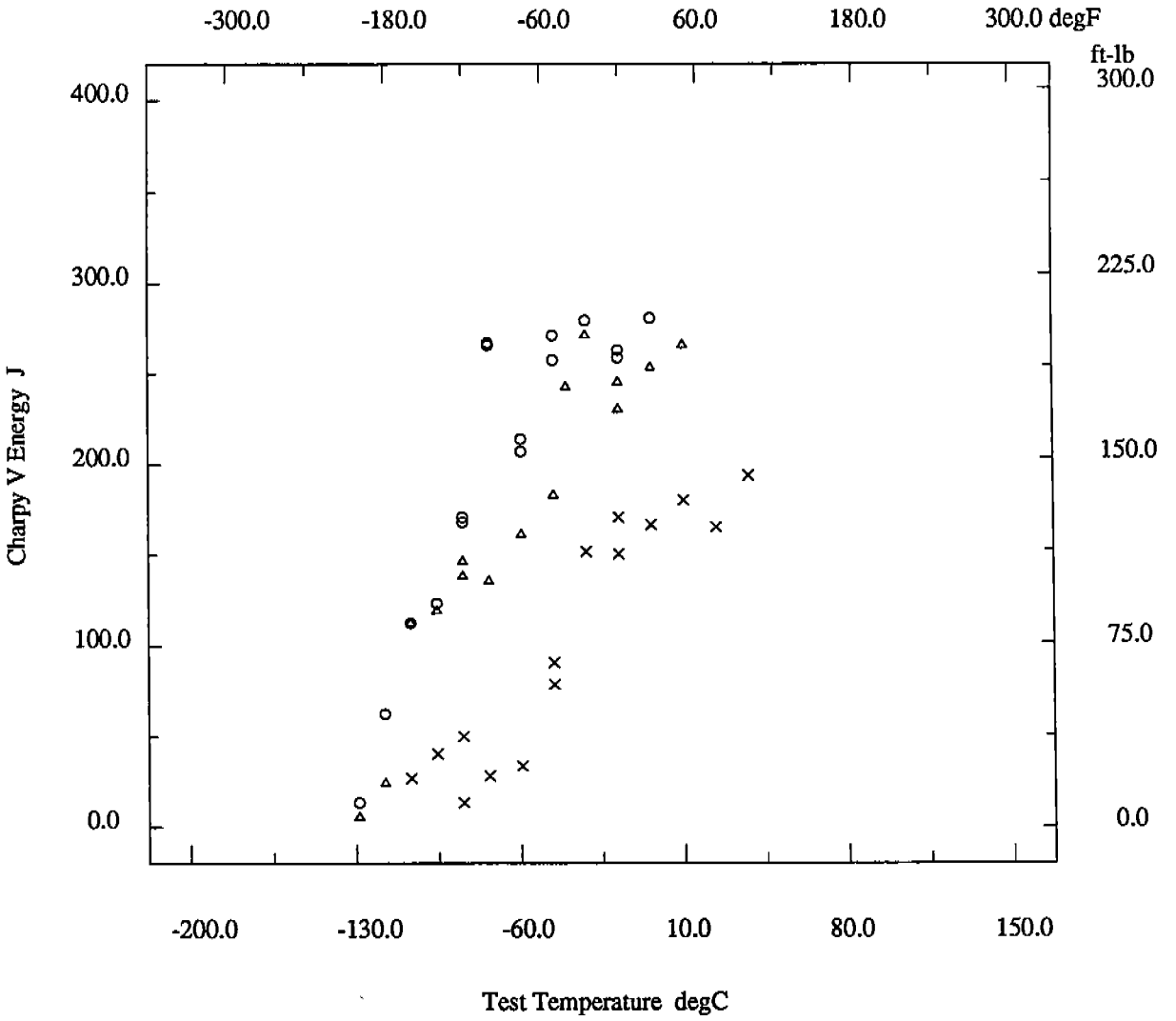
(continued)

Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
S-L ×	-120	10	5	6
S-L ×	-120	37	23	14
S-L ×	-100	21	14	16
S-L ×	-75	25	17	19
S-L ×	-50	58	40	33
S-L ×	-50	67	47	38
S-L ×	-25	112	69	57
S-L ×	0	111	75	69
S-L ×	0	126	78	74
S-L ×	25	123	77	79
S-L ×	50	133	88	87
S-L ×	75	122	83	100
S-L ×	100	143	90	100

* - not reported

Material A710

Description			
Material Code	002.020.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	2 in	Composition Type	Actual
Composition Position	*	Lot ID	D6873-1B
Reference	3400		



* - not reported

Material A710

Description

Material Code	002.020.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	2 in	Composition Type	Actual
Composition Position	*	Lot ID	D6873-1B
Reference	3400		

Composition See Page 12700.1

Fabrication History See Page 12700.1

Property Measurements

Test Type	Dynamic Tear	Position	1/2T
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Standard Method	*	Standard Year	*

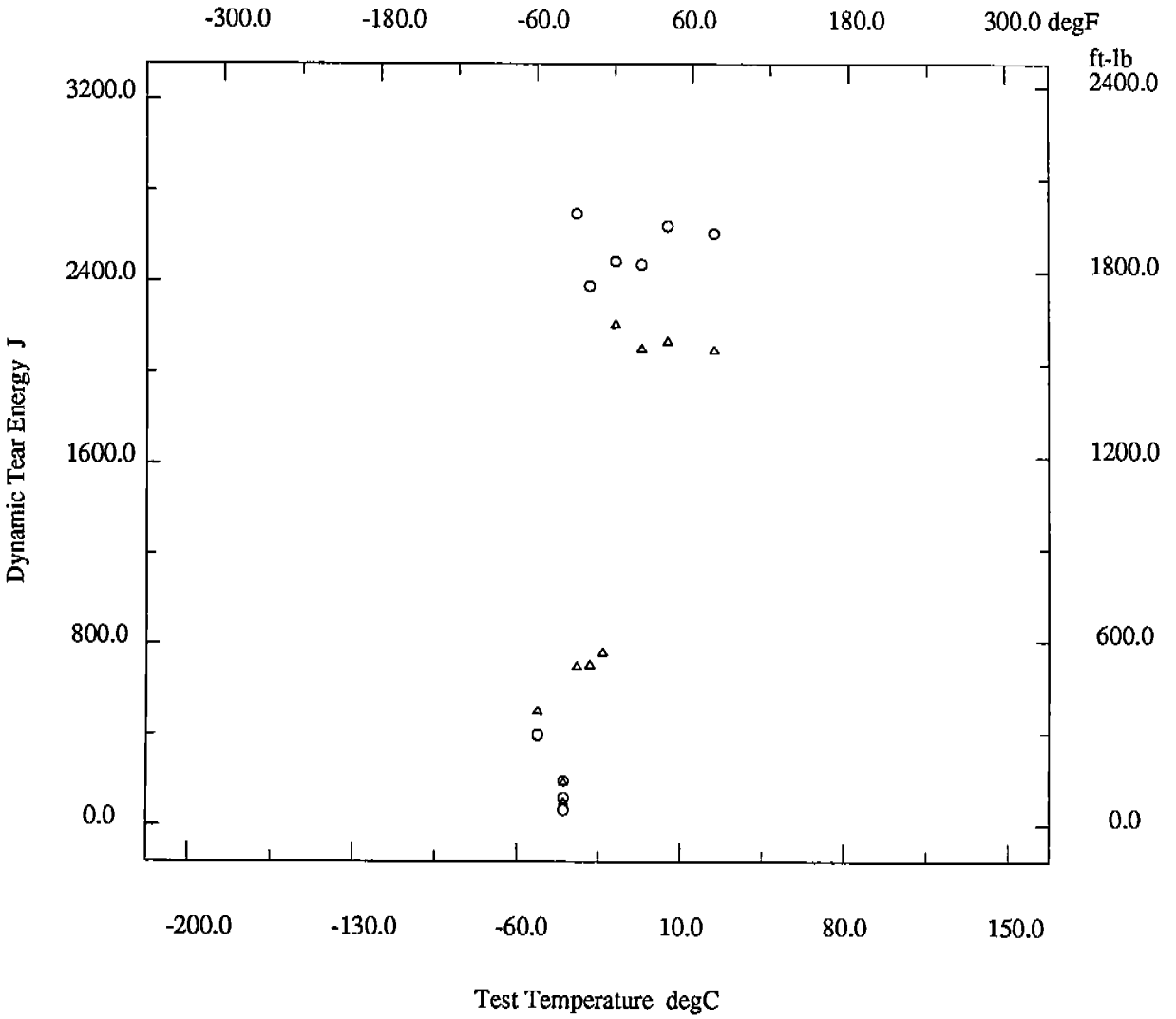
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
L-T ○	-60	295	12
L-T ○	-40	145	21
L-T ○	-40	50	18
L-T ○	-40	90	14
L-T ○	-30	1990	100
L-T ○	-20	1755	100
L-T ○	0	1835	100
L-T ○	20	1825	100
L-T ○	40	1950	100
L-T ○	76	1925	100
T-L △	-60	370	13
T-L △	-40	140	23
T-L △	-40	75	21
T-L △	-30	515	28
T-L △	-20	520	34
T-L △	-10	560	42
T-L △	0	1630	100
T-L △	20	1550	100
T-L △	40	1575	100
T-L △	76	1545	100

* - not reported

Material A710

Description

Material Code	002.020.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	2 in	Composition Type	Actual
Composition Position	*	Lot ID	D6873-1B
Reference	3400		



* - not reported

Material A710

Description

Material Code	002.021.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.25 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition

C	0.04 %	Mn	0.58 %
P	0.01 %	S	0.004 %
Si	0.30 %	Cr	0.68 %
Ni	0.87 %	Mo	0.19 %
V	*	Cu	1.20 %
Cb	0.046 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	A,K	Producer	*
Year Produced	*	Addl Info	FUO
Source	USN	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	*
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Loading Rate	*	Tensile Strength Offset	0.2 %
Tensile Yield Point	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Gage Lngth in	Test Temp degF	UTS ksi	TYS ksi	Elongation %	RA %
L	*	Room	97.8	83.6	30	76
T	2.0	Room	96.9	82.8	30	77

* - not reported

Material A710

Description

Material Code	002.021.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.25 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition See Page 12800.1

Fabrication History See Page 12800.1

Property Measurements

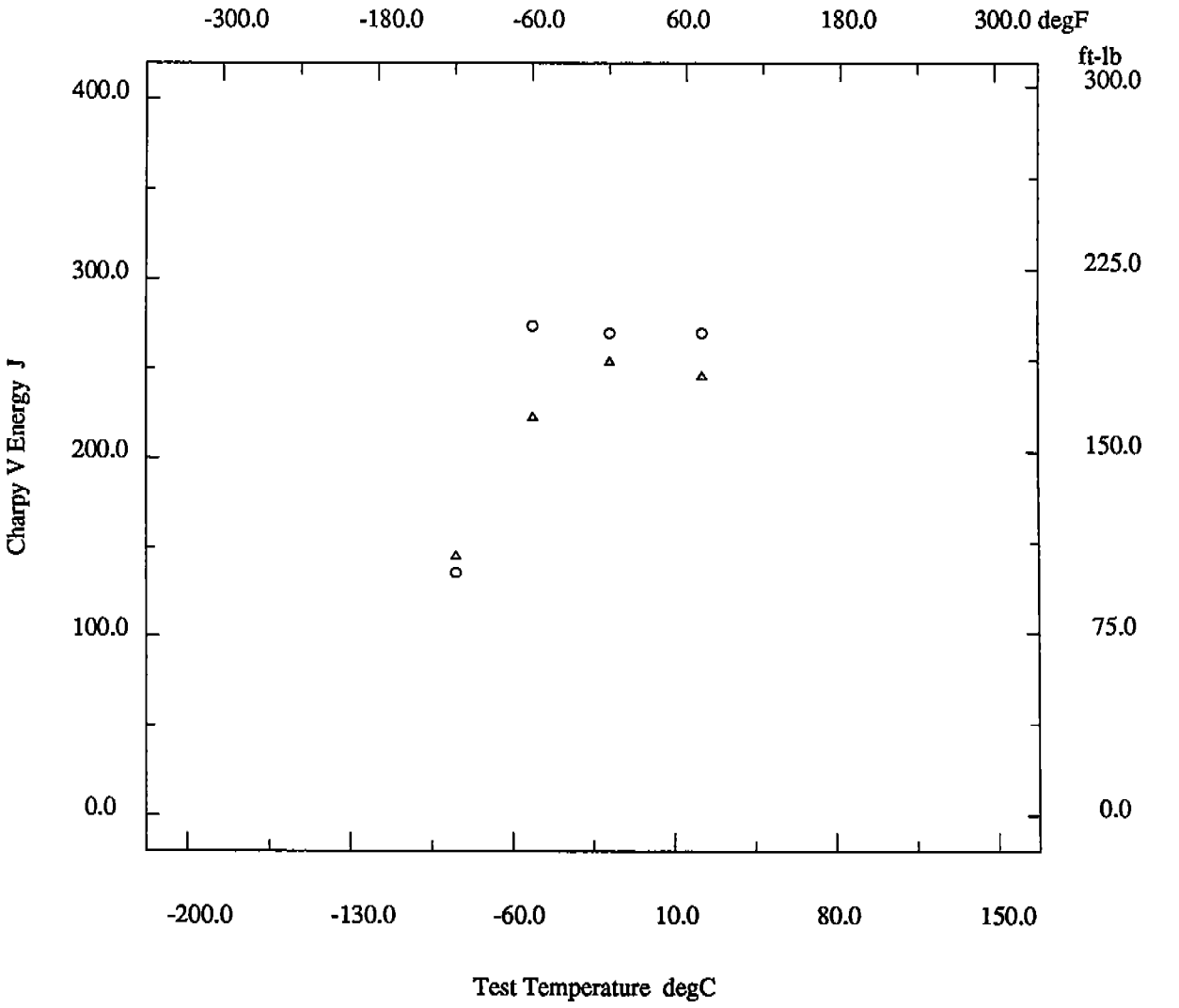
Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	*
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

Orien	Test Temp degF	CVN Energy ft-lb
L-T ○	-120	100
L-T ○	-60	202
L-T ○	0	199
L-T ○	72	199
T-L △	-120	107
T-L △	-60	164
T-L △	0	187
T-L △	72	181

* - not reported

Material A710

Description			
Material Code	002.021.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.25 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		



* - not reported

Material A710

Description

Material Code	002.021.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.25 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition See Page 12800.1

Fabrication History See Page 12800.1

Property Measurements

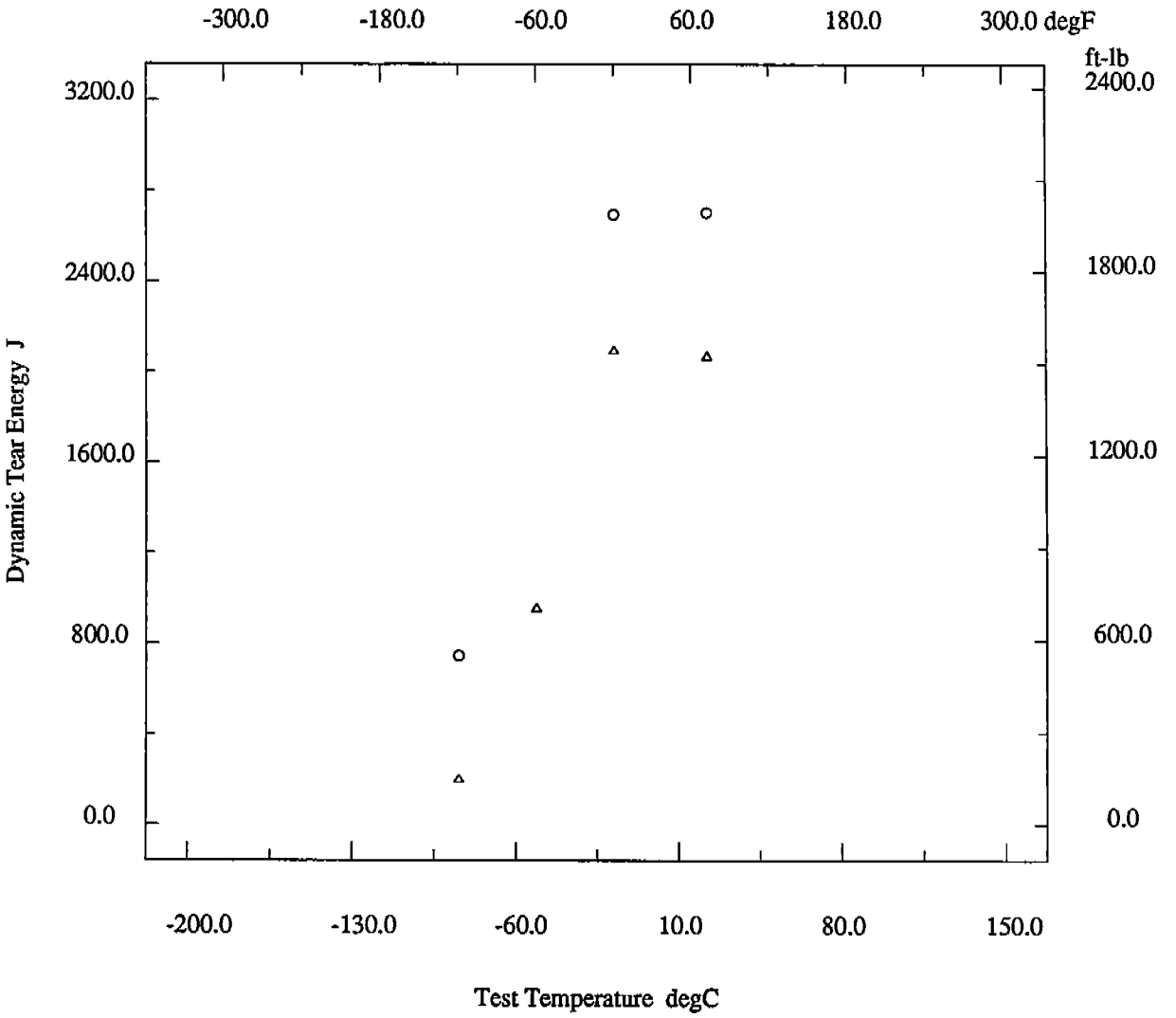
Test Type	Dynamic Tear	Position	1/2T
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Appearance	*	Standard Method	*
Standard Year	*		

Orien	Test Temp degF	DT Energy ft-lb
L-T ○	-120	550
L-T ○	0	1988
L-T ○	72	1995
T-L △	-120	147
T-L △	-60	703
T-L △	0	1543
T-L △	72	1525

* - not reported

Material A710

Description			
Material Code	002.021.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	1.25 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		



* - not reported

Material A710

Description

Material Code	002.022.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition

C	0.05 %	Mn	0.54 %
P	0.01 %	S	0.006 %
Si	0.26 %	Cr	0.72 %
Ni	0.91 %	Mo	0.20 %
V	*	Cu	1.20 %
Cb	0.036 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	A,K	Producer	*
Year Produced	*	Addl Info	FZF
Source	USN	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	*
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	Loading Rate	*
Tensile Strength Offset	0.2 %	Tensile Yield Point	*
Uniform Elongation	*	Tensile Modulus	*
Standard Method	*	Standard Year	*

Orient	Test Temp degF	UTS ksi	TYS ksi	Elongation %	RA %
L	Room	103.8	90.5	28	73
T	Room	104.3	91.3	28	75

* - not reported

Material A710

Description

Material Code	002.022.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition See Page 12900.1

Fabrication History See Page 12900.1

Property Measurements

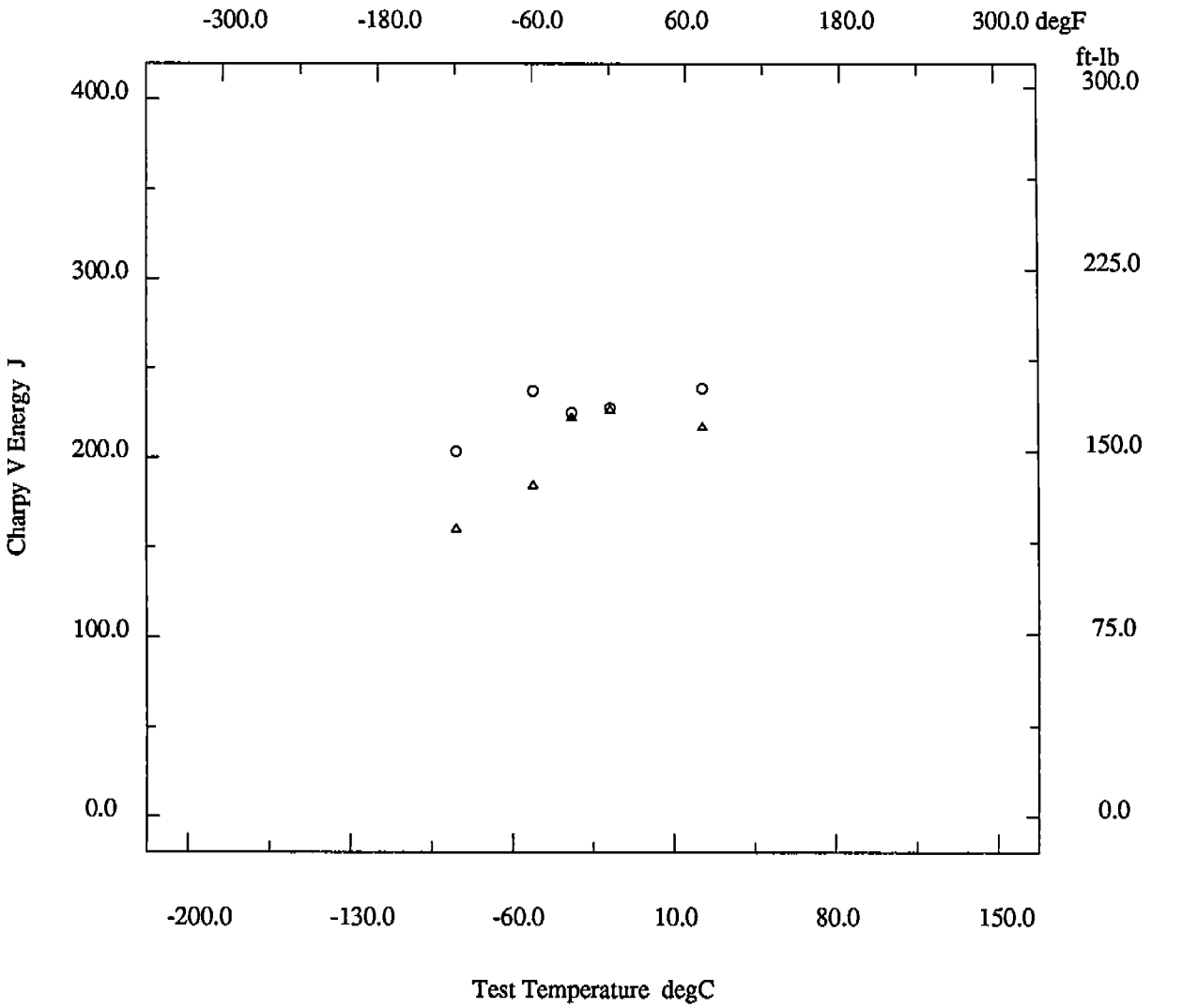
Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	*
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

Orien	Test Temp degF	CVN Energy ft-lb
L-T ○	-120	150
L-T ○	-60	175
L-T ○	-30	166
L-T ○	0	168
L-T ○	72	176
T-L △	-120	118
T-L △	-60	136
T-L △	-30	164
T-L △	0	167
T-L △	72	160

* - not reported

Material A710

Description			
Material Code	002.022.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		



* - not reported

Material A710

Description

Material Code	002.022.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition See Page 12900.1

Fabrication History See Page 12900.1

Property Measurements

Test Type	Dynamic Tear	Position	1/2T
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Appearance	*	Standard Method	*
Standard Year	*		

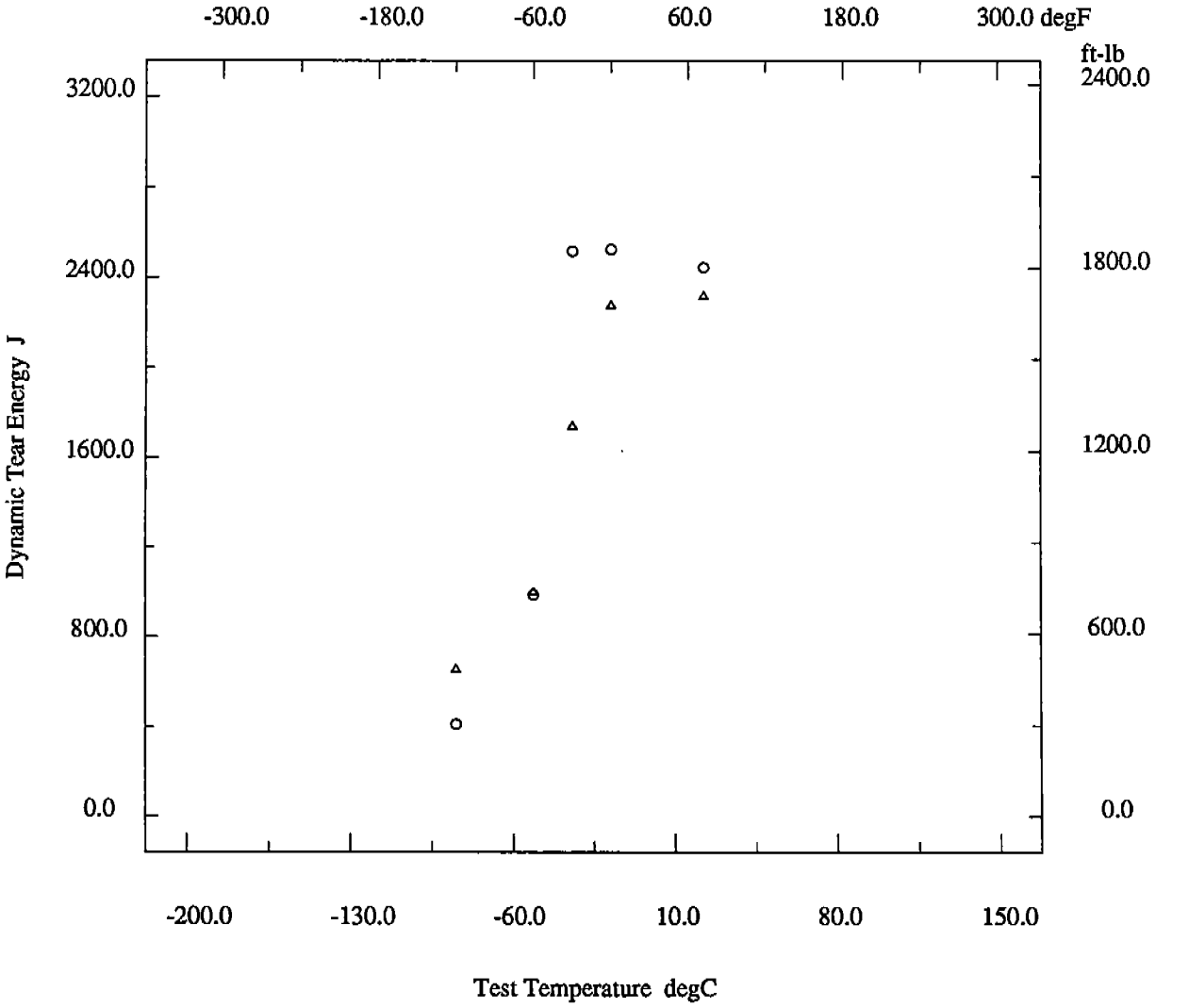
Orien	Test Temp degF	DT Energy ft-lb
L-T ○	-120	305
L-T ○	-60	730
L-T ○	-30	1857
L-T ○	0	1863
L-T ○	72	1803
T-L △	-120	483
T-L △	-60	737
T-L △	-30	1283
T-L △	0	1677
T-L △	72	1707

* - not reported

Material A710

Description

Material Code	002.022.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		



* - not reported

Material A710

Description

Material Code	002.023.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition

C	0.04 %	Mn	0.51 %
P	0.01 %	S	0.009 %
Si	0.31 %	Cr	0.68 %
Ni	0.93 %	Mo	0.20 %
V	*	Cu	1.20 %
Cb	0.042 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	A,K	Producer	*
Year Produced	*	Addl Info	GAG
Source	USN	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	*
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	Loading Rate	*
Tensile Strength Offset	0.2 %	Tensile Yield Point	*
Uniform Elongation	*	Tensile Modulus	*
Standard Method	*	Standard Year	*

Orient	Test Temp degF	UTS ksi	TYS ksi	Elongation %	RA %
L	Room	101.6	85.9	28	75
T	Room	101.5	87.1	27	70

* - not reported

Material A710

Description

Material Code	002.023.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition See Page 13000.1

Fabrication History See Page 13000.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	*
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

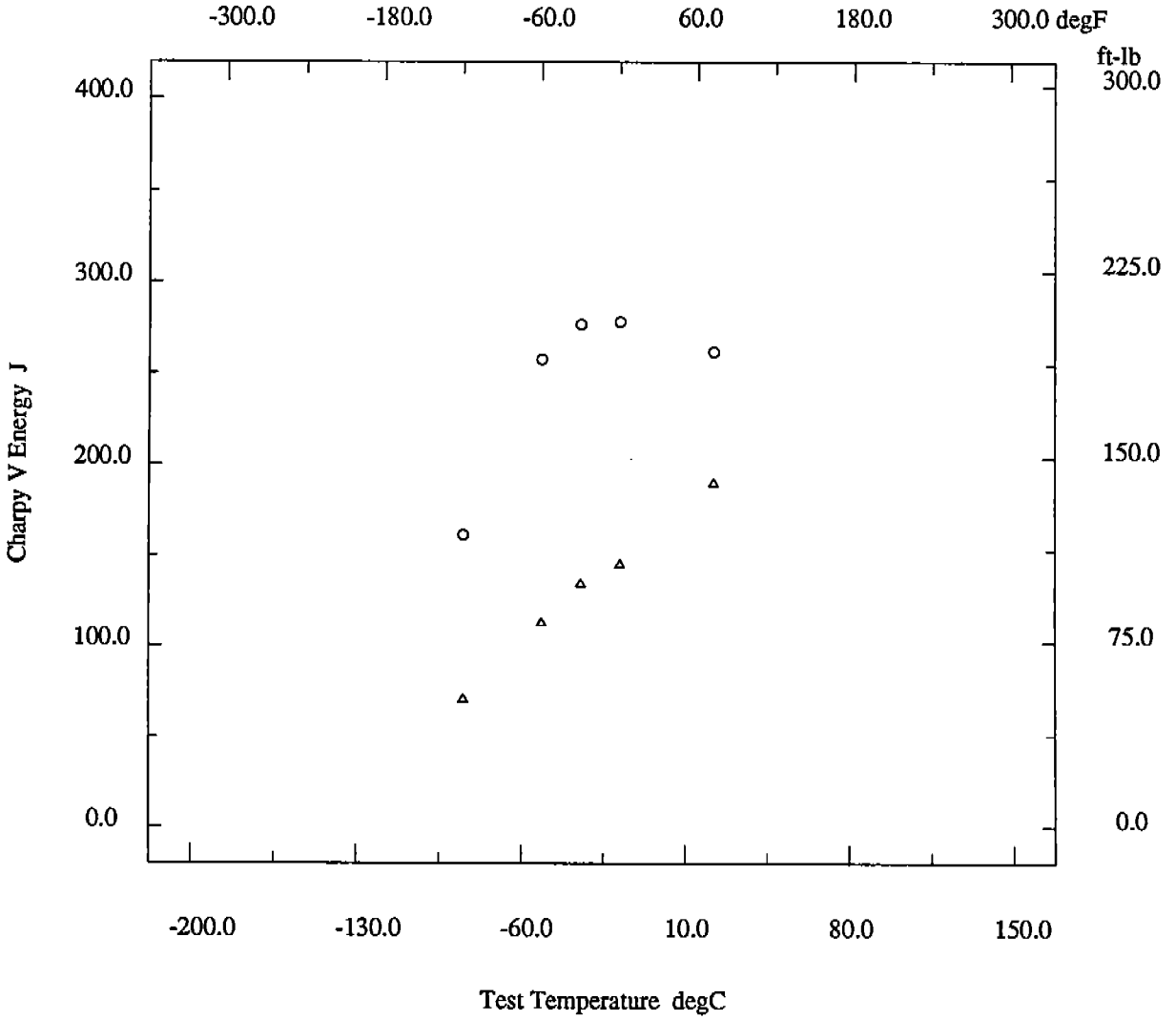
Orien	Test Temp degF	CVN Energy ft-lb
L-T ○	-120	119
L-T ○	-60	190
L-T ○	-30	204
L-T ○	0	205
L-T ○	72	193
T-L △	-120	52
T-L △	-60	83
T-L △	-30	99
T-L △	0	107
T-L △	72	140

* - not reported

Material A710

Description

Material Code	002.023.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		



* - not reported

Material A710

Description

Material Code	002.023.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition See Page 13000.1

Fabrication History See Page 13000.1

Property Measurements

Test Type	Dynamic Tear	Position	1/2T
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Appearance	*	Standard Method	*
Standard Year	*		

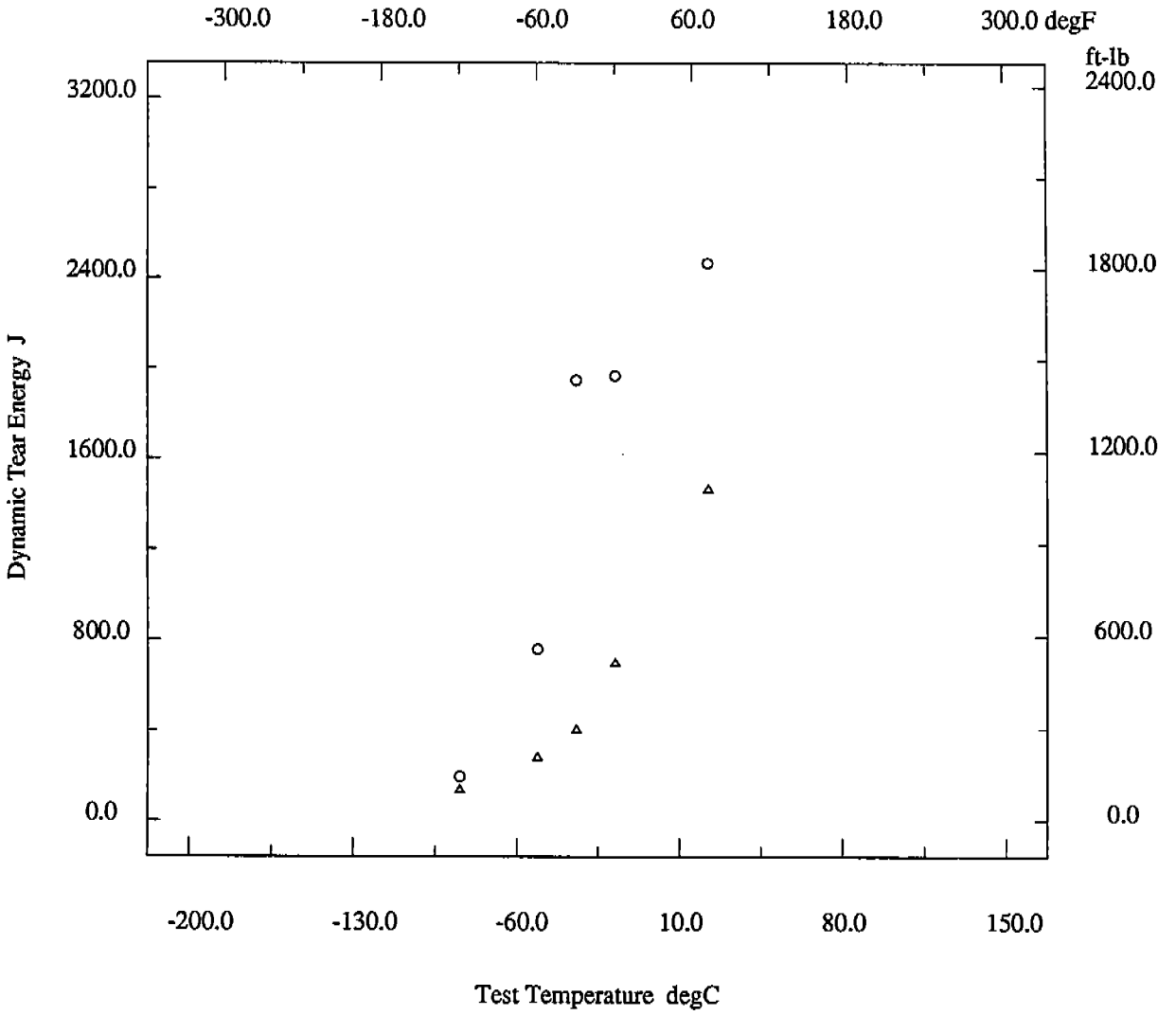
Orien	Test Temp degF	DT Energy ft-lb
L-T ○	-120	145
L-T ○	-60	560
L-T ○	-30	1435
L-T ○	0	1450
L-T ○	72	1820
T-L △	-120	100
T-L △	-60	207
T-L △	-30	297
T-L △	0	513
T-L △	72	1080

* - not reported

Material A710

Description

Material Code	002.023.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		



* - not reported

Material A710

Description

Material Code	002.024.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition

C	0.05 %	Mn	0.69 %
P	0.01 %	S	0.004 %
Si	*	Cr	0.83 %
Ni	0.92 %	Mo	0.19 %
V	*	Cu	1.20 %
Cb	0.04 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	A,K	Producer	*
Year Produced	*	Addl Info	GCM
Source	USN	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	*
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	Loading Rate	*
Tensile Strength Offset	0.2 %	Tensile Yield Point	*
Uniform Elongation	*	Tensile Modulus	*
Standard Method	*	Standard Year	*

Orient	Test Temp degF	UTS ksi	TYS ksi	Elongation %	RA %
L	Room	101.6	89.3	35	72
T	Room	102.7	90.7	35	76

* - not reported

Material A710

Description

Material Code	002.024.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition See Page 13100.1

Fabrication History See Page 13100.1

Property Measurements

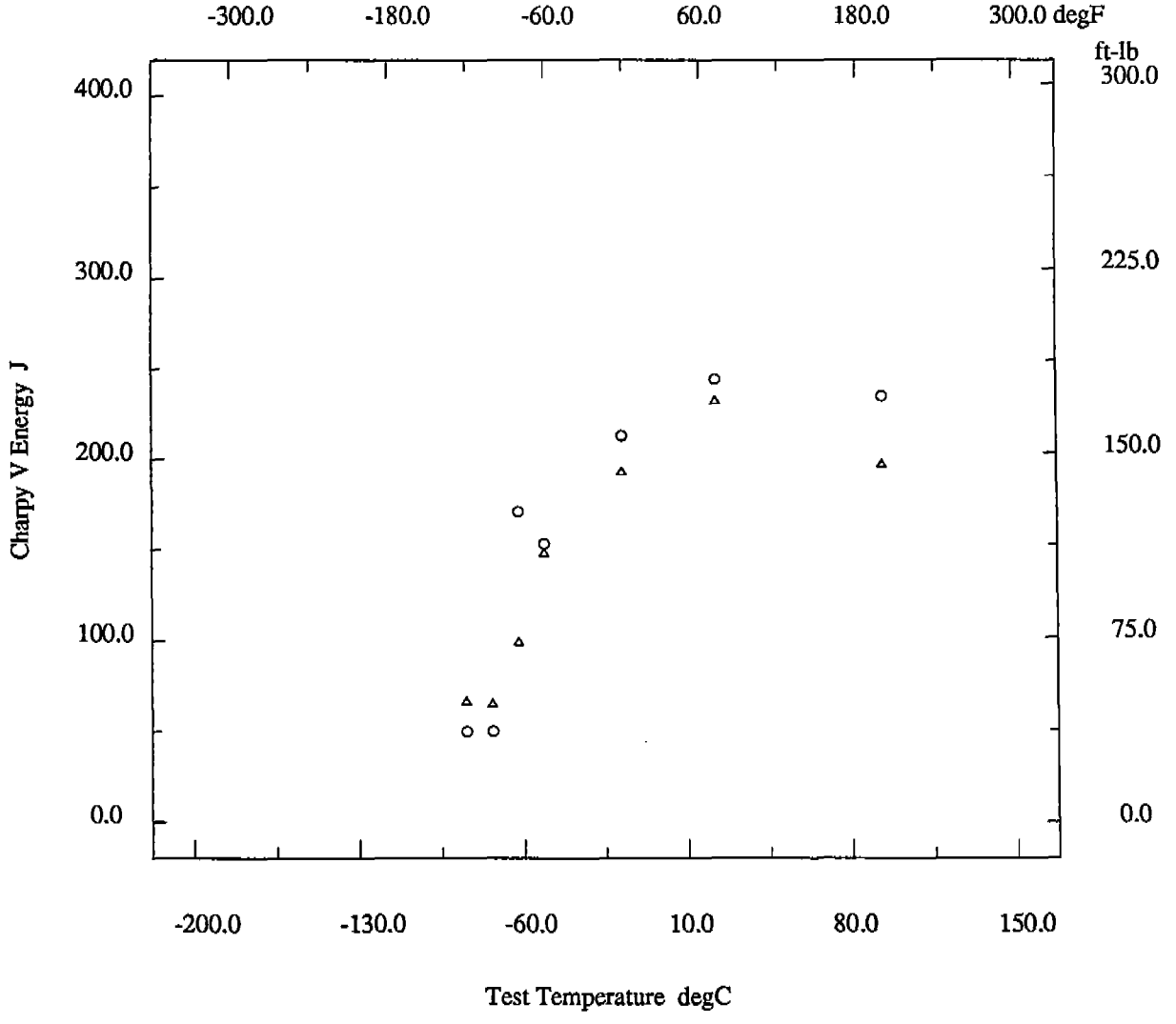
Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	*
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

Orien	Test Temp degF	CVN Energy ft-lb
L-T ○	-120	37
L-T ○	-100	37
L-T ○	-80	126
L-T ○	-60	113
L-T ○	0	157
L-T ○	72	180
L-T ○	200	173
T-L △	-120	49
T-L △	-100	48
T-L △	-80	73
T-L △	-60	109
T-L △	0	142
T-L △	72	171
T-L △	200	145

* - not reported

Material A710

Description			
Material Code	002.024.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		



* - not reported

Material A710

Description

Material Code	002.024.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition See Page 13100.1

Fabrication History See Page 13100.1

Property Measurements

Test Type	Dynamic Tear	Position	1/2T
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Appearance	*	Standard Method	*
Standard Year	*		

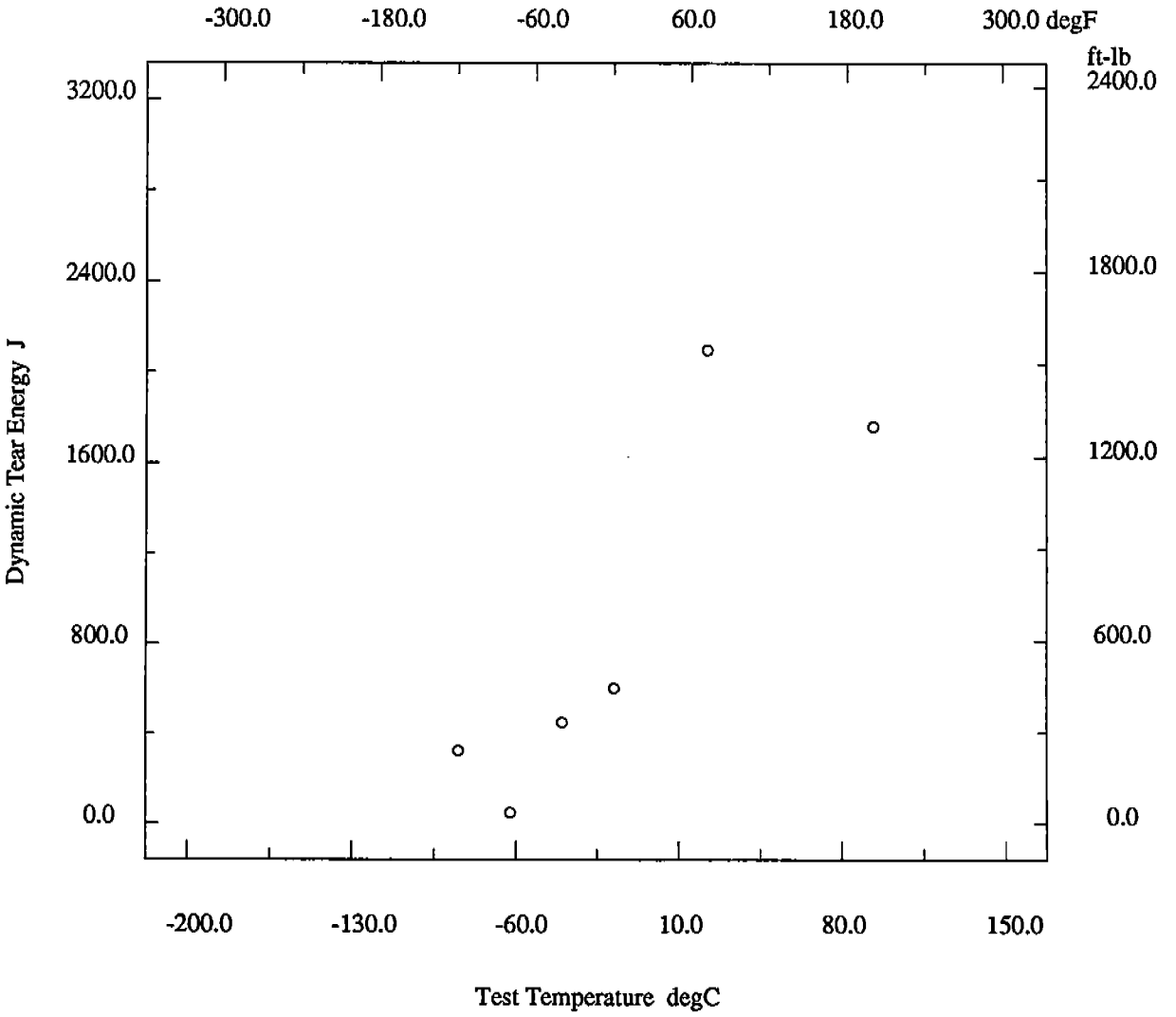
Orien	Test Temp degF	DT Energy ft-lb
T-L o	-120	240
T-L o	-80	35
T-L o	-40	333
T-L o	0	445
T-L o	72	1547
T-L o	200	1300

* - not reported

Material A710

Description

Material Code	002.024.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		



* - not reported

Material A710

Description

Material Code	002.025.01	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition

C	0.05 %	Mn	0.52 %
P	0.01 %	S	0.009 %
Si	0.27 %	Cr	0.76 %
Ni	0.90 %	Mo	0.20 %
V	*	Cu	1.20 %
Cb	0.037 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	A,K	Producer	*
Year Produced	*	Addl Info	FZY
Source	USN	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	*
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	Loading Rate	*
Tensile Strength Offset	0.2 %	Tensile Yield Point	*
Uniform Elongation	*	Tensile Modulus	*
Standard Method	*	Standard Year	*

Orient	Test Temp degF	UTS ksi	TYS ksi	Elongation %	RA %
L	Room	101.6	86.2	34	65
T	Room	107.0	88.6	32	63

* - not reported

Material A710

Description

Material Code	002.025.01	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition See Page 13200.1

Fabrication History See Page 13200.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	*
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

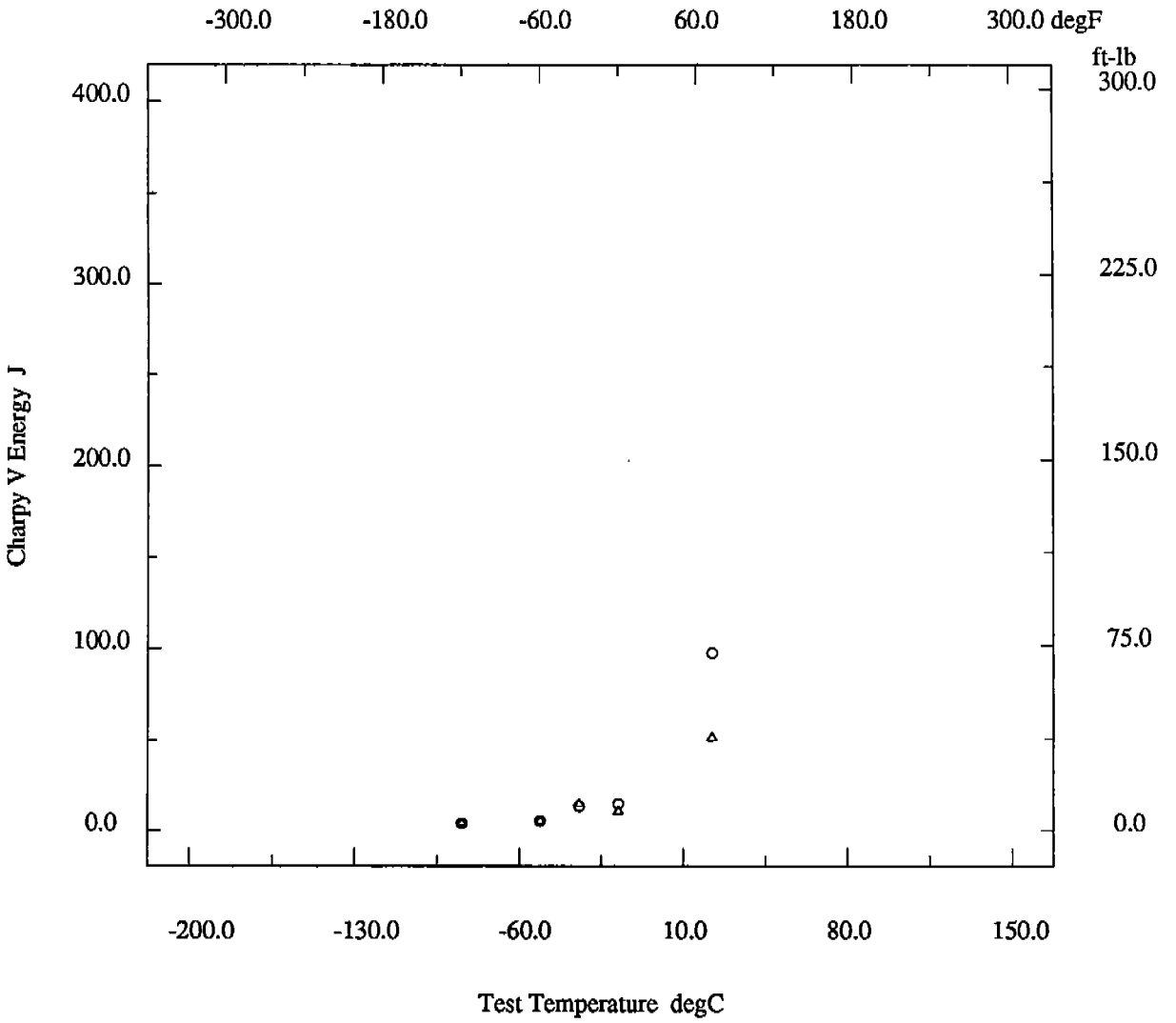
Orien	Test Temp degF	CVN Energy ft-lb
L-T ○	-120	3
L-T ○	-60	4
L-T ○	-30	10
L-T ○	0	11
L-T ○	72	72
T-L △	-120	3
T-L △	-60	4
T-L △	-30	11
T-L △	0	8
T-L △	72	38

* - not reported

Material A710

Description

Material Code	002.025.01	Material Name	A710
UNS	*	Other Designation	Class 1
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		



* - not reported

Material A710

Description

Material Code	002.026.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.625 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition

C	0.04 %	Mn	0.55 %
P	0.01 %	S	0.013 %
Si	0.29 %	Cr	0.78 %
Ni	0.83 %	Mo	0.18 %
V	*	Cu	1.15 %
Cb	0.041 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	A,K	Producer	*
Year Produced	*	Addl Info	FZZ
Source	USN	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	*
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	Loading Rate	*
Tensile Strength Offset	0.2 %	Tensile Yield Point	*
Uniform Elongation	*	Tensile Modulus	*
Standard Method	*	Standard Year	*

Orient	Test Temp degF	UTS ksi	TYS ksi	Elongation %	RA %
L	Room	103.4	91.8	35	71
T	Room	101.2	88.7	38	77

* - not reported

Material A710

Description

Material Code	002.026.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.625 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition See Page 13300.1

Fabrication History See Page 13300.1

Property Measurements

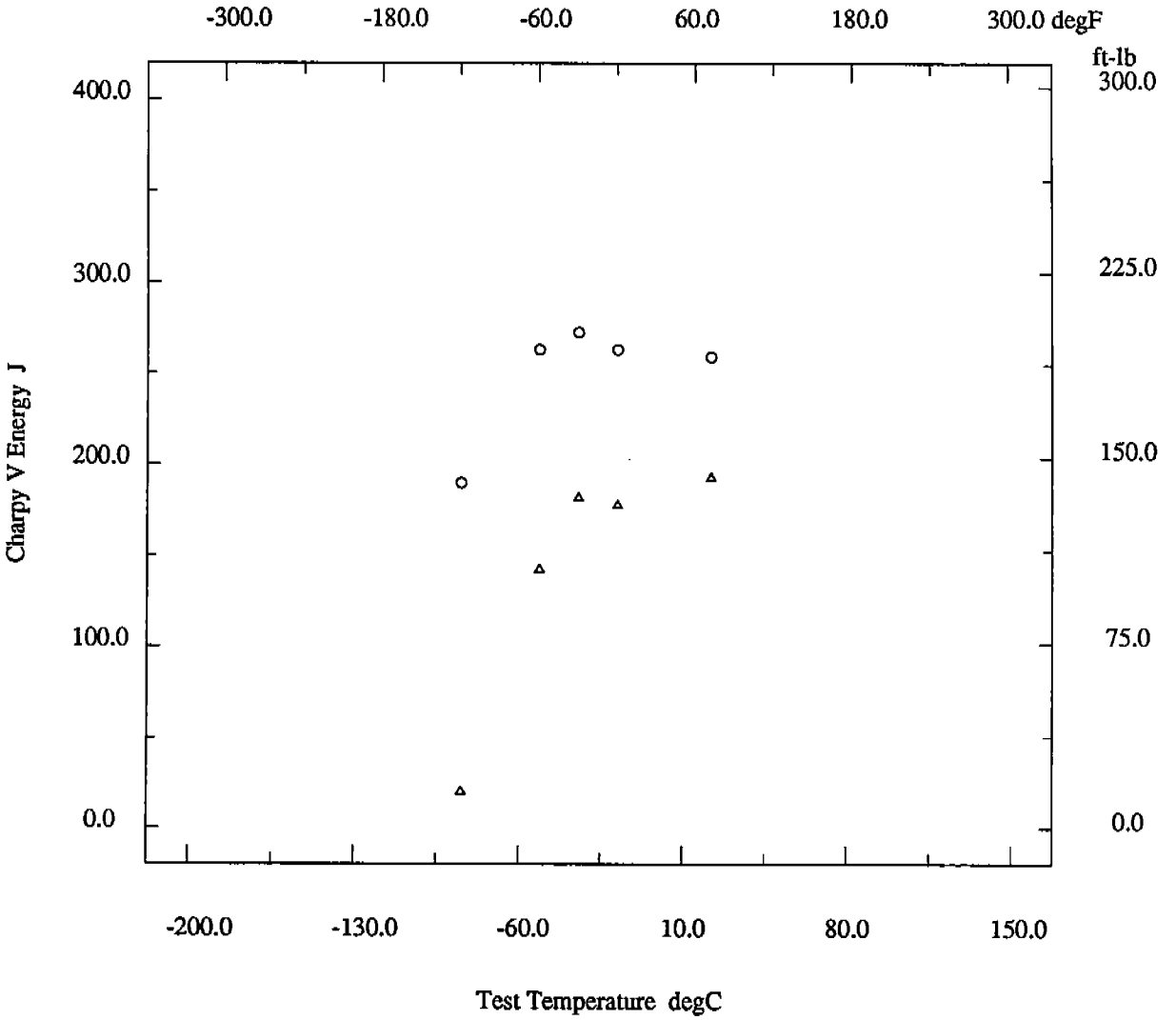
Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	*
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

Orien	Test Temp degF	CVN Energy ft-lb
L-T ○	-120	140
L-T ○	-60	194
L-T ○	-30	201
L-T ○	0	194
L-T ○	72	191
T-L △	-120	15
T-L △	-60	105
T-L △	-30	134
T-L △	0	131
T-L △	72	142

* - not reported

Material A710

Description			
Material Code	002.026.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.625 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		



* - not reported

Material A710

Description

Material Code	002.026.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.625 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition See Page 13300.1

Fabrication History See Page 13300.1

Property Measurements

Test Type	Dynamic Tear	Position	1/2T
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Appearance	*	Standard Method	*
Standard Year	*		

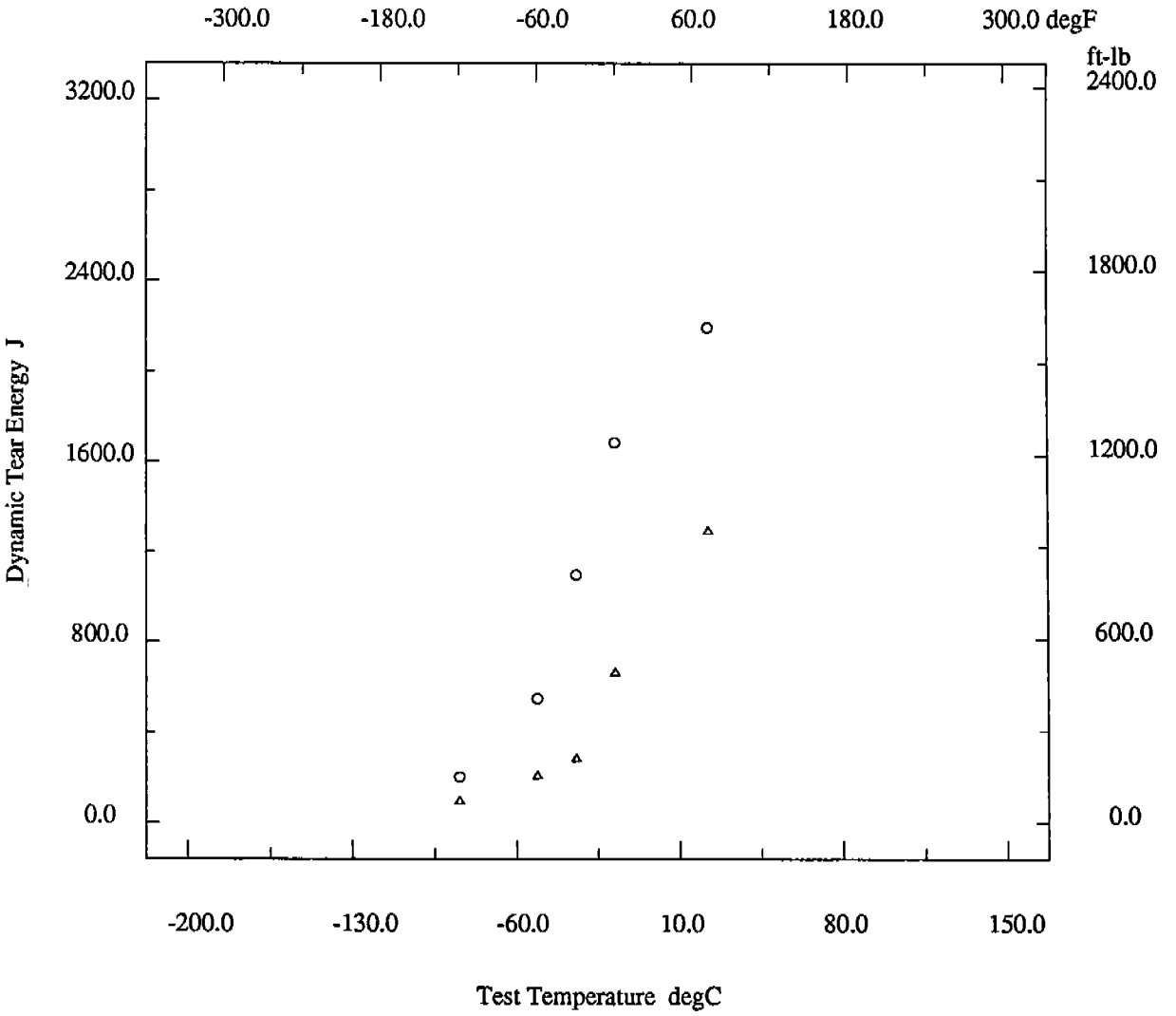
Orien	Test Temp degF	DT Energy ft-lb
L-T ○	-120	150
L-T ○	-60	407
L-T ○	-30	810
L-T ○	0	1243
L-T ○	72	1617
T-L △	-120	70
T-L △	-60	153
T-L △	-30	210
T-L △	0	490
T-L △	72	953

* - not reported

Material A710

Description

Material Code	002.026.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.625 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		



* - not reported

Material A710

Description

Material Code	002.027.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.625 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition

C	0.04 %	Mn	0.51 %
P	0.01 %	S	0.009 %
Si	0.31 %	Cr	0.68 %
Ni	0.93 %	Mo	0.20 %
V	*	Cu	1.20 %
Cb	0.042 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	A,K	Producer	*
Year Produced	*	Addl Info	GAH
Source	USN	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	*
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	Loading Rate	*
Tensile Strength Offset	0.2 %	Tensile Yield Point	*
Uniform Elongation	*	Tensile Modulus	*
Standard Method	*	Standard Year	*

Orient	Test Temp degF	UTS ksi	TYS ksi	Elongation %	RA %
L	Room	93.9	81.1	39	75
T	Room	95.4	84.1	37	76

* - not reported

Material A710

Description

Material Code	002.027.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.625 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition See Page 13400.1

Fabrication History See Page 13400.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	*
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

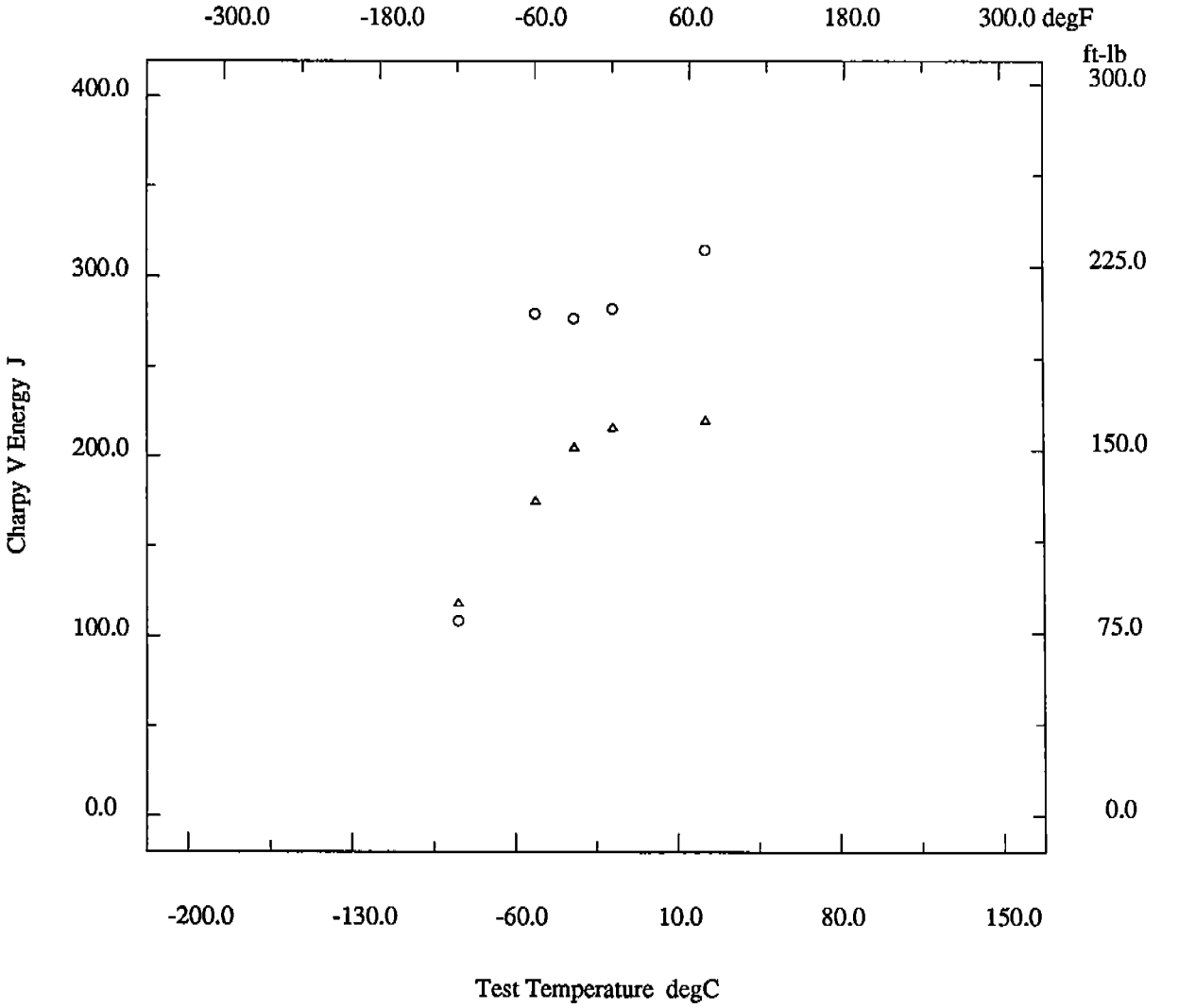
Orien	Test Temp degF	CVN Energy ft-lb
L-T ○	-120	80
L-T ○	-60	206
L-T ○	-30	204
L-T ○	0	208
L-T ○	72	232
T-L △	-120	87
T-L △	-60	129
T-L △	-30	151
T-L △	0	159
T-L △	72	162

* - not reported

Material A710

Description

Material Code	002.027.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.625 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		



* - not reported

Material A710

Description

Material Code	002.027.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.625 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition See Page 13400.1

Fabrication History See Page 13400.1

Property Measurements

Test Type	Dynamic Tear	Position	1/2T
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Appearance	*	Standard Method	*
Standard Year	*		

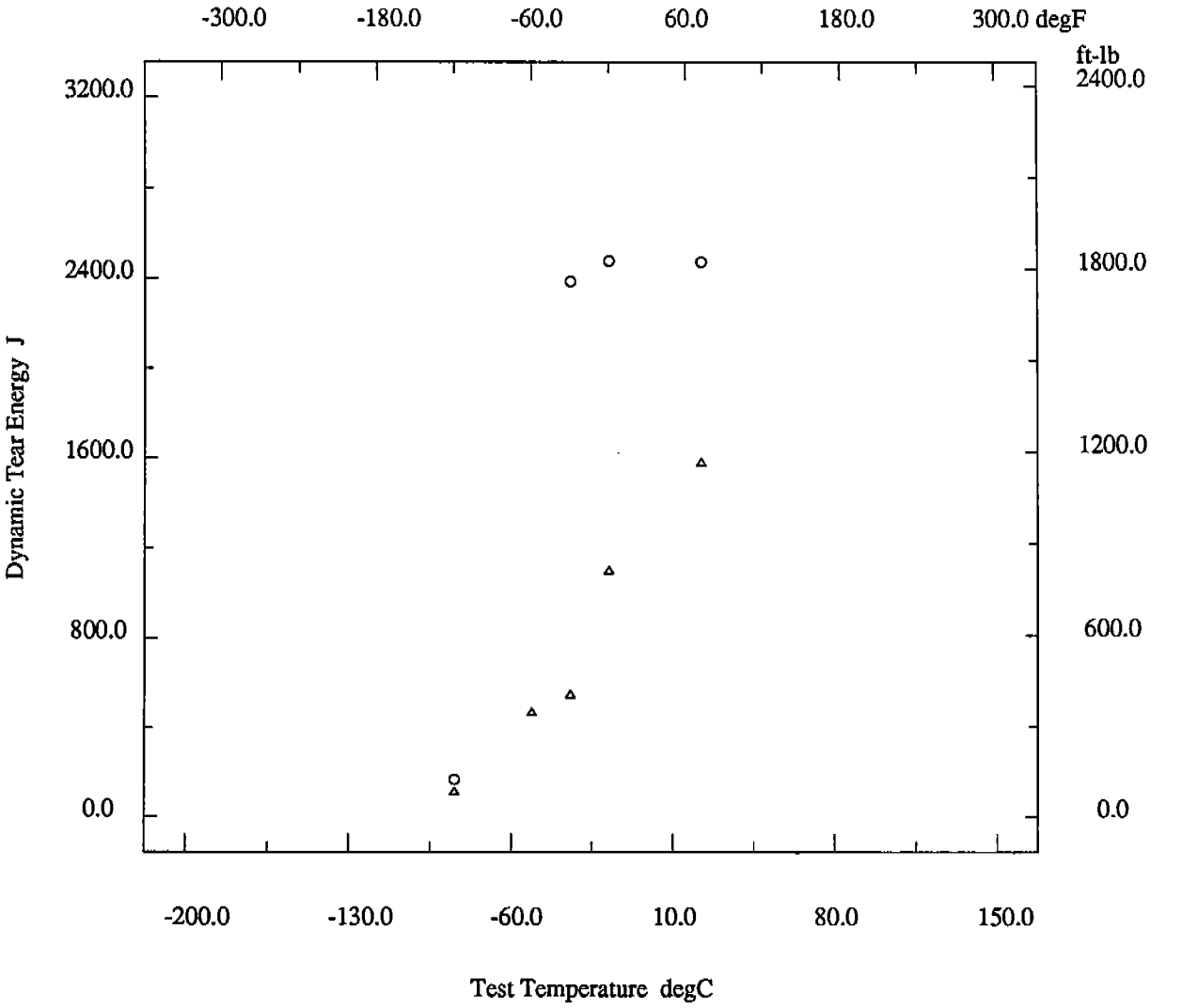
Orien	Test Temp degF	DT Energy ft-lb
L-T ○	-120	123
L-T ○	-60	2845
L-T ○	-30	1760
L-T ○	0	1827
L-T ○	72	1823
T-L △	-120	80
T-L △	-60	344
T-L △	-30	403
T-L △	0	810
T-L △	72	1163

* - not reported

Material A710

Description

Material Code	002.027.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.625 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		



* - not reported

Material A710

Description

Material Code	002.028.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.625 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition

C	0.04 %	Mn	0.58 %
P	0.01 %	S	0.004 %
Si	0.28 %	Cr	0.85 %
Ni	0.76 %	Mo	0.21 %
V	*	Cu	1.18 %
Cb	0.042 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	A,K	Producer	*
Year Produced	*	Addl Info	GAW
Source	USN	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	*
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	Loading Rate	*
Tensile Strength Offset	0.2 %	Tensile Yield Point	*
Uniform Elongation	*	Tensile Modulus	*
Standard Method	*	Standard Year	*

Orient	Test Temp degF	UTS ksi	TYS ksi	Elongation %	RA %
L	Room	103.4	91.7	37	76
T	Room	101.8	88.5	40	76

* - not reported

Material A710

Description

Material Code	002.028.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.625 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition See Page 13500.1

Fabrication History See Page 13500.1

Property Measurements

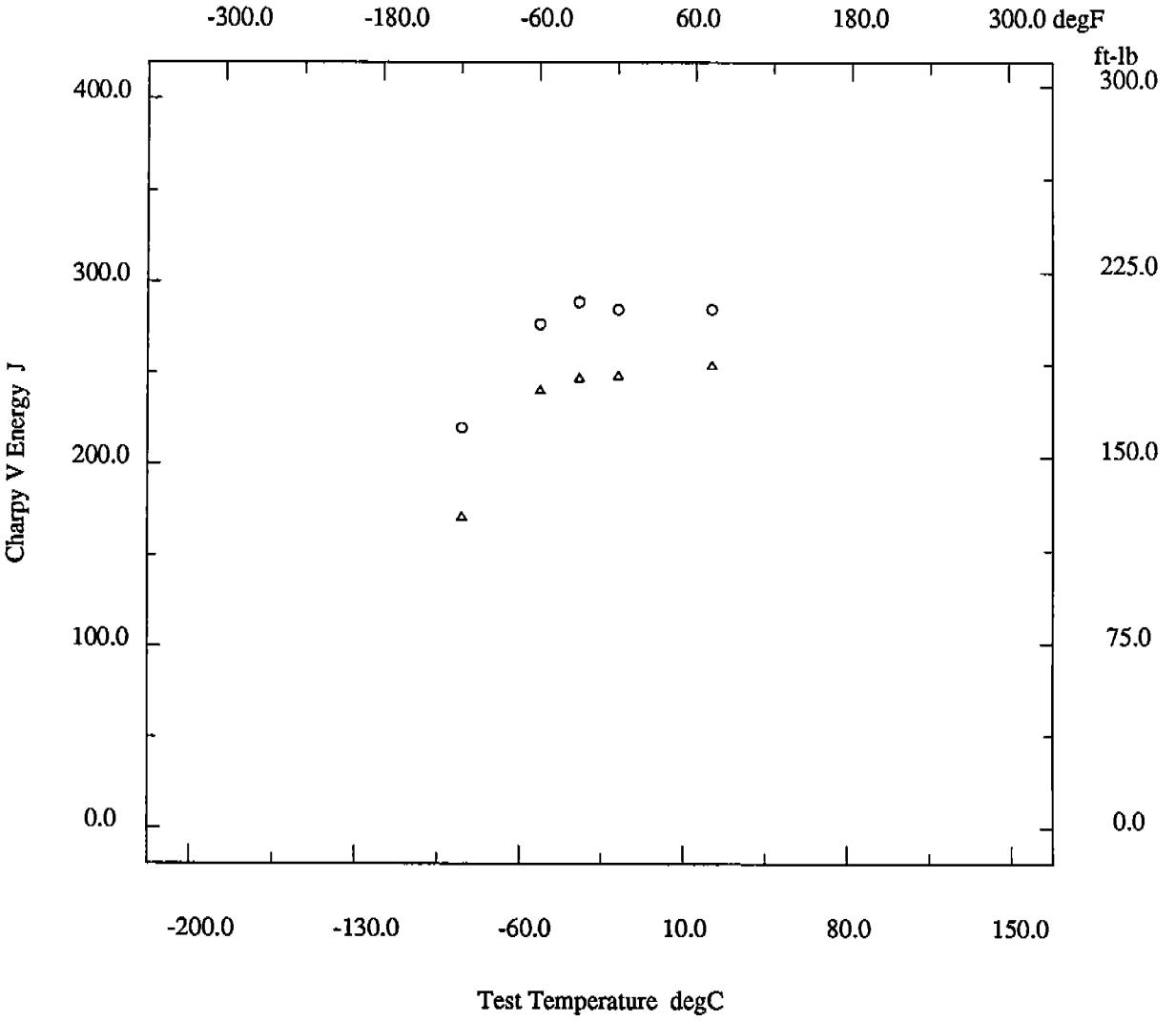
Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	*
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

Orien	Test Temp degF	CVN Energy ft-lb
L-T ○	-120	162
L-T ○	-60	204
L-T ○	-30	213
L-T ○	0	210
L-T ○	72	210
T-L △	-120	126
T-L △	-60	177
T-L △	-30	182
T-L △	0	183
T-L △	72	187

* - not reported

Material A710

Description			
Material Code	002.028.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.625 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		



* - not reported

Material A710

Description

Material Code	002.028.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.625 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition See Page 13500.1

Fabrication History See Page 13500.1

Property Measurements

Test Type	Dynamic Tear	Position	1/2T
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Appearance	*	Standard Method	*
Standard Year	*		

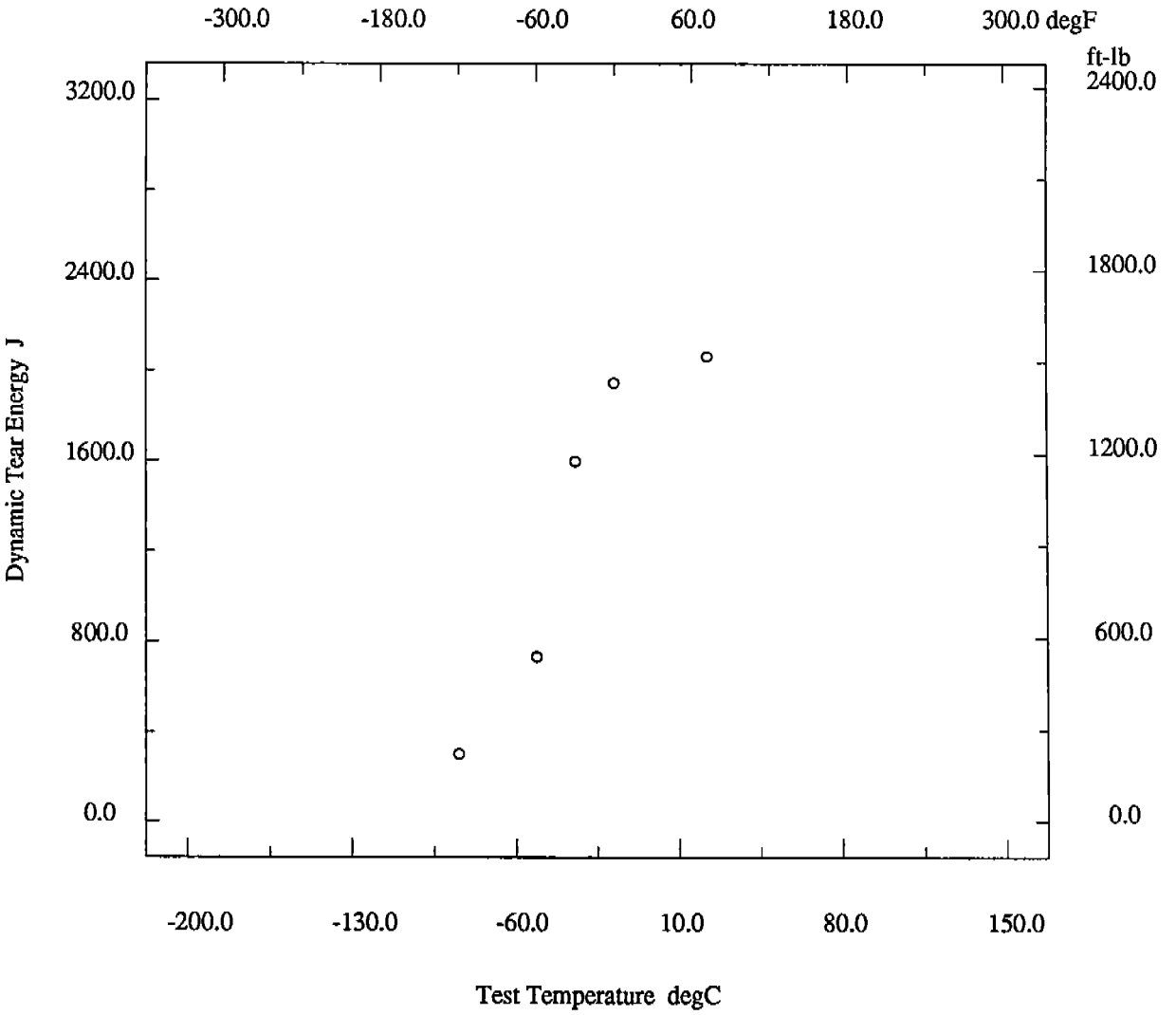
Orien	Test Temp degF	DT Energy ft-lb
T-L °	-120	223
T-L °	-60	540
T-L °	-30	1177
T-L °	0	1433
T-L °	72	1520

* - not reported

Material A710

Description

Material Code	002.028.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.625 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		



* - not reported

Material A710

Description

Material Code	002.029.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.625 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition

C	0.05 %	Mn	0.69 %
P	0.01 %	S	0.004 %
Si	*	Cr	0.83 %
Ni	0.92 %	Mo	0.19 %
V	*	Cu	1.20 %
Cb	0.04 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	A,K	Producer	*
Year Produced	*	Addl Info	GCL
Source	USN	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	*
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	Loading Rate	*
Tensile Strength Offset	0.2 %	Tensile Yield Point	*
Uniform Elongation	*	Tensile Modulus	*
Standard Method	*	Standard Year	*

Orient	Test Temp degF	UTS ksi	TYS ksi	Elongation %	RA %
L	Room	106.7	94.3	38	74
T	Room	107.8	97.2	37	73

* - not reported

Material A710

Description

Material Code	002.029.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.625 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition See Page 13600.1

Fabrication History See Page 13600.1

Property Measurements

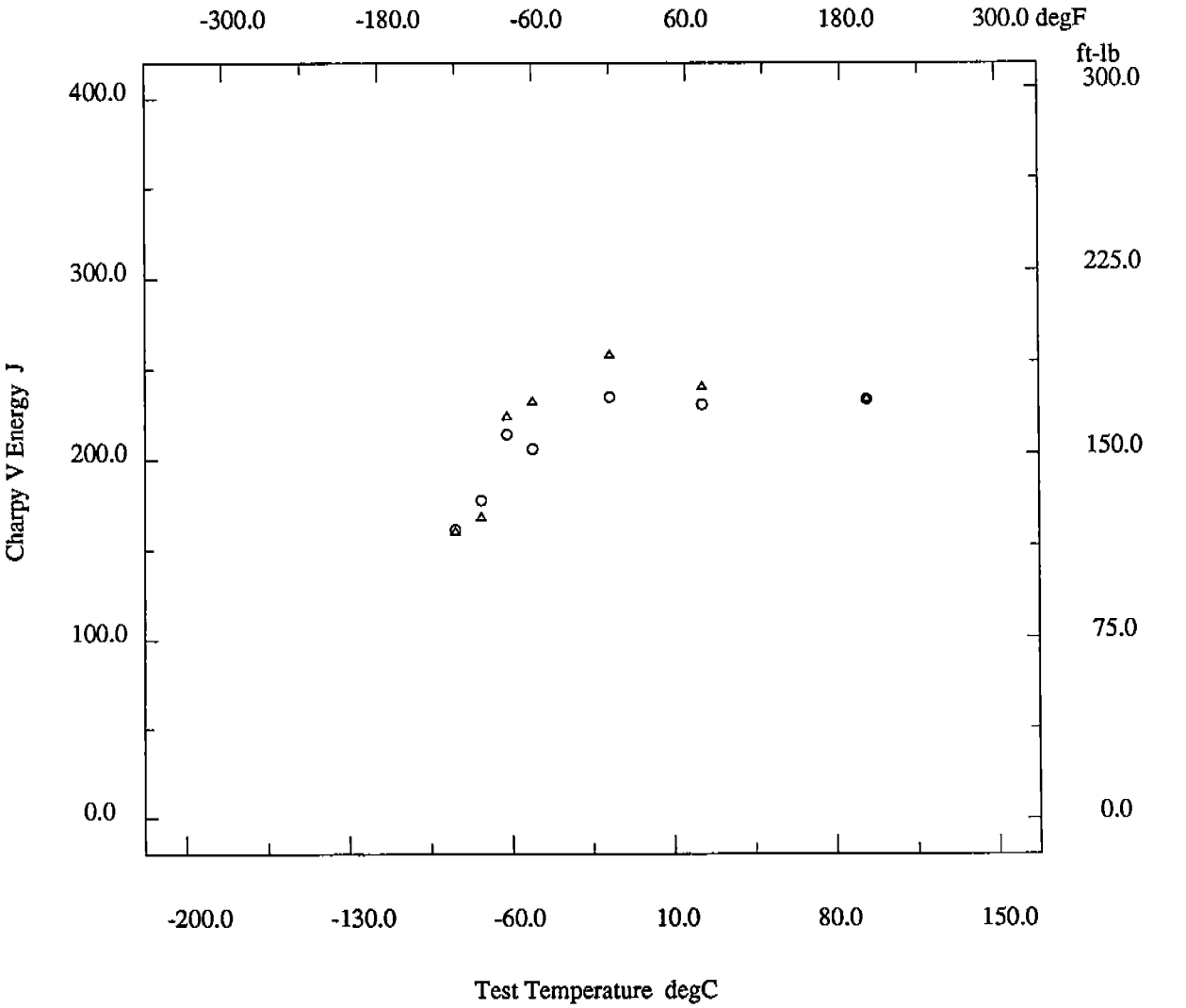
Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	*
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

Orien	Test Temp degF	CVN Energy ft-lb
L-T ○	-120	119
L-T ○	-100	131
L-T ○	-80	158
L-T ○	-60	152
L-T ○	0	173
L-T ○	72	170
L-T ○	200	172
T-L △	-120	118
T-L △	-100	124
T-L △	-80	165
T-L △	-60	171
T-L △	0	190
T-L △	72	177
T-L △	200	172

* - not reported

Material A710

Description			
Material Code	002.029.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.625 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		



* - not reported

Material A710

Description

Material Code	002.029.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.625 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition See Page 13600.1

Fabrication History See Page 13600.1

Property Measurements

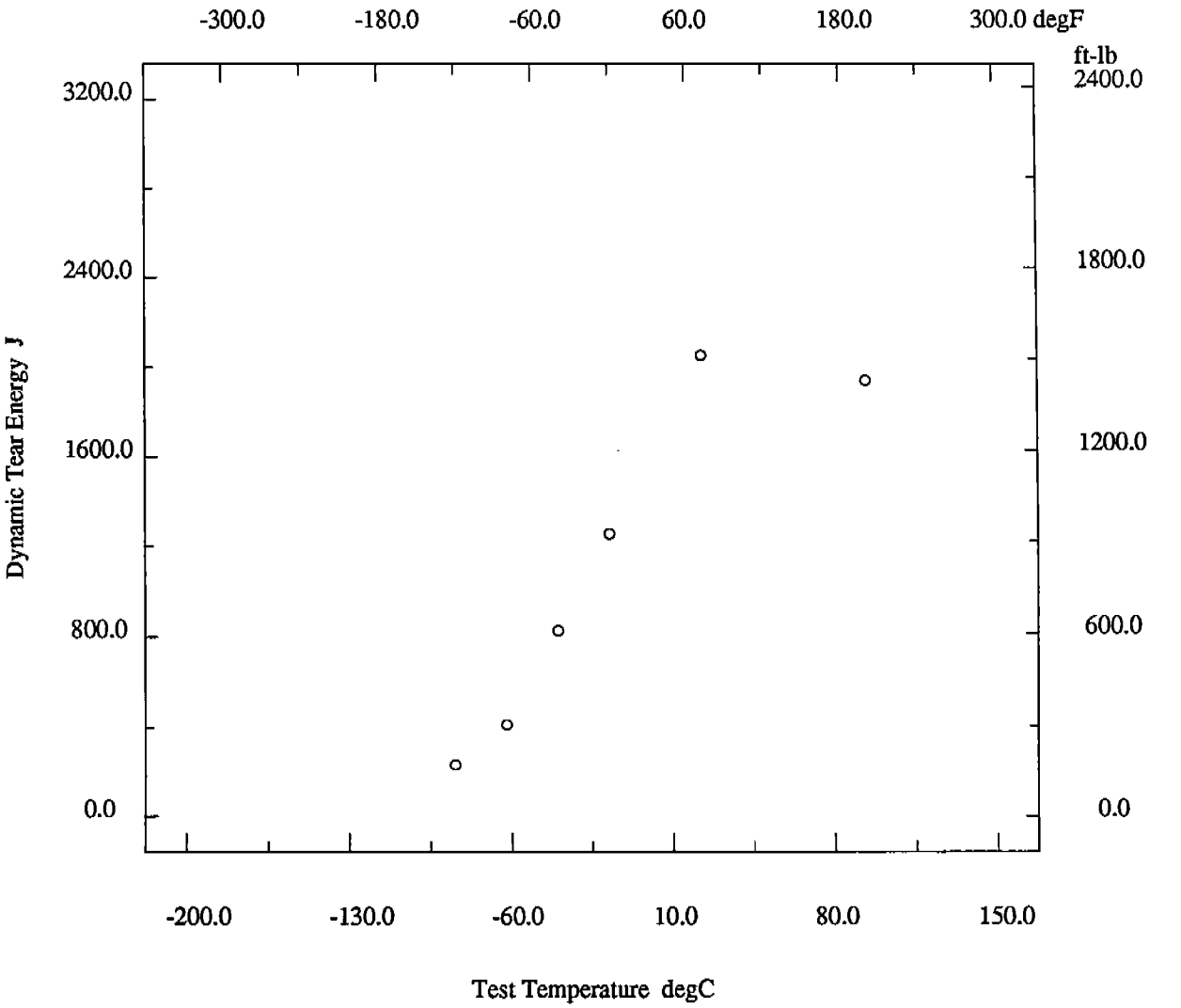
Test Type	Dynamic Tear	Position	1/2T
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Appearance	*	Standard Method	*
Standard Year	*		

Orien	Test Temp degF	DT Energy ft-lb
T-L °	-120	173
T-L °	-80	305
T-L °	-40	610
T-L °	0	925
T-L °	72	1513
T-L °	200	1430

* - not reported

Material A710

Description			
Material Code	002.029.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.625 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		



* - not reported

Material A710

Description

Material Code	002.030.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.625 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition

C	0.04 %	Mn	0.55 %
P	0.01 %	S	0.013 %
Si	0.29 %	Cr	0.78 %
Ni	0.83 %	Mo	0.18 %
V	*	Cu	1.15 %
Cb	0.041 %	Ti	*
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	A,K	Producer	*
Year Produced	*	Addl Info	FZO
Source	USN	Melting Practice	*
Ingot Position	*	Killing Process	*
Process Temperature	*	Process Time	*
Rolling Conditions	*	Final Processing	*
Final Temperature	*	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	Loading Rate	*
Tensile Strength Offset	0.2 %	Tensile Yield Point	*
Uniform Elongation	*	Tensile Modulus	*
Standard Method	*	Standard Year	*

Orient	Test Temp degF	UTS ksi	TYS ksi	Elongation %	RA %
L	Room	97.1	84.9	38	73
T	Room	97.9	86.2	36	65

* - not reported

Material A710

Description

Material Code	002.030.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.625 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		

Composition See Page 13700.1

Fabrication History See Page 13700.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	*
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

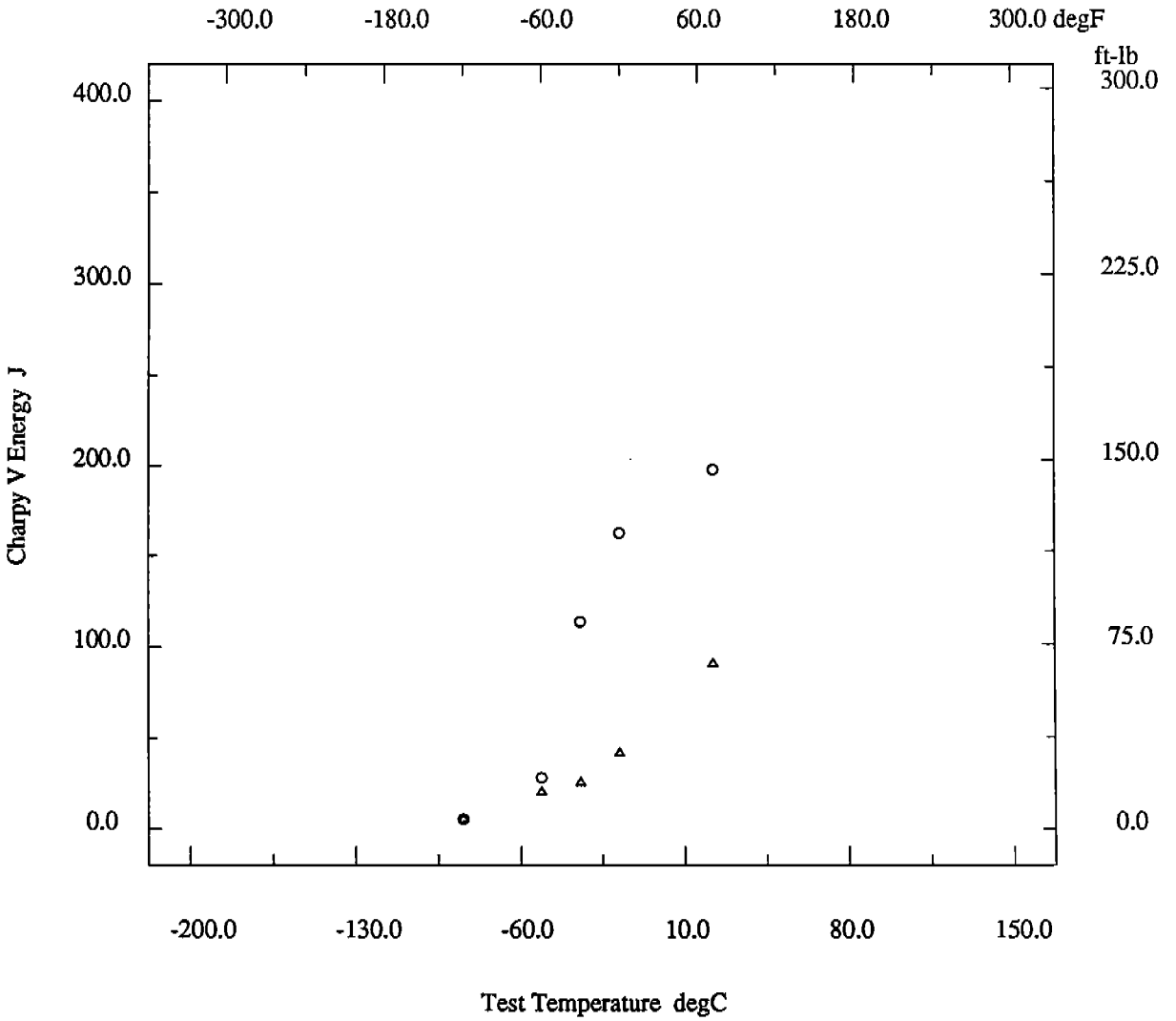
Orien	Test Temp degF	CVN Energy ft-lb
L-T ○	-120	4
L-T ○	-60	21
L-T ○	-30	84
L-T ○	0	120
L-T ○	72	146
T-L △	-120	4
T-L △	-60	15
T-L △	-30	19
T-L △	0	31
T-L △	72	67

* - not reported

Material A710

Description

Material Code	002.030.01	Material Name	A710
UNS	*	Other Designation	Class 3
Type	Wrought Metal	Form	Plate
Thickness	0.625 in	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	USN 9/9		



* - not reported

Index

0 Lot ID 3800.1–3800.4

004-2 Reference 1100.1–1100.2, 1100.5–1100.6, 1200.1–1200.2, 1200.5–1200.6, 1300.1–1300.2, 1300.5–1300.6, 1400.1–1400.2, 1400.5–1400.6, 1500.1–1500.2, 1500.5–1500.6, 1600.1–1600.2, 1600.5–1600.6, 1700.1–1700.2, 1700.5–1700.6, 1800.1–1800.2, 1800.5–1800.6, 1900.1–1900.2, 1900.5–1900.6

007-1 Reference 2100.1–2100.8, 2200.1–2200.8, 2300.1–2300.8, 2400.1–2400.20, 2500.1–2500.18, 2600.1–2600.20, 2700.1–2700.18

007-4 Reference 2800.1–2800.8, 2900.1–2900.8, 3000.1–3000.8

1 Lot ID 3900.1–3900.3

1010 Reference 7800.1–7800.6, 7900.1–7900.6

1120 Reference 16600.1–16600.7

11672 Lot ID 3400.1–3400.4

11682 Lot ID 4600.1–4600.3

11692 Lot ID 4200.1–4200.3

11mm in HAZ Location wrt Weld 2500.16, 2700.16, 3200.1, 3200.8, 3200.12, 3200.16, 3200.20, 6400.4, 6400.10, 6400.16, 6500.1, 6600.1, 6700.1, 6800.1, 7200.7–7200.8, 7500.1, 7500.6, 7500.12, 7500.16, 7500.20, 7600.2, 7600.6, 7600.10, 7600.14, 7600.18, 7700.1, 7700.6, 7700.10, 7700.14, 7700.18, 8000.1, 8100.1, 8200.1, 8300.1, 8500.1, 8600.1, 8700.1, 8800.1, 9200.2, 9200.6, 9200.10, 9200.14, 9200.18, 9300.1, 9300.6, 9300.10, 9300.14, 9300.18, 9700.7, 9900.7, 10200.4, 10200.8, 10500.4, 10800.4, 10900.4, 11000.4, 11500.4, 12300.4, 12300.8, 12300.12, 13800.8, 13800.20, 13800.24, 13800.34, 13900.1, 13900.14, 13900.24, 14000.1, 14000.4, 14000.14, 14200.1, 14200.4–14200.6, 14200.16–14200.18, 14200.28, 14200.38–14200.40, 14300.1, 14300.4–14300.6, 14300.16–14300.18, 14300.28, 14300.38–14300.40, 14400.1, 14400.4–14400.6, 14400.16–14400.18, 14400.28, 14400.38–14400.40, 14500.1, 14500.4–14500.6, 14500.16, 14500.26, 14500.36, 14600.1, 14600.4–14600.6, 14600.16, 14600.26, 14600.36, 14700.1–14700.3, 14700.6–14700.8, 14700.11–14700.12, 14700.15–14700.17, 14700.20–14700.21, 14700.24–14700.26, 14800.1–14800.3, 14800.6–14800.8, 14800.11–14800.12, 14800.15–14800.17, 14800.20–14800.21, 14800.24–14800.26, 14900.1–14900.3, 14900.6–14900.8, 14900.11–14900.12, 14900.15–14900.17, 15000.1–15000.3, 15000.6–15000.8, 15000.11–15000.12, 15000.15–15000.17, 15000.20–15000.21, 15000.24–15000.26, 15100.1–15100.3, 15100.6–15100.8, 15100.11–15100.12, 15100.15–15100.17, 15100.20–15100.21, 15100.24–15100.26, 15200.1–15200.3, 15200.6–15200.8, 15200.11–15200.12, 15200.15–15200.17, 16500.1, 16500.5, 19000.1, 19100.1, 19200.1, 19300.1, 19400.1, 19600.7, 19600.14

1/2 V-Groove Joint Preparation 13800.8–13800.36, 13900.1, 13900.4–13900.26, 14000.1–14000.22

1211 Reference 9000.1–9000.2, 9000.5–9000.9, 9100.1–9100.3, 9100.6–9100.9

14320 Lot ID 3600.1–3600.4

14453 Lot ID 4500.1–4500.4

14460 Lot ID 3300.1–3300.4

14490 Lot ID 5700.1–5700.3

14500 Lot ID 6000.1–6000.3

1/4T Composition Position 13800.1–13800.37, 13900.1–13900.26, 14000.1–14000.23

1/4T Location wrt Surface 7200.7–7200.8, 7200.13

17754 Lot ID 5800.1–5800.3, 6100.1–6100.3

17777 Lot ID 6200.1–6200.3

17846 Lot ID 5900.1–5900.3

18553 Lot ID 6300.1–6300.3

1969 Standard Year 1000.14, 18600.1, 18800.1, 18900.1, 19000.2, 19100.2, 19200.2, 19300.2, 19400.2, 19600.1, 19600.8, 19600.14

1971 Year Produced 1000.1–1000.3, 1000.6, 1000.9, 1000.12–1000.14

1972 Standard Year 18600.3, 18700.2, 18800.3, 18900.3, 19600.3, 19600.10, 19600.16–19600.18

1972 Year Produced 2100.1–2100.3, 2100.6, 2200.1–2200.3, 2200.6, 2300.1–2300.3, 2400.1–2400.3, 2400.6, 2400.9, 2400.12, 2400.15, 2400.18, 2500.1, 2600.1–2600.3, 2600.6, 2600.9, 2600.12, 2600.15, 2600.18, 2700.1, 2800.1–2800.3, 2800.6, 2900.1–2900.3, 2900.6, 3000.1–3000.3, 3000.6

1976 Standard Year 7100.5, 7200.5, 7200.11, 7200.15

1976 Year Produced 15300.1, 15400.1, 16000.1, 16200.1

1977 Year Produced 16100.1, 16600.1

1978 Year Produced 7300.1, 15500.1, 15600.1, 15900.1

1979 Standard Year 7000.2, 14700.2, 14700.11, 14700.20, 14800.2, 14800.11, 14800.20, 14900.2, 14900.11, 15000.2, 15000.11, 15000.20, 15100.2, 15100.11, 15100.20, 15200.2, 15200.11

1979 Year Produced 1100.1, 1200.1, 1300.1, 1400.1, 1500.1, 1600.1, 1700.1, 1800.1, 1900.1, 15700.1, 15800.1, 16300.1, 16400.1

1980 Standard Year 18600.5, 18700.4, 18800.5, 18900.5, 19600.5, 19600.12, 19600.20

1980 Year Produced 9000.1, 9100.1

1981 Standard Year 16500.2–16500.6

1981 Year Produced 17400.1, 17400.11, 17400.20
1982 Year Produced 12600.1, 16700.1, 16700.11, 16700.20, 16800.1, 16800.5, 16900.1, 16900.5, 17000.1, 17000.7, 17100.1, 17100.11, 17200.1, 17200.17, 17200.32, 17300.1, 17300.11, 17500.1, 17500.11, 17600.1, 17600.5, 17700.1, 17700.11, 17700.20, 17800.1, 17800.5, 17900.1, 17900.17, 17900.32, 18000.1, 18000.7, 18100.1, 18100.7, 18200.1, 18200.11, 18200.20, 18300.1, 18300.17, 18300.32, 18400.1, 18400.11, 18400.20, 18500.1, 18500.5, 19500.1
1983 Year Produced 7800.1, 7900.1
1984 Year Produced 12500.1, 12700.1
1987 Standard Year 7800.2, 9000.6, 9100.2, 12500.2, 12600.2, 12700.2, 15700.2, 15800.2, 15900.2, 16100.2
1G Welding Position 14800.11–14800.12, 14800.15–14800.17
1mm in HAZ Location wrt Weld 2500.4, 2700.4, 6400.7, 6400.13, 6400.19–6400.21, 6500.4, 6600.4, 6700.4, 6800.4, 7200.13, 8000.4, 8100.4, 8200.4, 8300.4, 8500.4, 8600.4, 8700.4, 8800.4, 13800.12, 13800.28, 13900.6, 13900.18, 14000.8, 14000.18, 14200.10, 14200.22, 14200.32, 14200.44, 14300.10, 14300.22, 14300.32, 14300.44, 14400.10, 14400.22, 14400.32, 14400.44, 14500.10, 14500.20, 14500.30, 14500.40, 14600.10, 14600.20, 14600.30, 14600.40
2/3 Specimen Type 9400.2, 9600.2
2G Welding Position 14700.11–14700.12, 14700.15–14700.17, 14800.20–14800.21, 14800.24–14800.26
3200 Reference 12600.1–12600.14
3201 Reference 15400.1–15400.6, 15700.1–15700.3, 15700.6–15700.8, 15800.1–15800.3, 15800.6–15800.8, 15900.1–15900.6, 16000.1–16000.6, 16100.1–16100.3, 16100.6–16100.8, 16200.1–16200.6, 16300.1–16300.6
3202 Reference 15300.1–15300.6, 15500.1–15500.2, 15500.5–15500.7, 15600.1–15600.6, 16400.1–16400.6
3/4 Specimen Type 9500.2, 9500.5, 9700.2, 9700.5–9700.9, 9800.2, 9900.2, 9900.5–9900.9, 10200.2–10200.10, 11300.2, 11400.2, 11500.2, 11600.2, 11700.2, 11700.5
3400 Reference 12500.1–12500.6, 12700.1–12700.7
3530 Reference 19500.1–19500.7
3G Welding Position 14700.20–14700.21, 14700.24–14700.26, 14900.1–14900.3, 14900.6–14900.8, 15000.20–15000.21, 15000.24–15000.26, 15100.1–15100.3, 15100.6–15100.8, 15100.20–15100.21, 15100.24–15100.26, 15200.11–15200.12, 15200.15–15200.17
3mm in HAZ Location wrt Weld 2500.7, 2700.7, 13800.14, 13800.30, 13900.8, 13900.20, 14000.10, 14000.20, 14200.12, 14200.24, 14200.34, 14200.46, 14300.12, 14300.24, 14300.34, 14300.46, 14400.12, 14400.24, 14400.34, 14400.46, 14500.12, 14500.22, 14500.32, 14500.42, 14600.12, 14600.22, 14600.32, 14600.42
40574 Lot ID 12000.1–12000.3, 12100.1–12100.3, 12200.1–12200.3
41509 Lot ID 10200.1–10200.11
42252 Lot ID 10800.1–10800.7, 10900.1–10900.7, 11000.1–11000.7
43731 Lot ID 5400.1–5400.3
43752 Lot ID 3500.1–3500.4
47444 Lot ID 11200.1–11200.6
47574 Lot ID 9600.1–9600.7, 9700.1–9700.10, 9800.1–9800.3
48160 Lot ID 9900.1–9900.10, 10000.1–10000.5, 10100.1–10100.5
48682 Lot ID 11500.1–11500.7, 11600.1–11600.3
4G Welding Position 14800.1–14800.3, 14800.6–14800.8, 14900.11–14900.12, 14900.15–14900.17
50% weld, 50% HAZ Location wrt Weld 13800.18, 13900.12
50054 Lot ID 10300.1–10300.3, 10400.1–10400.3, 10500.1–10500.7
52100 Lot ID 12400.1–12400.3
52110 Lot ID 12300.1–12300.15
52765 Lot ID 5600.1–5600.3
52797 Lot ID 5500.1–5500.3
54614 Lot ID 11100.1–11100.4
55946 Lot ID 11800.1–11800.6, 11900.1–11900.6
57053 Lot ID 11700.1–11700.6
57221 Lot ID 9400.1–9400.3, 9500.1–9500.6
58568 Lot ID 11300.1–11300.3, 11400.1–11400.3
59609 Lot ID 10300.4–10300.6, 10600.1–10600.4, 10700.1–10700.7
5mm in HAZ Location wrt Weld 2500.10, 2700.10, 13800.16, 13800.32, 13900.10, 13900.22, 14000.12, 14000.22, 14200.14, 14200.26, 14200.36, 14200.48, 14300.14, 14300.26, 14300.36, 14300.48, 14400.14, 14400.26, 14400.36, 14400.48, 14500.14, 14500.24, 14500.34, 14500.44, 14600.14, 14600.24, 14600.34, 14600.44
60865 Lot ID 4300.1–4300.3
60868 Lot ID 3700.1–3700.4, 4400.1–4400.4
641661 Lot ID 1100.1–1100.2, 1100.5–1100.6, 1200.1–1200.2, 1200.5–1200.6, 1300.1–1300.2, 1300.5–1300.6
641662 Lot ID 1400.1–1400.2, 1400.5–1400.6, 1500.1–1500.2, 1500.5–1500.6, 1600.1–1600.2, 1600.5–1600.6
642696 Lot ID 1800.1–1800.2, 1800.5–1800.6, 1900.1–1900.2, 1900.5–1900.6
642697 Lot ID 1700.1–1700.2, 1700.5–1700.6
7mm in HAZ Location wrt Weld 2500.13, 2700.13
813 Standard Method 18600.2, 18700.1, 18800.2, 18900.2, 19600.2, 19600.9, 19600.15

A

A Lot ID 5200.1–5200.4
A0161 Lot ID 7800.1–7800.6
A1579-2AA Lot ID 15900.1–15900.6
A36 Material Name 3100.1–3100.11, 3200.1–3200.21, 3300.1–3300.4, 3400.1–3400.4, 3500.1–3500.4, 3600.1–3600.4, 3700.1–3700.4, 3800.1–3800.4, 3900.1–3900.3, 4000.1–4000.3, 4100.1–4100.3, 4200.1–4200.3, 4300.1–4300.3, 4400.1–4400.4, 4500.1–4500.4, 4600.1–4600.3, 4700.1–4700.3, 4800.1–4800.3, 4900.1–4900.3, 5000.1–5000.4, 5100.1–5100.4, 5200.1–5200.4, 5300.1–5300.4, 5400.1–5400.3, 5500.1–5500.3, 5600.1–5600.3, 5700.1–5700.3, 5800.1–5800.3, 5900.1–5900.3, 6000.1–6000.3, 6100.1–6100.3, 6200.1–6200.3, 6300.1–6300.3, 6400.1–6400.23, 6500.1–6500.5, 6600.1–6600.5, 6700.1–6700.5, 6800.1–6800.6, 6900.1–6900.2, 7000.1–7000.2, 7000.5–7000.6
A537 CL1 Material Name 7300.1–7300.6, 7400.1–7400.11, 7500.1–7500.21
A572 Gr50 Material Name 7600.1–7600.21, 7700.1–7700.21, 7800.1–7800.6, 7900.1–7900.6
A588 GrA Material Name 9200.1–9200.21, 9300.1–9300.21
A588 Material Name 8000.1–8000.5, 8100.1–8100.5, 8200.1–8200.5, 8300.1–8300.5, 8400.1–8400.2, 8500.1–8500.5, 8600.1–8600.5, 8700.1–8700.5, 8800.1–8800.5, 8900.1–8900.2, 9000.1–9000.2, 9000.5–9000.9, 9100.1–9100.3, 9100.6–9100.9
A6175-8 Lot ID 16100.1–16100.3, 16100.6–16100.8
A6670-3A Lot ID 16400.1–16400.6
A6670-3B Lot ID 16300.1–16300.6
A710 Material Name 9400.1–9400.3, 9500.1–9500.6, 9600.1–9600.7, 9700.1–9700.10, 9800.1–9800.3, 9900.1–9900.10, 10000.1–10000.5, 10100.1–10100.5, 10200.1–10200.11, 10300.1–10300.6, 10400.1–10400.3, 10500.1–10500.7, 10600.1–10600.4, 10700.1–10700.7, 10800.1–10800.7, 10900.1–10900.7, 11000.1–11000.7, 11100.1–11100.4, 11200.1–11200.6, 11300.1–11300.3, 11400.1–11400.3, 11500.1–11500.7, 11600.1–11600.3, 11700.1–11700.6, 11800.1–11800.6, 11900.1–11900.6, 12000.1–12000.3, 12100.1–12100.3, 12200.1–12200.3, 12300.1–12300.15, 12400.1–12400.3, 12700.1–12700.7, 12800.1–12800.5, 12900.1–12900.5, 13000.1–13000.5, 13100.1–13100.5, 13200.1–13200.3, 13300.1–13300.5, 13400.1–13400.5, 13500.1–13500.5, 13600.1–13600.5, 13700.1–13700.3
A710-A Material Name 12500.1–12500.6, 12600.1–12600.14
ABS Sec43 Standard Method 2800.3, 2800.6, 2900.3, 2900.6, 3000.3, 3000.6
ABS-B Material Name 1000.1–1000.14, 1100.1–1100.2, 1100.5–1100.6, 1200.1–1200.2, 1200.5–1200.6, 1300.1–1300.2, 1300.5–1300.6, 1400.1–1400.2, 1400.5–1400.6, 1500.1–1500.2, 1500.5–1500.6, 1600.1–1600.2, 1600.5–1600.6, 1700.1–1700.2, 1700.5–1700.6, 1800.1–1800.2, 1800.5–1800.6, 1900.1–1900.2, 1900.5–1900.6
ABS-EH32 Material Name 2000.1–2000.9
ABS-EH36 Material Name 2100.1–2100.8, 2200.1–2200.8, 2300.1–2300.8, 2400.1–2400.20, 2500.1–2500.18, 2600.1–2600.20, 2700.1–2700.18, 2800.1–2800.8, 2900.1–2900.8, 3000.1–3000.8
A,F Heat Treatment 2800.2, 2800.6, 2900.1–2900.3, 2900.6, 3000.1–3000.3, 3000.6
A,F,A,F,Q,T Heat Treatment 2100.2, 2100.6, 2200.1–2200.3, 2300.1–2300.3, 2400.1–2400.3, 2400.6, 2400.9, 2400.12, 2400.15, 2400.18, 2500.1
A,F,N Heat Treatment 2800.1–2800.3
A,K Heat Treatment 12800.1, 12900.1, 13000.1, 13100.1, 13200.1, 13300.1, 13400.1, 13500.1, 13600.1, 13700.1
Al-killed Killing Process 2800.1–2800.3, 2800.6, 2900.1–2900.3, 2900.6, 3000.1–3000.3, 3000.6
A,Q,T Final Processing 16700.1, 16700.11, 16700.20, 16800.1, 16800.5, 16900.1, 16900.5, 17000.1, 17000.7, 17100.1, 17100.11, 17200.1, 17200.17, 17200.32, 17300.1, 17300.11, 17400.1, 17400.11, 17400.20, 17500.1, 17500.11, 17600.1, 17600.5, 17700.1, 17700.11, 17700.20, 17800.1, 17800.5, 17900.1, 17900.17, 17900.32, 18000.1, 18000.7, 18100.1, 18100.7, 18200.1, 18200.11, 18200.20, 18300.1, 18300.17, 18300.32, 18400.1, 18400.11, 18400.20, 18500.1, 18500.5
A,Q,T Heat Treatment 16700.1, 16700.11, 16700.20, 16800.1, 16800.5, 16900.1, 16900.5, 17000.1, 17000.7, 17100.1, 17100.11, 17200.1, 17200.17, 17200.32, 17300.1, 17300.11, 17400.1, 17400.11, 17400.20, 17500.1, 17500.11, 17600.1, 17600.5, 17700.1, 17700.11, 17700.20, 17800.1, 17800.5, 17900.1, 17900.17, 17900.32, 18000.1, 18000.7, 18100.1, 18100.7, 18200.1, 18200.11, 18200.20, 18300.1, 18300.17, 18300.32, 18400.1, 18400.11, 18400.20, 18500.1, 18500.5
A,R Final Processing 1000.1–1000.3, 1000.6, 1000.9, 1000.12–1000.14, 1100.1, 1200.1, 1300.1, 1400.1, 1500.1, 1600.1, 1700.1, 1800.1, 1900.1, 3100.1, 3200.1, 3300.1, 3400.1, 3500.1, 3600.1, 3700.1, 3800.1, 3900.1, 4000.1, 4100.1, 4200.1, 4300.1, 4400.1, 4500.1, 4600.1, 4700.1, 4800.1, 4900.1, 5000.1, 5100.1, 5200.1, 5300.1, 5400.1, 5500.1, 5600.1, 5700.1, 5800.1, 5900.1, 6000.1, 6100.1, 6200.1, 6300.1, 7000.1, 7600.1, 7700.1, 7800.1, 7900.1
Armco D&M Source 3700.1, 3800.1, 3900.1, 4000.1, 4100.1, 4200.1, 4300.1, 4400.1, 4500.1, 4600.1, 4700.1, 4800.1, 4900.1, 5000.1, 5100.1, 5200.1, 5300.1, 5400.1, 5500.1, 5600.1, 5700.1, 5800.1, 5900.1, 6000.1, 6100.1, 6200.1, 6300.1

Armco Producer 2000.1, 3300.1, 3400.1, 3500.1, 3600.1, 3700.1, 3800.1, 3900.1, 4000.1, 4100.1, 4200.1, 4300.1, 4400.1, 4500.1, 4600.1, 4700.1, 4800.1, 4900.1, 5000.1, 5100.1, 5200.1, 5300.1, 5400.1, 5500.1, 5600.1, 5700.1, 5800.1, 5900.1, 6000.1, 6100.1, 6200.1, 6300.1, 7100.1, 7200.1

Armco Source 2000.1, 3300.1, 3400.1, 3500.1, 3600.1

Armco W18 Filler Name 7200.7–7200.8, 7200.13, 10900.4–10900.6, 11500.4–11500.6

Armco W24 Filler Name 10200.4–10200.6, 10800.4–10800.6, 11000.4–11000.6, 12300.4–12300.6

Armco W25 Filler Name 9900.7–9900.9

Armco-MPC Reference 3300.1–3300.4, 3400.1–3400.4, 3500.1–3500.4, 3600.1–3600.4, 3700.1–3700.4, 3800.1–3800.4, 3900.1–3900.3, 4000.1–4000.3, 4100.1–4100.3, 4200.1–4200.3, 4300.1–4300.3, 4400.1–4400.4, 4500.1–4500.4, 4600.1–4600.3, 4700.1–4700.3, 4800.1–4800.3, 4900.1–4900.3, 5000.1–5000.4, 5100.1–5100.4, 5200.1–5200.4, 5300.1–5300.4, 5400.1–5400.3, 5500.1–5500.3, 5600.1–5600.3, 5700.1–5700.3, 5800.1–5800.3, 5900.1–5900.3, 6000.1–6000.3, 6100.1–6100.3, 6200.1–6200.3, 6300.1–6300.3

Assumed Did Specimen Fracture? 1000.3, 1000.6, 1000.9, 1000.12, 2100.3, 2100.6, 2300.3, 2300.6, 2400.3, 2400.6, 2400.9, 2400.12, 2400.15, 2400.18, 2500.2–2500.4, 2500.7, 2500.10, 2500.13, 2500.16, 2600.3, 2600.6, 2600.9, 2600.12, 2600.15, 2600.18, 2700.2–2700.4, 2700.7, 2700.10, 2700.13, 2700.16, 3100.2–3100.10, 3200.2–3200.20, 7100.2, 7300.2, 7400.2–7400.10, 7500.2–7500.20, 7600.2–7600.20, 7700.2–7700.20, 9200.2–9200.20, 9300.2–9300.20, 9400.2, 9500.2, 9500.5, 9600.2, 9600.5, 9700.2, 9700.5–9700.9, 9800.2, 9900.2, 9900.5–9900.9, 10100.2, 10200.2–10200.10, 10300.2, 10300.5, 10400.2, 10500.2–10500.6, 10600.1, 10700.2–10700.4, 10800.2–10800.6, 10900.2–10900.6, 11000.2–11000.6, 11100.1, 11200.2, 11200.5, 11300.2, 11400.2, 11500.2–11500.6, 11600.2, 11700.2, 11700.5, 11900.2, 12000.2, 12100.2, 12200.2, 12300.2–12300.14, 12400.2, 13800.8–13800.32, 13900.2–13900.22, 14000.4–14000.22, 14700.4–14700.6, 14700.9, 14700.13–14700.15, 14700.18, 14700.22–14700.24, 14700.27, 14800.4–14800.6, 14800.9, 14800.13–14800.15, 14800.18, 14800.22–14800.24, 14800.27, 14900.4–14900.6, 14900.9, 14900.13–14900.15, 14900.18, 15000.4–15000.6, 15000.9, 15000.13–15000.15, 15000.18, 15000.22–15000.24, 15000.27, 15100.4–15100.6, 15100.9, 15100.13–15100.15, 15100.18, 15100.22–15100.24, 15100.27, 15200.4–15200.6, 15200.9, 15200.13–15200.15, 15200.18, 16500.3, 16500.6, 16700.2, 16700.6, 16700.9, 16700.12, 16700.15, 16700.18, 16700.21, 16700.24, 16700.27, 16800.2, 16800.6, 16900.2, 16900.6, 17000.2, 17000.8, 17100.2, 17100.6, 17100.9, 17100.12, 17100.15, 17100.18, 17200.2, 17200.8, 17200.13, 17200.18, 17200.23, 17200.28, 17200.33, 17200.38, 17200.43, 17300.2, 17300.6, 17300.9, 17300.12, 17300.15, 17300.18, 17400.2, 17400.6, 17400.9, 17400.12, 17400.15, 17400.18, 17400.21, 17400.24, 17400.27, 17500.2, 17500.6, 17500.9, 17500.12, 17500.15, 17500.18, 17600.2, 17600.6, 17700.2, 17700.6, 17700.9, 17700.12, 17700.15, 17700.18, 17700.21, 17700.24, 17700.27, 17800.2, 17800.6, 17900.2, 17900.8, 17900.13, 17900.18, 17900.23, 17900.28, 17900.33, 17900.38, 17900.43, 18000.2, 18000.8, 18100.2, 18100.8, 18200.2, 18200.6, 18200.9, 18200.12, 18200.15, 18200.18, 18200.21, 18200.24, 18200.27, 18300.2, 18300.8, 18300.13, 18300.18, 18300.23, 18300.28, 18300.33, 18300.38, 18300.43, 18400.2, 18400.6, 18400.9, 18400.12, 18400.15, 18400.18, 18400.21, 18400.24, 18400.27, 18500.2, 18500.6, 18600.3, 18700.2, 18800.3, 18900.3, 19000.4, 19100.4, 19200.4, 19300.4, 19400.4, 19600.3, 19600.10, 19600.16–19600.18

Australia Producer 1100.1, 1200.1, 1300.1, 1400.1, 1500.1, 1600.1, 1700.1, 1800.1, 1900.1

Australia Source 1100.1, 1200.1, 1300.1, 1400.1, 1500.1, 1600.1, 1700.1, 1800.1, 1900.1

B

B Location 1000.2, 1000.6

B0469-2C Lot ID 15400.1–15400.6, 16200.1–16200.6

B1038-2B Lot ID 18600.1–18600.6

B-1088-3 Lot ID 18800.1–18800.6

B-1088-5 Lot ID 18900.1–18900.6

B1908-3 Lot ID 15500.1–15500.2, 15500.5–15500.7

B1908-5A Lot ID 15600.1–15600.6

B1908-5B Lot ID 15800.1–15800.3, 15800.6–15800.8

B5761-2R Lot ID 19500.1–19500.7

B8478-3 Lot ID 17800.1–17800.7

B8490-2 Lot ID 17500.1–17500.19

B8563-4 Lot ID 17300.1–17300.19

B8601-5 Lot ID 17100.1–17100.19

B8687-1 Lot ID 17600.1–17600.7

B8740-2 Lot ID 17200.1–17200.46

B8740-3 Lot ID 16700.1–16700.28

B8817-1 Lot ID 18400.1–18400.28

B9353-3 Lot ID 16600.1–16600.7

B9671-1E Lot ID 12600.1–12600.14

Back surface at root Location wrt Surface 14200.16, 14200.38, 14300.16, 14300.38, 14400.16, 14400.38, 14500.16–14500.24, 14500.36–14500.44, 14600.16–14600.24, 14600.36–14600.44, 14700.8, 14700.17, 14700.26, 14800.8, 14800.17, 14800.26, 14900.8, 14900.17, 15000.8, 15000.17, 15000.26, 15100.8, 15100.17, 15100.26, 15200.8, 15200.17

Back surface not root Location wrt Surface 13800.20–13800.22, 14200.18–14200.26, 14200.40–14200.48, 14300.18–14300.26, 14300.40–14300.48, 14400.18–14400.26, 14400.40–14400.48

Basic Flux Type 16500.1, 16500.5

BL55 Flux Name 13900.1, 13900.4–13900.26, 14000.4–14000.22, 14300.1–14300.48, 14400.1–14400.48, 14500.1–14500.47, 14600.1–14600.47

BOF Melting Practice 1000.1–1000.3, 1000.6, 1000.9, 1000.12–1000.14, 1100.1, 1200.1, 1300.1, 1400.1, 1500.1, 1600.1, 1700.1, 1800.1, 1900.1, 2100.1–2100.3, 2100.6, 2200.1–2200.3, 2200.6, 2300.1–2300.3, 2400.1–2400.3, 2400.6, 2400.9, 2400.12, 2400.15, 2400.18, 2500.1, 2600.1–2600.3, 2600.6, 2600.9, 2600.12, 2600.15, 2600.18, 2700.1

Bottom Composition Position 2100.2, 2100.6–2100.8, 2200.2, 2200.6–2200.8, 2300.2, 2400.2, 2400.6–2400.8, 2400.12–2400.14, 2400.18–2400.20, 2600.2, 2600.6–2600.8, 2600.12–2600.14, 2600.18–2600.20, 2800.2, 2800.6–2800.8, 2900.2, 2900.6–2900.8, 3000.2, 3000.6–3000.8

Bottom Ingot Position 2100.2, 2100.6, 2200.2, 2200.6, 2300.2, 2400.2, 2400.6, 2400.12, 2400.18, 2600.2, 2600.6, 2600.12, 2600.18, 16700.20, 16800.5, 16900.5, 17000.7, 17100.11, 17200.32, 17300.11, 17400.20, 17500.11, 17600.5, 17700.20, 17800.5, 17900.32, 18000.7, 18100.7, 18200.20, 18300.32, 18400.20, 18500.5

BS131H2 Standard Method 14700.4–14700.6, 14700.9, 14700.13–14700.15, 14700.18, 14700.22–14700.24, 14700.27, 14800.4–14800.6, 14800.9, 14800.13–14800.15, 14800.18, 14800.22–14800.24, 14800.27, 14900.4–14900.6, 14900.9, 14900.13–14900.15, 14900.18, 15000.4–15000.6, 15000.9, 15000.13–15000.15, 15000.18, 15000.22–15000.24, 15000.27, 15100.4–15100.6, 15100.9, 15100.13–15100.15, 15100.18, 15100.22–15100.24, 15100.27, 15200.4–15200.6, 15200.9, 15200.13–15200.15, 15200.18

BS4360 Gr50D Material Name 13800.1–13800.37, 13900.1–13900.26, 14000.1–14000.23, 14100.1–14100.10, 14200.1–14200.49, 14300.1–14300.49, 14400.1–14400.49, 14500.1–14500.47, 14600.1–14600.47, 14700.1–14700.28, 14800.1–14800.28, 14900.1–14900.19, 15000.1–15000.28, 15100.1–15100.28, 15200.1–15200.19, 15300.1–15300.6, 15400.1–15400.6, 15500.1–15500.2, 15500.5–15500.7, 15600.1–15600.6, 15700.1–15700.3, 15700.6–15700.8, 15800.1–15800.3, 15800.6–15800.8, 15900.1–15900.6, 16000.1–16000.6, 16100.1–16100.3, 16100.6–16100.8, 16200.1–16200.6, 16300.1–16300.6, 16400.1–16400.6

BS5762 Standard Method 7000.2, 13800.34–13800.37, 13900.24–13900.26, 14200.2–14200.5, 14300.2–14300.5, 14400.2–14400.5, 14500.2–14500.5, 14600.2–14600.5, 14700.2, 14700.11, 14700.20, 14800.2, 14800.11, 14800.20, 14900.2, 14900.11, 15000.2, 15000.11, 15000.20, 15100.2, 15100.11, 15100.20, 15200.2, 15200.11

Bunge Producer 16500.1

C

C Lot ID 4000.1–4000.3

C4771-39A Lot ID 18500.1–18500.7

C5830 Lot ID 16000.1–16000.6

C5830-5T Lot ID 15300.1–15300.6

C-9283-11 Lot ID 18700.1–18700.5

CG A537M Material Name 7100.1–7100.6, 7200.1–7200.16

Charpy V Impact Test Type 1000.3, 1000.6, 1000.9, 1000.12, 1100.2, 1200.2, 1300.2, 1400.2, 1500.2, 1600.2, 1700.2, 1800.2, 1900.2, 2000.4, 2100.3, 2100.6, 2200.3, 2200.6, 2300.3, 2300.6, 2400.3, 2400.6, 2400.9, 2400.12, 2400.15, 2400.18, 2500.2–2500.4, 2500.7, 2500.10, 2500.13, 2500.16, 2600.3, 2600.6, 2600.9, 2600.12, 2600.15, 2600.18, 2700.2–2700.4, 2700.7, 2700.10, 2700.13, 2700.16, 2800.3, 2800.6, 2900.3, 2900.6, 3000.3, 3000.6, 3100.2–3100.10, 3200.2–3200.20, 3300.2, 3400.2, 3500.2, 3600.2, 3700.2, 3800.2, 3900.2, 4000.2, 4100.2, 4200.2, 4300.2, 4400.2, 4500.2, 4600.2, 4700.2, 4800.2, 4900.2, 5000.2, 5100.2, 5200.2, 5300.2, 5400.2, 5500.2, 5600.2, 5700.2, 5800.2, 5900.2, 6000.2, 6100.2, 6200.2, 6300.2, 6400.1, 6400.4, 6400.7, 6400.10, 6400.13, 6400.16, 6400.19–6400.21, 6500.2–6500.4, 6600.2–6600.4, 6700.2–6700.4, 6800.2–6800.4, 6900.1, 7000.5, 7100.2, 7200.2, 7200.8, 7200.13, 7300.2, 7400.2–7400.10, 7500.2–7500.20, 7600.2–7600.20, 7700.2–7700.20, 7800.3, 7900.3, 8000.2–8000.4, 8100.2–8100.4, 8200.2–8200.4, 8300.2–8300.4, 8400.1, 8500.2–8500.4, 8600.2–8600.4, 8700.2–8700.4, 8800.2–8800.4, 8900.1, 9000.2, 9100.3, 9200.2–9200.20, 9300.2–9300.20, 9400.2, 9500.2, 9500.5, 9600.2, 9600.5, 9700.2, 9700.5–9700.9, 9800.2, 9900.2, 9900.5–9900.9, 10000.2, 10100.2, 10200.2–10200.10, 10300.2, 10300.5, 10400.2, 10500.2–10500.6, 10600.1, 10700.2–10700.4, 10800.2–10800.6, 10900.2–10900.6, 11000.2–11000.6, 11100.1, 11200.2, 11200.5, 11300.2, 11400.2, 11500.2–11500.6, 11600.2, 11700.2, 11700.5, 11800.2, 11800.5, 11900.2–11900.4, 12000.2, 12100.2, 12200.2, 12300.2–12300.14, 12400.2, 12500.3, 12600.3, 12600.6, 12700.3, 12800.2, 12900.2, 13000.2, 13100.2, 13200.2, 13300.2, 13400.2, 13500.2, 13600.2, 13700.2, 13800.3–13800.5, 13800.8–13800.32, 13900.2–13900.22, 14000.4–14000.22, 14100.5–14100.9, 14200.6–14200.48, 14300.6–14300.48, 14400.6–14400.48, 14500.6–14500.44, 14600.6–14600.44, 14700.4–14700.6, 14700.9, 14700.13–14700.15, 14700.18,

14700.22–14700.24, 14700.27, 14800.4–14800.6, 14800.9, 14800.13–14800.15, 14800.18, 14800.22–14800.24, 14800.27, 14900.4–14900.6, 14900.9, 14900.13–14900.15, 14900.18, 15000.4–15000.6, 15000.9, 15000.13–15000.15, 15000.18, 15000.22–15000.24, 15000.27, 15100.4–15100.6, 15100.9, 15100.13–15100.15, 15100.18, 15100.22–15100.24, 15100.27, 15200.4–15200.6, 15200.9, 15200.13–15200.15, 15200.18, 15300.2, 15400.2, 15500.2, 15600.2, 15700.3, 15800.3, 15900.3, 16000.2, 16100.3, 16200.2, 16300.2, 16400.2, 16500.3, 16500.6, 16600.2, 16700.2, 16700.6, 16700.9, 16700.12, 16700.15, 16700.18, 16700.21, 16700.24, 16700.27, 16800.2, 16800.6, 16900.2, 16900.6, 17000.2, 17000.8, 17100.2, 17100.6, 17100.9, 17100.12, 17100.15, 17100.18, 17200.2, 17200.8, 17200.13, 17200.18, 17200.23, 17200.28, 17200.33, 17200.38, 17200.43, 17300.2, 17300.6, 17300.9, 17300.12, 17300.15, 17300.18, 17400.2, 17400.6, 17400.9, 17400.12, 17400.15, 17400.18, 17400.21, 17400.24, 17400.27, 17500.2, 17500.6, 17500.9, 17500.12, 17500.15, 17500.18, 17600.2, 17600.6, 17700.2, 17700.6, 17700.9, 17700.12, 17700.15, 17700.18, 17700.21, 17700.24, 17700.27, 17800.2, 17800.6, 17900.2, 17900.8, 17900.13, 17900.18, 17900.23, 17900.28, 17900.33, 17900.38, 17900.43, 18000.2, 18000.8, 18100.2, 18100.8, 18200.2, 18200.6, 18200.9, 18200.12, 18200.15, 18200.18, 18200.21, 18200.24, 18200.27, 18300.2, 18300.8, 18300.13, 18300.18, 18300.23, 18300.28, 18300.33, 18300.38, 18300.43, 18400.2, 18400.6, 18400.9, 18400.12, 18400.15, 18400.18, 18400.21, 18400.24, 18400.27, 18500.2, 18500.6, 18600.3, 18700.2, 18800.3, 18900.3, 19000.4, 19100.4, 19200.4, 19300.4, 19400.4, 19500.5, 19600.3, 19600.10, 19600.16–19600.18

Cleavage Curve Shape 14800.20, 14900.11

Compact Specimen Type 7800.2, 9000.6, 9100.2, 12500.2, 12600.2, 12700.2, 15700.2, 15800.2, 15900.2, 16100.2

Compact Tension Specimen Type 18600.2, 18700.1, 18800.2, 18900.2, 19000.3, 19100.3, 19200.3, 19300.3, 19400.3, 19600.2, 19600.9, 19600.15

Composition Position

- **1/4T** 13800.1–13800.37, 13900.1–13900.26, 14000.1–14000.23
- **Bottom** 2100.2, 2100.6–2100.8, 2200.2, 2200.6–2200.8, 2300.2, 2400.2, 2400.6–2400.8, 2400.12–2400.14, 2400.18–2400.20, 2600.2, 2600.6–2600.8, 2600.12–2600.14, 2600.18–2600.20, 2800.2, 2800.6–2800.8, 2900.2, 2900.6–2900.8, 3000.2, 3000.6–3000.8
- **Ladle** 1100.1–1100.2, 1100.5–1100.6, 1200.1–1200.2, 1200.5–1200.6, 1300.1–1300.2, 1300.5–1300.6, 1400.1–1400.2, 1400.5–1400.6, 1500.1–1500.2, 1500.5–1500.6, 1600.1–1600.2, 1600.5–1600.6, 1700.1–1700.2, 1700.5–1700.6, 1800.1–1800.2, 1800.5–1800.6, 1900.1–1900.2, 1900.5–1900.6, 15500.1–15500.2, 15500.5–15500.7, 15600.1–15600.6, 16700.1–16700.28, 16800.1–16800.7, 16900.1–16900.7, 17000.1–17000.11, 17100.1–17100.19, 17200.1–17200.46, 17300.1–17300.19, 17400.1–17400.28, 17500.1–17500.19, 17600.1–17600.7, 17700.1–17700.28, 17800.1–17800.7, 17900.1–17900.46, 18000.1–18000.11, 18100.1–18100.11, 18200.1–18200.28, 18300.1–18300.46, 18400.1–18400.28, 18500.1–18500.7
- **Top** 2100.1–2100.5, 2200.1–2200.5, 2300.1–2300.8, 2400.1–2400.5, 2400.9–2400.11, 2400.15–2400.17, 2500.1–2500.18, 2600.1–2600.5, 2600.9–2600.11, 2600.15–2600.17, 2700.1–2700.18, 2800.1–2800.5, 2900.1–2900.5, 3000.1–3000.5

Concast Ingot Position 1000.1–1000.3, 1000.6, 1000.9, 1000.12–1000.14, 1100.1, 1200.1, 1300.1, 1400.1, 1500.1, 1600.1, 1700.1, 1800.1, 1900.1, 2800.1–2800.3, 2800.6, 2900.1–2900.3, 2900.6, 3000.1–3000.3, 3000.6

Curve Shape

- **Cleavage** 14800.20, 14900.11
- **Maximum** 15000.2, 15000.20

Cylindrical Specimen Type 3100.1, 7000.1, 7300.1, 7400.1, 7600.1, 7800.1, 7900.1, 9000.1, 9100.1, 9200.1, 12500.1, 12600.1, 12700.1, 14700.3, 14700.8, 14700.12, 14700.17, 14700.21, 14700.26, 14800.3, 14800.8, 14800.12, 14800.17, 14800.21, 14800.26, 14900.3, 14900.8, 14900.12, 14900.17, 15000.3, 15000.8, 15000.12, 15000.17, 15000.21, 15000.26, 15100.3, 15100.8, 15100.12, 15100.17, 15100.21, 15100.26, 15200.3, 15200.8, 15200.12, 15200.17, 15300.1, 15400.1, 15500.1, 15600.1, 15700.1, 15800.1, 15900.1, 16000.1, 16100.1, 16200.1, 16300.1, 16400.1, 16500.2, 16500.5, 18600.1, 18800.1, 18900.1, 19000.2, 19100.2, 19200.2, 19300.2, 19400.2, 19600.1, 19600.8, 19600.14

D

D2580-4 Lot ID 17400.1–17400.28

D3007-3 Lot ID 15700.1–15700.3, 15700.6–15700.8

D3631-7L Lot ID 16900.1–16900.7

D3667-3M Lot ID 17000.1–17000.11

D3703-4B Lot ID 16800.1–16800.7

D3710-42B Lot ID 17900.1–17900.46

D3791-2B Lot ID 7300.1–7300.6

D3974-1B Lot ID 18200.1–18200.28

D3975-3E Lot ID 17700.1–17700.28

D4030-4A Lot ID 18300.1–18300.46

D4179-3B Lot ID 7900.1–7900.6

D6274-4 Lot ID 9000.1–9000.2, 9000.5–9000.9, 9100.1–9100.3, 9100.6–9100.9

D6873-1A Lot ID 12500.1–12500.6

D6873-1B Lot ID 12700.1–12700.7

Did Specimen Fracture?
Assumed 1000.3, 1000.6, 1000.9, 1000.12, 2100.3, 2100.6, 2300.3, 2300.6, 2400.3, 2400.6, 2400.9, 2400.12, 2400.15, 2400.18, 2500.2–2500.4, 2500.7, 2500.10, 2500.13, 2500.16, 2600.3, 2600.6, 2600.9, 2600.12, 2600.15, 2600.18, 2700.2–2700.4, 2700.7, 2700.10, 2700.13, 2700.16, 3100.2–3100.10, 3200.2–3200.20, 7100.2, 7300.2, 7400.2–7400.10, 7500.2–7500.20, 7600.2–7600.20, 7700.2–7700.20, 9200.2–9200.20, 9300.2–9300.20, 9400.2, 9500.2, 9500.5, 9600.2, 9600.5, 9700.2, 9700.5–9700.9, 9800.2, 9900.2, 9900.5–9900.9, 10100.2, 10200.2–10200.10, 10300.2, 10300.5, 10400.2, 10500.2–10500.6, 10600.1, 10700.2–10700.4, 10800.2–10800.6, 10900.2–10900.6, 11000.2–11000.6, 11100.1, 11200.2, 11200.5, 11300.2, 11400.2, 11500.2–11500.6, 11600.2, 11700.2, 11700.5, 11900.2, 12000.2, 12100.2, 12200.2, 12300.2–12300.14, 12400.2, 13800.8–13800.32, 13900.2–13900.22, 14000.4–14000.22, 14700.4–14700.6, 14700.9, 14700.13–14700.15, 14700.18, 14700.22–14700.24, 14700.27, 14800.4–14800.6, 14800.9, 14800.13–14800.15, 14800.18, 14800.22–14800.24, 14800.27, 14900.4–14900.6, 14900.9, 14900.13–14900.15, 14900.18, 15000.4–15000.6, 15000.9, 15000.13–15000.15, 15000.18, 15000.22–15000.24, 15000.27, 15100.4–15100.6, 15100.9, 15100.13–15100.15, 15100.18, 15100.22–15100.24, 15100.27, 15200.4–15200.6, 15200.9, 15200.13–15200.15, 15200.18, 16500.3, 16500.6, 16700.2, 16700.6, 16700.9, 16700.12, 16700.15, 16700.18, 16700.21, 16700.24, 16700.27, 16800.2, 16800.6, 16900.2, 16900.6, 17000.2, 17000.8, 17100.2, 17100.6, 17100.9, 17100.12, 17100.15, 17100.18, 17200.2, 17200.8, 17200.13, 17200.18, 17200.23, 17200.28, 17200.33, 17200.38, 17200.43, 17300.2, 17300.6, 17300.9, 17300.12, 17300.15, 17300.18, 17400.2, 17400.6, 17400.9, 17400.12, 17400.15, 17400.18, 17400.21, 17400.24, 17400.27, 17500.2, 17500.6, 17500.9, 17500.12, 17500.15, 17500.18, 17600.2, 17600.6, 17700.2, 17700.6, 17700.9, 17700.12, 17700.15, 17700.18, 17700.21, 17700.24, 17700.27, 17800.2, 17800.6, 17900.2, 17900.8, 17900.13, 17900.18, 17900.23, 17900.28, 17900.33, 17900.38, 17900.43, 18000.2, 18000.8, 18100.2, 18100.8, 18200.2, 18200.6, 18200.9, 18200.12, 18200.15, 18200.18, 18200.21, 18200.24, 18200.27, 18300.2, 18300.8, 18300.13, 18300.18, 18300.23, 18300.28, 18300.33, 18300.38, 18300.43, 18400.2, 18400.6, 18400.9, 18400.12, 18400.15, 18400.18, 18400.21, 18400.24, 18400.27, 18500.2, 18500.6, 18600.3, 18700.2, 18800.3, 18900.3, 19000.4, 19100.4, 19200.4, 19300.4, 19400.4, 19600.3, 19600.10, 19600.16–19600.18
Yes 1100.2, 1200.2, 1300.2, 1400.2, 1500.2, 1600.2, 1700.2, 1800.2, 1900.2, 2000.4, 2200.6, 2900.3, 2900.6, 3300.2, 3400.2, 3500.2, 3600.2, 3700.2, 3800.2, 3900.2, 4000.2, 4100.2, 4200.2, 4300.2, 4400.2, 4500.2, 4600.2, 4700.2, 4800.2, 4900.2, 5000.2, 5100.2, 5200.2, 5300.2, 5400.2, 5500.2, 5600.2, 5700.2, 5800.2, 5900.2, 6000.2, 6100.2, 6200.2, 6300.2, 6400.1, 6400.4, 6400.7, 6400.10, 6400.13, 6400.16, 6400.19–6400.21, 6500.2–6500.4, 6600.2–6600.4, 6700.2–6700.4, 6800.2–6800.4, 6900.1, 8000.2–8000.4, 8100.2–8100.4, 8200.2–8200.4, 8300.2–8300.4, 8400.1, 8500.2–8500.4, 8600.2–8600.4, 8700.2–8700.4, 8800.2–8800.4, 8900.1, 14100.5–14100.9
Did Specimen Split?
No 8000.2–8000.4, 8100.2–8100.4, 8200.2–8200.4, 8300.2–8300.4, 8400.1, 8500.2–8500.4, 8600.2–8600.4, 8700.2–8700.4, 8800.2–8800.4, 8900.1
DO733-1D Lot ID 18000.1–18000.11
Double Notch Bend Specimen Type 2000.3, 7000.2, 14700.2, 14700.11, 14700.20, 14800.2, 14800.11, 14800.20, 14900.2, 14900.11, 15000.2, 15000.11, 15000.20, 15100.2, 15100.11, 15100.20, 15200.2, 15200.11
Double U-Groove Joint Preparation 10800.4–10800.6, 10900.4–10900.6, 11000.4–11000.6, 12300.4–12300.6
Double V-Groove Joint Preparation 7200.7–7200.8, 7200.13, 10500.4–10500.6, 11500.4–11500.6, 12300.8–12300.14, 14500.1–14500.47, 14600.1–14600.47, 16500.1, 16500.5
Downhand IG Welding Position 2500.1, 2500.4, 2500.7, 2500.10, 2500.13, 2500.16, 2700.1, 2700.4, 2700.7, 2700.10, 2700.13, 2700.16, 3100.2–3100.10, 3200.1, 3200.4–3200.20, 7400.2–7400.10, 7500.1, 7500.4–7500.20, 14200.1–14200.48, 14300.1–14300.48, 14400.1–14400.48, 14500.1–14500.47, 14600.1–14600.47
Downhand Welding Position 7200.7–7200.8, 7200.13, 13800.8–13800.36, 13900.1, 13900.4–13900.26, 14000.1–14000.22, 16500.1, 16500.5, 19000.1, 19100.1, 19200.1, 19300.1, 19400.1, 19600.7, 19600.14
DTNSRDC Producer 19000.1, 19100.1, 19200.1
Dynamic Tear Specimen Type 2000.8, 7100.5, 7200.5, 7200.11, 7200.15, 7300.5, 7800.5, 7900.5, 9000.7, 9100.7, 12500.5, 12600.9–12600.13, 12700.6, 12800.4, 12900.4, 13000.4, 13100.4, 13300.4, 13400.4, 13500.4, 13600.4, 15300.5, 15400.5, 15500.6, 15600.5, 15700.7, 15800.7, 15900.5, 16000.5, 16100.7, 16200.5, 16300.5, 16400.5, 16600.6, 17000.5, 17000.10, 17200.5, 17200.10, 17200.15, 17200.20, 17200.25, 17200.30, 17200.35, 17200.40, 17200.45, 17900.5, 17900.10, 17900.15, 17900.20, 17900.25, 17900.30, 17900.35, 17900.40, 17900.45, 18000.5, 18000.10, 18100.5, 18100.10, 18300.5, 18300.10, 18300.15, 18300.20, 18300.25, 18300.30, 18300.35, 18300.40, 18300.45,

18600.5, 18700.4, 18800.5, 18900.5, 19000.6, 19100.6, 19200.6, 19300.6, 19400.6, 19500.2, 19600.5, 19600.12, 19600.20

Dynamic Tear Test Type 2000.8, 7100.5, 7200.5, 7200.11, 7200.15, 7300.5, 7800.5, 7900.5, 9000.7, 9100.7, 12500.5, 12600.9–12600.13, 12700.6, 12800.4, 12900.4, 13000.4, 13100.4, 13300.4, 13400.4, 13500.4, 13600.4, 15300.5, 15400.5, 15500.6, 15600.5, 15700.7, 15800.7, 15900.5, 16000.5, 16100.7, 16200.5, 16300.5, 16400.5, 16600.6, 17000.5, 17000.10, 17200.5, 17200.10, 17200.15, 17200.20, 17200.25, 17200.30, 17200.35, 17200.40, 17200.45, 17900.5, 17900.10, 17900.15, 17900.20, 17900.25, 17900.30, 17900.35, 17900.40, 17900.45, 18000.5, 18000.10, 18100.5, 18100.10, 18300.5, 18300.10, 18300.15, 18300.20, 18300.25, 18300.30, 18300.35, 18300.40, 18300.45, 18600.5, 18700.4, 18800.5, 18900.5, 19000.6, 19100.6, 19200.6, 19300.6, 19400.6, 19500.2, 19600.5, 19600.12, 19600.20

E

E 208 Standard Method 1000.14, 1100.6, 1200.6, 1300.6, 1400.6, 1500.6, 1600.6, 1700.6, 1800.6, 1900.6, 2000.7, 3300.1, 3400.1, 3500.1, 3600.1, 3700.1, 3800.1, 3900.1, 4000.1, 4100.1, 4200.1, 4300.1, 4400.1, 4500.1, 4600.1, 4700.1, 4800.1, 4900.1, 5000.1, 5100.1, 5200.1, 5300.1, 5400.1, 5500.1, 5600.1, 5700.1, 5800.1, 5900.1, 6000.1, 6100.1, 6200.1, 6300.1, 7100.4, 7200.4, 7200.10, 13800.7

E 23 Standard Method 7100.2, 16500.3, 16500.6, 18600.3, 18700.2, 18800.3, 18900.3, 19000.4, 19100.4, 19200.4, 19300.4, 19400.4, 19600.3, 19600.10, 19600.16–19600.18

E 604 Standard Method 2000.8, 7100.5, 7200.5, 7200.11, 7200.15, 18600.5, 18700.4, 18800.5, 18900.5, 19000.6, 19100.6, 19200.6, 19300.6, 19400.6, 19600.5, 19600.12, 19600.20

E 8 Standard Method 7100.1, 7200.1, 7200.7, 16500.2, 16500.5, 18600.1, 18800.1, 18900.1, 19000.2, 19100.2, 19200.2, 19300.2, 19400.2, 19600.1, 19600.8, 19600.14

E Lot ID 5300.1–5300.4

E10018 Filler Specification 16500.1, 16500.5

E11018-M Filler Specification 9900.7–9900.9, 10200.8–10200.10

E22000/1E Filler Name 19100.1, 19200.1, 19300.1, 19400.1

E318 Standard Method 12600.2

E7018 Filler Specification 3100.2–3100.10, 7600.2–7600.20

E70-EA2 Filler Specification 7700.1, 7700.4–7700.20

E72-EW-W Filler Specification 9300.1, 9300.4–9300.20

E8018 Filler Specification 10500.4–10500.6

E8018-C1 Filler Specification 12300.8–12300.14

E8018C-2 Filler Specification 9200.2–9200.20, 9700.7–9700.9

E8018-C3 Filler Specification 7400.2–7400.10

E813 Standard Method 7800.2, 7900.2, 9000.6, 9100.2, 12500.2, 12700.2, 15700.2, 15800.2, 15900.2, 16100.2, 19000.3, 19100.3, 19200.3, 19300.3, 19400.3

EF2-F2 Filler Specification 7500.1, 7500.4–7500.20

electric furnace Melting Practice 5400.1, 5500.1, 5600.1

ESW Weld Type 6400.4, 6400.7, 6500.1, 6500.4, 8000.1, 8000.4, 8600.1, 8600.4

F

F Heat Treatment 1000.1–1000.3, 1000.6, 1000.9, 1000.12–1000.14, 7800.1, 7900.1

F72-EM12K Filler Specification 3200.1, 3200.4–3200.20

F96 Flux Type 7500.1, 7500.4–7500.20

FCA Weld Type 14700.1–14700.3, 14700.6–14700.8, 14700.11–14700.12, 14700.15–14700.17, 14700.20–14700.21, 14700.24–14700.26, 14800.1–14800.3, 14800.6–14800.8, 14800.11–14800.12, 14800.15–14800.17, 14800.20–14800.21, 14800.24–14800.26, 14900.1–14900.3, 14900.6–14900.8, 14900.11–14900.12, 14900.15–14900.17, 15000.1–15000.3, 15000.6–15000.8, 15000.11–15000.12, 15000.15–15000.17, 15000.20–15000.21, 15000.24–15000.26, 15100.1–15100.3, 15100.6–15100.8, 15100.11–15100.12, 15100.15–15100.17, 15100.20–15100.21, 15100.24–15100.26, 15200.1–15200.3, 15200.6–15200.8, 15200.11–15200.12, 15200.15–15200.17

Filler Alloy

- **Hardex-N** 1100.6, 1200.6, 1300.6, 1400.6, 1500.6, 1600.6, 1700.6, 1800.6, 1900.6, 7100.4, 7200.4, 7200.10

Filler Name

- **Armco W18** 7200.7–7200.8, 7200.13, 10900.4–10900.6, 11500.4–11500.6
- **Armco W24** 10200.4–10200.6, 10800.4–10800.6, 11000.4–11000.6, 12300.4–12300.6
- **Armco W25** 9900.7–9900.9
- **E22000/1E** 19100.1, 19200.1, 19300.1, 19400.1
- **Hobart25P** 6400.4, 6400.7, 6400.10, 6400.13, 6500.1, 6500.4, 6600.1, 6600.4
- **L-50N** 13800.8–13800.36, 14200.1–14200.48
- **LindeWS** 8000.1, 8000.4, 8100.1, 8100.4, 8200.1, 8200.4, 8600.1, 8600.4, 8700.1, 8700.4
- **Nk203NiC** 14700.1–14700.3, 14700.6–14700.8, 14700.11–14700.12, 14700.15–14700.17, 14700.20–

14700.21, 14700.24–14700.26, 14800.1–14800.3, 14800.6–14800.8, 14800.11–14800.12, 14800.15–14800.17, 14800.20–14800.21, 14800.24–14800.26, 14900.1–14900.3, 14900.6–14900.8, 14900.11–14900.12, 14900.15–14900.17, 15000.1–15000.3, 15000.6–15000.8, 15000.11–15000.12, 15000.15–15000.17, 15000.20–15000.21, 15000.24–15000.26, 15100.1–15100.3, 15100.6–15100.8, 15100.11–15100.12, 15100.15–15100.17, 15100.20–15100.21, 15100.24–15100.26, 15200.1–15200.3, 15200.6–15200.8, 15200.11–15200.12, 15200.15–15200.17

TW8544 6400.16, 6400.19–6400.21, 6700.1, 6700.4, 6800.1, 6800.4, 8300.1, 8300.4, 8500.1, 8500.4, 8800.1, 8800.4

W36 13900.1, 13900.4–13900.26, 14000.1–14000.22, 14300.1–14300.48, 14400.1–14400.48, 14500.1–14500.47, 14600.1–14600.47

Filler Specification

E10018 16500.1, 16500.5

E11018-M 9900.7–9900.9, 10200.8–10200.10

E7018 3100.2–3100.10, 7600.2–7600.20

E70-EA2 7700.1, 7700.4–7700.20

E72-EW-W 9300.1, 9300.4–9300.20

E8018 10500.4–10500.6

E8018-C1 12300.8–12300.14

E8018C-2 9200.2–9200.20, 9700.7–9700.9

E8018-C3 7400.2–7400.10

EF2-F2 7500.1, 7500.4–7500.20

F72-EM12K 3200.1, 3200.4–3200.20

M22000/10 19600.7, 19600.14

M22000/1E 19000.1

PFH-60A 2500.1, 2500.4, 2500.7, 2500.10, 2500.13, 2500.16, 2700.1, 2700.4, 2700.7, 2700.10, 2700.13, 2700.16

Final Processing

A,Q,T 16700.1, 16700.11, 16700.20, 16800.1, 16800.5, 16900.1, 16900.5, 17000.1, 17000.7, 17100.1, 17100.11, 17200.1, 17200.17, 17200.32, 17300.1, 17300.11, 17400.1, 17400.11, 17400.20, 17500.1, 17500.11, 17600.1, 17600.5, 17700.1, 17700.11, 17700.20, 17800.1, 17800.5, 17900.1, 17900.17, 17900.32, 18000.1, 18000.7, 18100.1, 18100.7, 18200.1, 18200.11, 18200.20, 18300.1, 18300.17, 18300.32, 18400.1, 18400.11, 18400.20, 18500.1, 18500.5

A,R 1000.1–1000.3, 1000.6, 1000.9, 1000.12–1000.14, 1100.1, 1200.1, 1300.1, 1400.1, 1500.1, 1600.1, 1700.1, 1800.1, 1900.1, 3100.1, 3200.1, 3300.1, 3400.1, 3500.1, 3600.1, 3700.1, 3800.1, 3900.1, 4000.1, 4100.1, 4200.1, 4300.1, 4400.1, 4500.1, 4600.1, 4700.1, 4800.1, 4900.1, 5000.1, 5100.1, 5200.1, 5300.1, 5400.1, 5500.1, 5600.1, 5700.1, 5800.1, 5900.1, 6000.1, 6100.1, 6200.1, 6300.1, 7000.1, 7600.1, 7700.1, 7800.1, 7900.1

H 14700.1, 14800.1, 14900.1, 15000.1, 15100.1, 15200.1

K 9400.1, 9500.1, 9500.4, 9600.1, 9700.1, 9700.4, 9800.1, 9900.1, 9900.4, 9900.7, 10000.1, 10100.1, 10200.1, 10300.1, 10300.4, 10400.1, 10500.1, 10600.1, 10700.1, 10700.4, 10800.1, 10900.1, 11000.1, 11100.1, 11200.1, 11200.4, 11300.1, 11400.1, 11500.1, 11600.1, 11700.1, 11800.1, 11800.5, 11900.1, 11900.4, 12000.1, 12100.1, 12200.1, 12300.1, 12400.1

N 2000.1, 2800.1–2800.3, 2800.6, 2900.1–2900.3, 2900.6, 3000.1–3000.3, 3000.6, 7300.1, 7400.1, 7500.1, 9000.1, 9100.1, 9200.1, 9300.1, 13800.2, 13800.5, 13900.1, 14000.4, 14100.1, 14200.1, 14300.1, 14400.1, 14500.1, 14600.1, 15300.1, 15400.1, 15700.1, 15800.1, 15900.1, 16000.1, 16100.1, 16200.1, 16300.1

N,A 13800.1–13800.3, 14100.4–14100.5

N,C,A 14100.7–14100.9

Q,K 12500.1, 12700.1

Q,T 2100.1–2100.3, 2100.6, 2200.1–2200.3, 2200.6, 2300.1–2300.3, 2400.1–2400.3, 2400.6, 2400.9, 2400.12, 2400.15, 2400.18, 2500.1, 2600.1–2600.3, 2600.6, 2600.9, 2600.12, 2600.15, 2600.18, 2700.1, 7100.1, 7200.1, 12600.1, 16400.1, 18600.1, 18700.1, 18800.1, 18900.1, 19500.1, 19600.1

Q,T,W 19600.7

W 19000.1, 19100.1, 19200.1, 19300.1, 19400.1

Final surface Location wrt Surface 11500.4–11500.6, 12300.4–12300.14, 13800.8–13800.18, 13800.24–13800.32, 13900.1, 13900.4–13900.22, 14000.4–14000.22, 14200.6–14200.14, 14200.28–14200.36, 14300.6–14300.14, 14300.28–14300.36, 14400.6–14400.14, 14400.28–14400.36, 14500.6–14500.14, 14500.26–14500.34, 14600.6–14600.14, 14600.26–14600.34, 14700.3, 14700.12, 14700.21, 14800.3, 14800.12, 14800.21, 14900.3, 14900.12, 15000.3, 15000.12, 15000.21, 15100.3, 15100.12, 15100.21, 15200.3, 15200.12

Flat Specimen Type 13800.1–13800.2

Flat Welding Position 9700.7–9700.9, 9900.7–9900.9, 10200.4–10200.10, 10800.4–10800.6, 10900.4–10900.6, 11000.4–11000.6, 11500.4–11500.6, 12300.4–12300.6

Flux Name

BL55 13900.1, 13900.4–13900.26, 14000.4–14000.22, 14300.1–14300.48, 14400.1–14400.48, 14500.1–14500.47, 14600.1–14600.47

Hobart201 6400.4, 6400.7, 6400.10, 6400.13, 6400.16, 6400.19–6400.21, 6500.1, 6500.4, 6600.1, 6600.4, 6700.1, 6700.4, 6800.1, 6800.4, 8000.1, 8000.4, 8100.1, 8100.4, 8200.1, 8200.4, 8300.1, 8300.4, 8500.1, 8500.4, 8600.1, 8600.4, 8700.1, 8700.4, 8800.1, 8800.4

Linc 860 7200.7–7200.8, 7200.13

Linc 880 11500.4–11500.6
Linc 882 10900.4–10900.6
Linde166p 10200.4–10200.6, 10800.4–10800.6, 11000.4–11000.6, 12300.4–12300.6
Linde709-5 9900.7–9900.9
US-43 2500.1, 2500.4, 2500.7, 2500.10, 2500.13, 2500.16, 2700.1, 2700.4, 2700.7, 2700.10, 2700.13, 2700.16
Flux Type
Basic 16500.1, 16500.5
F96 7500.1, 7500.4–7500.20
Fracture Toughness Test Type 2000.3, 7000.2, 7800.2, 7900.2, 9000.6, 9100.2, 12500.2, 12600.2, 12700.2, 13800.34–13800.37, 13900.24–13900.26, 14000.2–14000.3, 14100.3, 14200.2–14200.5, 14300.2–14300.5, 14400.2–14400.5, 14500.2–14500.5, 14600.2–14600.5, 14700.2, 14700.11, 14700.20, 14800.2, 14800.11, 14800.20, 14900.2, 14900.11, 15000.2, 15000.11, 15000.20, 15100.2, 15100.11, 15100.20, 15200.2, 15200.11, 15700.2, 15800.2, 15900.2, 16100.2, 16600.1, 18600.2, 18700.1, 18800.2, 18900.2, 19000.3, 19100.3, 19200.3, 19300.3, 19400.3, 19600.2, 19600.9, 19600.15
FRM Lot ID 19000.1–19000.7
FRN Lot ID 19100.1–19100.7
FRO Lot ID 19600.7–19600.13
FRP Lot ID 19600.14–19600.21
Full cross section Location wrt Surface 13800.34–13800.36, 13900.24–13900.26, 14000.1–14000.3, 14200.1–14200.5, 14300.1–14300.5, 14400.1–14400.5, 14500.1–14500.5, 14600.1–14600.5, 14600.46–14600.47
Full Specimen Type 1100.2, 1200.2, 1300.2, 1400.2, 1500.2, 1600.2, 1700.2, 1800.2, 1900.2, 2000.4, 2100.1–2100.3, 2100.6, 2200.1–2200.3, 2200.6, 2300.1–2300.3, 2300.6, 2400.1–2400.3, 2400.6, 2400.9, 2400.12, 2400.15, 2400.18, 2500.2–2500.4, 2500.7, 2500.10, 2500.13, 2500.16, 2600.1–2600.3, 2600.6, 2600.9, 2600.12, 2600.15, 2600.18, 2700.2–2700.4, 2700.7, 2700.10, 2700.13, 2700.16, 2800.3, 2800.6, 2900.3, 2900.6, 3000.3, 3000.6, 3100.2–3100.10, 3200.2–3200.20, 3700.2, 3800.2, 3900.2, 4000.2, 4100.2, 4200.2, 4300.2, 4400.2, 4500.2, 4600.2, 4700.2, 4800.2, 4900.2, 5000.2, 5100.2, 5200.2, 5300.2, 5400.2, 5500.2, 5600.2, 5700.2, 5800.2, 5900.2, 6000.2, 6100.2, 6200.2, 6300.2, 6400.1, 6400.4, 6400.7, 6400.10, 6400.13, 6400.16, 6400.19–6400.21, 6500.2–6500.4, 6600.2–6600.4, 6700.2–6700.4, 6800.2–6800.4, 6900.1, 7000.5, 7100.2, 7200.2, 7200.8, 7200.13, 7300.2, 7400.2–7400.10, 7500.2–7500.20, 7600.2–7600.20, 7700.2–7700.20, 7800.3, 7900.3, 8000.2–8000.4, 8100.2–8100.4, 8200.2–8200.4, 8300.2–8300.4, 8400.1, 8500.2–8500.4, 8600.2–8600.4, 8700.2–8700.4, 8800.2–8800.4, 8900.1, 9000.2, 9100.3, 9200.2–9200.20, 9300.2–9300.20, 10100.2, 10300.2, 10300.5, 10400.2, 10500.2–10500.6, 10600.1, 10700.2–10700.4, 10800.2–10800.6, 10900.2–10900.6, 11000.2–11000.6, 11100.1, 11200.2, 11200.5, 11500.4–11500.6, 11800.2, 11800.5, 11900.2–11900.4, 12000.2, 12100.2, 12200.2, 12300.2–12300.14, 12400.2, 12500.3, 12600.3, 12600.6, 12700.3, 12800.2, 12900.2, 13000.2, 13100.2, 13200.2, 13300.2, 13400.2, 13500.2, 13600.2, 13700.2, 13800.8–13800.32, 13900.2–13900.22, 14100.5–14100.9, 14700.4–14700.6, 14700.9, 14700.13–14700.15, 14700.18, 14700.22–14700.24, 14700.27, 14800.4–14800.6, 14800.9, 14800.13–14800.15, 14800.18, 14800.22–14800.24, 14800.27, 14900.4–14900.6, 14900.9, 14900.13–14900.15, 14900.18, 15000.4–15000.6, 15000.9, 15000.13–15000.15, 15000.18, 15000.22–15000.24, 15000.27, 15100.4–15100.6, 15100.9, 15100.13–15100.15, 15100.18, 15100.22–15100.24, 15100.27, 15200.4–15200.6, 15200.9, 15200.13–15200.15, 15200.18, 15300.2, 15400.2, 15500.2, 15600.2, 15700.3, 15800.3, 15900.3, 16000.2, 16100.3, 16200.2, 16300.2, 16400.2, 16500.3, 16500.6, 16700.2, 16700.6, 16700.9, 16700.12, 16700.15, 16700.18, 16700.21, 16700.24, 16700.27, 16800.2, 16800.6, 16900.2, 16900.6, 17000.2, 17000.8, 17100.2, 17100.6, 17100.9, 17100.12, 17100.15, 17100.18, 17200.2, 17200.8, 17200.13, 17200.18, 17200.23, 17200.28, 17200.33, 17200.38, 17200.43, 17300.2, 17300.6, 17300.9, 17300.12, 17300.15, 17300.18, 17400.2, 17400.6, 17400.9, 17400.12, 17400.15, 17400.18, 17400.21, 17400.24, 17400.27, 17500.2, 17500.6, 17500.9, 17500.12, 17500.15, 17500.18, 17600.2, 17600.6, 17700.2, 17700.6, 17700.9, 17700.12, 17700.15, 17700.18, 17700.21, 17700.24, 17700.27, 17800.2, 17800.6, 17900.2, 17900.8, 17900.13, 17900.18, 17900.23, 17900.28, 17900.33, 17900.38, 17900.43, 18000.2, 18000.8, 18100.2, 18100.8, 18200.2, 18200.6, 18200.9, 18200.12, 18200.15, 18200.18, 18200.21, 18200.24, 18200.27, 18300.2, 18300.8, 18300.13, 18300.18, 18300.23, 18300.28, 18300.33, 18300.38, 18300.43, 18400.2, 18400.6, 18400.9, 18400.12, 18400.15, 18400.18, 18400.21, 18400.24, 18400.27, 18500.2, 18500.6, 18600.3, 18700.2, 18800.3, 18900.3, 19000.4, 19100.4, 19200.4, 19300.4, 19400.4, 19500.5, 19600.3, 19600.10, 19600.16–19600.18
Fully Killing Process 1100.1, 1200.1, 1300.1, 1400.1, 1500.1, 1600.1, 1700.1, 1800.1, 1900.1, 2000.1, 2100.1–2100.3, 2100.6, 2200.1–2200.3, 2200.6, 2300.1–2300.3, 2400.1–2400.3, 2400.6, 2400.9, 2400.12, 2400.15, 2400.18, 2500.1, 2600.1–2600.3, 2600.6, 2600.9, 2600.12, 2600.15, 2600.18, 2700.1
Fusion line Location wrt Weld 2500.1, 2700.1, 3100.2–3100.10, 3200.4–3200.6, 3200.10, 3200.14, 3200.18, 7400.2–7400.10, 7500.4, 7500.8–7500.10,

010.001.05BFS 13900.22–13900.23
010.001.05CFA 14000.12–14000.13
010.001.05CFS 14000.22–14000.23
010.001.09ABA 13800.20–13800.21
010.001.09AFA 13800.8–13800.9
010.001.09AFS 13800.24–13800.25
010.001.09ANA 13800.34
010.001.09BFA 13900.1–13900.3
010.001.09BFS 13900.14–13900.15
010.001.09BNA 13900.24
010.001.09CFA 14000.4–14000.5
010.001.09CFS 14000.14–14000.15
010.001.09CNA 14000.1
010.001.11AFA 13800.18–13800.19
010.001.11BFA 13900.12–13900.13
010.002.010A 14100.1–14100.3
010.002.010C 14100.5–14100.6
010.002.010D 14100.7–14100.8
010.002.010E 14100.9–14100.10
010.002.010S 14100.4
010.002.02DBA 14200.20–14200.21
010.002.02DBS 14200.42–14200.43
010.002.02DFA 14200.8–14200.9
010.002.02DFS 14200.30–14200.31
010.002.02DNA 14200.3
010.002.02DNS 14200.5
010.002.02EBA 14300.20–14300.21
010.002.02EBS 14300.42–14300.43
010.002.02EFA 14300.8–14300.9
010.002.02EFS 14300.30–14300.31
010.002.02ENA 14300.3
010.002.02ENS 14300.5
010.002.02FBA 14400.20–14400.21
010.002.02FBS 14400.42–14400.43
010.002.02FFA 14400.8–14400.9
010.002.02FFS 14400.30–14400.31
010.002.02FNA 14400.3
010.002.02FNS 14400.5
010.002.02GFA 14500.8–14500.9
010.002.02GFS 14500.28–14500.29
010.002.02GNA 14500.3
010.002.02GNS 14500.5
010.002.02GRA 14500.18–14500.19
010.002.02GRS 14500.38–14500.39
010.002.02HFA 14600.8–14600.9
010.002.02HFS 14600.28–14600.29
010.002.02HNA 14600.3
010.002.02HNS 14600.5
010.002.02HRA 14600.18–14600.19
010.002.02HRS 14600.38–14600.39
010.002.03DBA 14200.22–14200.23
010.002.03DBS 14200.44–14200.45
010.002.03DFA 14200.10–14200.11
010.002.03DFS 14200.32–14200.33
010.002.03EBA 14300.22–14300.23
010.002.03EBS 14300.44–14300.45
010.002.03EFA 14300.10–14300.11
010.002.03EFS 14300.32–14300.33
010.002.03FBA 14400.22–14400.23
010.002.03FBS 14400.44–14400.45
010.002.03FFA 14400.10–14400.11
010.002.03FFS 14400.32–14400.33
010.002.03GFA 14500.10–14500.11
010.002.03GFS 14500.30–14500.31
010.002.03GRA 14500.20–14500.21
010.002.03GRS 14500.40–14500.41
010.002.03HFA 14600.10–14600.11
010.002.03HFS 14600.30–14600.31
010.002.03HRA 14600.20–14600.21
010.002.03HRS 14600.40–14600.41
010.002.04DBA 14200.24–14200.25
010.002.04DBS 14200.46–14200.47
010.002.04DFA 14200.12–14200.13
010.002.04DFS 14200.34–14200.35
010.002.04EBA 14300.24–14300.25
010.002.04EBS 14300.46–14300.47
010.002.04EFA 14300.12–14300.13
010.002.04EFS 14300.34–14300.35
010.002.04FBA 14400.24–14400.25
010.002.04FBS 14400.46–14400.47
010.002.04FFA 14400.12–14400.13
010.002.04FFS 14400.34–14400.35
010.002.04GFA 14500.12–14500.13
010.002.04GFS 14500.32–14500.33
010.002.04GRA 14500.22–14500.23
010.002.04GRS 14500.42–14500.43
010.002.04HFA 14600.12–14600.13
010.002.04HFS 14600.32–14600.33
010.002.04HRA 14600.22–14600.23
010.002.04HRS 14600.42–14600.43
010.002.05DBA 14200.26–14200.27
010.002.05DBS 14200.48–14200.49
010.002.05DFA 14200.14–14200.15
010.002.05DFS 14200.36–14200.37
010.002.05EBA 14300.26–14300.27
010.002.05EBS 14300.48–14300.49
010.002.05EFA 14300.14–14300.15
010.002.05EFS 14300.36–14300.37
010.002.05FBA 14400.26–14400.27
010.002.05FBS 14400.48–14400.49
010.002.05FFA 14400.14–14400.15
010.002.05FFS 14400.36–14400.37
010.002.05GFA 14500.14–14500.15
010.002.05GFS 14500.34–14500.35
010.002.05GRA 14500.24–14500.25
010.002.05GRS 14500.44–14500.45

010.002.05HFA 14600.14–14600.15
010.002.05HFS 14600.34–14600.35
010.002.05HRA 14600.24–14600.25
010.002.05HRS 14600.44–14600.45
010.002.09DBA 14200.18–14200.19
010.002.09DBS 14200.40–14200.41
010.002.09DFA 14200.6–14200.7
010.002.09DFS 14200.28–14200.29
010.002.09DNA 14200.1
010.002.09DNS 14200.4
010.002.09DRA 14200.16–14200.17
010.002.09DRS 14200.38–14200.39
010.002.09EBA 14300.18–14300.19
010.002.09EBS 14300.40–14300.41
010.002.09EFA 14300.6–14300.7
010.002.09EFS 14300.28–14300.29
010.002.09ENA 14300.1
010.002.09ENS 14300.4
010.002.09ERA 14300.16–14300.17
010.002.09ERS 14300.38–14300.39
010.002.09FBA 14400.18–14400.19
010.002.09FBS 14400.40–14400.41
010.002.09FFA 14400.6–14400.7
010.002.09FFS 14400.28–14400.29
010.002.09FNA 14400.1
010.002.09FNS 14400.4
010.002.09FRA 14400.16–14400.17
010.002.09FRS 14400.38–14400.39
010.002.09GFA 14500.6–14500.7
010.002.09GFS 14500.26–14500.27
010.002.09GNA 14500.1
010.002.09GNS 14500.4
010.002.09GRA 14500.16–14500.17
010.002.09GRS 14500.36–14500.37
010.002.09HFA 14600.6–14600.7
010.002.09HFS 14600.26–14600.27
010.002.09HNA 14600.1
010.002.09HNS 14600.4
010.002.09HRA 14600.16–14600.17
010.002.09HRS 14600.36–14600.37
010.002.10GSA 14500.46
010.002.10GSS 14500.47
010.002.10HSA 14600.46
010.002.10HSS 14600.47
010.003.09ABRA 14700.8–14700.10
010.003.09AFA 14700.3–14700.5
010.003.09AMA 14700.6–14700.7
010.003.09ASA 14700.1
010.003.09BBRA 14700.17–14700.19
010.003.09BFA 14700.12–14700.14
010.003.09BMA 14700.15–14700.16
010.003.09BSA 14700.11
010.003.09CBRA 14700.26–14700.28
010.003.09CFA 14700.21–14700.23
010.003.09CMA 14700.24–14700.25
010.003.09CSA 14700.20
010.003.09DBRA 14800.8–14800.10
010.003.09DFA 14800.3–14800.5
010.003.09DMA 14800.6–14800.7
010.003.09DSA 14800.1
010.003.09EBRA 14800.17–14800.19
010.003.09EFA 14800.12–14800.14
010.003.09EMA 14800.15–14800.16
010.003.09ESA 14800.11
010.003.09FBRA 14800.26–14800.28
010.003.09FFA 14800.21–14800.23
010.003.09FMA 14800.24–14800.25
010.003.09FSA 14800.20
010.003.09GBRA 14900.8–14900.10
010.003.09GFA 14900.3–14900.5
010.003.09GMA 14900.6–14900.7
010.003.09GSA 14900.1
010.003.09HBRA 14900.17–14900.19
010.003.09HFA 14900.12–14900.14
010.003.09HMA 14900.15–14900.16
010.003.09HSA 14900.11
010.003.09IBRA 15000.8–15000.10
010.003.09IFA 15000.3–15000.5
010.003.09IMA 15000.6–15000.7
010.003.09ISA 15000.1
010.003.09JBRA 15000.17–15000.19
010.003.09JFA 15000.12–15000.14
010.003.09JMA 15000.15–15000.16
010.003.09JSA 15000.11
010.003.09KBRA 15000.26–15000.28
010.003.09KFA 15000.21–15000.23
010.003.09KMA 15000.24–15000.25
010.003.09KSA 15000.20
010.003.09LBRA 15100.8–15100.10
010.003.09LFA 15100.3–15100.5
010.003.09LMA 15100.6–15100.7
010.003.09LSA 15100.1
010.003.09MBRA 15100.17–15100.19
010.003.09MFA 15100.12–15100.14
010.003.09MMA 15100.15–15100.16
010.003.09MSA 15100.11
010.003.09NBRA 15100.26–15100.28
010.003.09NFA 15100.21–15100.23
010.003.09NMA 15100.24–15100.25
010.003.09NSA 15100.20
010.003.09PBRA 15200.8–15200.10
010.003.09PFA 15200.3–15200.5
010.003.09PMA 15200.6–15200.7
010.003.09PSA 15200.1
010.003.09QBRA 15200.17–15200.19
010.003.09QFA 15200.12–15200.14

010.003.09QMA 15200.15–15200.16
010.003.09QSA 15200.11
010.004.01 15300.1–15300.6
010.005.01 15400.1–15400.6
010.006.01 15500.1–15500.2, 15500.5–15500.7
010.007.01 15600.1–15600.6
010.008.01 15700.1–15700.3, 15700.6–15700.8
010.009.01 15800.1–15800.3, 15800.6–15800.8
010.010.01 15900.1–15900.6
010.011.01 16000.1–16000.6
010.012.01 16100.1–16100.3, 16100.6–16100.8
010.013.01 16200.1–16200.6
010.014.01 16300.1–16300.6
010.015.01 16400.1–16400.6
011.001.01 19500.1–19500.7
011.003.01 19600.1–19600.6
011.003.09A 19600.7–19600.13, 19600.16–19600.17
011.003.09B 19600.14–19600.15, 19600.18–19600.21
012.001.01 8400.1–8400.2
012.001.03A 8000.4–8000.5
012.001.03B 8100.4–8100.5
012.001.03C 8200.4–8200.5
012.001.03D 8300.4–8300.5
012.001.03E 8500.4–8500.5
012.001.09A 8000.1–8000.3
012.001.09B 8100.1–8100.3
012.001.09C 8200.1–8200.3
012.001.09D 8300.1–8300.3
012.001.09E 8500.1–8500.3
012.002.01 8900.1–8900.2
012.002.03A 8600.4–8600.5
012.002.03B 8700.4–8700.5
012.002.03C 8800.4–8800.5
012.002.09A 8600.1–8600.3
012.002.09B 8700.1–8700.3
012.002.09C 8800.1–8800.3
012.003.01 9000.1–9000.2, 9000.5–9000.9
012.004.01 9100.1–9100.3, 9100.6–9100.9
012.005.010A 9200.1
012.005.02AA 9200.4–9200.5
012.005.02AS1 9200.8–9200.9
012.005.02AS2 9200.12–9200.13
012.005.02AS3 9200.16–9200.17
012.005.02AS4 9200.20–9200.21
012.005.02BA 9300.4–9300.5
012.005.02BS1 9300.8–9300.9
012.005.02BS2 9300.12–9300.13
012.005.02BS3 9300.16–9300.17
012.005.02BS4 9300.20–9300.21
012.005.09AA 9200.2–9200.3
012.005.09AS1 9200.6–9200.7
012.005.09AS2 9200.10–9200.11
012.005.09AS3 9200.14–9200.15
012.005.09AS4 9200.18–9200.19
012.005.09BA 9300.1–9300.3
012.005.09BS1 9300.6–9300.7
012.005.09BS2 9300.10–9300.11
012.005.09BS3 9300.14–9300.15
012.005.09BS4 9300.18–9300.19
013.004.010A 7400.1
013.004.02AS1 7400.4–7400.5
013.004.02AS2 7400.6–7400.7
013.004.02AS3 7400.8–7400.9
013.004.02AS4 7400.10–7400.11
013.004.02AW 7400.2–7400.3
013.004.02BA 7500.4–7500.5
013.004.02BS2 7500.10–7500.11
013.004.02BS3 7500.14–7500.15
013.004.02BS4 7500.18–7500.19
013.004.09BA 7500.1–7500.3
013.004.09BS1 7500.6–7500.7
013.004.09BS2 7500.8–7500.9, 7500.20–7500.21
013.004.09BS3 7500.12–7500.13
013.004.09BS4 7500.16–7500.17
016.001.010A 7600.1
016.001.02AA 7600.4–7600.5
016.001.02AS1 7600.8–7600.9
016.001.02AS2 7600.12–7600.13
016.001.02AS3 7600.16–7600.17
016.001.02AS4 7600.20–7600.21
016.001.02BA 7700.4–7700.5
016.001.02BS1 7700.8–7700.9
016.001.02BS2 7700.12–7700.13
016.001.02BS3 7700.16–7700.17
016.001.02BS4 7700.20–7700.21
016.001.09AA 7600.2–7600.3
016.001.09AS1 7600.6–7600.7
016.001.09AS2 7600.10–7600.11
016.001.09AS3 7600.14–7600.15
016.001.09AS4 7600.18–7600.19
016.001.09BA 7700.1–7700.3
016.001.09BS1 7700.6–7700.7
016.001.09BS2 7700.10–7700.11
016.001.09BS3 7700.14–7700.15
016.001.09BS4 7700.18–7700.19
016.002.01 7800.1–7800.6
016.003.01 7900.1–7900.6
032.001.01 2000.1–2000.9

Material Name

A36 3100.1–3100.11, 3200.1–3200.21, 3300.1–3300.4, 3400.1–3400.4, 3500.1–3500.4, 3600.1–3600.4, 3700.1–3700.4, 3800.1–3800.4, 3900.1–3900.3, 4000.1–4000.3, 4100.1–4100.3, 4200.1–4200.3, 4300.1–4300.3, 4400.1–4400.4, 4500.1–4500.4, 4600.1–4600.3, 4700.1–4700.3, 4800.1–4800.3, 4900.1–4900.3, 5000.1–5000.4,

5100.1–5100.4, 5200.1–5200.4, 5300.1–5300.4, 5400.1–5400.3, 5500.1–5500.3, 5600.1–5600.3, 5700.1–5700.3, 5800.1–5800.3, 5900.1–5900.3, 6000.1–6000.3, 6100.1–6100.3, 6200.1–6200.3, 6300.1–6300.3, 6400.1–6400.23, 6500.1–6500.5, 6600.1–6600.5, 6700.1–6700.5, 6800.1–6800.6, 6900.1–6900.2, 7000.1–7000.2, 7000.5–7000.6

A537 CL1 7300.1–7300.6, 7400.1–7400.11, 7500.1–7500.21

A572 Gr50 7600.1–7600.21, 7700.1–7700.21, 7800.1–7800.6, 7900.1–7900.6

A588 8000.1–8000.5, 8100.1–8100.5, 8200.1–8200.5, 8300.1–8300.5, 8400.1–8400.2, 8500.1–8500.5, 8600.1–8600.5, 8700.1–8700.5, 8800.1–8800.5, 8900.1–8900.2, 9000.1–9000.2, 9000.5–9000.9, 9100.1–9100.3, 9100.6–9100.9

A588 GrA 9200.1–9200.21, 9300.1–9300.21

A710 9400.1–9400.3, 9500.1–9500.6, 9600.1–9600.7, 9700.1–9700.10, 9800.1–9800.3, 9900.1–9900.10, 10000.1–10000.5, 10100.1–10100.5, 10200.1–10200.11, 10300.1–10300.6, 10400.1–10400.3, 10500.1–10500.7, 10600.1–10600.4, 10700.1–10700.7, 10800.1–10800.7, 10900.1–10900.7, 11000.1–11000.7, 11100.1–11100.4, 11200.1–11200.6, 11300.1–11300.3, 11400.1–11400.3, 11500.1–11500.7, 11600.1–11600.3, 11700.1–11700.6, 11800.1–11800.6, 11900.1–11900.6, 12000.1–12000.3, 12100.1–12100.3, 12200.1–12200.3, 12300.1–12300.15, 12400.1–12400.3, 12700.1–12700.7, 12800.1–12800.5, 12900.1–12900.5, 13000.1–13000.5, 13100.1–13100.5, 13200.1–13200.3, 13300.1–13300.5, 13400.1–13400.5, 13500.1–13500.5, 13600.1–13600.5, 13700.1–13700.3

A710-A 12500.1–12500.6, 12600.1–12600.14

ABS-B 1000.1–1000.14, 1100.1–1100.2, 1100.5–1100.6, 1200.1–1200.2, 1200.5–1200.6, 1300.1–1300.2, 1300.5–1300.6, 1400.1–1400.2, 1400.5–1400.6, 1500.1–1500.2, 1500.5–1500.6, 1600.1–1600.2, 1600.5–1600.6, 1700.1–1700.2, 1700.5–1700.6, 1800.1–1800.2, 1800.5–1800.6, 1900.1–1900.2, 1900.5–1900.6

ABS-EH32 2000.1–2000.9

ABS-EH36 2100.1–2100.8, 2200.1–2200.8, 2300.1–2300.8, 2400.1–2400.20, 2500.1–2500.18, 2600.1–2600.20, 2700.1–2700.18, 2800.1–2800.8, 2900.1–2900.8, 3000.1–3000.8

BS4360 Gr50D 13800.1–13800.37, 13900.1–13900.26, 14000.1–14000.23, 14100.1–14100.10, 14200.1–14200.49, 14300.1–14300.49, 14400.1–14400.49, 14500.1–14500.47, 14600.1–14600.47, 14700.1–14700.28, 14800.1–14800.28, 14900.1–14900.19, 15000.1–15000.28, 15100.1–15100.28, 15200.1–15200.19, 15300.1–15300.6, 15400.1–15400.6, 15500.1–15500.2, 15500.5–15500.7, 15600.1–15600.6, 15700.1–15700.3, 15700.6–15700.8, 15800.1–15800.3, 15800.6–15800.8, 15900.1–15900.6, 16000.1–16000.6, 16100.1–16100.3, 16100.6–16100.8, 16200.1–16200.6, 16300.1–16300.6, 16400.1–16400.6

CG A537M 7100.1–7100.6, 7200.1–7200.16

HY100 19500.1–19500.7, 19600.1–19600.21

HY80 16500.1–16500.7, 16600.1–16600.7, 16700.1–16700.28, 16800.1–16800.7, 16900.1–16900.7, 17000.1–17000.11, 17100.1–17100.19, 17200.1–17200.46, 17300.1–17300.19, 17400.1–17400.28, 17500.1–17500.19, 17600.1–17600.7, 17700.1–17700.28, 17800.1–17800.7, 17900.1–17900.46, 18000.1–18000.11, 18100.1–18100.11, 18200.1–18200.28, 18300.1–18300.46, 18400.1–18400.28, 18500.1–18500.7, 18600.1–18600.6, 18700.1–18700.5, 18800.1–18800.6, 18900.1–18900.6, 19000.1–19000.7, 19100.1–19100.7, 19200.1–19200.7, 19300.1–19300.7, 19400.1–19400.7

Maximum Curve Shape 15000.2, 15000.20

Melting Practice

BOF 1000.1–1000.3, 1000.6, 1000.9, 1000.12–1000.14, 1100.1, 1200.1, 1300.1, 1400.1, 1500.1, 1600.1, 1700.1, 1800.1, 1900.1, 2100.1–2100.3, 2100.6, 2200.1–2200.3, 2200.6, 2300.1–2300.3, 2400.1–2400.3, 2400.6, 2400.9, 2400.12, 2400.15, 2400.18, 2500.1, 2600.1–2600.3, 2600.6, 2600.9, 2600.12, 2600.15, 2600.18, 2700.1

electric furnace 5400.1, 5500.1, 5600.1

open hearth 3300.1, 3400.1, 3500.1, 3600.1, 3700.1, 4200.1, 4300.1, 4400.1, 4500.1, 4600.1, 5700.1, 5800.1, 5900.1, 6000.1, 6100.1, 6200.1, 6300.1

METZ/MPC13 Reference 2000.1–2000.9

Mid Ingot Position 16700.11, 17200.17, 17400.11, 17700.11, 17900.17, 18200.11, 18300.17, 18400.11

Mid thickness at root Location wrt Surface 3100.2–3100.10, 7400.2–7400.10, 7600.2–7600.20, 9200.2–9200.20, 9900.7–9900.9, 10200.4–10200.6

Mid thickness not root Location wrt Surface 2500.1, 2500.4, 2500.7, 2500.10, 2500.13, 2500.16, 2700.1, 2700.4, 2700.7, 2700.10, 2700.13, 2700.16, 3200.1, 3200.4–3200.20, 6400.4, 6400.7, 6400.10, 6400.13, 6400.16, 6400.19–6400.21, 6500.1, 6500.4, 6600.1, 6600.4, 6700.1, 6700.4, 6800.1, 6800.4, 7500.1, 7500.4–7500.20, 7700.1, 7700.4–7700.20, 8000.1, 8000.4, 8100.1, 8100.4, 8200.1, 8200.4, 8300.1, 8300.4, 8500.1, 8500.4, 8600.1, 8600.4, 8700.1, 8700.4, 8800.1, 8800.4, 9300.1, 9300.4–9300.20, 9700.7–9700.9, 10200.8–10200.10, 14700.6, 14700.15, 14700.24, 14800.6, 14800.15, 14800.24, 14900.6, 14900.15, 15000.6, 15000.15, 15000.24, 15100.6, 15100.15, 15100.24, 15200.6, 15200.15

Minsy Producer 19300.1, 19400.1

Modified Standard JIcpr 18600.2, 18700.1, 18800.2, 18900.2, 19000.3, 19100.3, 19200.3, 19300.3, 19400.3, 19600.2, 19600.9, 19600.15

N

N Final Processing 2000.1, 2800.1–2800.3, 2800.6, 2900.1–2900.3, 2900.6, 3000.1–3000.3, 3000.6, 7300.1, 7400.1, 7500.1, 9000.1, 9100.1, 9200.1, 9300.1, 13800.2, 13800.5, 13900.1, 14000.4, 14100.1, 14200.1, 14300.1, 14400.1, 14500.1, 14600.1, 15300.1, 15400.1, 15700.1, 15800.1, 15900.1, 16000.1, 16100.1, 16200.1, 16300.1

N Heat Treatment 7300.1, 9000.1, 9100.1, 15700.1, 15800.1, 15900.1, 16000.1, 16100.1, 16200.1, 16300.1

N8686-5 Lot ID 18100.1–18100.11

N,A Final Processing 13800.1–13800.3, 14100.4–14100.5

N,C,A Final Processing 14100.7–14100.9

NGESW Weld Type 6400.10, 6400.13, 6400.16, 6400.19–6400.21, 6600.1, 6600.4, 6700.1, 6700.4, 6800.1, 6800.4, 8100.1, 8100.4, 8200.1, 8200.4, 8300.1, 8300.4, 8500.1, 8500.4, 8700.1, 8700.4, 8800.1, 8800.4

Nil Ductilty Transition Test Type 1000.14, 1100.6, 1200.6, 1300.6, 1400.6, 1500.6, 1600.6, 1700.6, 1800.6, 1900.6, 2000.7, 3300.1, 3400.1, 3500.1, 3600.1, 3700.1, 3800.1, 3900.1, 4000.1, 4100.1, 4200.1, 4300.1, 4400.1, 4500.1, 4600.1, 4700.1, 4800.1, 4900.1, 5000.1, 5100.1, 5200.1, 5300.1, 5400.1, 5500.1, 5600.1, 5700.1, 5800.1, 5900.1, 6000.1, 6100.1, 6200.1, 6300.1, 7100.4, 7200.4, 7200.10, 10000.5, 10100.5, 10600.4, 10700.7, 11100.4, 11800.4, 11900.6, 13800.7, 14100.2

Nk203NiC Filler Name 14700.1–14700.3, 14700.6–14700.8, 14700.11–14700.12, 14700.15–14700.17, 14700.20–14700.21, 14700.24–14700.26, 14800.1–14800.3, 14800.6–14800.8, 14800.11–14800.12, 14800.15–14800.17, 14800.20–14800.21, 14800.24–14800.26, 14900.1–14900.3, 14900.6–14900.8, 14900.11–14900.12, 14900.15–14900.17, 15000.1–15000.3, 15000.6–15000.8, 15000.11–15000.12, 15000.15–15000.17, 15000.20–15000.21, 15000.24–15000.26, 15100.1–15100.3, 15100.6–15100.8, 15100.11–15100.12, 15100.15–15100.17, 15100.20–15100.21, 15100.24–15100.26, 15200.1–15200.3, 15200.6–15200.8, 15200.11–15200.12, 15200.15–15200.17

No Did Specimen Split? 8000.2–8000.4, 8100.2–8100.4, 8200.2–8200.4, 8300.2–8300.4, 8400.1, 8500.2–8500.4, 8600.2–8600.4, 8700.2–8700.4, 8800.2–8800.4, 8900.1

No Groove Joint Preparation 6600.1, 6600.4, 6700.1, 6700.4, 6800.1, 6800.4, 8100.1, 8100.4, 8200.1, 8200.4, 8300.1, 8300.4, 8500.1, 8500.4, 8700.1, 8700.4, 8800.1, 8800.4

None Shielding Gas 10500.4–10500.6

Notch Preparation

Pressed 7100.5, 7200.5, 7200.11, 7200.15, 7300.5, 7800.5, 7900.5, 9000.7, 9100.7, 12500.5, 12600.9–12600.13, 12700.6, 12800.4, 12900.4, 13000.4, 13100.4, 13300.4, 13400.4, 13500.4, 13600.4, 15300.5, 15400.5, 15500.6, 15600.5, 15700.7, 15800.7, 15900.5, 16000.5, 16100.7, 16200.5, 16300.5, 16400.5, 17000.5, 17000.10, 17200.5, 17200.10, 17200.15, 17200.20, 17200.25, 17200.30, 17200.35, 17200.40, 17200.45, 17900.5, 17900.10, 17900.15, 17900.20, 17900.25, 17900.30, 17900.35, 17900.40, 17900.45, 18000.5, 18000.10, 18100.5, 18100.10, 18300.5, 18300.10, 18300.15, 18300.20, 18300.25, 18300.30, 18300.35, 18300.40, 18300.45, 18600.5, 18700.4, 18800.5, 18900.5, 19000.6, 19100.6, 19200.6, 19300.6, 19400.6, 19500.2, 19600.5, 19600.12, 19600.20

O

OGC Source 6400.1, 6500.1, 6600.1, 6700.1, 6800.1, 6900.1, 8000.1, 8100.1, 8200.1, 8300.1, 8400.1, 8500.1, 8600.1, 8700.1, 8800.1, 8900.1

OGC-1 Reference 6400.1–6400.23, 6500.1–6500.5, 6600.1–6600.5, 6700.1–6700.5, 6800.1–6800.6, 6900.1–6900.2, 8000.1–8000.5, 8100.1–8100.5, 8200.1–8200.5, 8300.1–8300.5, 8400.1–8400.2, 8500.1–8500.5, 8600.1–8600.5, 8700.1–8700.5, 8800.1–8800.5, 8900.1–8900.2

open hearth Melting Practice 3300.1, 3400.1, 3500.1, 3600.1, 3700.1, 4200.1, 4300.1, 4400.1, 4500.1, 4600.1, 5700.1, 5800.1, 5900.1, 6000.1, 6100.1, 6200.1, 6300.1

OrStMills Producer 6400.1, 8600.1, 8700.1, 8800.1, 8900.1

P

P Lot ID 4900.1–4900.3

P-1 Specimen Type 1000.14, 1100.6, 1200.6, 1300.6, 1400.6, 1500.6, 1600.6, 1700.6, 1800.6, 1900.6, 13800.7, 14100.2

P-2 Specimen Type 10600.4, 10700.7, 11100.4, 11800.4, 11900.6

P-3 Specimen Type 7100.4, 7200.4, 7200.10, 10000.5, 10100.5

Per Standard JIcpr 7800.2, 7900.2, 9000.6, 9100.2, 12500.2, 12600.2, 12700.2, 15700.2, 15800.2, 15900.2, 16100.2

P&EStat Source 16500.1

PFH-60A Filler Specification 2500.1, 2500.4, 2500.7, 2500.10, 2500.13, 2500.16, 2700.1, 2700.4, 2700.7, 2700.10, 2700.13, 2700.16

Pressed Notch Preparation 7100.5, 7200.5, 7200.11, 7200.15, 7300.5, 7800.5, 7900.5, 9000.7, 9100.7, 12500.5, 12600.9–12600.13, 12700.6, 12800.4, 12900.4, 13000.4, 13100.4, 13300.4, 13400.4, 13500.4, 13600.4, 15300.5, 15400.5, 15500.6, 15600.5, 15700.7, 15800.7, 15900.5, 16000.5, 16100.7, 16200.5, 16300.5, 16400.5, 17000.5, 17000.10, 17200.5, 17200.10, 17200.15, 17200.20, 17200.25, 17200.30, 17200.35,

17200.40, 17200.45, 17900.5, 17900.10, 17900.15, 17900.20, 17900.25, 17900.30, 17900.35, 17900.40, 17900.45, 18000.5, 18000.10, 18100.5, 18100.10, 18300.5, 18300.10, 18300.15, 18300.20, 18300.25, 18300.30, 18300.35, 18300.40, 18300.45, 18600.5, 18700.4, 18800.5, 18900.5, 19000.6, 19100.6, 19200.6, 19300.6, 19400.6, 19500.2, 19600.5, 19600.12, 19600.20

Producer

Armco 2000.1, 3300.1, 3400.1, 3500.1, 3600.1, 3700.1, 3800.1, 3900.1, 4000.1, 4100.1, 4200.1, 4300.1, 4400.1, 4500.1, 4600.1, 4700.1, 4800.1, 4900.1, 5000.1, 5100.1, 5200.1, 5300.1, 5400.1, 5500.1, 5600.1, 5700.1, 5800.1, 5900.1, 6000.1, 6100.1, 6200.1, 6300.1, 7100.1, 7200.1

Australia 1100.1, 1200.1, 1300.1, 1400.1, 1500.1, 1600.1, 1700.1, 1800.1, 1900.1

Bunge 16500.1

DTNSRDC 19000.1, 19100.1, 19200.1

Kobe 2100.1–2100.3, 2100.6, 2200.1–2200.3, 2200.6, 2300.1–2300.3, 2400.1–2400.3, 2400.6, 2400.9, 2400.12, 2400.15, 2400.18, 2500.1, 2600.1–2600.3, 2600.6, 2600.9, 2600.12, 2600.15, 2600.18, 2700.1

Lukens 7300.1, 7800.1, 7900.1, 9000.1, 9100.1, 12500.1, 12600.1, 12700.1, 15300.1, 15400.1, 15500.1, 15600.1, 15700.1, 15800.1, 15900.1, 16000.1, 16100.1, 16200.1, 16300.1, 16400.1, 16600.1, 19500.1

Minsy 19300.1, 19400.1

OrStMills 6400.1, 8600.1, 8700.1, 8800.1, 8900.1

Sumitomo 1000.1–1000.3, 1000.6, 1000.9, 1000.12–1000.14, 2800.1–2800.3, 2800.6, 2900.1–2900.3, 2900.6, 3000.1–3000.3, 3000.6, 13800.1–13800.5, 13800.34, 13900.1, 13900.24, 14000.1, 14000.4, 14100.1, 14100.4–14100.9, 14200.1, 14300.1, 14400.1, 14500.1, 14600.1

US Steel 3100.1, 3200.1, 6500.1, 6600.1, 6700.1, 6800.1, 6900.1, 7000.1, 7400.1, 7500.1, 7600.1, 7700.1, 8000.1, 8100.1, 8200.1, 8300.1, 8400.1, 8500.1, 9200.1, 9300.1

Q

Q,K Final Processing 12500.1, 12700.1

Q,K Heat Treatment 9400.1, 9500.1, 9500.4, 9600.1, 9700.1, 9700.4, 9800.1, 9900.1, 9900.4, 9900.7, 10000.1, 10100.1, 10200.1, 10300.1, 10300.4, 10400.1, 10500.1, 10600.1, 10700.1, 10700.4, 10800.1, 10900.1, 11000.1, 11100.1, 11200.1, 11200.4, 11300.1, 11400.1, 11500.1, 11600.1, 11700.1, 11800.1, 11800.5, 11900.1, 11900.4, 12000.1, 12100.1, 12200.1, 12300.1, 12400.1, 12500.1, 12700.1

Q,T Final Processing 2100.1–2100.3, 2100.6, 2200.1–2200.3, 2200.6, 2300.1–2300.3, 2400.1–2400.3, 2400.6, 2400.9, 2400.12, 2400.15, 2400.18, 2500.1, 2600.1–2600.3, 2600.6, 2600.9, 2600.12, 2600.15, 2600.18, 2700.1, 7100.1, 7200.1, 12600.1, 16400.1, 18600.1, 18700.1, 18800.1, 18900.1, 19500.1, 19600.1

Q,T Heat Treatment 7100.1, 7200.1, 12600.1, 15300.1, 15400.1, 15500.1, 15600.1, 16400.1, 18600.1, 18700.1, 18800.1, 18900.1, 19500.1, 19600.1

Q,T,W Final Processing 19600.7

Q,T,W Heat Treatment 19600.7

R

Reference

004-2 1100.1–1100.2, 1100.5–1100.6, 1200.1–1200.2, 1200.5–1200.6, 1300.1–1300.2, 1300.5–1300.6, 1400.1–1400.2, 1400.5–1400.6, 1500.1–1500.2, 1500.5–1500.6, 1600.1–1600.2, 1600.5–1600.6, 1700.1–1700.2, 1700.5–1700.6, 1800.1–1800.2, 1800.5–1800.6, 1900.1–1900.2, 1900.5–1900.6

007-1 2100.1–2100.8, 2200.1–2200.8, 2300.1–2300.8, 2400.1–2400.20, 2500.1–2500.18, 2600.1–2600.20, 2700.1–2700.18

007-4 2800.1–2800.8, 2900.1–2900.8, 3000.1–3000.8

1010 7800.1–7800.6, 7900.1–7900.6

1120 16600.1–16600.7

1211 9000.1–9000.2, 9000.5–9000.9, 9100.1–9100.3, 9100.6–9100.9

3200 12600.1–12600.14

3201 15400.1–15400.6, 15700.1–15700.3, 15700.6–15700.8, 15800.1–15800.3, 15800.6–15800.8, 15900.1–15900.6, 16000.1–16000.6, 16100.1–16100.3, 16100.6–16100.8, 16200.1–16200.6, 16300.1–16300.6

3202 15300.1–15300.6, 15500.1–15500.2, 15500.5–15500.7, 15600.1–15600.6, 16400.1–16400.6

3400 12500.1–12500.6, 12700.1–12700.7

3530 19500.1–19500.7

Armco-MPC 3300.1–3300.4, 3400.1–3400.4, 3500.1–3500.4, 3600.1–3600.4, 3700.1–3700.4, 3800.1–3800.4, 3900.1–3900.3, 4000.1–4000.3, 4100.1–4100.3, 4200.1–4200.3, 4300.1–4300.3, 4400.1–4400.4, 4500.1–4500.4, 4600.1–4600.3, 4700.1–4700.3, 4800.1–4800.3, 4900.1–4900.3, 5000.1–5000.4, 5100.1–5100.4, 5200.1–5200.4, 5300.1–5300.4, 5400.1–5400.3, 5500.1–5500.3, 5600.1–5600.3, 5700.1–5700.3, 5800.1–5800.3, 5900.1–5900.3, 6000.1–6000.3, 6100.1–6100.3, 6200.1–6200.3, 6300.1–6300.3

KONKUL-1 3100.1–3100.11, 3200.1–3200.21, 7400.1–7400.11, 7500.1–7500.21, 7600.1–7600.21, 7700.1–7700.21, 9200.1–9200.21, 9300.1–9300.21

LR3201 7300.1–7300.6

METZ/MPC13 2000.1–2000.9

OGC-1 6400.1–6400.23, 6500.1–6500.5, 6600.1–6600.5, 6700.1–6700.5, 6800.1–6800.6, 6900.1–6900.2, 8000.1–8000.5, 8100.1–8100.5, 8200.1–8200.5, 8300.1–8300.5, 8400.1–8400.2, 8500.1–8500.5, 8600.1–8600.5,

8700.1–8700.5, 8800.1–8800.5, 8900.1–8900.2
S-1971 1000.1–1000.14
SHI-01 13800.1–13800.37, 13900.1–13900.26, 14000.1–14000.23, 14100.1–14100.10, 14200.1–14200.49, 14300.1–14300.49, 14400.1–14400.49, 14500.1–14500.47, 14600.1–14600.47
SSC-276 7100.1–7100.6
USN 6/9 18600.1–18600.6, 18700.1–18700.5, 18800.1–18800.6, 18900.1–18900.6, 19000.1–19000.7, 19100.1–19100.7, 19200.1–19200.7, 19300.1–19300.7, 19400.1–19400.7, 19600.1–19600.21
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USN-1 16700.1–16700.28, 16800.1–16800.7, 16900.1–16900.7, 17000.1–17000.11, 17100.1–17100.19, 17200.1–17200.46, 17300.1–17300.19, 17400.1–17400.28, 17500.1–17500.19, 17600.1–17600.7, 17700.1–17700.28, 17800.1–17800.7, 17900.1–17900.46, 18000.1–18000.11, 18100.1–18100.11, 18200.1–18200.28, 18300.1–18300.46, 18400.1–18400.28, 18500.1–18500.7
WJ,3/87 16500.1–16500.7
WJ,7/87 14700.1–14700.28, 14800.1–14800.28, 14900.1–14900.19, 15000.1–15000.28, 15100.1–15100.28, 15200.1–15200.19
Round Specimen Type 2800.1–2800.2, 2900.1–2900.2, 3000.1–3000.2, 7100.1, 7200.1, 7200.7, 14100.1, 14100.4

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S-1971 Reference 1000.1–1000.14
SAW Weld Type 2500.1, 2500.4, 2500.7, 2500.10, 2500.13, 2500.16, 2700.1, 2700.4, 2700.7, 2700.10, 2700.13, 2700.16, 3200.1, 3200.4–3200.20, 7200.7–7200.8, 7200.13, 7500.1, 7500.4–7500.20, 7700.1, 7700.4–7700.20, 9300.1, 9300.4–9300.20, 10200.4–10200.6, 10800.4–10800.6, 10900.4–10900.6, 11000.4–11000.6, 11500.4–11500.6, 12300.4–12300.6, 13900.1, 13900.4–13900.26, 14300.1–14300.48, 14500.1–14500.47
SHI-01 Reference 13800.1–13800.37, 13900.1–13900.26, 14000.1–14000.23, 14100.1–14100.10, 14200.1–14200.49, 14300.1–14300.49, 14400.1–14400.49, 14500.1–14500.47, 14600.1–14600.47
Shielding Gas
None 10500.4–10500.6
Si-Al Killing Process 7400.1, 7500.1
Silicon Killing Process 1000.1–1000.3, 1000.6, 1000.9, 1000.12–1000.14
SK Killing Process 3300.1, 3400.1, 3500.1, 3600.1, 3700.1, 3800.1, 3900.1, 4000.1, 4100.1, 4200.1, 4300.1, 4400.1, 4500.1, 4600.1, 4700.1, 4800.1, 4900.1, 5000.1, 5100.1, 5200.1, 5300.1
Slow Loading Type 2000.3, 7000.2, 14700.2, 14700.11, 14700.20, 14800.2, 14800.11, 14800.20, 14900.2, 14900.11, 15000.2, 15000.11, 15000.20, 15100.2, 15100.11, 15100.20, 15200.2, 15200.11
SMA Weld Type 3100.2–3100.10, 7400.2–7400.10, 7600.2–7600.20, 9200.2–9200.20, 13800.8–13800.36, 14200.1–14200.48, 16500.1, 16500.5, 19000.1, 19100.1, 19200.1, 19300.1, 19400.1, 19600.7, 19600.14
SMAW Weld Type 9700.7–9700.9, 10200.8–10200.10, 10500.4–10500.6, 12300.8–12300.14
SMAW/SAW Weld Type 9900.7–9900.9
Smooth Butt Joint Preparation 6400.4, 6400.7, 6400.10, 6400.13, 6400.16, 6400.19–6400.21, 6500.1, 6500.4, 8000.1, 8000.4, 8600.1, 8600.4, 10200.4–10200.6
Source
Armco 2000.1, 3300.1, 3400.1, 3500.1, 3600.1
Armco D&M 3700.1, 3800.1, 3900.1, 4000.1, 4100.1, 4200.1, 4300.1, 4400.1, 4500.1, 4600.1, 4700.1, 4800.1, 4900.1, 5000.1, 5100.1, 5200.1, 5300.1, 5400.1, 5500.1, 5600.1, 5700.1, 5800.1, 5900.1, 6000.1, 6100.1, 6200.1, 6300.1
Australia 1100.1, 1200.1, 1300.1, 1400.1, 1500.1, 1600.1, 1700.1, 1800.1, 1900.1
HIFAB 14700.1, 14800.1, 14900.1, 15000.1, 15100.1, 15200.1
Kobe 2100.1–2100.3, 2100.6, 2200.1–2200.3, 2200.6, 2300.1–2300.3, 2400.1–2400.3, 2400.6, 2400.9, 2400.12, 2400.15, 2400.18, 2500.1, 2600.1–2600.3, 2600.6, 2600.9, 2600.12, 2600.15, 2600.18, 2700.1
Lukens 7300.1, 7800.1, 7900.1, 9000.1, 9100.1, 12500.1, 12600.1, 12700.1, 15300.1, 15400.1, 15500.1, 15600.1, 15700.1, 15800.1, 15900.1, 16000.1, 16100.1, 16200.1, 16300.1, 16400.1, 16600.1, 19500.1
OGC 6400.1, 6500.1, 6600.1, 6700.1, 6800.1, 6900.1, 8000.1, 8100.1, 8200.1, 8300.1, 8400.1, 8500.1, 8600.1, 8700.1, 8800.1, 8900.1
P&EStat 16500.1
Sumitomo 1000.1–1000.3, 1000.6, 1000.9, 1000.12–1000.14, 2800.1–2800.3, 2800.6, 2900.1–2900.3, 2900.6, 3000.1–3000.3, 3000.6, 13800.1–13800.5, 13800.34, 13900.1, 13900.24, 14000.1, 14000.4, 14100.1, 14100.4–14100.9, 14200.1, 14300.1, 14400.1, 14500.1, 14600.1
SWRI 7100.1, 7200.1
Un Kansas 7000.1
US Steel 3100.1, 3200.1, 7400.1, 7500.1, 7600.1, 7700.1, 9200.1, 9300.1
USN 12800.1, 12900.1, 13000.1, 13100.1, 13200.1, 13300.1, 13400.1, 13500.1, 13600.1, 13700.1, 18600.1, 18700.1, 18800.1, 18900.1, 19000.1, 19100.1, 19200.1, 19300.1, 19400.1, 19600.1, 19600.7

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Compact 7800.2, 9000.6, 9100.2, 12500.2, 12600.2, 12700.2, 15700.2, 15800.2, 15900.2, 16100.2
Compact Tension 18600.2, 18700.1, 18800.2, 18900.2, 19000.3, 19100.3, 19200.3, 19300.3, 19400.3, 19600.2, 19600.9, 19600.15
Cylindrical 3100.1, 7000.1, 7300.1, 7400.1, 7600.1, 7800.1, 7900.1, 9000.1, 9100.1, 9200.1, 12500.1, 12600.1, 12700.1, 14700.3, 14700.8, 14700.12, 14700.17, 14700.21, 14700.26, 14800.3, 14800.8, 14800.12, 14800.17, 14800.21, 14800.26, 14900.3, 14900.8, 14900.12, 14900.17, 15000.3, 15000.8, 15000.12, 15000.17, 15000.21, 15000.26, 15100.3, 15100.8, 15100.12, 15100.17, 15100.21, 15100.26, 15200.3, 15200.8, 15200.12, 15200.17, 15300.1, 15400.1, 15500.1, 15600.1, 15700.1, 15800.1, 15900.1, 16000.1, 16100.1, 16200.1, 16300.1, 16400.1, 16500.2, 16500.5, 18600.1, 18800.1, 18900.1, 19000.2, 19100.2, 19200.2, 19300.2, 19400.2, 19600.1, 19600.8, 19600.14
Double Notch Bend 2000.3, 7000.2, 14700.2, 14700.11, 14700.20, 14800.2, 14800.11, 14800.20, 14900.2, 14900.11, 15000.2, 15000.11, 15000.20, 15100.2, 15100.11, 15100.20, 15200.2, 15200.11
Dynamic Tear 2000.8, 7100.5, 7200.5, 7200.11, 7200.15, 7300.5, 7800.5, 7900.5, 9000.7, 9100.7, 12500.5, 12600.9–12600.13, 12700.6, 12800.4, 12900.4, 13000.4, 13100.4, 13300.4, 13400.4, 13500.4, 13600.4, 15300.5, 15400.5, 15500.6, 15600.5, 15700.7, 15800.7, 15900.5, 16000.5, 16100.7, 16200.5, 16300.5, 16400.5, 16600.6, 17000.5, 17000.10, 17200.5, 17200.10, 17200.15, 17200.20, 17200.25, 17200.30, 17200.35, 17200.40, 17200.45, 17900.5, 17900.10, 17900.15, 17900.20, 17900.25, 17900.30, 17900.35, 17900.40, 17900.45, 18000.5, 18000.10, 18100.5, 18100.10, 18300.5, 18300.10, 18300.15, 18300.20, 18300.25, 18300.30, 18300.35, 18300.40, 18300.45, 18600.5, 18700.4, 18800.5, 18900.5, 19000.6, 19100.6, 19200.6, 19300.6, 19400.6, 19500.2, 19600.5, 19600.12, 19600.20
Flat 13800.1–13800.2
Full 1100.2, 1200.2, 1300.2, 1400.2, 1500.2, 1600.2, 1700.2, 1800.2, 1900.2, 2000.4, 2100.1–2100.3, 2100.6, 2200.1–2200.3, 2200.6, 2300.1–2300.3, 2300.6, 2400.1–2400.3, 2400.6, 2400.9, 2400.12, 2400.15, 2400.18, 2500.2–2500.4, 2500.7, 2500.10, 2500.13, 2500.16, 2600.1–2600.3, 2600.6, 2600.9, 2600.12, 2600.15, 2600.18, 2700.2–2700.4, 2700.7, 2700.10, 2700.13, 2700.16, 2800.3, 2800.6, 2900.3, 2900.6, 3000.3, 3000.6, 3100.2–3100.10, 3200.2–3200.20, 3700.2, 3800.2, 3900.2, 4000.2, 4100.2, 4200.2, 4300.2, 4400.2, 4500.2, 4600.2, 4700.2, 4800.2, 4900.2, 5000.2, 5100.2, 5200.2, 5300.2, 5400.2, 5500.2, 5600.2, 5700.2, 5800.2, 5900.2, 6000.2, 6100.2, 6200.2, 6300.2, 6400.1, 6400.4, 6400.7, 6400.10, 6400.13, 6400.16, 6400.19–6400.21, 6500.2–6500.4, 6600.2–6600.4, 6700.2–6700.4, 6800.2–6800.4, 6900.1, 7000.5, 7100.2, 7200.2, 7200.8, 7200.13, 7300.2, 7400.2–7400.10, 7500.2–7500.20, 7600.2–7600.20, 7700.2–7700.20, 7800.3, 7900.3, 8000.2–8000.4, 8100.2–8100.4, 8200.2–8200.4, 8300.2–8300.4, 8400.1, 8500.2–8500.4, 8600.2–8600.4, 8700.2–8700.4, 8800.2–8800.4, 8900.1, 9000.2, 9100.3, 9200.2–9200.20, 9300.2–9300.20, 10100.2, 10300.2, 10300.5, 10400.2, 10500.2–10500.6, 10600.1, 10700.2–10700.4, 10800.2–10800.6, 10900.2–10900.6, 11000.2–11000.6, 11100.1, 11200.2, 11200.5, 11500.4–11500.6, 11800.2, 11800.5, 11900.2–11900.4, 12000.2, 12100.2, 12200.2, 12300.2–12300.14, 12400.2, 12500.3, 12600.3, 12600.6, 12700.3, 12800.2, 12900.2, 13000.2, 13100.2, 13200.2, 13300.2, 13400.2, 13500.2, 13600.2, 13700.2, 13800.8–13800.32, 13900.2–13900.22, 14100.5–14100.9, 14700.4–14700.6, 14700.9, 14700.13–14700.15, 14700.18, 14700.22–14700.24, 14700.27, 14800.4–14800.6, 14800.9, 14800.13–14800.15, 14800.18, 14800.22–14800.24, 14800.27, 14900.4–14900.6, 14900.9, 14900.13–14900.15, 14900.18, 15000.4–15000.6, 15000.9, 15000.13–15000.15, 15000.18, 15000.22–15000.24, 15000.27, 15100.4–15100.6, 15100.9, 15100.13–15100.15, 15100.18, 15100.22–15100.24, 15100.27, 15200.4–15200.6, 15200.9, 15200.13–15200.15, 15200.18, 15300.2, 15400.2, 15500.2, 15600.2, 15700.3, 15800.3, 15900.3, 16000.2, 16100.3, 16200.2, 16300.2, 16400.2, 16500.3, 16500.6, 16700.2, 16700.6, 16700.9, 16700.12, 16700.15, 16700.18, 16700.21, 16700.24, 16700.27, 16800.2, 16800.6, 16900.2, 16900.6, 17000.2, 17000.8, 17100.2, 17100.6, 17100.9, 17100.12, 17100.15, 17100.18, 17200.2, 17200.8, 17200.13, 17200.18, 17200.23, 17200.28, 17200.33, 17200.38, 17200.43, 17300.2, 17300.6, 17300.9, 17300.12, 17300.15, 17300.18, 17400.2, 17400.6, 17400.9, 17400.12, 17400.15, 17400.18, 17400.21, 17400.24, 17400.27, 17500.2, 17500.6, 17500.9, 17500.12, 17500.15, 17500.18, 17600.2, 17600.6, 17700.2, 17700.6, 17700.9, 17700.12, 17700.15, 17700.18, 17700.21, 17700.24, 17700.27, 17800.2, 17800.6, 17900.2, 17900.8, 17900.13, 17900.18, 17900.23, 17900.28, 17900.33, 17900.38, 17900.43, 18000.2, 18000.8, 18100.2, 18100.8, 18200.2, 18200.6, 18200.9, 18200.12, 18200.15, 18200.18, 18200.21, 18200.24, 18200.27, 18300.2, 18300.8, 18300.13, 18300.18, 18300.23, 18300.28, 18300.33, 18300.38, 18300.43, 18400.2, 18400.6, 18400.9, 18400.12, 18400.15, 18400.18, 18400.21, 18400.24, 18400.27, 18500.2, 18500.6, 18600.3, 18700.2, 18800.3, 18900.3,

19000.4, 19100.4, 19200.4, 19300.4, 19400.4, 19500.5, 19600.3, 19600.10, 19600.16–19600.18

P-1 1000.14, 1100.6, 1200.6, 1300.6, 1400.6, 1500.6, 1600.6, 1700.6, 1800.6, 1900.6, 13800.7, 14100.2

P-2 10600.4, 10700.7, 11100.4, 11800.4, 11900.6

P-3 7100.4, 7200.4, 7200.10, 10000.5, 10100.5

Round 2800.1–2800.2, 2900.1–2900.2, 3000.1–3000.2, 7100.1, 7200.1, 7200.7, 14100.1, 14100.4

SSC-276 Reference 7100.1–7100.6

Standard Method

813 18600.2, 18700.1, 18800.2, 18900.2, 19600.2, 19600.9, 19600.15

ABS Sec43 2800.3, 2800.6, 2900.3, 2900.6, 3000.3, 3000.6

BS131H2 14700.4–14700.6, 14700.9, 14700.13–14700.15, 14700.18, 14700.22–14700.24, 14700.27, 14800.4–14800.6, 14800.9, 14800.13–14800.15, 14800.18, 14800.22–14800.24, 14800.27, 14900.4–14900.6, 14900.9, 14900.13–14900.15, 14900.18, 15000.4–15000.6, 15000.9, 15000.13–15000.15, 15000.18, 15000.22–15000.24, 15000.27, 15100.4–15100.6, 15100.9, 15100.13–15100.15, 15100.18, 15100.22–15100.24, 15100.27, 15200.4–15200.6, 15200.9, 15200.13–15200.15, 15200.18

BS5762 7000.2, 13800.34–13800.37, 13900.24–13900.26, 14200.2–14200.5, 14300.2–14300.5, 14400.2–14400.5, 14500.2–14500.5, 14600.2–14600.5, 14700.2, 14700.11, 14700.20, 14800.2, 14800.11, 14800.20, 14900.2, 14900.11, 15000.2, 15000.11, 15000.20, 15100.2, 15100.11, 15100.20, 15200.2, 15200.11

E 208 1000.14, 1100.6, 1200.6, 1300.6, 1400.6, 1500.6, 1600.6, 1700.6, 1800.6, 1900.6, 2000.7, 3300.1, 3400.1, 3500.1, 3600.1, 3700.1, 3800.1, 3900.1, 4000.1, 4100.1, 4200.1, 4300.1, 4400.1, 4500.1, 4600.1, 4700.1, 4800.1, 4900.1, 5000.1, 5100.1, 5200.1, 5300.1, 5400.1, 5500.1, 5600.1, 5700.1, 5800.1, 5900.1, 6000.1, 6100.1, 6200.1, 6300.1, 7100.4, 7200.4, 7200.10, 13800.7

E 23 7100.2, 16500.3, 16500.6, 18600.3, 18700.2, 18800.3, 18900.3, 19000.4, 19100.4, 19200.4, 19300.4, 19400.4, 19600.3, 19600.10, 19600.16–19600.18

E 604 2000.8, 7100.5, 7200.5, 7200.11, 7200.15, 18600.5, 18700.4, 18800.5, 18900.5, 19000.6, 19100.6, 19200.6, 19300.6, 19400.6, 19600.5, 19600.12, 19600.20

E 8 7100.1, 7200.1, 7200.7, 16500.2, 16500.5, 18600.1, 18800.1, 18900.1, 19000.2, 19100.2, 19200.2, 19300.2, 19400.2, 19600.1, 19600.8, 19600.14

E318 12600.2

E813 7800.2, 7900.2, 9000.6, 9100.2, 12500.2, 12700.2, 15700.2, 15800.2, 15900.2, 16100.2, 19000.3, 19100.3, 19200.3, 19300.3, 19400.3

JISZ3121 14600.46–14600.47

Standard Year

1969 1000.14, 18600.1, 18800.1, 18900.1, 19000.2, 19100.2, 19200.2, 19300.2, 19400.2, 19600.1, 19600.8, 19600.14

1972 18600.3, 18700.2, 18800.3, 18900.3, 19600.3, 19600.10, 19600.16–19600.18

1976 7100.5, 7200.5, 7200.11, 7200.15

1979 7000.2, 14700.2, 14700.11, 14700.20, 14800.2, 14800.11, 14800.20, 14900.2, 14900.11, 15000.2, 15000.11, 15000.20, 15100.2, 15100.11, 15100.20, 15200.2, 15200.11

1980 18600.5, 18700.4, 18800.5, 18900.5, 19600.5, 19600.12, 19600.20

1981 16500.2–16500.6

1987 7800.2, 9000.6, 9100.2, 12500.2, 12600.2, 12700.2, 15700.2, 15800.2, 15900.2, 16100.2

Sumitomo Producer 1000.1–1000.3, 1000.6, 1000.9, 1000.12–1000.14, 2800.1–2800.3, 2800.6, 2900.1–2900.3, 2900.6, 3000.1–3000.3, 3000.6, 13800.1–13800.5, 13800.34, 13900.1, 13900.24, 14000.1, 14000.4, 14100.1, 14100.4–14100.9, 14200.1, 14300.1, 14400.1, 14500.1, 14600.1

Sumitomo Source 1000.1–1000.3, 1000.6, 1000.9, 1000.12–1000.14, 2800.1–2800.3, 2800.6, 2900.1–2900.3, 2900.6, 3000.1–3000.3, 3000.6, 13800.1–13800.5, 13800.34, 13900.1, 13900.24, 14000.1, 14000.4, 14100.1, 14100.4–14100.9, 14200.1, 14300.1, 14400.1, 14500.1, 14600.1

Surface Location wrt Surface 14700.1, 14700.11, 14700.20, 14800.1, 14800.11, 14800.20, 14900.1, 14900.11, 15000.1, 15000.11, 15000.20, 15100.1, 15100.11, 15100.20, 15200.1, 15200.11

SWRI Source 7100.1, 7200.1

T

T Location 1000.1–1000.3, 1000.9, 1000.12–1000.14

T Lot ID 4700.1–4700.3

Tensile Test Type 1000.1–1000.2, 1100.1, 1200.1, 1300.1, 1400.1, 1500.1, 1600.1, 1700.1, 1800.1, 1900.1, 2000.1, 2100.1–2100.2, 2200.1–2200.2, 2300.1–2300.2, 2400.1–2400.2, 2600.1–2600.2, 2800.1–2800.2, 2900.1–2900.2, 3000.1–3000.2, 3100.1, 7000.1, 7100.1, 7200.1, 7200.7, 7300.1, 7400.1, 7600.1, 7800.1, 7900.1, 9000.1, 9100.1, 9200.1, 9400.1, 9500.1, 9500.4, 9600.1, 9600.4, 9600.7, 9700.1, 9700.4, 9800.1, 9900.1, 9900.4, 10000.1, 10100.1, 10200.1, 10300.1, 10300.4, 10400.1, 10500.1, 10700.1, 10800.1, 10900.1, 11000.1, 11200.1, 11200.4, 11300.1, 11400.1, 11500.1, 11600.1, 11700.1, 11700.4, 11800.1, 11900.1, 12000.1, 12100.1, 12200.1, 12300.1, 12400.1, 12500.1, 12600.1, 12700.1, 12800.1, 12900.1, 13000.1, 13100.1, 13200.1, 13300.1, 13400.1, 13500.1, 13600.1, 13700.1, 13800.1–13800.2, 14100.1, 14100.4, 14500.46–14500.47, 14600.46–14600.47, 14700.3, 14700.8, 14700.12,

14700.17, 14700.21, 14700.26, 14800.3, 14800.8, 14800.12, 14800.17, 14800.21, 14800.26, 14900.3, 14900.8, 14900.12, 14900.17, 15000.3, 15000.8, 15000.12, 15000.17, 15000.21, 15000.26, 15100.3, 15100.8, 15100.12, 15100.17, 15100.21, 15100.26, 15200.3, 15200.8, 15200.12, 15200.17, 15300.1, 15400.1, 15500.1, 15600.1, 15700.1, 15800.1, 15900.1, 16000.1, 16100.1, 16200.1, 16300.1, 16400.1, 16500.2, 16500.5, 16600.5, 16700.1, 16700.5, 16700.8, 16700.11, 16700.14, 16700.17, 16700.20, 16700.23, 16700.26, 16800.1, 16800.5, 16900.1, 16900.5, 17000.1, 17000.7, 17100.1, 17100.5, 17100.8, 17100.11, 17100.14, 17100.17, 17200.1, 17200.7, 17200.12, 17200.17, 17200.22, 17200.27, 17200.32, 17200.37, 17200.42, 17300.1, 17300.5, 17300.8, 17300.11, 17300.14, 17300.17, 17400.1, 17400.5, 17400.8, 17400.11, 17400.14, 17400.17, 17400.20, 17400.23, 17400.26, 17500.1, 17500.5, 17500.8, 17500.11, 17500.14, 17500.17, 17600.1, 17600.5, 17700.1, 17700.5, 17700.8, 17700.11, 17700.14, 17700.17, 17700.20, 17700.23, 17700.26, 17800.1, 17800.5, 17900.1, 17900.7, 17900.12, 17900.17, 17900.22, 17900.27, 17900.32, 17900.37, 17900.42, 18000.1, 18000.7, 18100.1, 18100.7, 18200.1, 18200.5, 18200.8, 18200.11, 18200.14, 18200.17, 18200.20, 18200.23, 18200.26, 18300.1, 18300.7, 18300.12, 18300.17, 18300.22, 18300.27, 18300.32, 18300.37, 18300.42, 18400.1, 18400.5, 18400.8, 18400.11, 18400.14, 18400.17, 18400.20, 18400.23, 18400.26, 18500.1, 18500.5, 18600.1, 18800.1, 18900.1, 19000.2, 19100.2, 19200.2, 19300.2, 19400.2, 19500.1, 19600.1, 19600.8, 19600.14

Test Type

Charpy V Impact 1000.3, 1000.6, 1000.9, 1000.12, 1100.2, 1200.2, 1300.2, 1400.2, 1500.2, 1600.2, 1700.2, 1800.2, 1900.2, 2000.4, 2100.3, 2100.6, 2200.3, 2200.6, 2300.3, 2300.6, 2400.3, 2400.6, 2400.9, 2400.12, 2400.15, 2400.18, 2500.2–2500.4, 2500.7, 2500.10, 2500.13, 2500.16, 2600.3, 2600.6, 2600.9, 2600.12, 2600.15, 2600.18, 2700.2–2700.4, 2700.7, 2700.10, 2700.13, 2700.16, 2800.3, 2800.6, 2900.3, 2900.6, 3000.3, 3000.6, 3100.2–3100.10, 3200.2–3200.20, 3300.2, 3400.2, 3500.2, 3600.2, 3700.2, 3800.2, 3900.2, 4000.2, 4100.2, 4200.2, 4300.2, 4400.2, 4500.2, 4600.2, 4700.2, 4800.2, 4900.2, 5000.2, 5100.2, 5200.2, 5300.2, 5400.2, 5500.2, 5600.2, 5700.2, 5800.2, 5900.2, 6000.2, 6100.2, 6200.2, 6300.2, 6400.1, 6400.4, 6400.7, 6400.10, 6400.13, 6400.16, 6400.19–6400.21, 6500.2–6500.4, 6600.2–6600.4, 6700.2–6700.4, 6800.2–6800.4, 6900.1, 7000.5, 7100.2, 7200.2, 7200.8, 7200.13, 7300.2, 7400.2–7400.10, 7500.2–7500.20, 7600.2–7600.20, 7700.2–7700.20, 7800.3, 7900.3, 8000.2–8000.4, 8100.2–8100.4, 8200.2–8200.4, 8300.2–8300.4, 8400.1, 8500.2–8500.4, 8600.2–8600.4, 8700.2–8700.4, 8800.2–8800.4, 8900.1, 9000.2, 9100.3, 9200.2–9200.20, 9300.2–9300.20, 9400.2, 9500.2, 9500.5, 9600.2, 9600.5, 9700.2, 9700.5–9700.9, 9800.2, 9900.2, 9900.5–9900.9, 10000.2, 10100.2, 10200.2–10200.10, 10300.2, 10300.5, 10400.2, 10500.2–10500.6, 10600.1, 10700.2–10700.4, 10800.2–10800.6, 10900.2–10900.6, 11000.2–11000.6, 11100.1, 11200.2, 11200.5, 11300.2, 11400.2, 11500.2–11500.6, 11600.2, 11700.2, 11700.5, 11800.2, 11800.5, 11900.2–11900.4, 12000.2, 12100.2, 12200.2, 12300.2–12300.14, 12400.2, 12500.3, 12600.3, 12600.6, 12700.3, 12800.2, 12900.2, 13000.2, 13100.2, 13200.2, 13300.2, 13400.2, 13500.2, 13600.2, 13700.2, 13800.3–13800.5, 13800.8–13800.32, 13900.2–13900.22, 14000.4–14000.22, 14100.5–14100.9, 14200.6–14200.48, 14300.6–14300.48, 14400.6–14400.48, 14500.6–14500.44, 14600.6–14600.44, 14700.4–14700.6, 14700.9, 14700.13–14700.15, 14700.18, 14700.22–14700.24, 14700.27, 14800.4–14800.6, 14800.9, 14800.13–14800.15, 14800.18, 14800.22–14800.24, 14800.27, 14900.4–14900.6, 14900.9, 14900.13–14900.15, 14900.18, 15000.4–15000.6, 15000.9, 15000.13–15000.15, 15000.18, 15000.22–15000.24, 15000.27, 15100.4–15100.6, 15100.9, 15100.13–15100.15, 15100.18, 15100.22–15100.24, 15100.27, 15200.4–15200.6, 15200.9, 15200.13–15200.15, 15200.18, 15300.2, 15400.2, 15500.2, 15600.2, 15700.3, 15800.3, 15900.3, 16000.2, 16100.3, 16200.2, 16300.2, 16400.2, 16500.3, 16500.6, 16600.2, 16700.2, 16700.6, 16700.9, 16700.12, 16700.15, 16700.18, 16700.21, 16700.24, 16700.27, 16800.2, 16800.6, 16900.2, 16900.6, 17000.2, 17000.8, 17100.2, 17100.6, 17100.9, 17100.12, 17100.15, 17100.18, 17200.2, 17200.8, 17200.13, 17200.18, 17200.23, 17200.28, 17200.33, 17200.38, 17200.43, 17300.2, 17300.6, 17300.9, 17300.12, 17300.15, 17300.18, 17400.2, 17400.6, 17400.9, 17400.12, 17400.15, 17400.18, 17400.21, 17400.24, 17400.27, 17500.2, 17500.6, 17500.9, 17500.12, 17500.15, 17500.18, 17600.2, 17600.6, 17700.2, 17700.6, 17700.9, 17700.12, 17700.15, 17700.18, 17700.21, 17700.24, 17700.27, 17800.2, 17800.6, 17900.2, 17900.8, 17900.13, 17900.18, 17900.23, 17900.28, 17900.33, 17900.38, 17900.43, 18000.2, 18000.8, 18100.2, 18100.8, 18200.2, 18200.6, 18200.9, 18200.12, 18200.15, 18200.18, 18200.21, 18200.24, 18200.27, 18300.2, 18300.8, 18300.13, 18300.18, 18300.23, 18300.28, 18300.33, 18300.38, 18300.43, 18400.2, 18400.6, 18400.9, 18400.12, 18400.15, 18400.18, 18400.21, 18400.24, 18400.27, 18500.2, 18500.6, 18600.3, 18700.2, 18800.3, 18900.3, 19000.4, 19100.4, 19200.4, 19300.4, 19400.4, 19500.5, 19600.3, 19600.10, 19600.16–19600.18

Dynamic Tear 2000.8, 7100.5, 7200.5, 7200.11, 7200.15, 7300.5, 7800.5, 7900.5, 9000.7, 9100.7,

12500.5, 12600.9–12600.13, 12700.6, 12800.4, 12900.4, 13000.4, 13100.4, 13300.4, 13400.4, 13500.4, 13600.4, 15300.5, 15400.5, 15500.6, 15600.5, 15700.7, 15800.7, 15900.5, 16000.5, 16100.7, 16200.5, 16300.5, 16400.5, 16600.6, 17000.5, 17000.10, 17200.5, 17200.10, 17200.15, 17200.20, 17200.25, 17200.30, 17200.35, 17200.40, 17200.45, 17900.5, 17900.10, 17900.15, 17900.20, 17900.25, 17900.30, 17900.35, 17900.40, 17900.45, 18000.5, 18000.10, 18100.5, 18100.10, 18300.5, 18300.10, 18300.15, 18300.20, 18300.25, 18300.30, 18300.35, 18300.40, 18300.45, 18600.5, 18700.4, 18800.5, 18900.5, 19000.6, 19100.6, 19200.6, 19300.6, 19400.6, 19500.2, 19600.5, 19600.12, 19600.20

Fracture Toughness 2000.3, 7000.2, 7800.2, 7900.2, 9000.6, 9100.2, 12500.2, 12600.2, 12700.2, 13800.34–13800.37, 13900.24–13900.26, 14000.2–14000.3, 14100.3, 14200.2–14200.5, 14300.2–14300.5, 14400.2–14400.5, 14500.2–14500.5, 14600.2–14600.5, 14700.2, 14700.11, 14700.20, 14800.2, 14800.11, 14800.20, 14900.2, 14900.11, 15000.2, 15000.11, 15000.20, 15100.2, 15100.11, 15100.20, 15200.2, 15200.11, 15700.2, 15800.2, 15900.2, 16100.2, 16600.1, 18600.2, 18700.1, 18800.2, 18900.2, 19000.3, 19100.3, 19200.3, 19300.3, 19400.3, 19600.2, 19600.9, 19600.15

Nil Ductilty Transition 1000.14, 1100.6, 1200.6, 1300.6, 1400.6, 1500.6, 1600.6, 1700.6, 1800.6, 1900.6, 2000.7, 3300.1, 3400.1, 3500.1, 3600.1, 3700.1, 3800.1, 3900.1, 4000.1, 4100.1, 4200.1, 4300.1, 4400.1, 4500.1, 4600.1, 4700.1, 4800.1, 4900.1, 5000.1, 5100.1, 5200.1, 5300.1, 5400.1, 5500.1, 5600.1, 5700.1, 5800.1, 5900.1, 6000.1, 6100.1, 6200.1, 6300.1, 7100.4, 7200.4, 7200.10, 10000.5, 10100.5, 10600.4, 10700.7, 11100.4, 11800.4, 11900.6, 13800.7, 14100.2

Tensile 1000.1–1000.2, 1100.1, 1200.1, 1300.1, 1400.1, 1500.1, 1600.1, 1700.1, 1800.1, 1900.1, 2000.1, 2100.1–2100.2, 2200.1–2200.2, 2300.1–2300.2, 2400.1–2400.2, 2600.1–2600.2, 2800.1–2800.2, 2900.1–2900.2, 3000.1–3000.2, 3100.1, 7000.1, 7100.1, 7200.1, 7200.7, 7300.1, 7400.1, 7600.1, 7800.1, 7900.1, 9000.1, 9100.1, 9200.1, 9400.1, 9500.1, 9500.4, 9600.1, 9600.4, 9600.7, 9700.1, 9700.4, 9800.1, 9900.1, 9900.4, 10000.1, 10100.1, 10200.1, 10300.1, 10300.4, 10400.1, 10500.1, 10700.1, 10800.1, 10900.1, 11000.1, 11200.1, 11200.4, 11300.1, 11400.1, 11500.1, 11600.1, 11700.1, 11700.4, 11800.1, 11900.1, 12000.1, 12100.1, 12200.1, 12300.1, 12400.1, 12500.1, 12600.1, 12700.1, 12800.1, 12900.1, 13000.1, 13100.1, 13200.1, 13300.1, 13400.1, 13500.1, 13600.1, 13700.1, 13800.1–13800.2, 14100.1, 14100.4, 14500.46–14500.47, 14600.46–14600.47, 14700.3, 14700.8, 14700.12, 14700.17, 14700.21, 14700.26, 14800.3, 14800.8, 14800.12, 14800.17, 14800.21, 14800.26, 14900.3, 14900.8, 14900.12, 14900.17, 15000.3, 15000.8, 15000.12, 15000.17, 15000.21, 15000.26, 15100.3, 15100.8, 15100.12, 15100.17, 15100.21, 15100.26, 15200.3, 15200.8, 15200.12, 15200.17, 15300.1, 15400.1, 15500.1, 15600.1, 15700.1, 15800.1, 15900.1, 16000.1, 16100.1, 16200.1, 16300.1, 16400.1, 16500.2, 16500.5, 16600.5, 16700.1, 16700.5, 16700.8, 16700.11, 16700.14, 16700.17, 16700.20, 16700.23, 16700.26, 16800.1, 16800.5, 16900.1, 16900.5, 17000.1, 17000.7, 17100.1, 17100.5, 17100.8, 17100.11, 17100.14, 17100.17, 17200.1, 17200.7, 17200.12, 17200.17, 17200.22, 17200.27, 17200.32, 17200.37, 17200.42, 17300.1, 17300.5, 17300.8, 17300.11, 17300.14, 17300.17, 17400.1, 17400.5, 17400.8, 17400.11, 17400.14, 17400.17, 17400.20, 17400.23, 17400.26, 17500.1, 17500.5, 17500.8, 17500.11, 17500.14, 17500.17, 17600.1, 17600.5, 17700.1, 17700.5, 17700.8, 17700.11, 17700.14, 17700.17, 17700.20, 17700.23, 17700.26, 17800.1, 17800.5, 17900.1, 17900.7, 17900.12, 17900.17, 17900.22, 17900.27, 17900.32, 17900.37, 17900.42, 18000.1, 18000.7, 18100.1, 18100.7, 18200.1, 18200.5, 18200.8, 18200.11, 18200.14, 18200.17, 18200.20, 18200.23, 18200.26, 18300.1, 18300.7, 18300.12, 18300.17, 18300.22, 18300.27, 18300.32, 18300.37, 18300.42, 18400.1, 18400.5, 18400.8, 18400.11, 18400.14, 18400.17, 18400.20, 18400.23, 18400.26, 18500.1, 18500.5, 18600.1, 18800.1, 18900.1, 19000.2, 19100.2, 19200.2, 19300.2, 19400.2, 19500.1, 19600.1, 19600.8, 19600.14

Top Composition Position 2100.1–2100.5, 2200.1–2200.5, 2300.1–2300.8, 2400.1–2400.5, 2400.9–2400.11, 2400.15–2400.17, 2500.1–2500.18, 2600.1–2600.5, 2600.9–2600.11, 2600.15–2600.17, 2700.1–2700.18, 2800.1–2800.5, 2900.1–2900.5, 3000.1–3000.5

Top Ingot Position 2100.1–2100.3, 2200.1–2200.3, 2300.1–2300.3, 2400.1–2400.3, 2400.9, 2400.15, 2500.1, 2600.1–2600.3, 2600.9, 2600.15, 2700.1, 16700.1, 16800.1, 16900.1, 17000.1, 17100.1, 17200.1, 17300.1, 17400.1, 17500.1, 17600.1, 17700.1, 17800.1, 17900.1, 18000.1, 18100.1, 18200.1, 18300.1, 18400.1, 18500.1

Transverse Location wrt Weld 14500.46–14500.47, 14600.46–14600.47

TSAW Weld Type 14000.1–14000.22, 14400.1–14400.48, 14600.1–14600.47

TW8544 Filler Name 6400.16, 6400.19–6400.21, 6700.1, 6700.4, 6800.1, 6800.4, 8300.1, 8300.4, 8500.1, 8500.4, 8800.1, 8800.4

U

U Groove Joint Preparation 2500.1, 2500.4, 2500.7, 2500.10, 2500.13, 2500.16, 2700.1, 2700.4, 2700.7, 2700.10, 2700.13, 2700.16

Un Kansas Source 7000.1
US Steel Producer 3100.1, 3200.1, 6500.1, 6600.1, 6700.1, 6800.1, 6900.1, 7000.1, 7400.1, 7500.1, 7600.1, 7700.1, 8000.1, 8100.1, 8200.1, 8300.1, 8400.1, 8500.1, 9200.1, 9300.1
US Steel Source 3100.1, 3200.1, 7400.1, 7500.1, 7600.1, 7700.1, 9200.1, 9300.1
US-43 Flux Name 2500.1, 2500.4, 2500.7, 2500.10, 2500.13, 2500.16, 2700.1, 2700.4, 2700.7, 2700.10, 2700.13, 2700.16
USN 6/9 Reference 18600.1–18600.6, 18700.1–18700.5, 18800.1–18800.6, 18900.1–18900.6, 19000.1–19000.7, 19100.1–19100.7, 19200.1–19200.7, 19300.1–19300.7, 19400.1–19400.7, 19600.1–19600.21
USN 9/9 Reference 12800.1–12800.5, 12900.1–12900.5, 13000.1–13000.5, 13100.1–13100.5, 13200.1–13200.3, 13300.1–13300.5, 13400.1–13400.5, 13500.1–13500.5, 13600.1–13600.5, 13700.1–13700.3
USN Source 12800.1, 12900.1, 13000.1, 13100.1, 13200.1, 13300.1, 13400.1, 13500.1, 13600.1, 13700.1, 18600.1, 18700.1, 18800.1, 18900.1, 19000.1, 19100.1, 19200.1, 19300.1, 19400.1, 19600.1, 19600.7
USN-1 Reference 16700.1–16700.28, 16800.1–16800.7, 16900.1–16900.7, 17000.1–17000.11, 17100.1–17100.19, 17200.1–17200.46, 17300.1–17300.19, 17400.1–17400.28, 17500.1–17500.19, 17600.1–17600.7, 17700.1–17700.28, 17800.1–17800.7, 17900.1–17900.46, 18000.1–18000.11, 18100.1–18100.11, 18200.1–18200.28, 18300.1–18300.46, 18400.1–18400.28, 18500.1–18500.7

V

V Groove Joint Preparation 3200.1, 3200.4–3200.20, 7500.1, 7500.4–7500.20, 7700.1, 7700.4–7700.20, 9700.7–9700.9, 9900.7–9900.9, 10200.8–10200.10, 14700.1–14700.3, 14700.6–14700.8, 14700.11–14700.12, 14700.15–14700.17, 14700.20–14700.21, 14700.24–14700.26, 14800.1–14800.3, 14800.6–14800.8, 14800.11–14800.12, 14800.15–14800.17, 14800.20–14800.21, 14800.24–14800.26, 14900.1–14900.3, 14900.6–14900.8, 14900.11–14900.12, 14900.15–14900.17, 15000.1–15000.3, 15000.6–15000.8, 15000.11–15000.12, 15000.15–15000.17, 15000.20–15000.21, 15000.24–15000.26, 15100.1–15100.3, 15100.6–15100.8, 15100.11–15100.12, 15100.15–15100.17, 15100.20–15100.21, 15100.24–15100.26, 15200.1–15200.3, 15200.6–15200.8, 15200.11–15200.12, 15200.15–15200.17
Vertical Welding Position 6400.4, 6400.7, 6400.10, 6400.13, 6400.16, 6400.19–6400.21, 6500.1, 6500.4, 6600.1, 6600.4, 6700.1, 6700.4, 6800.1, 6800.4, 8000.1, 8000.4, 8100.1, 8100.4, 8200.1, 8200.4, 8300.1, 8300.4, 8500.1, 8500.4, 8600.1, 8600.4, 8700.1, 8700.4, 8800.1, 8800.4
Vert-Up Welding Position 10500.4–10500.6, 12300.8–12300.14

W

W Final Processing 19000.1, 19100.1, 19200.1, 19300.1, 19400.1
W Heat Treatment 19000.1, 19100.1, 19200.1, 19300.1, 19400.1
W36 Filler Name 13900.1, 13900.4–13900.26, 14000.1–14000.22, 14300.1–14300.48, 14400.1–14400.48, 14500.1–14500.47, 14600.1–14600.47
Weld Type
- **ESW** 6400.4, 6400.7, 6500.1, 6500.4, 8000.1, 8000.4, 8600.1, 8600.4
- **FCA** 14700.1–14700.3, 14700.6–14700.8, 14700.11–14700.12, 14700.15–14700.17, 14700.20–14700.21, 14700.24–14700.26, 14800.1–14800.3, 14800.6–14800.8, 14800.11–14800.12, 14800.15–14800.17, 14800.20–14800.21, 14800.24–14800.26, 14900.1–14900.3, 14900.6–14900.8, 14900.11–14900.12, 14900.15–14900.17, 15000.1–15000.3, 15000.6–15000.8, 15000.11–15000.12, 15000.15–15000.17, 15000.20–15000.21, 15000.24–15000.26, 15100.1–15100.3, 15100.6–15100.8, 15100.11–15100.12, 15100.15–15100.17, 15100.20–15100.21, 15100.24–15100.26, 15200.1–15200.3, 15200.6–15200.8, 15200.11–15200.12, 15200.15–15200.17
- **NGESW** 6400.10, 6400.13, 6400.16, 6400.19–6400.21, 6600.1, 6600.4, 6700.1, 6700.4, 6800.1, 6800.4, 8100.1, 8100.4, 8200.1, 8200.4, 8300.1, 8300.4, 8500.1, 8500.4, 8700.1, 8700.4, 8800.1, 8800.4
- **SAW** 2500.1, 2500.4, 2500.7, 2500.10, 2500.13, 2500.16, 2700.1, 2700.4, 2700.7, 2700.10, 2700.13, 2700.16, 3200.1, 3200.4–3200.20, 7200.7–7200.8, 7200.13, 7500.1, 7500.4–7500.20, 7700.1, 7700.4–7700.20, 9300.1, 9300.4–9300.20, 10200.4–10200.6, 10800.4–10800.6, 10900.4–10900.6, 11000.4–11000.6, 11500.4–11500.6, 12300.4–12300.6, 13900.1, 13900.4–13900.26, 14300.1–14300.48, 14500.1–14500.47
- **SMA** 3100.2–3100.10, 7400.2–7400.10, 7600.2–7600.20, 9200.2–9200.20, 13800.8–13800.36, 14200.1–14200.48, 16500.1, 16500.5, 19000.1, 19100.1, 19200.1, 19300.1, 19400.1, 19600.7, 19600.14
- **SMAW** 9700.7–9700.9, 10200.8–10200.10, 10500.4–10500.6, 12300.8–12300.14
- **SMAW/SAW** 9900.7–9900.9
- **TSAW** 14000.1–14000.22, 14400.1–14400.48, 14600.1–14600.47

Welding Position
- **1G** 14800.11–14800.12, 14800.15–14800.17
- **2G** 14700.11–14700.12, 14700.15–14700.17, 14800.20–14800.21, 14800.24–14800.26

3G 14700.20–14700.21, 14700.24–14700.26, 14900.1–14900.3, 14900.6–14900.8, 15000.20–15000.21, 15000.24–15000.26, 15100.1–15100.3, 15100.6–15100.8, 15100.20–15100.21, 15100.24–15100.26, 15200.11–15200.12, 15200.15–15200.17

4G 14800.1–14800.3, 14800.6–14800.8, 14900.11–14900.12, 14900.15–14900.17

Downhand 7200.7–7200.8, 7200.13, 13800.8–13800.36, 13900.1, 13900.4–13900.26, 14000.1–14000.22, 16500.1, 16500.5, 19000.1, 19100.1, 19200.1, 19300.1, 19400.1, 19600.7, 19600.14

Downhand IG 2500.1, 2500.4, 2500.7, 2500.10, 2500.13, 2500.16, 2700.1, 2700.4, 2700.7, 2700.10, 2700.13, 2700.16, 3100.2–3100.10, 3200.1, 3200.4–3200.20, 7400.2–7400.10, 7500.1, 7500.4–7500.20, 14200.1–14200.48, 14300.1–14300.48, 14400.1–14400.48, 14500.1–14500.47, 14600.1–14600.47

Flat 9700.7–9700.9, 9900.7–9900.9, 10200.4–10200.10, 10800.4–10800.6, 10900.4–10900.6, 11000.4–11000.6, 11500.4–11500.6, 12300.4–12300.6

IG 7600.2–7600.20, 7700.1, 7700.4–7700.20, 9200.2–9200.20, 9300.1, 9300.4–9300.20, 14700.1–14700.3, 14700.6–14700.8, 15000.1–15000.3, 15000.6–15000.8, 15000.11–15000.12, 15000.15–15000.17, 15100.11–15100.12, 15100.15–15100.17, 15200.1–15200.3, 15200.6–15200.8

Vertical 6400.4, 6400.7, 6400.10, 6400.13, 6400.16, 6400.19–6400.21, 6500.1, 6500.4, 6600.1, 6600.4, 6700.1, 6700.4, 6800.1, 6800.4, 8000.1, 8000.4, 8100.1, 8100.4, 8200.1, 8200.4, 8300.1, 8300.4, 8500.1, 8500.4, 8600.1, 8600.4, 8700.1, 8700.4, 8800.1, 8800.4

Vert-Up 10500.4–10500.6, 12300.8–12300.14

WJ,3/87 Reference 16500.1–16500.7

WJ,7/87 Reference 14700.1–14700.28, 14800.1–14800.28, 14900.1–14900.19, 15000.1–15000.28, 15100.1–15100.28, 15200.1–15200.19

Y

Year Produced

1971 1000.1–1000.3, 1000.6, 1000.9, 1000.12–1000.14

1972 2100.1–2100.3, 2100.6, 2200.1–2200.3, 2200.6, 2300.1–2300.3, 2400.1–2400.3, 2400.6, 2400.9, 2400.12, 2400.15, 2400.18, 2500.1, 2600.1–2600.3, 2600.6, 2600.9, 2600.12, 2600.15, 2600.18, 2700.1, 2800.1–2800.3, 2800.6, 2900.1–2900.3, 2900.6, 3000.1–3000.3, 3000.6

1976 15300.1, 15400.1, 16000.1, 16200.1

1977 16100.1, 16600.1

1978 7300.1, 15500.1, 15600.1, 15900.1

1979 1100.1, 1200.1, 1300.1, 1400.1, 1500.1, 1600.1, 1700.1, 1800.1, 1900.1, 15700.1, 15800.1, 16300.1, 16400.1

1980 9000.1, 9100.1

1981 17400.1, 17400.11, 17400.20

1982 12600.1, 16700.1, 16700.11, 16700.20, 16800.1, 16800.5, 16900.1, 16900.5, 17000.1, 17000.7, 17100.1, 17100.11, 17200.1, 17200.17, 17200.32, 17300.1, 17300.11, 17500.1, 17500.11, 17600.1, 17600.5, 17700.1, 17700.11, 17700.20, 17800.1, 17800.5, 17900.1, 17900.17, 17900.32, 18000.1, 18000.7, 18100.1, 18100.7, 18200.1, 18200.11, 18200.20, 18300.1, 18300.17, 18300.32, 18400.1, 18400.11, 18400.20, 18500.1, 18500.5, 19500.1

1983 7800.1, 7900.1

1984 12500.1, 12700.1

Yes Did Specimen Fracture? 1100.2, 1200.2, 1300.2, 1400.2, 1500.2, 1600.2, 1700.2, 1800.2, 1900.2, 2000.4, 2200.6, 2900.3, 2900.6, 3300.2, 3400.2, 3500.2, 3600.2, 3700.2, 3800.2, 3900.2, 4000.2, 4100.2, 4200.2, 4300.2, 4400.2, 4500.2, 4600.2, 4700.2, 4800.2, 4900.2, 5000.2, 5100.2, 5200.2, 5300.2, 5400.2, 5500.2, 5600.2, 5700.2, 5800.2, 5900.2, 6000.2, 6100.2, 6200.2, 6300.2, 6400.1, 6400.4, 6400.7, 6400.10, 6400.13, 6400.16, 6400.19–6400.21, 6500.2–6500.4, 6600.2–6600.4, 6700.2–6700.4, 6800.2–6800.4, 6900.1, 8000.2–8000.4, 8100.2–8100.4, 8200.2–8200.4, 8300.2–8300.4, 8400.1, 8500.2–8500.4, 8600.2–8600.4, 8700.2–8700.4, 8800.2–8800.4, 8900.1, 14100.5–14100.9

7500.14, 7500.18, 7600.4, 7600.8, 7600.12, 7600.16, 7600.20, 7700.4, 7700.8, 7700.12, 7700.16, 7700.20, 9200.4, 9200.8, 9200.12, 9200.16, 9200.20, 9300.4, 9300.8, 9300.12, 9300.16, 9300.20, 9700.9, 9900.9, 10200.6, 10200.10, 10500.6, 10800.6, 10900.6, 11000.6, 11500.6, 12300.6, 12300.10, 12300.14, 13800.10, 13800.22, 13800.26, 13800.36, 13900.4, 13900.16, 13900.26, 14000.3, 14000.6, 14000.16, 14200.3–14200.5, 14200.8, 14200.20, 14200.30, 14200.42, 14300.3–14300.5, 14300.8, 14300.20, 14300.30, 14300.42, 14400.3–14400.5, 14400.8, 14400.20, 14400.30, 14400.42, 14500.3–14500.5, 14500.8, 14500.18, 14500.28, 14500.38, 14600.3–14600.5, 14600.8, 14600.18, 14600.28, 14600.38

FVD Lot ID 19200.1–19200.7

FXF Lot ID 19400.1–19400.7

FXG Lot ID 19300.1–19300.7

G

G Lot ID 4100.1–4100.3

G9011 Lot ID 2300.1–2300.8

G9837 Lot ID 2600.1–2600.20, 2700.1–2700.18

H

H Final Processing 14700.1, 14800.1, 14900.1, 15000.1, 15100.1, 15200.1

H Lot ID 5000.1–5000.4

Hardex-N Filler Alloy 1100.6, 1200.6, 1300.6, 1400.6, 1500.6, 1600.6, 1700.6, 1800.6, 1900.6, 7100.4, 7200.4, 7200.10

Heat Treatment

- **A,F** 2800.2, 2800.6, 2900.1–2900.3, 2900.6, 3000.1–3000.3, 3000.6
- **A,F,A,F,Q,T** 2100.2, 2100.6, 2200.1–2200.3, 2300.1–2300.3, 2400.1–2400.3, 2400.6, 2400.9, 2400.12, 2400.15, 2400.18, 2500.1
- **A,F,N** 2800.1–2800.3
- **A,K** 12800.1, 12900.1, 13000.1, 13100.1, 13200.1, 13300.1, 13400.1, 13500.1, 13600.1, 13700.1
- **A,Q,T** 16700.1, 16700.11, 16700.20, 16800.1, 16800.5, 16900.1, 16900.5, 17000.1, 17000.7, 17100.1, 17100.11, 17200.1, 17200.17, 17200.32, 17300.1, 17300.11, 17400.1, 17400.11, 17400.20, 17500.1, 17500.11, 17600.1, 17600.5, 17700.1, 17700.11, 17700.20, 17800.1, 17800.5, 17900.1, 17900.17, 17900.32, 18000.1, 18000.7, 18100.1, 18100.7, 18200.1, 18200.11, 18200.20, 18300.1, 18300.17, 18300.32, 18400.1, 18400.11, 18400.20, 18500.1, 18500.5
- **F** 1000.1–1000.3, 1000.6, 1000.9, 1000.12–1000.14, 7800.1, 7900.1
- **N** 7300.1, 9000.1, 9100.1, 15700.1, 15800.1, 15900.1, 16000.1, 16100.1, 16200.1, 16300.1
- **Q,K** 9400.1, 9500.1, 9500.4, 9600.1, 9700.1, 9700.4, 9800.1, 9900.1, 9900.4, 9900.7, 10000.1, 10100.1, 10200.1, 10300.1, 10300.4, 10400.1, 10500.1, 10600.1, 10700.1, 10700.4, 10800.1, 10900.1, 11000.1, 11100.1, 11200.1, 11200.4, 11300.1, 11400.1, 11500.1, 11600.1, 11700.1, 11800.1, 11800.5, 11900.1, 11900.4, 12000.1, 12100.1, 12200.1, 12300.1, 12400.1, 12500.1, 12700.1
- **Q,T** 7100.1, 7200.1, 12600.1, 15300.1, 15400.1, 15500.1, 15600.1, 16400.1, 18600.1, 18700.1, 18800.1, 18900.1, 19500.1, 19600.1
- **Q,T,W** 19600.7
- **W** 19000.1, 19100.1, 19200.1, 19300.1, 19400.1

HIFAB Source 14700.1, 14800.1, 14900.1, 15000.1, 15100.1, 15200.1

Hobart201 Flux Name 6400.4, 6400.7, 6400.10, 6400.13, 6400.16, 6400.19–6400.21, 6500.1, 6500.4, 6600.1, 6600.4, 6700.1, 6700.4, 6800.1, 6800.4, 8000.1, 8000.4, 8100.1, 8100.4, 8200.1, 8200.4, 8300.1, 8300.4, 8500.1, 8500.4, 8600.1, 8600.4, 8700.1, 8700.4, 8800.1, 8800.4

Hobart25P Filler Name 6400.4, 6400.7, 6400.10, 6400.13, 6500.1, 6500.4, 6600.1, 6600.4

HY100 Material Name 19500.1–19500.7, 19600.1–19600.21

HY80 Material Name 16500.1–16500.7, 16600.1–16600.7, 16700.1–16700.28, 16800.1–16800.7, 16900.1–16900.7, 17000.1–17000.11, 17100.1–17100.19, 17200.1–17200.46, 17300.1–17300.19, 17400.1–17400.28, 17500.1–17500.19, 17600.1–17600.7, 17700.1–17700.28, 17800.1–17800.7, 17900.1–17900.46, 18000.1–18000.11, 18100.1–18100.11, 18200.1–18200.28, 18300.1–18300.46, 18400.1–18400.28, 18500.1–18500.7, 18600.1–18600.6, 18700.1–18700.5, 18800.1–18800.6, 18900.1–18900.6, 19000.1–19000.7, 19100.1–19100.7, 19200.1–19200.7, 19300.1–19300.7, 19400.1–19400.7

I

I Loading Type 18600.2, 18700.1, 18800.2, 18900.2, 19000.3, 19100.3, 19200.3, 19300.3, 19400.3, 19600.2, 19600.9, 19600.15

I Lot ID 5100.1–5100.4

IG Welding Position 7600.2–7600.20, 7700.1, 7700.4–7700.20, 9200.2–9200.20, 9300.1, 9300.4–9300.20, 14700.1–14700.3, 14700.6–14700.8, 15000.1–15000.3, 15000.6–15000.8, 15000.11–15000.12, 15000.15–15000.17, 15100.11–15100.12, 15100.15–15100.17, 15200.1–15200.3, 15200.6–15200.8

Ingot Position

- **Bottom** 2100.2, 2100.6, 2200.2, 2200.6, 2300.2, 2400.2, 2400.6, 2400.12, 2400.18, 2600.2, 2600.6, 2600.12, 2600.18, 16700.20, 16800.5, 16900.5, 17000.7, 17100.11, 17200.32, 17300.11, 17400.20, 17500.11, 17600.5, 17700.20, 17800.5, 17900.32, 18000.7, 18100.7, 18200.20, 18300.32, 18400.20, 18500.5
- **Concast** 1000.1–1000.3, 1000.6, 1000.9, 1000.12–1000.14, 1100.1, 1200.1, 1300.1, 1400.1, 1500.1,

1600.1, 1700.1, 1800.1, 1900.1, 2800.1–2800.3, 2800.6, 2900.1–2900.3, 2900.6, 3000.1–3000.3, 3000.6
Mid 16700.11, 17200.17, 17400.11, 17700.11, 17900.17, 18200.11, 18300.17, 18400.11
Top 2100.1–2100.3, 2200.1–2200.3, 2300.1–2300.3, 2400.1–2400.3, 2400.9, 2400.15, 2500.1, 2600.1–2600.3, 2600.9, 2600.15, 2700.1, 16700.1, 16800.1, 16900.1, 17000.1, 17100.1, 17200.1, 17300.1, 17400.1, 17500.1, 17600.1, 17700.1, 17800.1, 17900.1, 18000.1, 18100.1, 18200.1, 18300.1, 18400.1, 18500.1

J

J131267 Lot ID 1000.1–1000.14
JIcpr
Modified Standard 18600.2, 18700.1, 18800.2, 18900.2, 19000.3, 19100.3, 19200.3, 19300.3, 19400.3, 19600.2, 19600.9, 19600.15
Per Standard 7800.2, 7900.2, 9000.6, 9100.2, 12500.2, 12600.2, 12700.2, 15700.2, 15800.2, 15900.2, 16100.2
JISZ3121 Standard Method 14600.46–14600.47
Joint Preparation
1/2 V-Groove 13800.8–13800.36, 13900.1, 13900.4–13900.26, 14000.1–14000.22
Double U-Groove 10800.4–10800.6, 10900.4–10900.6, 11000.4–11000.6, 12300.4–12300.6
Double V-Groove 7200.7–7200.8, 7200.13, 10500.4–10500.6, 11500.4–11500.6, 12300.8–12300.14, 14500.1–14500.47, 14600.1–14600.47, 16500.1, 16500.5
K-Groove 3100.2–3100.10, 7400.2–7400.10, 7600.2–7600.20, 9200.2–9200.20, 9300.1, 9300.4–9300.20, 14200.1–14200.48, 14300.1–14300.48, 14400.1–14400.48
No Groove 6600.1, 6600.4, 6700.1, 6700.4, 6800.1, 6800.4, 8100.1, 8100.4, 8200.1, 8200.4, 8300.1, 8300.4, 8500.1, 8500.4, 8700.1, 8700.4, 8800.1, 8800.4
Smooth Butt 6400.4, 6400.7, 6400.10, 6400.13, 6400.16, 6400.19–6400.21, 6500.1, 6500.4, 8000.1, 8000.4, 8600.1, 8600.4, 10200.4–10200.6
U Groove 2500.1, 2500.4, 2500.7, 2500.10, 2500.13, 2500.16, 2700.1, 2700.4, 2700.7, 2700.10, 2700.13, 2700.16
V Groove 3200.1, 3200.4–3200.20, 7500.1, 7500.4–7500.20, 7700.1, 7700.4–7700.20, 9700.7–9700.9, 9900.7–9900.9, 10200.8–10200.10, 14700.1–14700.3, 14700.6–14700.8, 14700.11–14700.12, 14700.15–14700.17, 14700.20–14700.21, 14700.24–14700.26, 14800.1–14800.3, 14800.6–14800.8, 14800.11–14800.12, 14800.15–14800.17, 14800.20–14800.21, 14800.24–14800.26, 14900.1–14900.3, 14900.6–14900.8, 14900.11–14900.12, 14900.15–14900.17, 15000.1–15000.3, 15000.6–15000.8, 15000.11–15000.12, 15000.15–15000.17, 15000.20–15000.21, 15000.24–15000.26, 15100.1–15100.3, 15100.6–15100.8, 15100.11–15100.12, 15100.15–15100.17, 15100.20–15100.21, 15100.24–15100.26, 15200.1–15200.3, 15200.6–15200.8, 15200.11–15200.12, 15200.15–15200.17

K

K Final Processing 9400.1, 9500.1, 9500.4, 9600.1, 9700.1, 9700.4, 9800.1, 9900.1, 9900.4, 9900.7, 10000.1, 10100.1, 10200.1, 10300.1, 10300.4, 10400.1, 10500.1, 10600.1, 10700.1, 10700.4, 10800.1, 10900.1, 11000.1, 11100.1, 11200.1, 11200.4, 11300.1, 11400.1, 11500.1, 11600.1, 11700.1, 11800.1, 11800.5, 11900.1, 11900.4, 12000.1, 12100.1, 12200.1, 12300.1, 12400.1
K Killing Process 5400.1, 5500.1, 5600.1, 5700.1, 5800.1, 5900.1, 6000.1, 6100.1, 6200.1, 6300.1
K1325 Lot ID 2400.1–2400.20, 2500.1–2500.18
k21-6425 Lot ID 3000.1–3000.8
K21-7102 Lot ID 2900.1–2900.8
K22-6296 Lot ID 2800.1–2800.8
KB6479 Lot ID 2100.1–2100.8, 2200.1–2200.8
K-Groove Joint Preparation 3100.2–3100.10, 7400.2–7400.10, 7600.2–7600.20, 9200.2–9200.20, 9300.1, 9300.4–9300.20, 14200.1–14200.48, 14300.1–14300.48, 14400.1–14400.48
Killing Process
Al-killed 2800.1–2800.3, 2800.6, 2900.1–2900.3, 2900.6, 3000.1–3000.3, 3000.6
Fully 1100.1, 1200.1, 1300.1, 1400.1, 1500.1, 1600.1, 1700.1, 1800.1, 1900.1, 2000.1, 2100.1–2100.3, 2100.6, 2200.1–2200.3, 2200.6, 2300.1–2300.3, 2400.1–2400.3, 2400.6, 2400.9, 2400.12, 2400.15, 2400.18, 2500.1, 2600.1–2600.3, 2600.6, 2600.9, 2600.12, 2600.15, 2600.18, 2700.1
K 5400.1, 5500.1, 5600.1, 5700.1, 5800.1, 5900.1, 6000.1, 6100.1, 6200.1, 6300.1
Si-Al 7400.1, 7500.1
Silicon 1000.1–1000.3, 1000.6, 1000.9, 1000.12–1000.14
SK 3300.1, 3400.1, 3500.1, 3600.1, 3700.1, 3800.1, 3900.1, 4000.1, 4100.1, 4200.1, 4300.1, 4400.1, 4500.1, 4600.1, 4700.1, 4800.1, 4900.1, 5000.1, 5100.1, 5200.1, 5300.1
Kobe Producer 2100.1–2100.3, 2100.6, 2200.1–2200.3, 2200.6, 2300.1–2300.3, 2400.1–2400.3, 2400.6, 2400.9, 2400.12, 2400.15, 2400.18, 2500.1, 2600.1–2600.3, 2600.6, 2600.9, 2600.12, 2600.15, 2600.18, 2700.1
Kobe Source 2100.1–2100.3, 2100.6, 2200.1–2200.3, 2200.6, 2300.1–2300.3, 2400.1–2400.3, 2400.6, 2400.9, 2400.12, 2400.15, 2400.18, 2500.1, 2600.1–2600.3, 2600.6, 2600.9, 2600.12, 2600.15, 2600.18, 2700.1
KONKUL-1 Reference 3100.1–3100.11, 3200.1–3200.21, 7400.1–7400.11, 7500.1–7500.21, 7600.1–

7600.21, 7700.1–7700.21, 9200.1–9200.21, 9300.1–9300.21

L

L467OV559 Lot ID 19600.1–19600.6
L-50N Filler Name 13800.8–13800.36, 14200.1–14200.48
Ladle Composition Position 1100.1–1100.2, 1100.5–1100.6, 1200.1–1200.2, 1200.5–1200.6, 1300.1–1300.2, 1300.5–1300.6, 1400.1–1400.2, 1400.5–1400.6, 1500.1–1500.2, 1500.5–1500.6, 1600.1–1600.2, 1600.5–1600.6, 1700.1–1700.2, 1700.5–1700.6, 1800.1–1800.2, 1800.5–1800.6, 1900.1–1900.2, 1900.5–1900.6, 15500.1–15500.2, 15500.5–15500.7, 15600.1–15600.6, 16700.1–16700.28, 16800.1–16800.7, 16900.1–16900.7, 17000.1–17000.11, 17100.1–17100.19, 17200.1–17200.46, 17300.1–17300.19, 17400.1–17400.28, 17500.1–17500.19, 17600.1–17600.7, 17700.1–17700.28, 17800.1–17800.7, 17900.1–17900.46, 18000.1–18000.11, 18100.1–18100.11, 18200.1–18200.28, 18300.1–18300.46, 18400.1–18400.28, 18500.1–18500.7
Linc 860 Flux Name 7200.7–7200.8, 7200.13
Linc 880 Flux Name 11500.4–11500.6
Linc 882 Flux Name 10900.4–10900.6
Linde166p Flux Name 10200.4–10200.6, 10800.4–10800.6, 11000.4–11000.6, 12300.4–12300.6
Linde709-5 Flux Name 9900.7–9900.9
LindeWS Filler Name 8000.1, 8000.4, 8100.1, 8100.4, 8200.1, 8200.4, 8600.1, 8600.4, 8700.1, 8700.4
Loading Type
- **I** 18600.2, 18700.1, 18800.2, 18900.2, 19000.3, 19100.3, 19200.3, 19300.3, 19400.3, 19600.2, 19600.9, 19600.15
- **Slow** 2000.3, 7000.2, 14700.2, 14700.11, 14700.20, 14800.2, 14800.11, 14800.20, 14900.2, 14900.11, 15000.2, 15000.11, 15000.20, 15100.2, 15100.11, 15100.20, 15200.2, 15200.11

Location
- **B** 1000.2, 1000.6
- **T** 1000.1–1000.3, 1000.9, 1000.12–1000.14

Location wrt Surface
- **1/4T** 7200.7–7200.8, 7200.13
- **Back surface at root** 14200.16, 14200.38, 14300.16, 14300.38, 14400.16, 14400.38, 14500.16–14500.24, 14500.36–14500.44, 14600.16–14600.24, 14600.36–14600.44, 14700.8, 14700.17, 14700.26, 14800.8, 14800.17, 14800.26, 14900.8, 14900.17, 15000.8, 15000.17, 15000.26, 15100.8, 15100.17, 15100.26, 15200.8, 15200.17
- **Back surface not root** 13800.20–13800.22, 14200.18–14200.26, 14200.40–14200.48, 14300.18–14300.26, 14300.40–14300.48, 14400.18–14400.26, 14400.40–14400.48
- **Final surface** 11500.4–11500.6, 12300.4–12300.14, 13800.8–13800.18, 13800.24–13800.32, 13900.1, 13900.4–13900.22, 14000.4–14000.22, 14200.6–14200.14, 14200.28–14200.36, 14300.6–14300.14, 14300.28–14300.36, 14400.6–14400.14, 14400.28–14400.36, 14500.6–14500.14, 14500.26–14500.34, 14600.6–14600.14, 14600.26–14600.34, 14700.3, 14700.12, 14700.21, 14800.3, 14800.12, 14800.21, 14900.3, 14900.12, 15000.3, 15000.12, 15000.21, 15100.3, 15100.12, 15100.21, 15200.3, 15200.12
- **Full cross section** 13800.34–13800.36, 13900.24–13900.26, 14000.1–14000.3, 14200.1–14200.5, 14300.1–14300.5, 14400.1–14400.5, 14500.1–14500.5, 14600.1–14600.5, 14600.46–14600.47
- **Mid thickness at root** 3100.2–3100.10, 7400.2–7400.10, 7600.2–7600.20, 9200.2–9200.20, 9900.7–9900.9, 10200.4–10200.6
- **Mid thickness not root** 2500.1, 2500.4, 2500.7, 2500.10, 2500.13, 2500.16, 2700.1, 2700.4, 2700.7, 2700.10, 2700.13, 2700.16, 3200.1, 3200.4–3200.20, 6400.4, 6400.7, 6400.10, 6400.13, 6400.16, 6400.19–6400.21, 6500.1, 6500.4, 6600.1, 6600.4, 6700.1, 6700.4, 6800.1, 6800.4, 7500.1, 7500.4–7500.20, 7700.1, 7700.4–7700.20, 8000.1, 8000.4, 8100.1, 8100.4, 8200.1, 8200.4, 8300.1, 8300.4, 8500.1, 8500.4, 8600.1, 8600.4, 8700.1, 8700.4, 8800.1, 8800.4, 9300.1, 9300.4–9300.20, 9700.7–9700.9, 10200.8–10200.10, 14700.6, 14700.15, 14700.24, 14800.6, 14800.15, 14800.24, 14900.6, 14900.15, 15000.6, 15000.15, 15000.24, 15100.6, 15100.15, 15100.24, 15200.6, 15200.15
- **Surface** 14700.1, 14700.11, 14700.20, 14800.1, 14800.11, 14800.20, 14900.1, 14900.11, 15000.1, 15000.11, 15000.20, 15100.1, 15100.11, 15100.20, 15200.1, 15200.11

Location wrt Weld
- **11mm in HAZ** 2500.16, 2700.16, 3200.1, 3200.8, 3200.12, 3200.16, 3200.20, 6400.4, 6400.10, 6400.16, 6500.1, 6600.1, 6700.1, 6800.1, 7200.7–7200.8, 7500.1, 7500.6, 7500.12, 7500.16, 7500.20, 7600.2, 7600.6, 7600.10, 7600.14, 7600.18, 7700.1, 7700.6, 7700.10, 7700.14, 7700.18, 8000.1, 8100.1, 8200.1, 8300.1, 8500.1, 8600.1, 8700.1, 8800.1, 9200.2, 9200.6, 9200.10, 9200.14, 9200.18, 9300.1, 9300.6, 9300.10, 9300.14, 9300.18, 9700.7, 9900.7, 10200.4, 10200.8, 10500.4, 10800.4, 10900.4, 11000.4, 11500.4, 12300.4, 12300.8, 12300.12, 13800.8, 13800.20, 13800.24, 13800.34, 13900.1, 13900.14, 13900.24, 14000.1, 14000.4, 14000.14, 14200.1, 14200.4–14200.6, 14200.16–14200.18, 14200.28, 14200.38–14200.40, 14300.1, 14300.4–14300.6, 14300.16–14300.18, 14300.28, 14300.38–14300.40, 14400.1, 14400.4–14400.6, 14400.16–14400.18, 14400.28,

14400.38–14400.40, 14500.1, 14500.4–14500.6, 14500.16, 14500.26, 14500.36, 14600.1, 14600.4–14600.6, 14600.16, 14600.26, 14600.36, 14700.1–14700.3, 14700.6–14700.8, 14700.11–14700.12, 14700.15–14700.17, 14700.20–14700.21, 14700.24–14700.26, 14800.1–14800.3, 14800.6–14800.8, 14800.11–14800.12, 14800.15–14800.17, 14800.20–14800.21, 14800.24–14800.26, 14900.1–14900.3, 14900.6–14900.8, 14900.11–14900.12, 14900.15–14900.17, 15000.1–15000.3, 15000.6–15000.8, 15000.11–15000.12, 15000.15–15000.17, 15000.20–15000.21, 15000.24–15000.26, 15100.1–15100.3, 15100.6–15100.8, 15100.11–15100.12, 15100.15–15100.17, 15100.20–15100.21, 15100.24–15100.26, 15200.1–15200.3, 15200.6–15200.8, 15200.11–15200.12, 15200.15–15200.17, 16500.1, 16500.5, 19000.1, 19100.1, 19200.1, 19300.1, 19400.1, 19600.7, 19600.14

1mm in HAZ 2500.4, 2700.4, 6400.7, 6400.13, 6400.19–6400.21, 6500.4, 6600.4, 6700.4, 6800.4, 7200.13, 8000.4, 8100.4, 8200.4, 8300.4, 8500.4, 8600.4, 8700.4, 8800.4, 13800.12, 13800.28, 13900.6, 13900.18, 14000.8, 14000.18, 14200.10, 14200.22, 14200.32, 14200.44, 14300.10, 14300.22, 14300.32, 14300.44, 14400.10, 14400.22, 14400.32, 14400.44, 14500.10, 14500.20, 14500.30, 14500.40, 14600.10, 14600.20, 14600.30, 14600.40

3mm in HAZ 2500.7, 2700.7, 13800.14, 13800.30, 13900.8, 13900.20, 14000.10, 14000.20, 14200.12, 14200.24, 14200.34, 14200.46, 14300.12, 14300.24, 14300.34, 14300.46, 14400.12, 14400.24, 14400.34, 14400.46, 14500.12, 14500.22, 14500.32, 14500.42, 14600.12, 14600.22, 14600.32, 14600.42

50% weld, 50% HAZ 13800.18, 13900.12

5mm in HAZ 2500.10, 2700.10, 13800.16, 13800.32, 13900.10, 13900.22, 14000.12, 14000.22, 14200.14, 14200.26, 14200.36, 14200.48, 14300.14, 14300.26, 14300.36, 14300.48, 14400.14, 14400.26, 14400.36, 14400.48, 14500.14, 14500.24, 14500.34, 14500.44, 14600.14, 14600.24, 14600.34, 14600.44

7mm in HAZ 2500.13, 2700.13

Fusion line 2500.1, 2700.1, 3100.2–3100.10, 3200.4–3200.6, 3200.10, 3200.14, 3200.18, 7400.2–7400.10, 7500.4, 7500.8–7500.10, 7500.14, 7500.18, 7600.4, 7600.8, 7600.12, 7600.16, 7600.20, 7700.4, 7700.8, 7700.12, 7700.16, 7700.20, 9200.4, 9200.8, 9200.12, 9200.16, 9200.20, 9300.4, 9300.8, 9300.12, 9300.16, 9300.20, 9700.9, 9900.9, 10200.6, 10200.10, 10500.6, 10800.6, 10900.6, 11000.6, 11500.6, 12300.6, 12300.10, 12300.14, 13800.10, 13800.22, 13800.26, 13800.36, 13900.4, 13900.16, 13900.26, 14000.3, 14000.6, 14000.16, 14200.3–14200.5, 14200.8, 14200.20, 14200.30, 14200.42, 14300.3–14300.5, 14300.8, 14300.20, 14300.30, 14300.42, 14400.3–14400.5, 14400.8, 14400.20, 14400.30, 14400.42, 14500.3–14500.5, 14500.8, 14500.18, 14500.28, 14500.38, 14600.3–14600.5, 14600.8, 14600.18, 14600.28, 14600.38

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1 3900.1–3900.3

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11682 4600.1–4600.3

11692 4200.1–4200.3

14320 3600.1–3600.4

14453 4500.1–4500.4

14460 3300.1–3300.4

14490 5700.1–5700.3

14500 6000.1–6000.3

17754 5800.1–5800.3, 6100.1–6100.3

17777 6200.1–6200.3

17846 5900.1–5900.3

18553 6300.1–6300.3

40574 12000.1–12000.3, 12100.1–12100.3, 12200.1–12200.3

41509 10200.1–10200.11

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43731 5400.1–5400.3

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47444 11200.1–11200.6

47574 9600.1–9600.7, 9700.1–9700.10, 9800.1–9800.3

48160 9900.1–9900.10, 10000.1–10000.5, 10100.1–10100.5

48682 11500.1–11500.7, 11600.1–11600.3

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52110 12300.1–12300.15

52765 5600.1–5600.3

52797 5500.1–5500.3

54614 11100.1–11100.4

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57053 11700.1–11700.6

57221 9400.1–9400.3, 9500.1–9500.6

58568 11300.1–11300.3, 11400.1–11400.3

59609 10300.4–10300.6, 10600.1–10600.4, 10700.1–10700.7

60865 4300.1–4300.3

60868 3700.1–3700.4, 4400.1–4400.4

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641662 1400.1–1400.2, 1400.5–1400.6, 1500.1–1500.2, 1500.5–1500.6, 1600.1–1600.2, 1600.5–1600.6

642696 1800.1–1800.2, 1800.5–1800.6, 1900.1–1900.2, 1900.5–1900.6

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001.003.01M2 16700.17–16700.19
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010.001.04AFS 13800.30–13800.31
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010.001.05AFA 13800.16–13800.17
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