SSC-352

MARINE STRUCTURAL STEEL TOUGHNESS DATA BANK

(Volume 4)

This document has been approved
for public release and sale; its
distribution is unlimited

SHIP STRUCTURE COMMITTEE

1991

92 1386

COVERD

SHIP STRUCTURE COMMITTEE PUBLICATIONS

SSC-337 Ship Fracture Mechanisms (Parts 1 and 2) by Karl A. Stambaugh and William A. Wood 1987

SSC-338 Fatigue Prediction Analysis Validation from SL-7 Hatch Corner Strain Data by Jen-Wen Chiou and Yung-Kuang Chen 1985

SSC-339 Ice Loads and Ship Response to Ice - A Second Season by C. Daley, J. W. St. John, R. Brown, J. Meyer, and I. Glen 1990

SSC-340 Ice Forces and Ship Response to Ice - Consolidation Report by C. Daley, J. W. St. John, R. Brown, and I. Glen 1990

SSC-341 Global Ice Forces and Ship Response to Ice by P. Minnick, J. W. St. John, B. Cowper, and M. Edgecomb 1990

SSC-342 Global Ice Forces and Ship Response to Ice - Analysis of Ice Ramming Forces by Yung-Kuang Chen, Alfred L. Tunik, and Albert P-Y Chen 1990

SSC-343 Global Ice Forces and Ship Response to Ice - A Second Season by P. Minnick and J. W. St. John 1990

SSC-344 Development of an Onboard Strain Recorder by Eric Greene and William A. Wood 1987

SSC-345 Elastic-Plastic Fracture Mechanics (Parts 1 and 2) by T. L. Anderson 1990

SSC-346 Fatigue Characterization of Fabricated Ship Details - Phase 2 by K. K. Park and F. V. Lawrence, Jr. 1988

SSC-347 Strategies for Nonlinear Analysis of Marine Structures by Subrata K. Chakrabarti 1988

SSC-348 Corrosion Experience Data Requirements by Karl A. Stambaugh and John C. Knecht 1988

SSC-349 Development of a Generalized Onboard Response Monitoring System (Phase I) by F. W. DeBord, Jr. and B. Hennessy 1987

SSC-350 Ship Vibration Design Guide by Edward F. Noonan 1989

SSC-351 An Introduction to Structural Reliability Theory by Alaa E. Mansour 1990

None Ship Structure Committee Publications - A Special Bibliography 1983

Cover (4) Cover (4)

COMMITTEE ON MARINE STRUCTURES

Commission on Engineering and Technical Systems

National Academy of Sciences - National Research Council

The COMMITTEE ON MARINE STRUCTURES has technical cognizance over the interagency Ship Structure Committee's research program.

Peter M. Palermo (Chairman), Alexandria, VA
Mark Y. Berman, Amoco Production Company, Tulsa, OK
Peter A. Gale, Silver Spring, MD
Rolf D. Glasfeld, General Dynamics Corporation, Groton, CT
William H. Hartt, Florida Atlantic University, Boca Raton, FL
Paul H. Wirsching, University of Arizona, Tucson, AZ
Alexander B. Stavovy, National Research Council, Washington, DC
Michael K. Parmelee, Ship Structure Committee, Washington, DC

LOADS WORK GROUP

Paul H. Wirsching (Chairman), University of Arizona, Tucson, AZ
Subrata K. Chakrabarti, Chicago Bridge and Iron Company, Plainfield, IL
Keith D. Hjelmstad, University of Illinois, Urbana, IL
Hsien Yun Jan, Martech Incorporated, Neshanic Station, NJ
Jack Y. K. Lou, Texas A & M University, College Station, TX
Naresh Maniar, M. Rosenblatt & Son, Incorporated, New York, NY
Solomon C. S. Yim, Oregon State University, Corvallis, OR

MATERIALS WORK GROUP

William H. Hartt (Chairman), Florida Atlantic University, Boca Raton, FL
Fereshteh Ebrahimi, University of Florida, Gainesville, FL
Santiago Ibarra, Jr., Amoco Corporation, Naperville, IL
Paul A. Lagace, Massachusetts Institute of Technology, Cambridge, MA
John Landes, University of Tennessee, Knoxville, TN
Mamdouh M. Salama, Conoco Incorporated, Ponca City, OK
James M. Sawhill, Jr., Newport News Shipbuilding, Newport News, VA

Cover #3 Cover 3

SHIP STRUCTURE COMMITTEE

The SHIP STRUCTURE COMMITTEE is constituted to prosecute a research program to improve the hull structures of ships and other marine structures by an extension of knowledge pertaining to design, materials, and methods of construction.

RADM A. E. Henn, USCG, (Chairman)
Chief, Office of Marine Safety, Security and Environmental Protection
U. S. Coast Guard

Mr. Alexander Malakhoff
Director, Structural Integrity Subgroup (SEA 55Y)
Naval Sea Systems Command

Dr. Donald Liu
Senior Vice President
American Bureau of Shipping

Mr. H. T. Haller
Associate Administrator for Shipbuilding and Ship Operations
Maritime Administration

Mr. Thomas W. Allen
Engineering Officer (N7)
Military Sealift Command

CDR Michael K. Parmelee, USCG,
Secretary, Ship Structure Committee
U. S. Coast Guard

CONTRACTING OFFICER TECHNICAL REPRESENTATIVE

Mr. William J. Siekierka
SEA 55Y3
Naval Sea Systems Command

SHIP STRUCTURE SUBCOMMITTEE

The SHIP STRUCTURE SUBCOMMITTEE acts for the Ship Structure Committee on technical matters by providing technical coordination for determinating the goals and objectives of the program and by evaluating and interpreting the results in terms of structural design, construction, and operation.

AMERICAN BUREAU OF SHIPPING

Mr. Stephen G. Arntson (Chairman)
Mr. John F. Conlon
Dr. John S. Spencer
Mr. Glenn M. Ashe

NAVAL SEA SYSTEMS COMMAND

Dr. Robert A. Sielski
Mr. Charles L. Null
Mr. W. Thomas Packard
Mr. Allen H. Engle

MILITARY SEALIFT COMMAND

Mr. Robert E. Van Jones
Mr. Albert J. Attermeyer
Mr. Michael W. Touma
Mr. Jeffery E. Beach

MARITIME ADMINISTRATION

Mr. Frederick Seibold
Mr. Norman O. Hammer
Mr. Chao H. Lin
Dr. Walter M. Maclean

U. S. COAST GUARD

CAPT T. E. Thompson
CAPT Donald S. Jensen
CDR Mark E. Noll

SHIP STRUCTURE SUBCOMMITTEE LIAISON MEMBERS

U. S. COAST GUARD ACADEMY

LCDR Bruce R. Mustain

U. S. MERCHANT MARINE ACADEMY

Dr. C. B. Kim

U. S. NAVAL ACADEMY

Dr. Ramswar Bhattacharyya

STATE UNIVERSITY OF NEW YORK MARITIME COLLEGE

Dr. W. R. Porter

WELDING RESEARCH COUNCIL

Dr. Martin Prager

NATIONAL ACADEMY OF SCIENCES – MARINE BOARD

Mr. Alexander B. Stavovy

NATIONAL ACADEMY OF SCIENCES – COMMITTEE ON MARINE STRUCTURES

Mr. Peter M. Palermo

SOCIETY OF NAVAL ARCHITECTS AND MARINE ENGINEERS – HYDRODYNAMICS COMMITTEE

Dr. William Sandberg

AMERICAN IRON AND STEEL INSTITUTE

Mr. Alexander D. Wilson

Cover #2

SSC-352 Marine Structural Steel Toughness Data Bank – Volume 4 Ship Structure Committee 1991

SPINE

Member Agencies:

United States Coast Guard
Naval Sea Systems Command
Maritime Administration
American Bureau of Shipping
Military Sealift Command

Ship Structure Committee

An Interagency Advisory Committee
Dedicated to the Improvement of Marine Structures

Address Correspondence to:

Secretary, Ship Structure Committee
U.S. Coast Guard (G-MTH)
2100 Second Street S.W.
Washington, D.C. 20593-0001
PH: (202) 267-0003

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

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
SSC-352 (Volume 4)		

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	559	

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

METRIC CONVERSION FACTORS

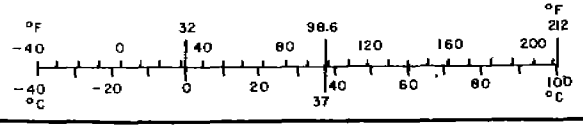
Approximate Conversions to Metric Measures

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



Contents

1 Introduction **1**

2 Scope **1**

3 Materials Included in Marine Toughness Data Bank **2**

4 Types of Data (Properties) Covered in the Program **4**

5 Format Development **5**

6 Sources of Data **6**

7 Procedures Employed in Building the Data Bank **6**

8 Summary **7**

9 References in the Report **7**

10 Annex I: Summary and Directory of Data Sheets **11**

10.1 Summary and General Description of Marine Toughness Data Bank 11
10.2 Table A - List of Alloys and Directory for Data Bank 12
10.3 Table B - Explanation of Material Codes 13
10.4 Table C - Symbols and Abbreviations Used in Data Bank 14
10.5 Table D - List Abbreviations for Data Source References: 17

11 Annex II: Martuf on MPD Network **19**

12 Annex III: Data Collection Formats **20**

13 Data Presentations for Marine Materials **26**

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

© DX (5) 6X (5) 6X

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

- 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.

[1] *LOTUS* and *1-2-3* are trademarks of Lotus Development Corporation.
SPIRES is a trademark of Leland Stanford, Jr. University.
TEX is a trademark of the American Mathematical Society.
PostScript is a trademark of Adobe Systems Incorporation.

(13)

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

15 16

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	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.
			SPECIFIED COMPOSITION, element, per cent													
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	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
			SPECIFIED COMPOSITION, element, per cent												
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

(16) (16)

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

21 21

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

(22) (20)

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

25 25

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 _____

(27) (27)

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)

28 28

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.
__ __ __.__ __ __.__	__ __	_____	_____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.

30

32

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.

3

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 HY80

Description

Material Code	001.001.09B	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	50 mm	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	WJ,3/87		

Composition

C	0.060 %	Mn	1.17 %
P	0.013 %	S	0.006 %
Si	0.32 %	Cr	0.15 %
Ni	1.80 %	Mo	0.40 %
V	0.026 %	Cu	0.020 %
Cb	*	Ti	*
B	*	Al	*
N	*	Other Components	*

Fabrication History

Heat Treatment	*	Producer	Bunge
Year Produced	*	Addl Info	None
Source	P&EStat	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	001.001.09B	Weld Type	SMA
Base Metal Thickness	32 mm	Welding Position	Downhand
Preheat Temperature	150 degC	Metal Gap	0 mm
Interpass Temperature	150 degC	Passes	>40
Filler Specification	E10018	Filler Name	*
Filler Carbon Content	0.06 %	Filler Metal Size	4 mm
Shielding Gas	*	Voltage	23-26 volts
Amperage	160-200 amps	Polarity	DC
Travel Speed	160-300 mm/min	Heat Input/Pass	25 KJ/cm
Joint Preparation	Double V-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	*
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	Basic	Flux Name	*
Weld Composition Reported?	Yes		

(continued)

* - not reported

Material HY80

(continued)

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	Cylindrical	Specimen Thickness	5.9 mm
Gage Length	23.6 mm	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	E 8
Standard Year	1981		

Orient	Test Temp degC	UTS MPa	TYS MPa	TYP MPa	Elongation %	RA %
L	-18	793	738	*	21.5	62

* - not reported

Material HY80

Description

Material Code	001.001.09B	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	50 mm	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	WJ,3/87		

Composition

See Page 16500.1

Fabrication History

See Page 16500.1

Weld

See Page 16500.1

Property Measurements

Test Type	Charpy V Impact	Position	0/4T
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	E 23
Standard Year	1981		

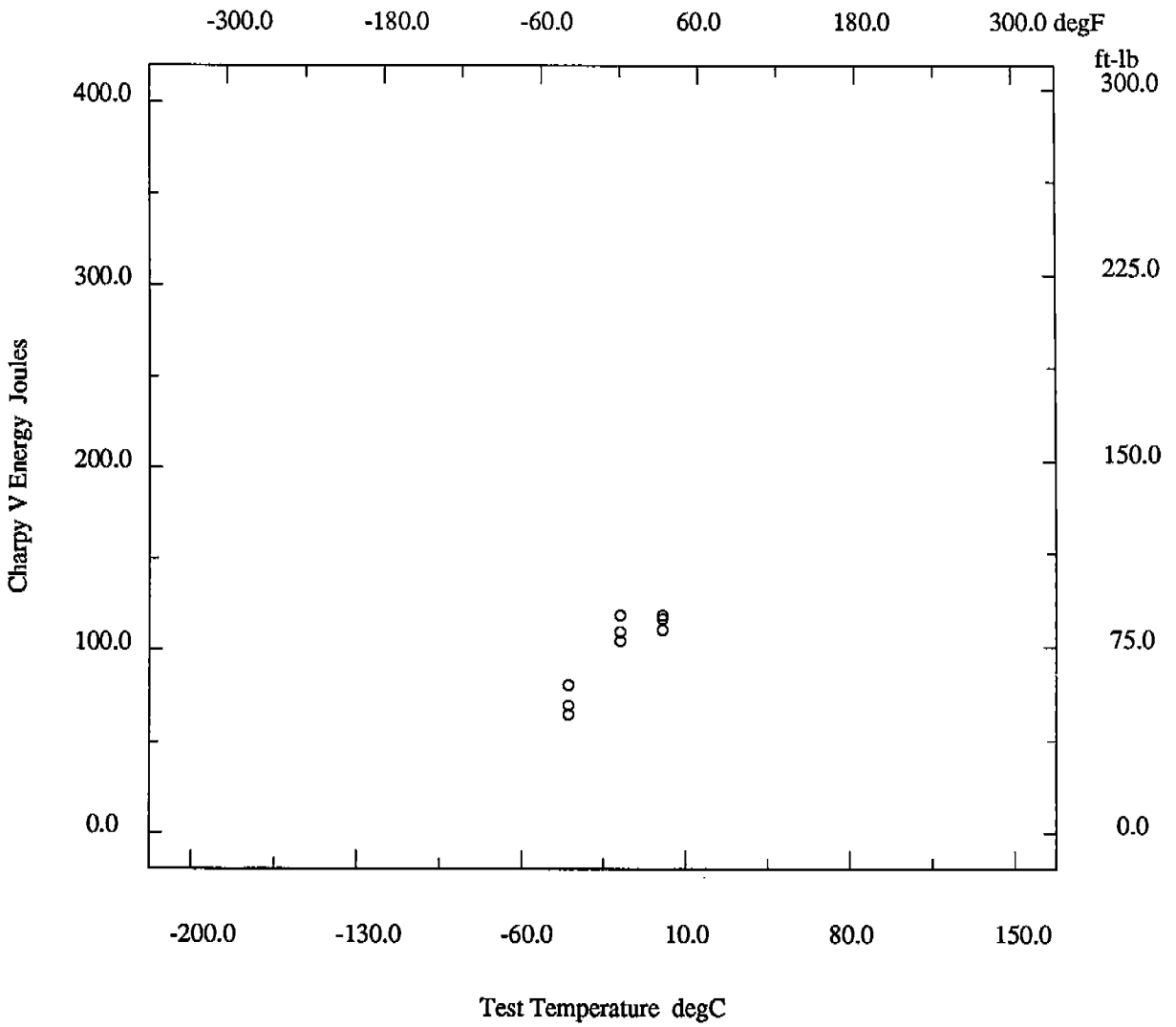
Orien	Test Temp degC	CVN Energy Joules
T-L °	-40	65
T-L °	-40	70
T-L °	-40	81
T-L °	-18	105
T-L °	-18	110
T-L °	-18	119
T-L °	0	111
T-L °	0	117
T-L °	0	119

* - not reported

Material HY80

Description

Material Code	001.001.09B	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	50 mm	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	WJ,3/87		



* - not reported

Material HY80

Description

Material Code	001.001.09F	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	50 mm	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	WJ,3/87		

Composition

C	0.080 %	Mn	1.24 %
P	0.013 %	S	0.007 %
Si	0.44 %	Cr	0.13 %
Ni	2.10 %	Mo	0.40 %
V	0.017 %	Cu	0.020 %
Cb	*	Ti	*
B	*	Al	*
N	*	Other Components	*

Fabrication History

See Page 16500.1

Weld

Weld Code	001.001.09F	Weld Type	SMA
Base Metal Thickness	32 mm	Welding Position	Downhand
Preheat Temperature	150 degC	Metal Gap	0 mm
Interpass Temperature	150 degC	Passes	>40
Filler Specification	E10018	Filler Name	*
Filler Carbon Content	0.08 %	Filler Metal Size	4 mm
Shielding Gas	*	Voltage	23-26 volts
Amperage	160-200 amps	Polarity	DC
Travel Speed	160-300 mm/min	Heat Input/Pass	25 KJ/cm
Joint Preparation	Double V-Groove	Number of Sides	2
Location wrt Weld	11mm in HAZ	Location wrt Surface	*
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	Basic	Flux Name	*
Weld Composition Reported?	Yes		

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	Cylindrical	Specimen Thickness	5.9 mm
Gage Length	23.6 mm	Loading Rate	*
Tensile Strength Offset	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	E 8
Standard Year	1981		

Orient	Test Temp degC	UTS MPa	TYS MPa	TYP MPa	Elongation %	RA %
L	-18	751	644	*	28.0	68

* - not reported

Material HY80

Description

Material Code	001.001.09F	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	50 mm	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	WJ,3/87		

Composition

See Page 16500.5

Fabrication History

See Page 16500.1

Weld

See Page 16500.5

Property Measurements

Test Type	Charpy V Impact	Position	0/4T
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	E 23
Standard Year	1981		

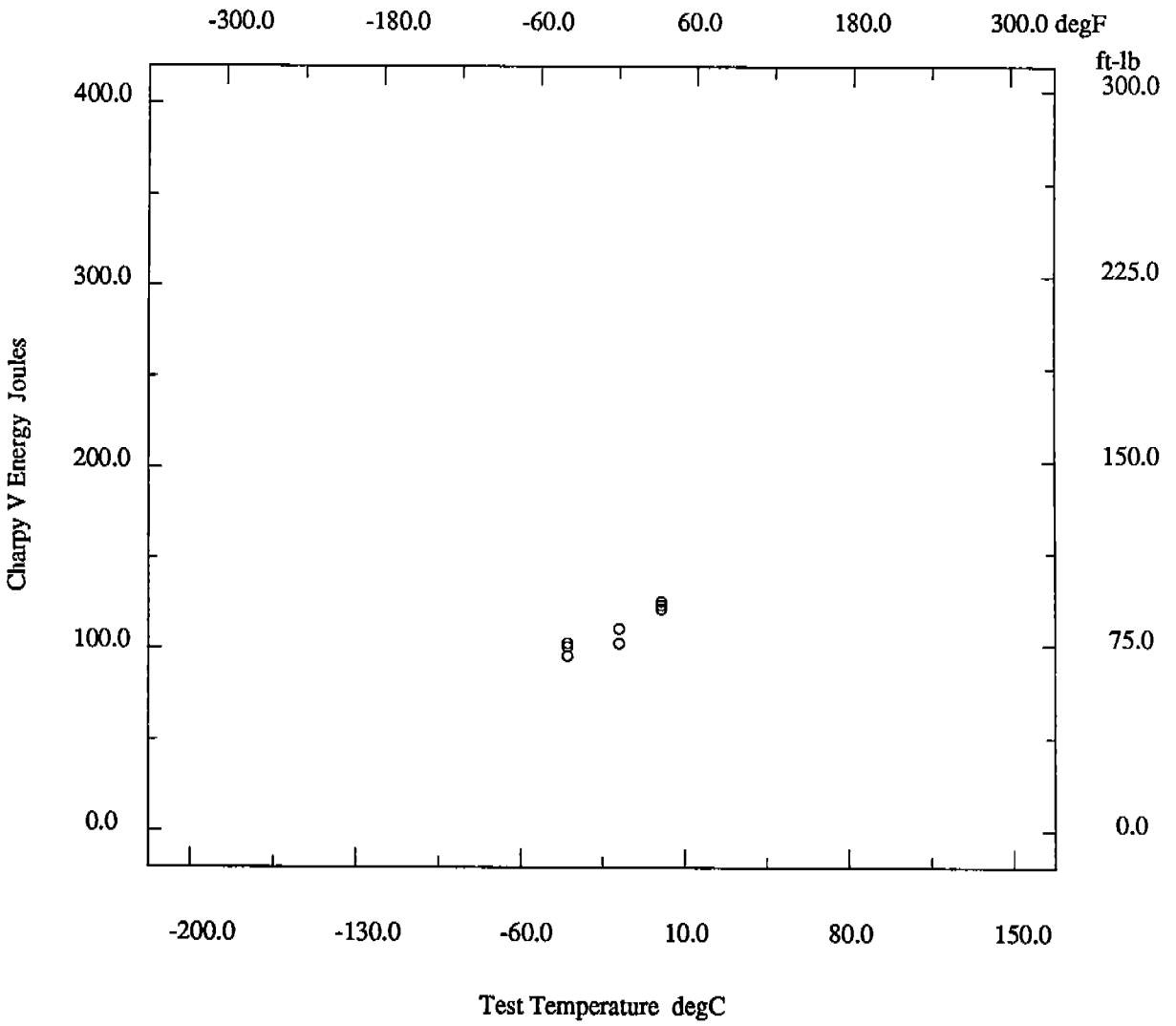
Orien	Test Temp degC	CVN Energy Joules
T-L °	-40	101
T-L °	-40	103
T-L °	-40	96
T-L °	-18	103
T-L °	-18	111
T-L °	0	122
T-L °	0	124
T-L °	0	126

* - not reported

Material HY80

Description

Material Code	001.001.09F	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	50 mm	Composition Type	Actual
Composition Position	*	Lot ID	*
Reference	WJ,3/87		



* - not reported

(39) (39) 40X

Material HY80

Description

Material Code	001.002.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.5 in	Composition Type	Actual
Composition Position	*	Lot ID	B9353-3
Reference	1120		

Composition

C	0.17 %	Mn	0.28 %
P	0.007 %	S	0.013 %
Si	0.20 %	Cr	1.29 %
Ni	2.48 %	Mo	0.30 %
V	0.003 %	Cu	0.18 %
Cb	*	Ti	0.003 %
B	*	Al	*
N	*	Other Components	fgp,Al %

Fabrication History

Heat Treatment	*	Producer	Lukens
Year Produced	1977	Addl Info	None
Source	Lukens	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	Fracture Toughness	Position	*
Specimen Type	*	Specimen Thickness	1.5 in
Crack Length	*	Loading Type	*
Loading Rate	*	KQ	*
KIc	*	Valid KIc?	*
Reason for Invalid	*	JIc	*
KJc	*	JIcpr	*
Curve Shape	*	Standard Method	*
Standard Year	*		

Orien	Test Temp degF	CODi in	CODIc in	JI in-lb/in**2	Jmax in-lb/in**2	Tear Mod in-lb/in**2
L-T	72	0.0236	0.0380	4346	4315	260.2
L-T	72	0.0186	0.0349	3841	4195	306.1
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	*	0.0131	0.0220	1971	2465	229.8

* - not reported

Material HY80

Description

Material Code	001.002.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.5 in	Composition Type	Actual
Composition Position	*	Lot ID	B9353-3
Reference	1120		

Composition See Page 16600.1

Fabrication History See Page 16600.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	*	Did Specimen Fracture?	*
Did Specimen Split?	*	Standard Method	*
Standard Year	*		

Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
L-T ○	-320	6	2	5
L-T ○	-255	24	12	16
L-T ○	-250	23	12	11
L-T ○	-240	25	15	17
L-T ○	-230	33	20	24
L-T ○	-220	24	15	21
L-T ○	-210	27	16	27
L-T ○	-200	35	26	36
L-T ○	-180	46	32	42
L-T ○	-160	55	40	55
L-T ○	-140	61	46	72
L-T ○	-120	73	55	88
L-T ○	-100	79	57	95
L-T ○	-80	80	62	100
L-T ○	-60	83	63	100
L-T ○	-40	84	64	100
L-T ○	-20	88	69	100
L-T ○	0	90	67	100
L-T ○	20	82	62	100
L-T ○	76	86	70	100
T-L △	-320	6	2	5
T-L △	-255	28	14	11
T-L △	-240	38	21	19
T-L △	-220	45	27	30
T-L △	-210	66	44	44
T-L △	-200	96	58	60
T-L △	-190	70	45	52
T-L △	-180	85	54	55
T-L △	-160	97	63	77
T-L △	-150	107	69	85
T-L △	-140	119	78	90
T-L △	-120	122	80	100
T-L △	-100	121	81	100
T-L △	-80	136	88	100

(continued)

* - not reported

Material HY80

(continued)

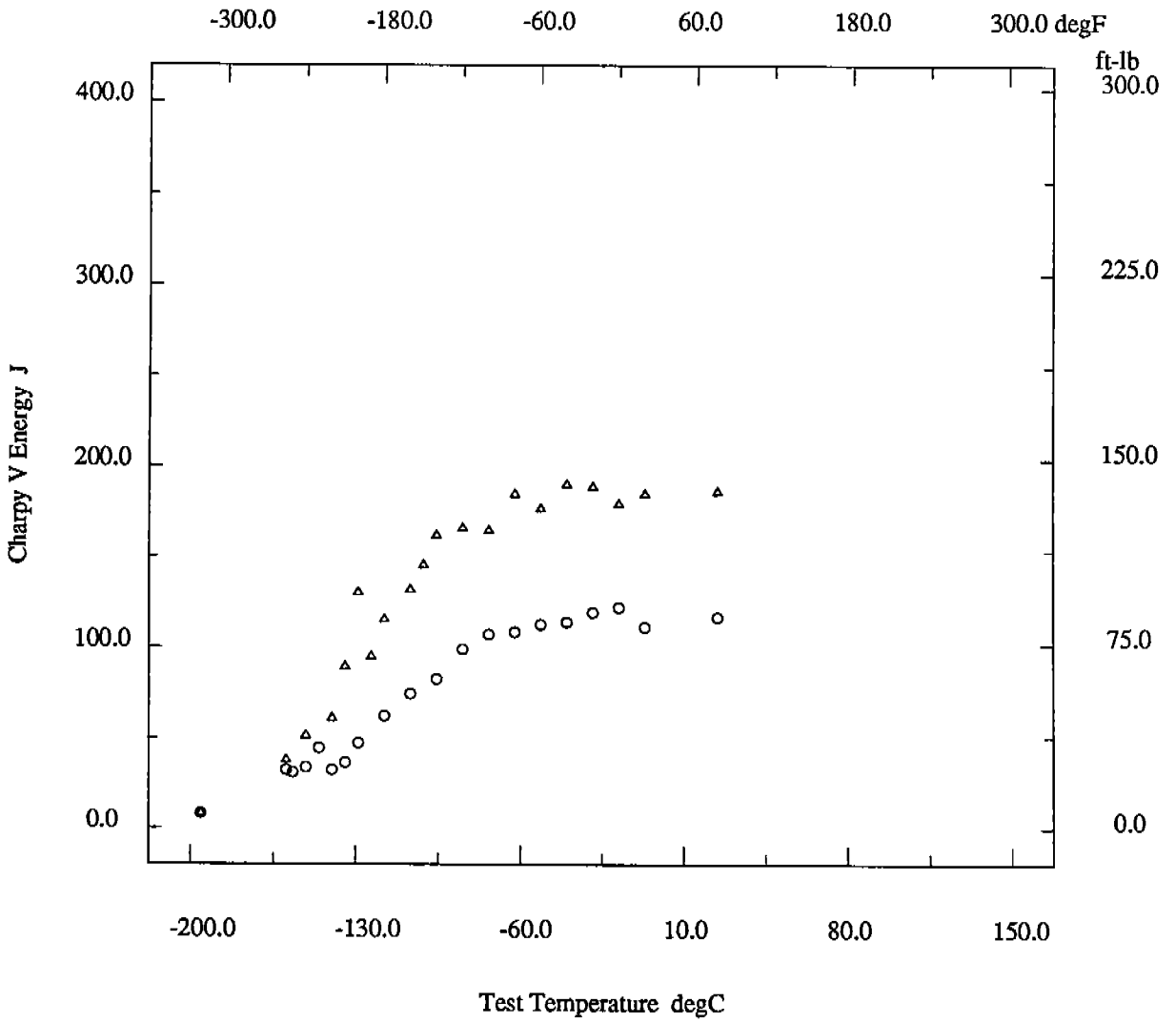
Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %
T-L ▲	-60	130	79	100
T-L ▲	-40	140	87	100
T-L ▲	-20	139	87	100
T-L ▲	0	132	86	100
T-L ▲	20	136	88	100
T-L ▲	76	137	90	100

* - not reported

Material HY80

Description

Material Code	001.002.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.5 in	Composition Type	Actual
Composition Position	*	Lot ID	B9353-3
Reference	1120		



* - not reported

Material HY80

Description

Material Code	001.002.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.5 in	Composition Type	Actual
Composition Position	*	Lot ID	B9353-3
Reference	1120		

Composition

See Page 16600.1

Fabrication History

See Page 16600.1

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	80	106.8	92.2	23.8	72.1
L	80	106.8	93.2	23.7	72.1
T	80	106.8	86.7	24.3	76.6
T	80	107.3	90.7	23.9	75.4

* - not reported

Material HY80

Description

Material Code	001.002.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.5 in	Composition Type	Actual
Composition Position	*	Lot ID	B9353-3
Reference	1120		

Composition See Page 16600.1

Fabrication History See Page 16600.1

Property Measurements

Test Type	Dynamic Tear	Position	*
Specimen Type	Dynamic Tear	Notch Preparation	*
Specimen Thickness	0.625 in	Loading Rate	*
Standard Method	*	Standard Year	*

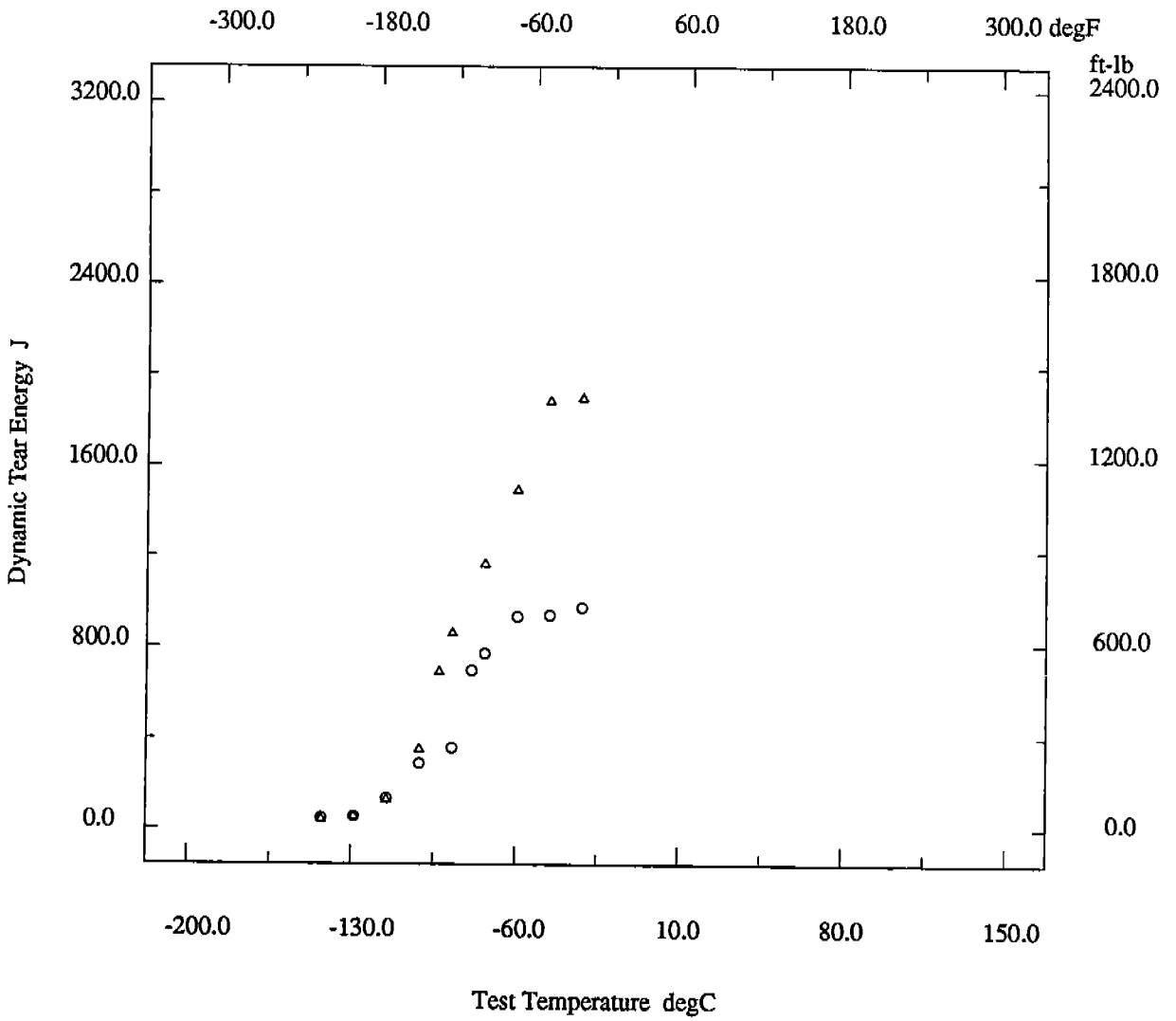
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
L-T ○	-225	35	5
L-T ○	-200	40	14
L-T ○	-175	100	22
L-T ○	-150	215	33
L-T ○	-125	265	42
L-T ○	-110	515	69
L-T ○	-100	570	79
L-T ○	-75	690	99
L-T ○	-50	695	100
L-T ○	-25	720	100
T-L △	-225	30	10
T-L △	-200	40	13
T-L △	-175	95	22
T-L △	-150	260	38
T-L △	-135	510	52
T-L △	-125	635	64
T-L △	-100	860	77
T-L △	-75	1100	88
T-L △	-50	1390	100
T-L △	-25	1400	100

* - not reported

Material HY80

Description

Material Code	001.002.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.5 in	Composition Type	Actual
Composition Position	*	Lot ID	B9353-3
Reference	1120		



* - not reported

47 48X 47 48X

Material HY80

Description

Material Code	001.003.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		

Composition

C	0.16 %	Mn	0.27 %
P	0.007 %	S	0.007 %
Si	0.24 %	Cr	1.48 %
Ni	2.83 %	Mo	0.40 %
V	0.01 %	Cu	0.11 %
Cb	*	Ti	0.003 %
B	*	Al	0.039 %
N	*	Other Components	As=.008; Sb=.003 %

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Top	Killing Process	*
Process Temperature	1650 degF	Process Time	8 hr
Rolling Conditions	78 %	Final Processing	A,Q,T
Final Temperature	1180 degF	Final Time	8.25 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	100.0	82.5	*	23	67.0

* - not reported

Material HY80

Description

Material Code	001.003.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		

Composition

See Page 16700.1

Fabrication History

See Page 16700.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
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 ○	-120	80
L-T ○	-120	84
L-T ○	-120	84
L-T ○	-120	86
L-T ○	-120	90
L-T ○	-40	114
L-T ○	-40	118
L-T ○	-40	120
L-T ○	-40	126
L-T ○	-40	128
L-T ○	0	126
L-T ○	0	134
L-T ○	0	150
L-T ○	0	154
L-T ○	0	154
L-T ○	32	152
L-T ○	32	154
L-T ○	32	154
L-T ○	32	156
L-T ○	32	158
L-T ○	70	142
L-T ○	70	150
L-T ○	70	152
L-T ○	70	152
L-T ○	70	160
T-L △	-120	52
T-L △	-120	56
T-L △	-120	58
T-L △	-120	72
T-L △	-120	74
T-L △	-40	106
T-L △	-40	118
T-L △	-40	88

(continued)

* - not reported

Material HY80

(continued)

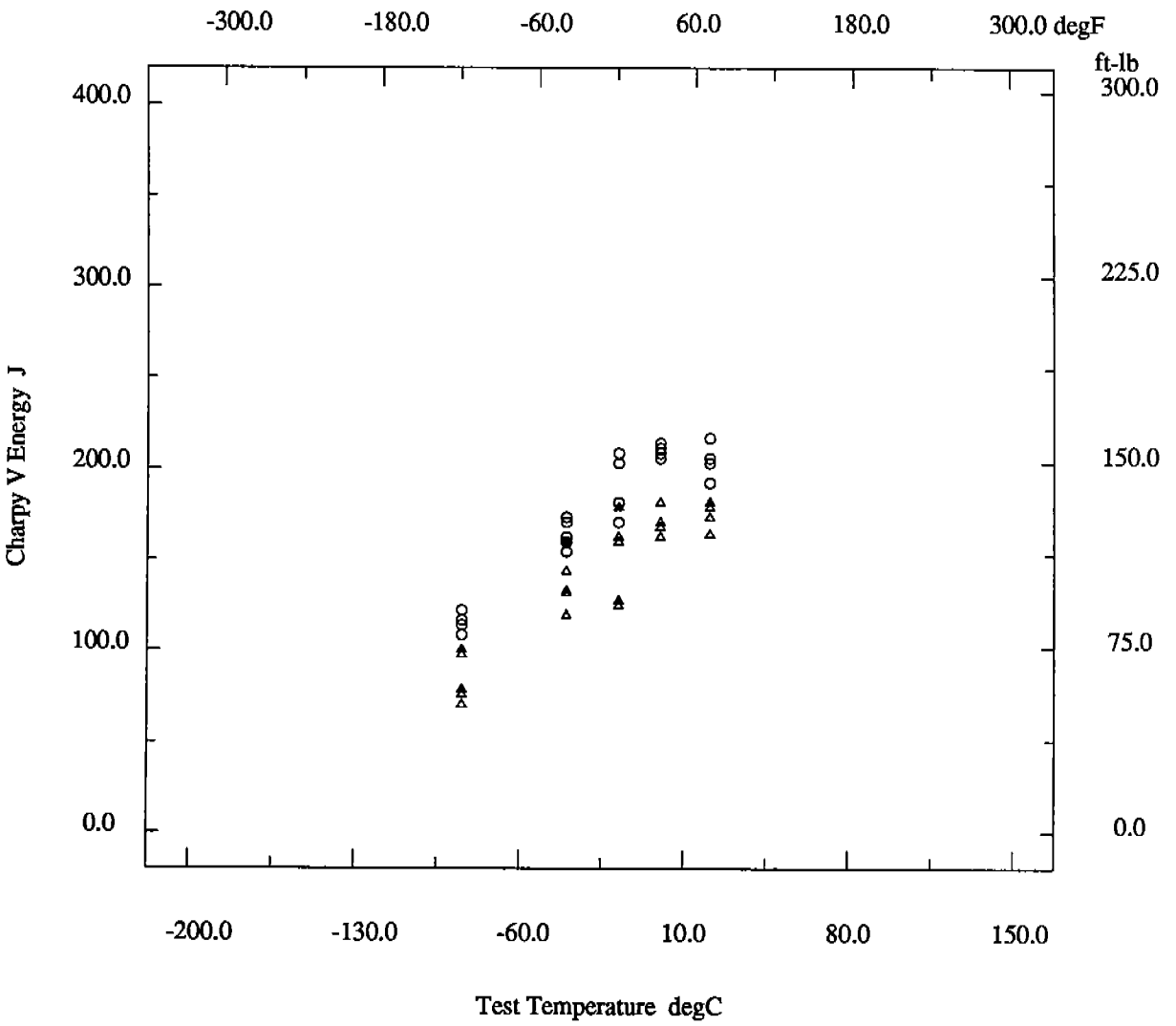
Orien	Test Temp degF	CVN Energy ft-lb
T-L △	-40	97
T-L △	-40	98
T-L △	0	118
T-L △	0	120
T-L △	0	132
T-L △	0	92
T-L △	0	94
T-L △	32	120
T-L △	32	124
T-L △	32	126
T-L △	32	134
T-L △	32	134
T-L △	70	121
T-L △	70	128
T-L △	70	128
T-L △	70	132
T-L △	70	134

* - not reported

Material HY80

Description

Material Code	001.003.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.003.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		

Composition

See Page 16700.1

Fabrication History

See Page 16700.1

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	102.5	82.8	*	24	70.5

* - not reported

Material HY80

Description

Material Code	001.003.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		

Composition

See Page 16700.1

Fabrication History

See Page 16700.1

Property Measurements

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

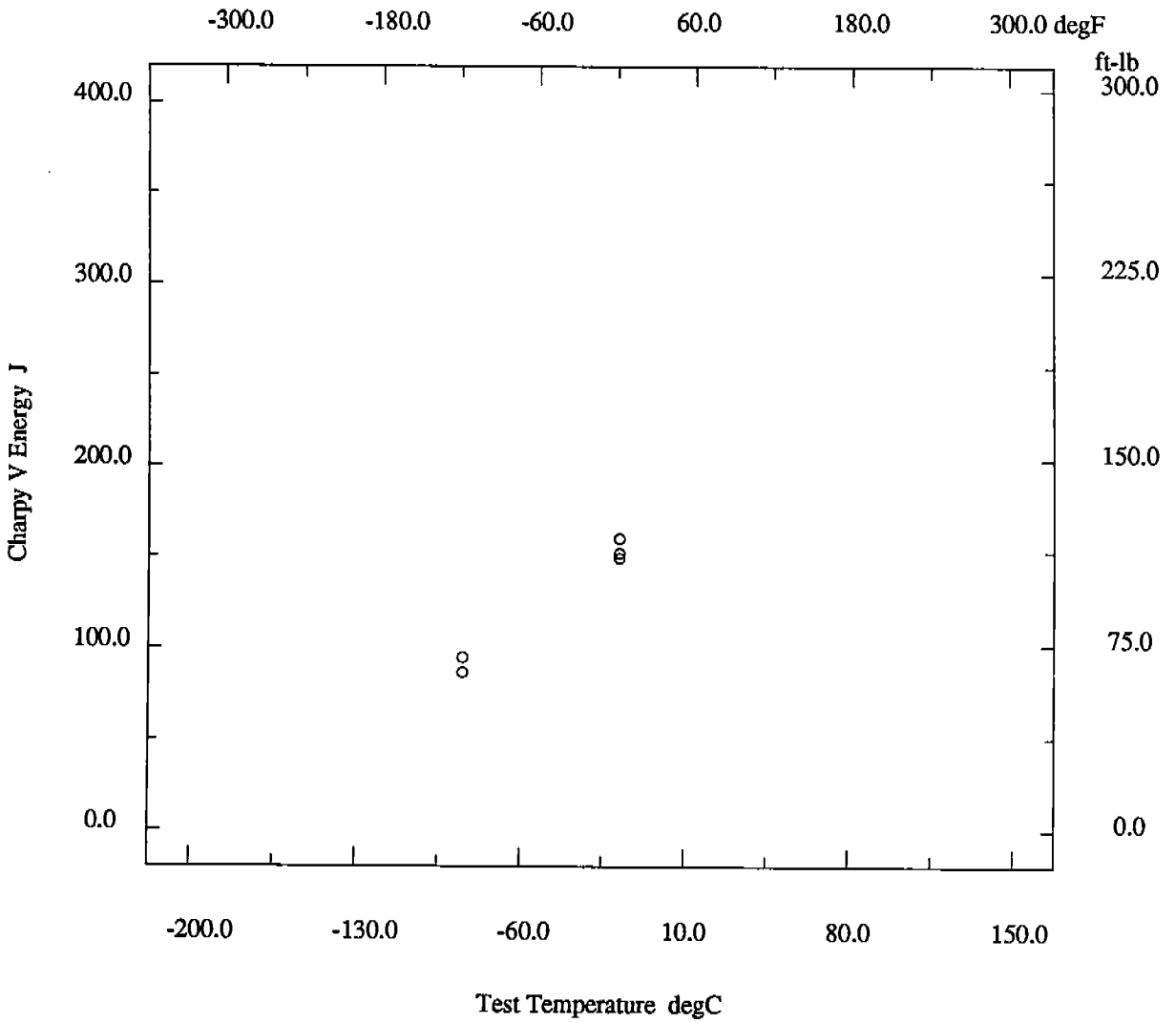
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	64
T-L °	-120	64
T-L °	-120	70
T-L °	0	110
T-L °	0	112
T-L °	0	118

* - not reported

Material HY80

Description

Material Code	001.003.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.003.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		

Composition

See Page 16700.1

Fabrication History

See Page 16700.1

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	105.5	86.5	*	23	73.3

* - not reported

Material HY80

Description

Material Code	001.003.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		

Composition See Page 16700.1

Fabrication History See Page 16700.1

Property Measurements

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

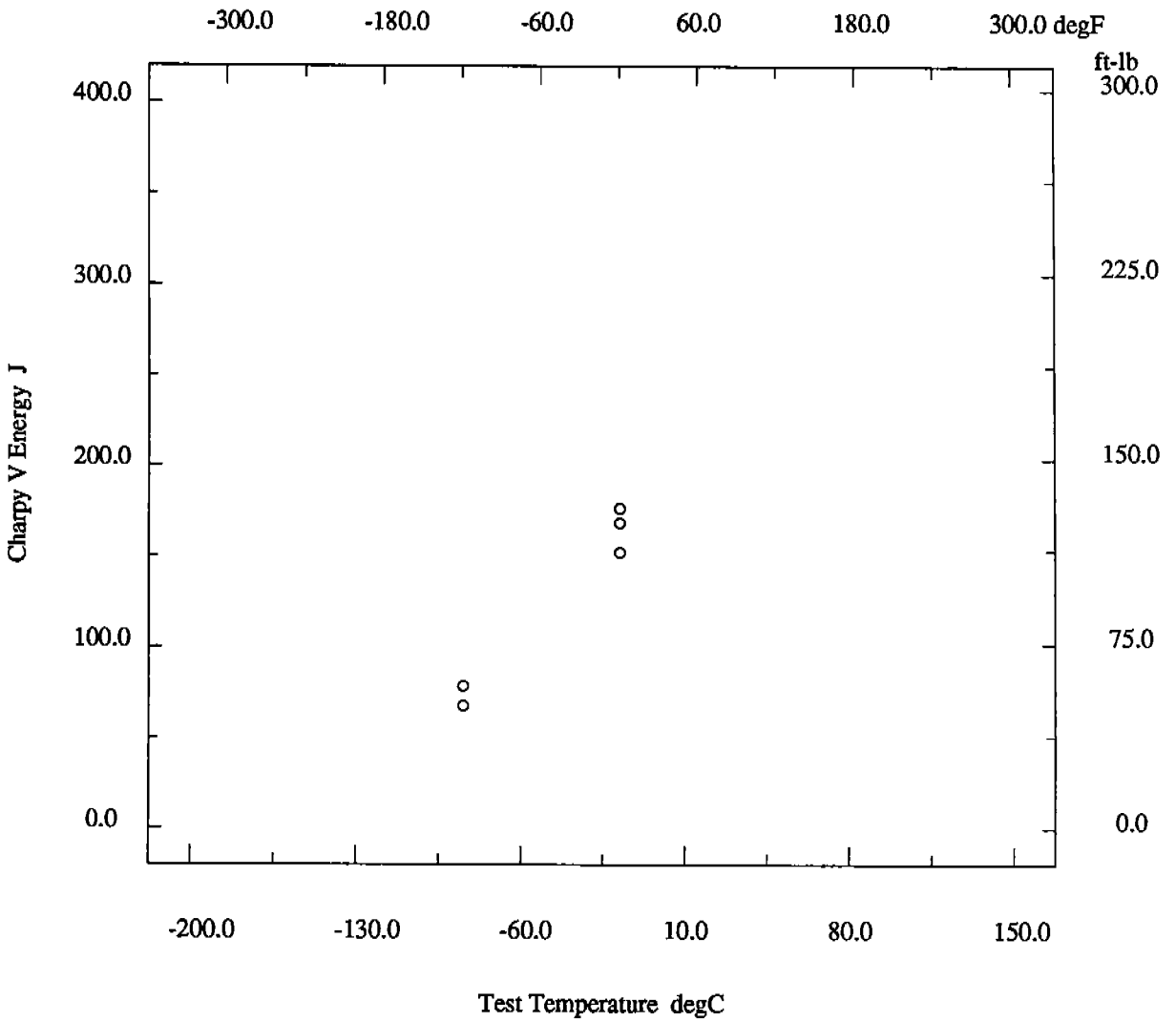
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	50
T-L °	-120	50
T-L °	-120	58
T-L °	0	112
T-L °	0	124
T-L °	0	130

* - not reported

Material HY80

Description

Material Code	001.003.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.003.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		

Composition

See Page 16700.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Mid	Killing Process	*
Process Temperature	1650 degF	Process Time	8 hr
Rolling Conditions	78 %	Final Processing	A,Q,T
Final Temperature	1180 degF	Final Time	8.25 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	103.0	85.1	*	23	74.4

* - not reported

Material HY80

Description

Material Code	001.003.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		

Composition

See Page 16700.1

Fabrication History

See Page 16700.11

Property Measurements

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

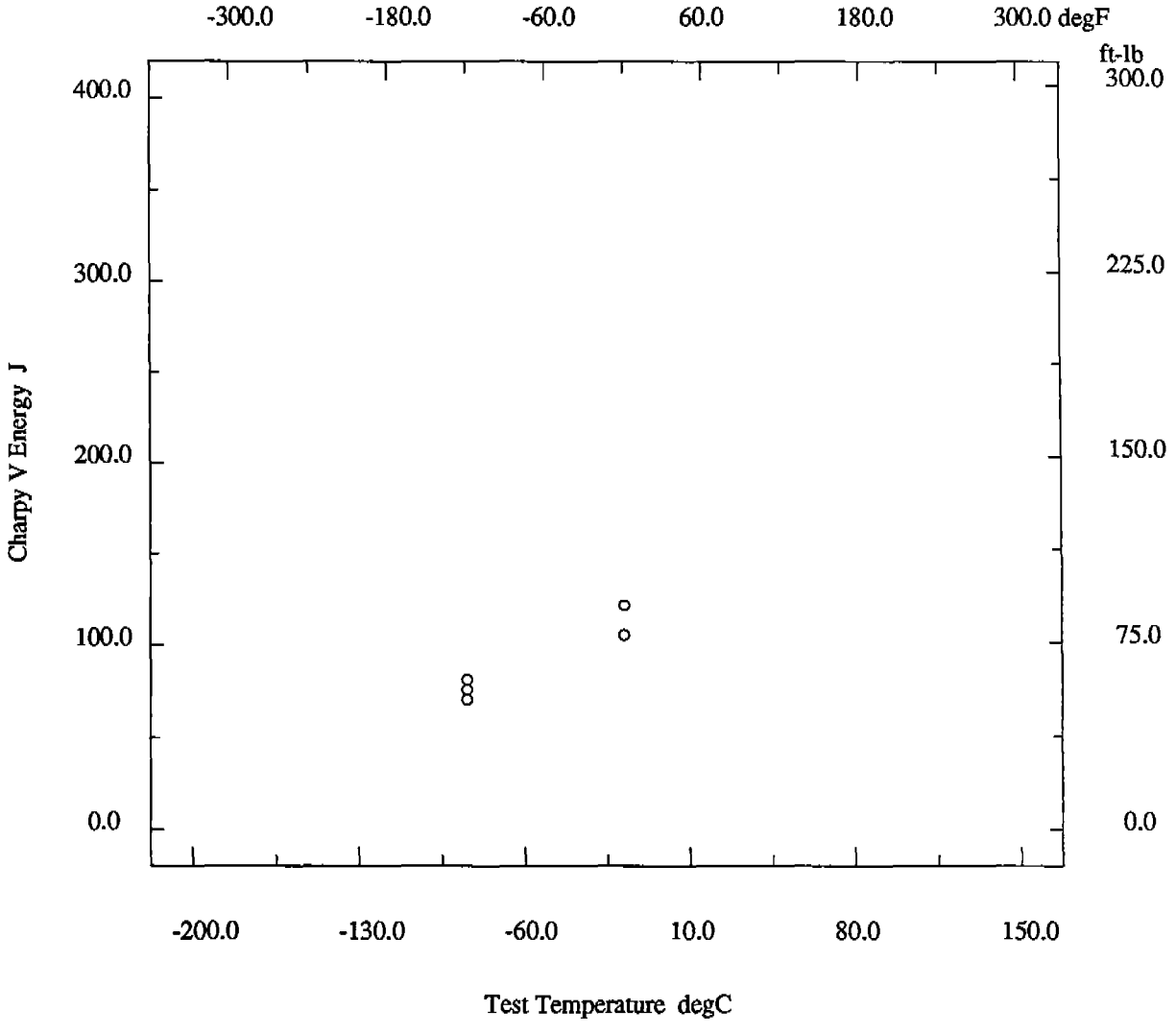
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	52
T-L °	-120	56
T-L °	-120	60
T-L °	0	78
T-L °	0	78
T-L °	0	90

* - not reported

Material HY80

Description

Material Code	001.003.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.003.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		

Composition

See Page 16700.1

Fabrication History

See Page 16700.11

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	104.1	84.2	*	23	67.5

* - not reported

Material HY80

Description

Material Code	001.003.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		

Composition

See Page 16700.1

Fabrication History

See Page 16700.11

Property Measurements

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

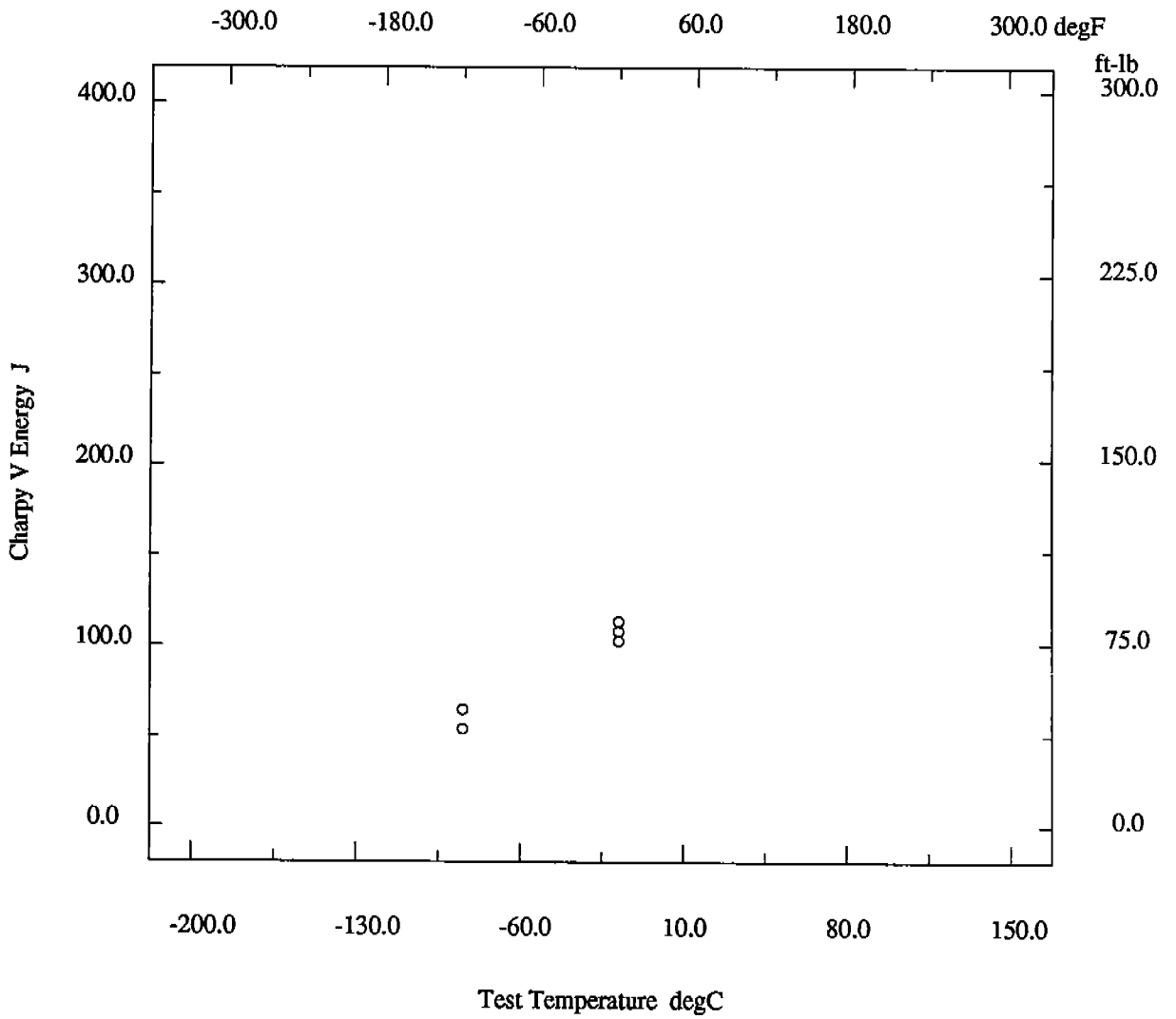
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	40
T-L °	-120	40
T-L °	-120	48
T-L °	0	76
T-L °	0	80
T-L °	0	84

* - not reported

Material HY80

Description

Material Code	001.003.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.003.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		

Composition

See Page 16700.1

Fabrication History

See Page 16700.11

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	104.5	84.3	*	22	71.4

* - not reported

Material HY80

Description

Material Code	001.003.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		

Composition

See Page 16700.1

Fabrication History

See Page 16700.11

Property Measurements

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

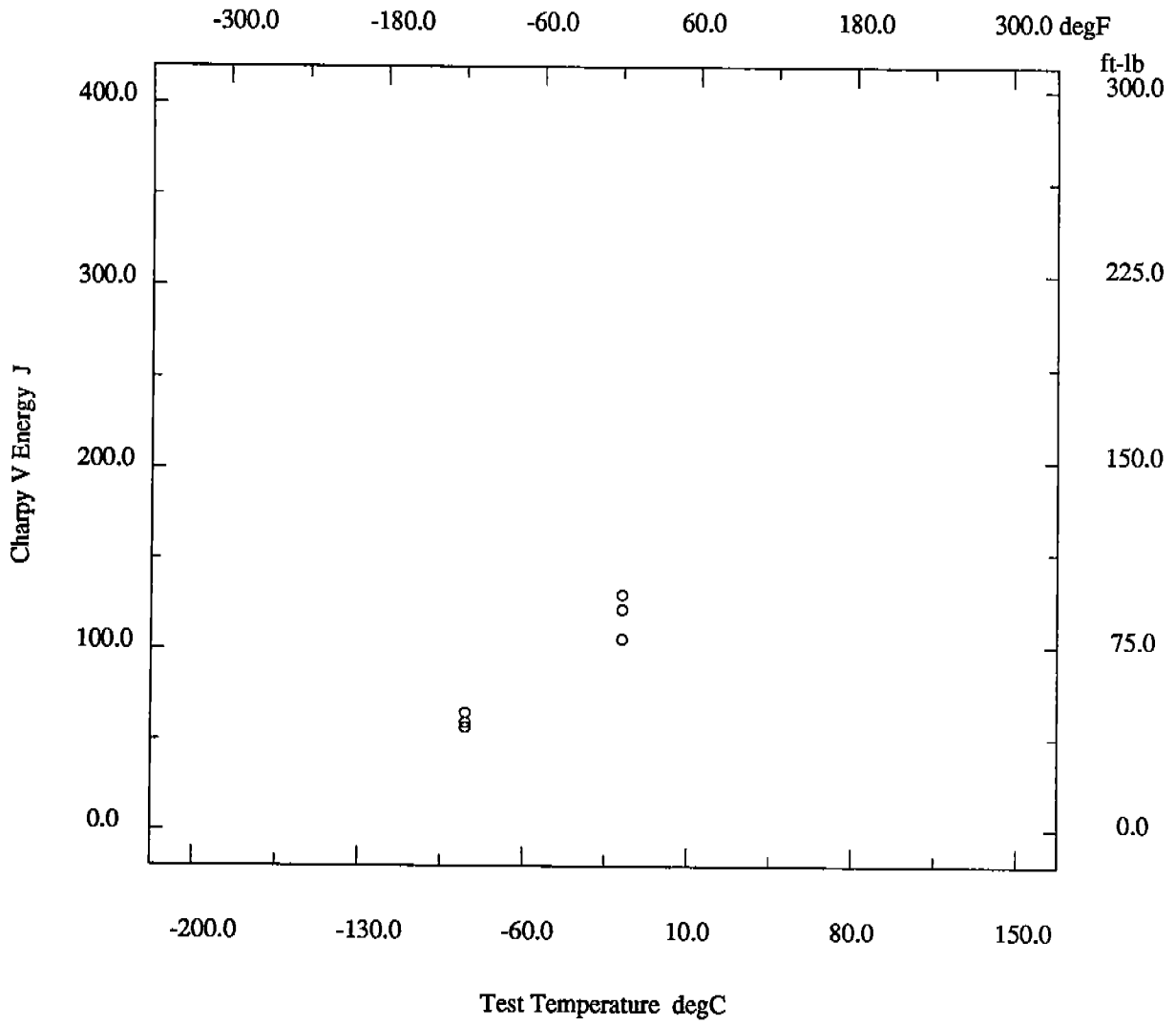
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	42
T-L °	-120	44
T-L °	-120	48
T-L °	0	78
T-L °	0	90
T-L °	0	96

* - not reported

Material HY80

Description

Material Code	001.003.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.003.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		

Composition

See Page 16700.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Bottom	Killing Process	*
Process Temperature	1650 degF	Process Time	8 hr
Rolling Conditions	78 %	Final Processing	A,Q,T
Final Temperature	1180 degF	Final Time	8.25 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	101.5	83.4	*	23	72.5

* - not reported

68 68

Material HY80

Description

Material Code	001.003.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		

Composition

See Page 16700.1

Fabrication History

See Page 16700.20

Property Measurements

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

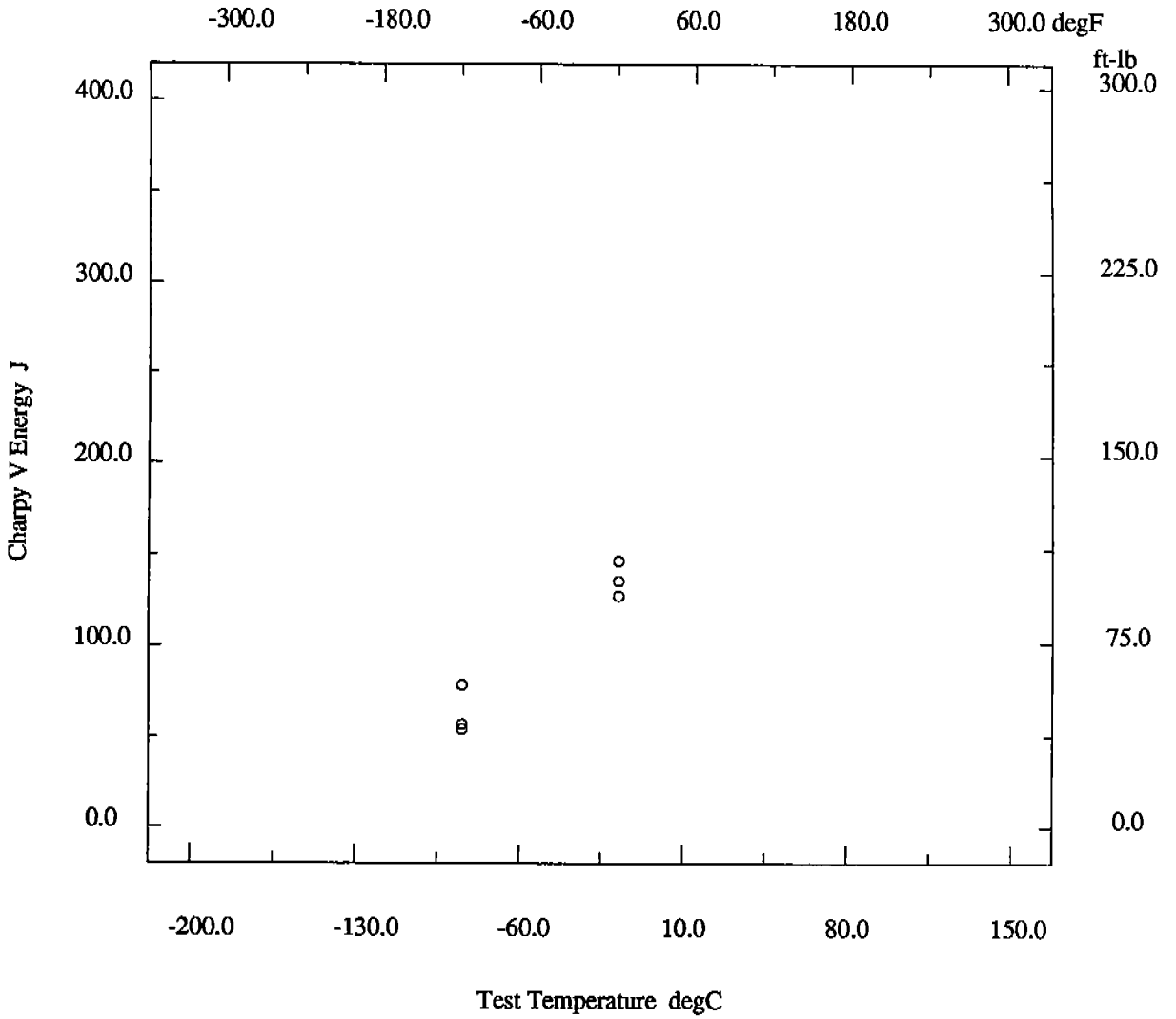
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	40
T-L °	-120	42
T-L °	-120	58
T-L °	0	100
T-L °	0	108
T-L °	0	94

* - not reported

Material HY80

Description

Material Code	001.003.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.003.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		

Composition

See Page 16700.1

Fabrication History

See Page 16700.20

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	103.5	83.3	*	22	70.5

* - not reported

Material HY80

Description

Material Code	001.003.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		

Composition

See Page 16700.1

Fabrication History

See Page 16700.20

Property Measurements

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

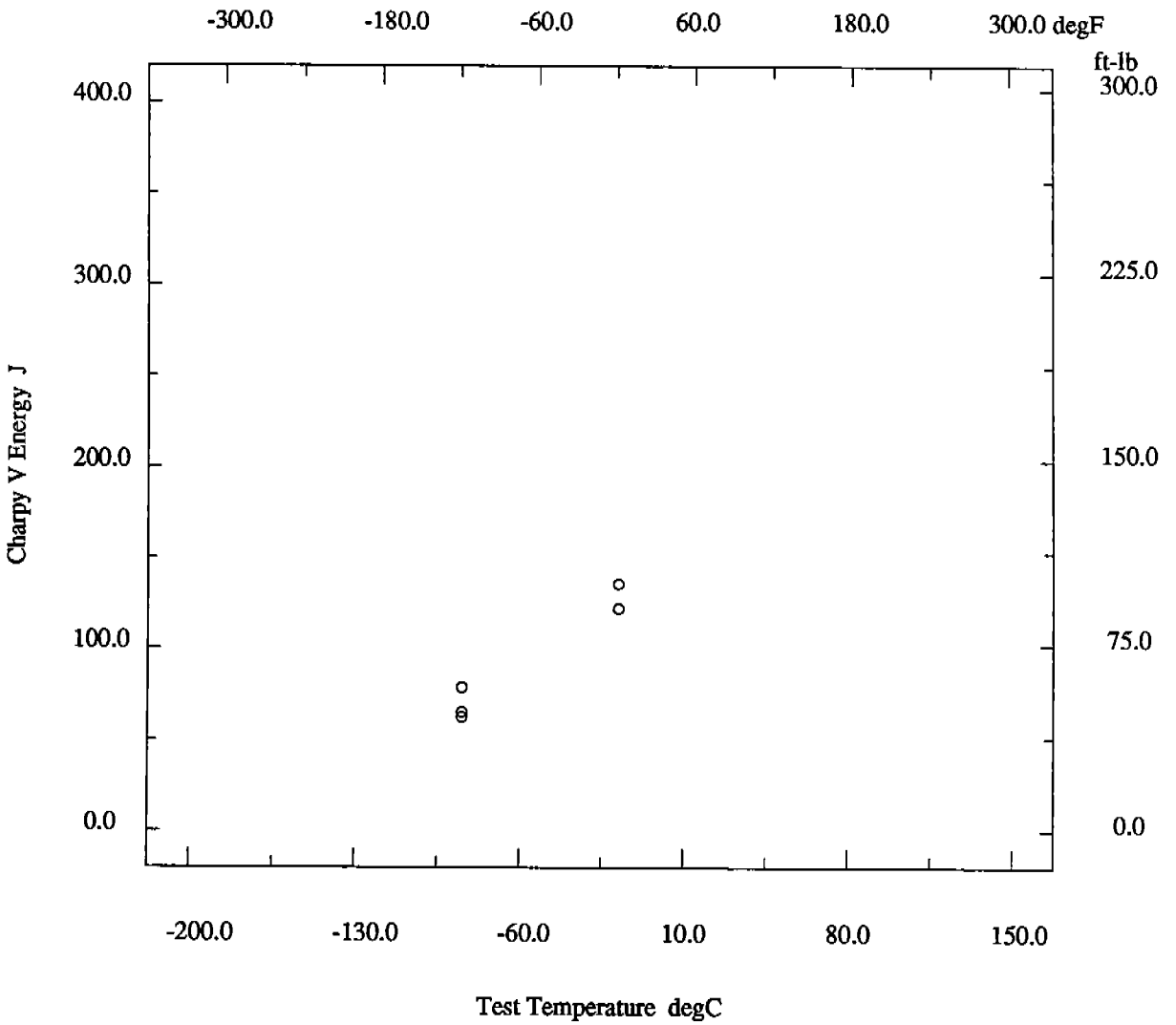
Orien	Test Temp degF	CVN Energy ft-lb
T-L ○	-120	46
T-L ○	-120	48
T-L ○	-120	58
T-L ○	0	100
T-L ○	0	100
T-L ○	0	90

* - not reported

Material HY80

Description

Material Code	001.003.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.003.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		

Composition

See Page 16700.1

Fabrication History

See Page 16700.20

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	103.5	85.3	*	24	71.5

* - not reported

Material HY80

Description

Material Code	001.003.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		

Composition

See Page 16700.1

Fabrication History

See Page 16700.20

Property Measurements

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

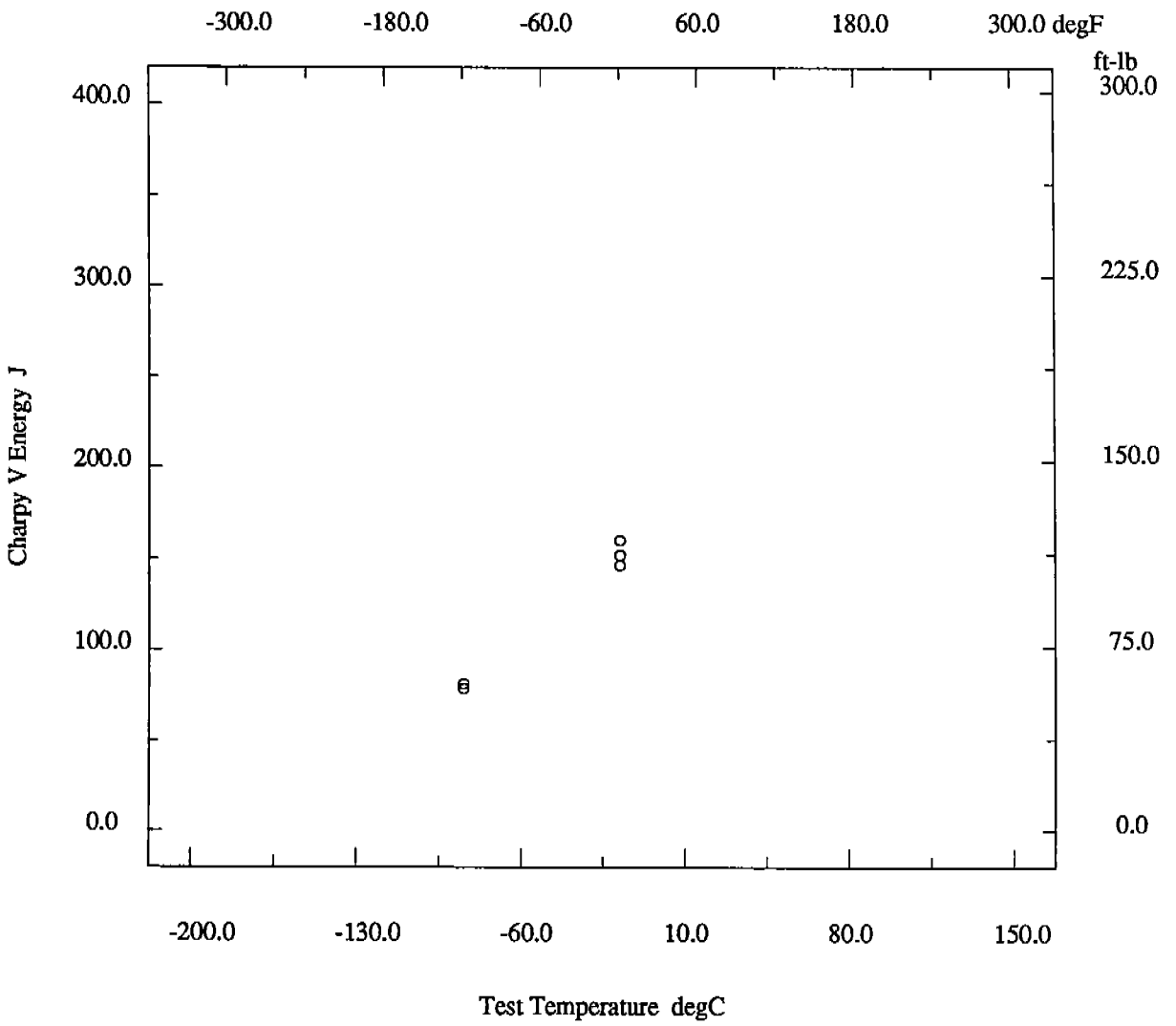
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	58
T-L °	-120	58
T-L °	-120	60
T-L °	0	108
T-L °	0	112
T-L °	0	118

* - not reported

Material HY80

Description

Material Code	001.003.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	8 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-3
Reference	USN-1		



* - not reported

76

Material HY80

Description

Material Code	001.004.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3703-4B
Reference	USN-1		

Composition

C	0.16 %	Mn	0.28 %
P	0.006 %	S	0.013 %
Si	0.23 %	Cr	1.44 %
Ni	2.72 %	Mo	0.38 %
V	0.01 %	Cu	0.15 %
Cb	*	Ti	0.002 %
B	*	Al	0.024 %
N	*	Other Components	As=0.005;Sn=0.007;Sb=0.007 %

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Top	Killing Process	*
Process Temperature	1600 degF	Process Time	1.76 hr
Rolling Conditions	80 %	Final Processing	A,Q,T
Final Temperature	1300 degF	Final Time	1.82 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	99.5	82.8	*	25	73.5

* - not reported

Material HY80

Description

Material Code	001.004.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3703-4B
Reference	USN-1		

Composition See Page 16800.1

Fabrication History See Page 16800.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
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 ○	-120	144
L-T ○	-120	147
L-T ○	-120	148
L-T ○	-120	152
L-T ○	-120	152
L-T ○	-40	148
L-T ○	-40	160
L-T ○	-40	162
L-T ○	-40	168
L-T ○	-40	174
L-T ○	0	159
L-T ○	0	160
L-T ○	0	164
L-T ○	0	168
L-T ○	0	181
L-T ○	32	161
L-T ○	32	162
L-T ○	32	168
L-T ○	32	175
L-T ○	32	178
L-T ○	70	169
L-T ○	70	172
L-T ○	70	178
L-T ○	70	182
L-T ○	70	184
T-L △	-120	75
T-L △	-120	77
T-L △	-120	77
T-L △	-120	79
T-L △	-120	81
T-L △	-40	102
T-L △	-40	74
T-L △	-40	90

(continued)

* - not reported

Material HY80

(continued)

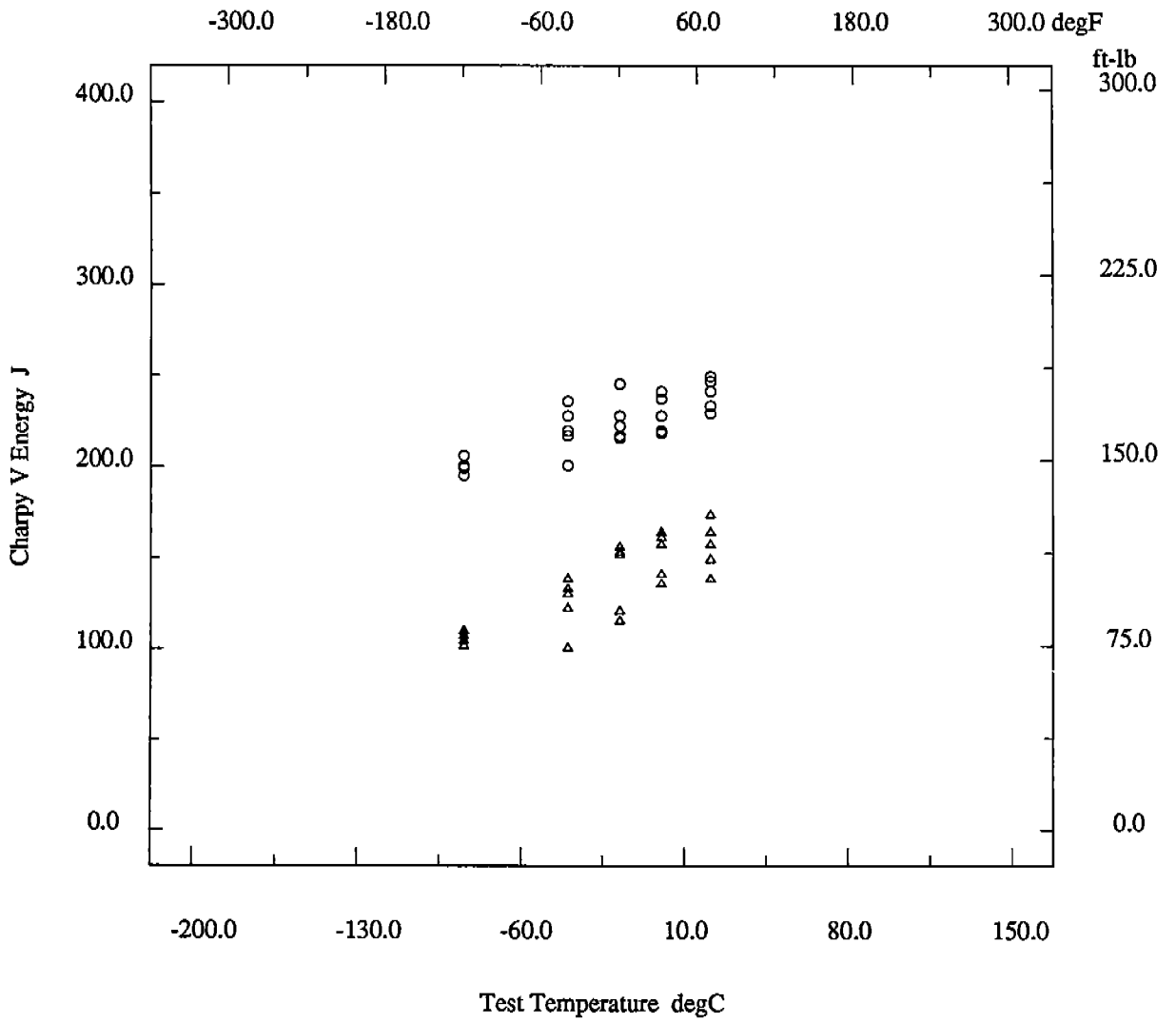
Orien	Test Temp degF	CVN Energy ft-lb
T-L △	-40	96
T-L △	-40	98
T-L △	0	112
T-L △	0	113
T-L △	0	115
T-L △	0	85
T-L △	0	89
T-L △	32	100
T-L △	32	104
T-L △	32	116
T-L △	32	119
T-L △	32	121
T-L △	70	102
T-L △	70	110
T-L △	70	116
T-L △	70	121
T-L △	70	128

* - not reported

Material HY80

Description

Material Code	001.004.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3703-4B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.004.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3703-4B
Reference	USN-1		

Composition

See Page 16800.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Bottom	Killing Process	*
Process Temperature	1600 degF	Process Time	1.76 hr
Rolling Conditions	80 %	Final Processing	A,Q,T
Final Temperature	1300 degF	Final Time	1.82 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	101.0	82.9	*	25	70.6

* - not reported

Material HY80

Description

Material Code	001.004.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3703-4B
Reference	USN-1		

Composition

See Page 16800.1

Fabrication History

See Page 16800.5

Property Measurements

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

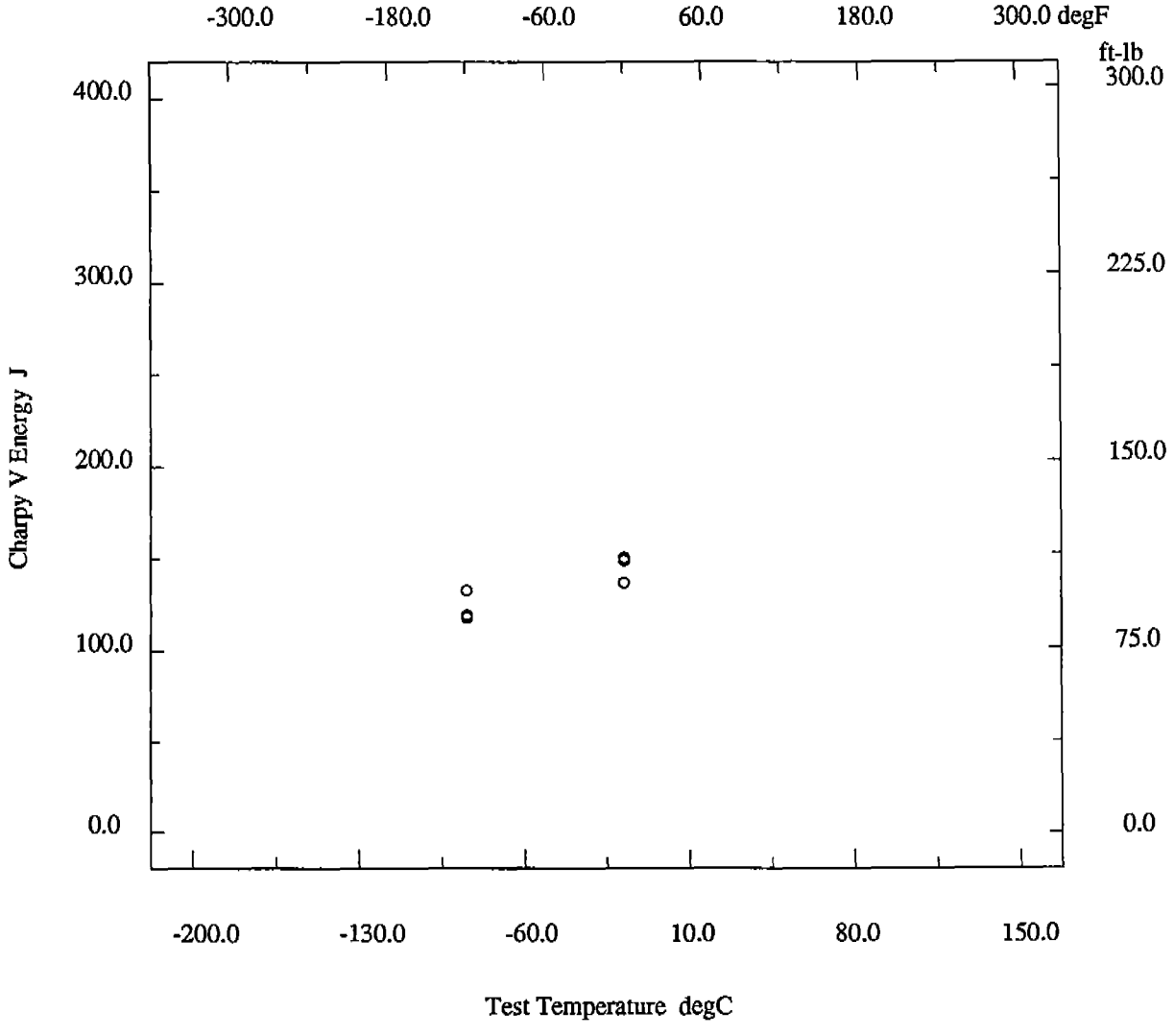
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	87
T-L °	-120	88
T-L °	-120	98
T-L °	0	101
T-L °	0	110
T-L °	0	111

* - not reported

Material HY80

Description

Material Code	001.004.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3703-4B
Reference	USN-1		



* - not reported

5 51x 83 84x

Material HY80

Description

Material Code	001.005.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3631-7L
Reference	USN-1		

Composition

C	0.15 %	Mn	0.30 %
P	0.005 %	S	0.017 %
Si	0.23 %	Cr	1.35 %
Ni	2.37 %	Mo	0.30 %
V	0.01 %	Cu	0.13 %
Cb	*	Ti	0.003 %
B	*	Al	0.025 %
N	*	Other Components	As=0.008;Sn=0.011;Sb=0.007 %

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Top	Killing Process	*
Process Temperature	1600 degF	Process Time	1.95 hr
Rolling Conditions	74 %	Final Processing	A,Q,T
Final Temperature	1280 degF	Final Time	1.05 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	110.6	98.0	*	22	63.0

* - not reported

Material HY80

Description

Material Code	001.005.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3631-7L
Reference	USN-1		

Composition See Page 16900.1

Fabrication History See Page 16900.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
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 ○	-120	102
L-T ○	-120	102
L-T ○	-120	103
L-T ○	-120	108
L-T ○	-120	112
L-T ○	-40	102
L-T ○	-40	108
L-T ○	-40	110
L-T ○	-40	112
L-T ○	-40	126
L-T ○	0	112
L-T ○	0	112
L-T ○	0	112
L-T ○	0	116
L-T ○	0	120
L-T ○	32	122
L-T ○	32	122
L-T ○	32	126
L-T ○	32	129
L-T ○	32	130
L-T ○	70	118
L-T ○	70	118
L-T ○	70	128
L-T ○	70	132
L-T ○	70	136
T-L △	-120	56
T-L △	-120	62
T-L △	-120	62
T-L △	-120	68
T-L △	-120	69
T-L △	-40	70
T-L △	-40	70
T-L △	-40	78

(continued)

* - not reported

Material HY80

(continued)

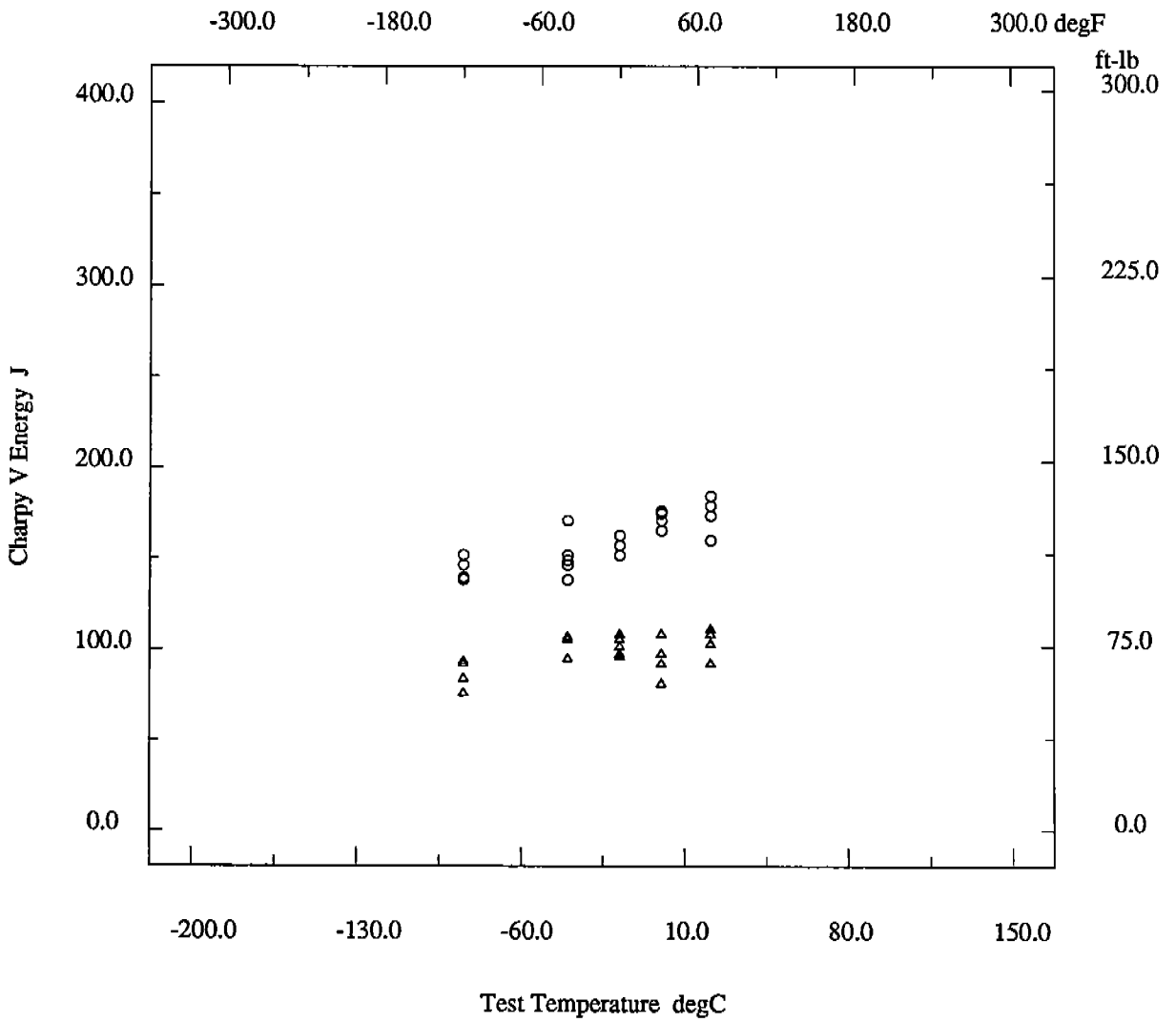
Orien	Test Temp degF	CVN Energy ft-lb
T-L △	-40	79
T-L △	-40	79
T-L △	0	71
T-L △	0	72
T-L △	0	75
T-L △	0	78
T-L △	0	80
T-L △	32	60
T-L △	32	68
T-L △	32	72
T-L △	32	80
T-L △	32	80
T-L △	70	68
T-L △	70	68
T-L △	70	76
T-L △	70	80
T-L △	70	82

* - not reported

Material HY80

Description

Material Code	001.005.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3631-7L
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.005.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3631-7L
Reference	USN-1		

Composition

See Page 16900.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Bottom	Killing Process	*
Process Temperature	1600 degF	Process Time	1.95 hr
Rolling Conditions	74 %	Final Processing	A,Q,T
Final Temperature	1280 degF	Final Time	1.05 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	91.7	105.5	*	22	62.4

* - not reported

Material HY80

Description

Material Code	001.005.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3631-7L
Reference	USN-1		

Composition

See Page 16900.1

Fabrication History

See Page 16900.5

Property Measurements

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

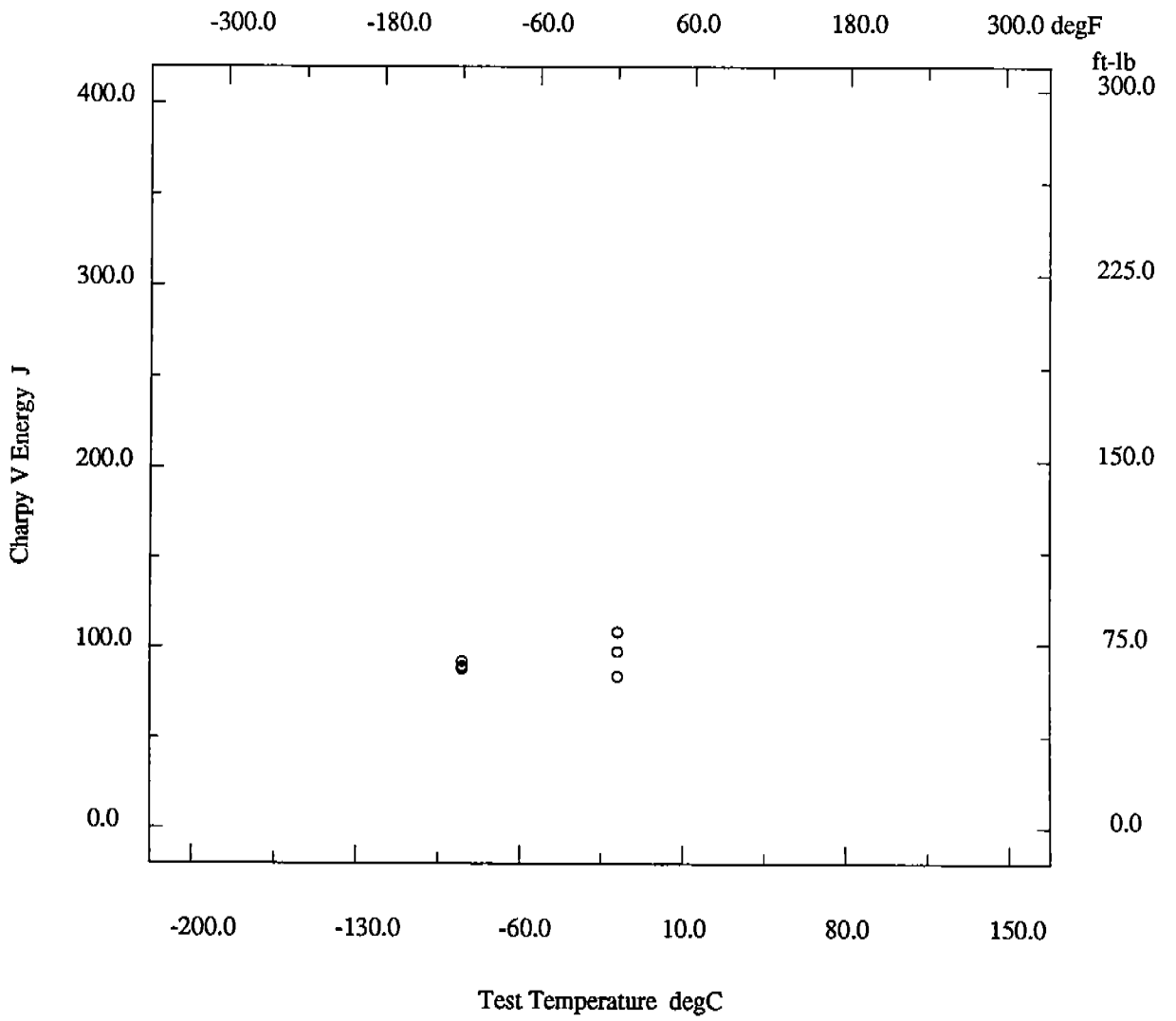
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	65
T-L °	-120	66
T-L °	-120	68
T-L °	0	62
T-L °	0	72
T-L °	0	80

* - not reported

Material HY80

Description

Material Code	001.005.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3631-7L
Reference	USN-1		



* - not reported

91
92x

Material HY80

Description

Material Code	001.006.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3667-3M
Reference	USN-1		

Composition

C	0.16 %	Mn	0.25 %
P	0.011 %	S	0.015 %
Si	0.25 %	Cr	1.48 %
Ni	2.80 %	Mo	0.40 %
V	0.004 %	Cu	0.13 %
Cb	*	Ti	0.003 %
B	*	Al	0.023 %
N	*	Other Components	As=0.007;Sn=0.012;Sb=0.008 %

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Top	Killing Process	*
Process Temperature	1660 degF	Process Time	0.58 hr
Rolling Conditions	92 %	Final Processing	A,Q,T
Final Temperature	1300 degF	Final Time	0.58 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	107.0	92.6	*	22	58.5

* - not reported

(43) a3

Material HY80

Description

Material Code	001.006.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3667-3M
Reference	USN-1		

Composition See Page 17000.1

Fabrication History See Page 17000.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
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 ○	-120	108
L-T ○	-120	110
L-T ○	-120	116
L-T ○	-120	118
L-T ○	-120	120
L-T ○	-40	120
L-T ○	-40	122
L-T ○	-40	128
L-T ○	-40	128
L-T ○	-40	138
L-T ○	0	122
L-T ○	0	122
L-T ○	0	124
L-T ○	0	125
L-T ○	0	132
L-T ○	32	118
L-T ○	32	126
L-T ○	32	128
L-T ○	32	130
L-T ○	32	133
L-T ○	70	122
L-T ○	70	127
L-T ○	70	128
L-T ○	70	132
L-T ○	70	136
T-L △	-120	53
T-L △	-120	54
T-L △	-120	57
T-L △	-120	57
T-L △	-120	60
T-L △	-40	63
T-L △	-40	64
T-L △	-40	68

(continued)

* - not reported

Material HY80

(continued)

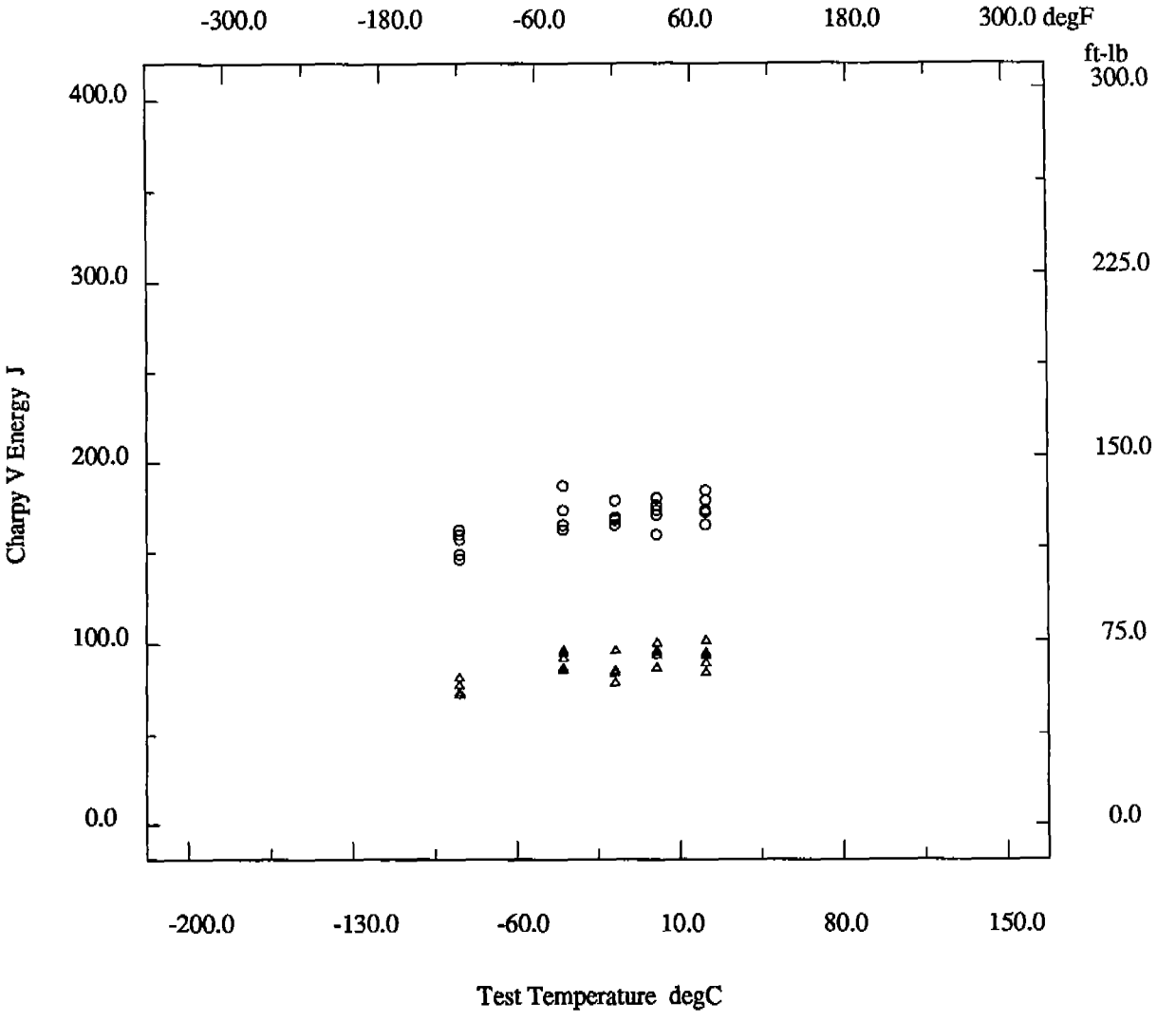
Orien	Test Temp degF	CVN Energy ft-lb
T-L △	-40	70
T-L △	-40	71
T-L △	0	58
T-L △	0	62
T-L △	0	63
T-L △	0	63
T-L △	0	71
T-L △	32	64
T-L △	32	69
T-L △	32	70
T-L △	32	71
T-L △	32	74
T-L △	70	62
T-L △	70	66
T-L △	70	69
T-L △	70	70
T-L △	70	75

* - not reported

Material HY80

Description

Material Code	001.006.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3667-3M
Reference	USN-1		



* - not reported

96

Material HY80

Description

Material Code	001.006.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3667-3M
Reference	USN-1		

Composition

See Page 17000.1

Fabrication History

See Page 17000.1

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	*

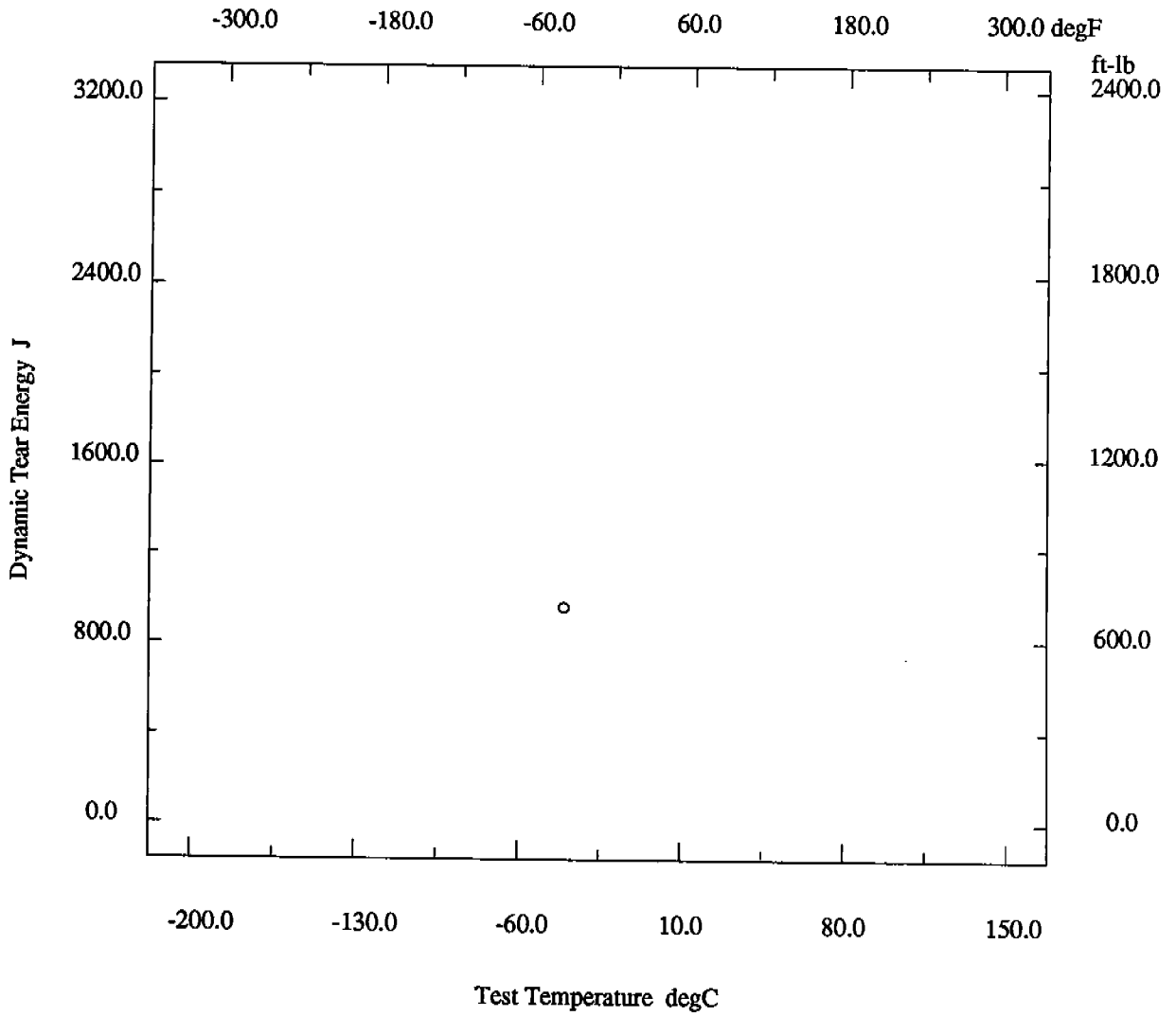
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L ○	-40	710	*

* - not reported

Material HY80

Description

Material Code	001.006.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3667-3M
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.006.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3667-3M
Reference	USN-1		

Composition

See Page 17000.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Bottom	Killing Process	*
Process Temperature	1660 degF	Process Time	0.58 hr
Rolling Conditions	92 %	Final Processing	A,Q,T
Final Temperature	1300 degF	Final Time	0.58 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	104.9	92.2	*	20	60.2

* - not reported

Material HY80

Description

Material Code	001.006.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3667-3M
Reference	USN-1		

Composition

See Page 17000.1

Fabrication History

See Page 17000.7

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
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 °	-120	43
T-L °	-120	47
T-L °	-120	49
T-L °	0	56
T-L °	0	60
T-L °	0	65

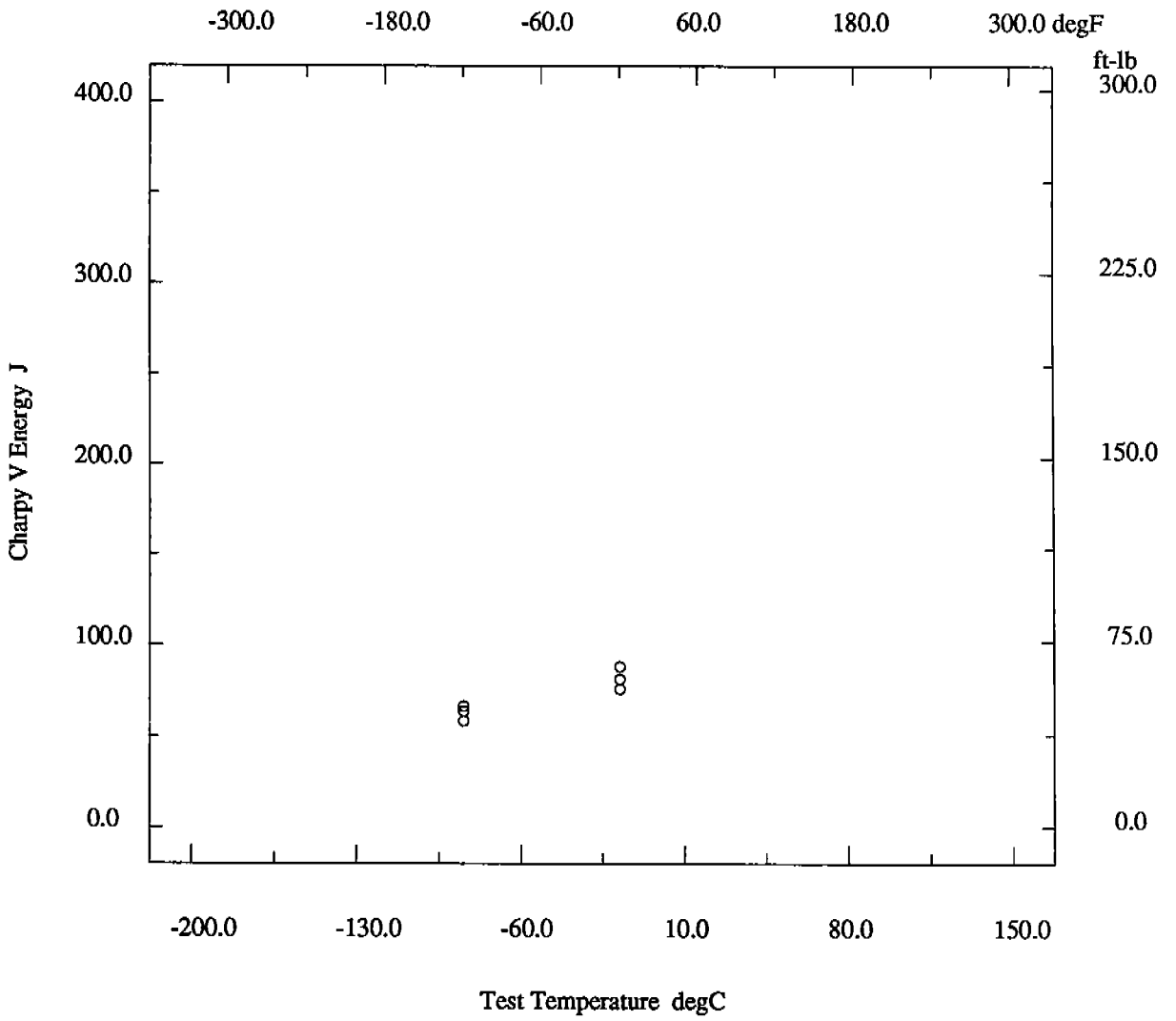
* - not reported

100

Material HY80

Description

Material Code	001.006.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3667-3M
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.006.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3667-3M
Reference	USN-1		

Composition

See Page 17000.1

Fabrication History

See Page 17000.7

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	*

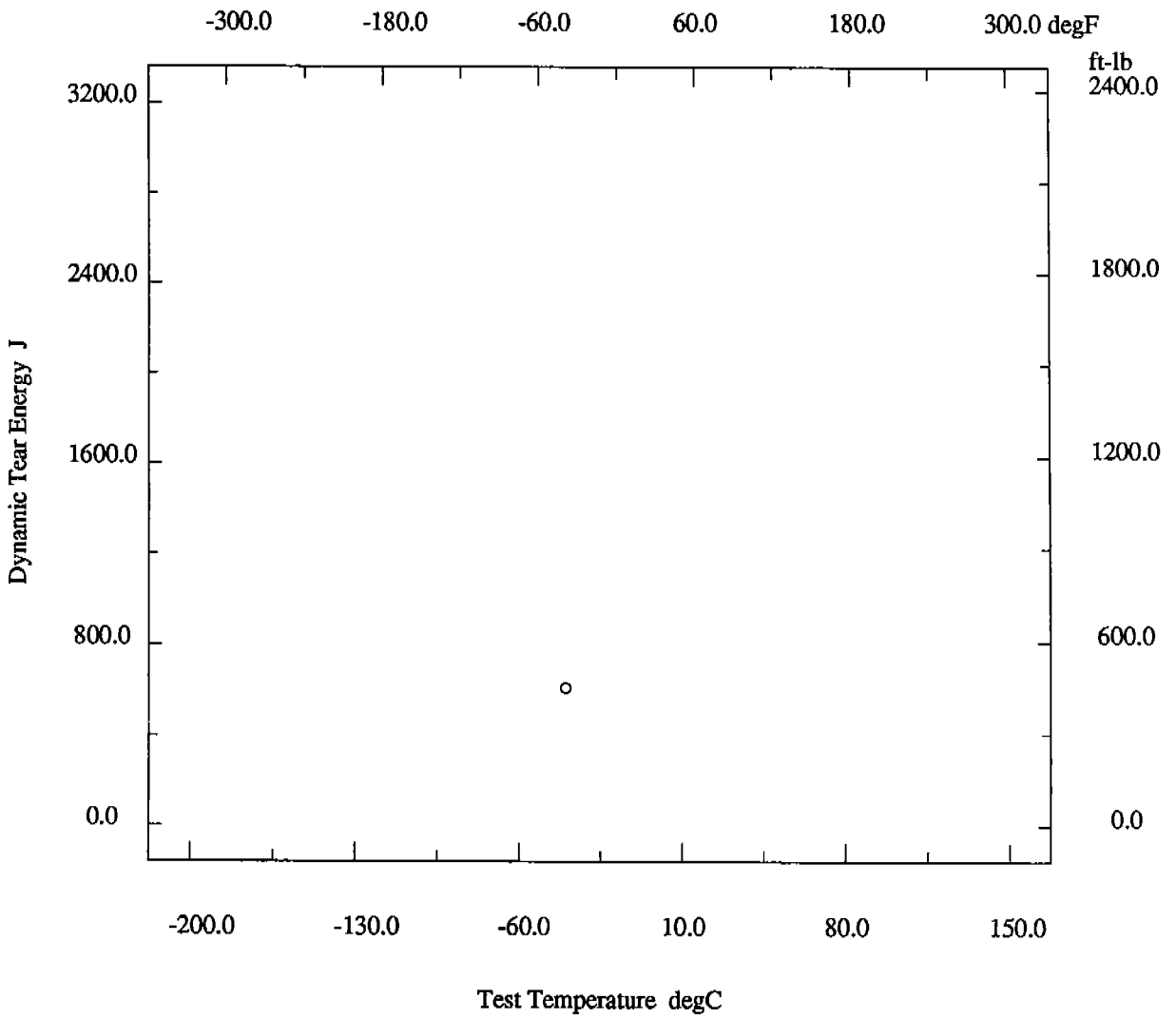
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L °	-40	450	*

* - not reported

Material HY80

Description

Material Code	001.006.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	0.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3667-3M
Reference	USN-1		



* - not reported

(10) 104+ 103 104x

Material HY80

Description

Material Code	001.007.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	6.5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8601-5
Reference	USN-1		

Composition

C	0.16 %	Mn	0.28 %
P	0.01 %	S	0.007 %
Si	0.27 %	Cr	1.47 %
Ni	2.79 %	Mo	0.41 %
V	0.01 %	Cu	0.13 %
Cb	*	Ti	0.003 %
B	*	Al	0.029 %
N	*	Other Components	As=0.010;Sn=0.010;Sb=0.007 %

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Top	Killing Process	*
Process Temperature	1650 degF	Process Time	6.5 hr
Rolling Conditions	81 %	Final Processing	A,Q,T
Final Temperature	1180 degF	Final Time	6.5 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	111.4	96.5	*	21	69.2

* - not reported

Material HY80

Description

Material Code	001.007.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	6.5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8601-5
Reference	USN-1		

Composition

See Page 17100.1

Fabrication History

See Page 17100.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
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 ○	-120	47
L-T ○	-120	49
L-T ○	-120	54
L-T ○	-120	63
L-T ○	-120	66
L-T ○	-40	101
L-T ○	-40	75
L-T ○	-40	77
L-T ○	-40	83
L-T ○	-40	99
L-T ○	0	107
L-T ○	0	114
L-T ○	0	122
L-T ○	0	90
L-T ○	0	95
L-T ○	32	116
L-T ○	32	124
L-T ○	32	124
L-T ○	32	130
L-T ○	32	132
L-T ○	70	119
L-T ○	70	120
L-T ○	70	131
L-T ○	70	139
L-T ○	70	142
T-L △	-120	26
T-L △	-120	38
T-L △	-120	42
T-L △	-120	46
T-L △	-120	48
T-L △	-40	54
T-L △	-40	54
T-L △	-40	70

(continued)

* - not reported

Material HY80

(continued)

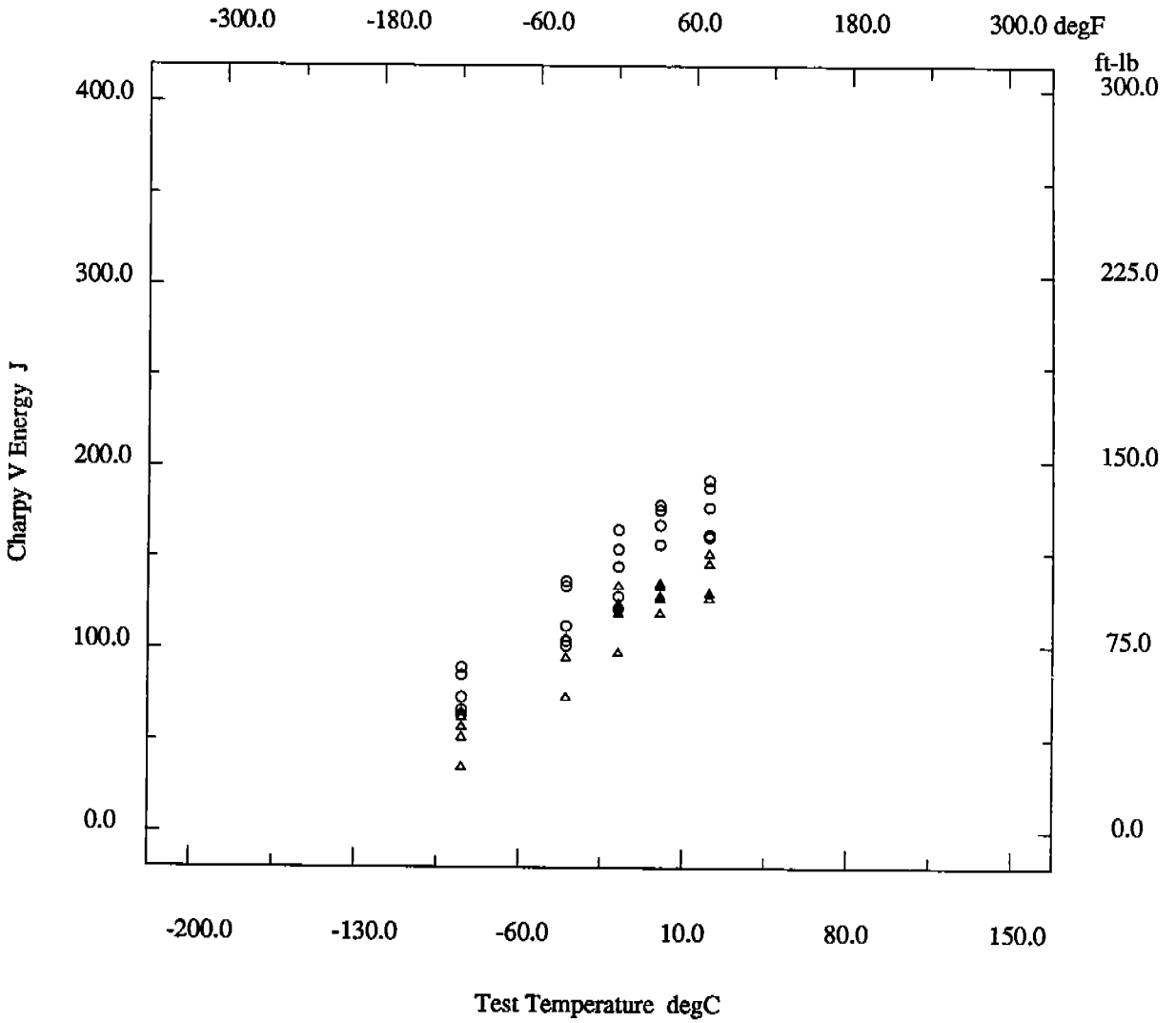
Orien	Test Temp degF	CVN Energy ft-lb
T-L △	-40	70
T-L △	-40	78
T-L △	0	72
T-L △	0	88
T-L △	0	90
T-L △	0	92
T-L △	0	99
T-L △	32	100
T-L △	32	88
T-L △	32	94
T-L △	32	95
T-L △	32	99
T-L △	70	108
T-L △	70	112
T-L △	70	112
T-L △	70	94
T-L △	70	96

* - not reported

Material HY80

Description

Material Code	001.007.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	6.5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8601-5
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.007.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	6.5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8601-5
Reference	USN-1		

Composition See Page 17100.1

Fabrication History See Page 17100.1

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	111.3	97.6	*	24	71.0

* - not reported

Material HY80

Description

Material Code	001.007.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	6.5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8601-5
Reference	USN-1		

Composition See Page 17100.1

Fabrication History See Page 17100.1

Property Measurements

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

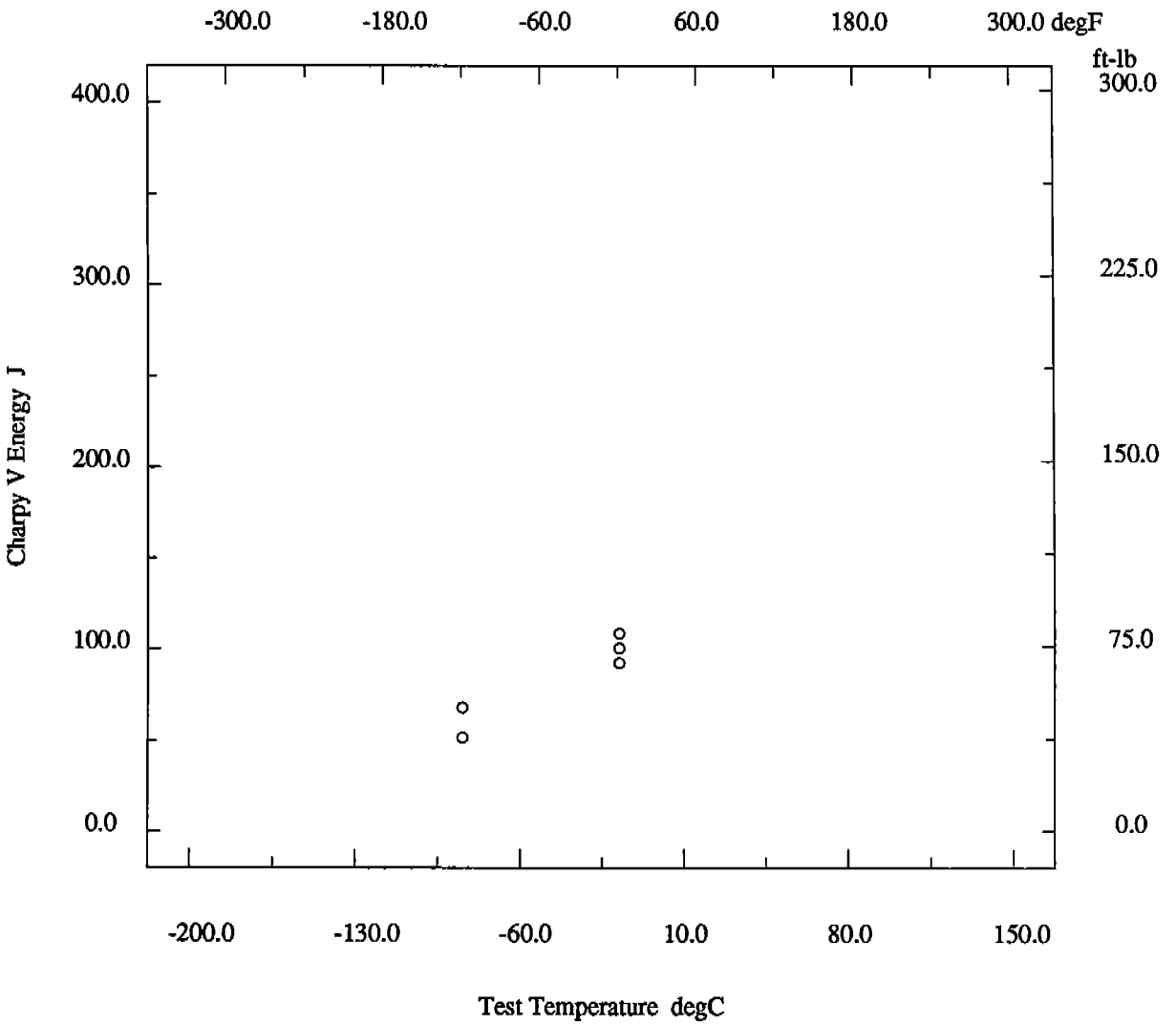
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	38
T-L °	-120	38
T-L °	-120	50
T-L °	0	68
T-L °	0	74
T-L °	0	80

* - not reported

Material HY80

Description

Material Code	001.007.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	6.5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8601-5
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.007.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	6.5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8601-5
Reference	USN-1		

Composition See Page 17100.1

Fabrication History See Page 17100.1

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	110.8	95.3	*	22	68.5

* - not reported

Material HY80

Description

Material Code	001.007.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	6.5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8601-5
Reference	USN-1		

Composition See Page 17100.1

Fabrication History See Page 17100.1

Property Measurements

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

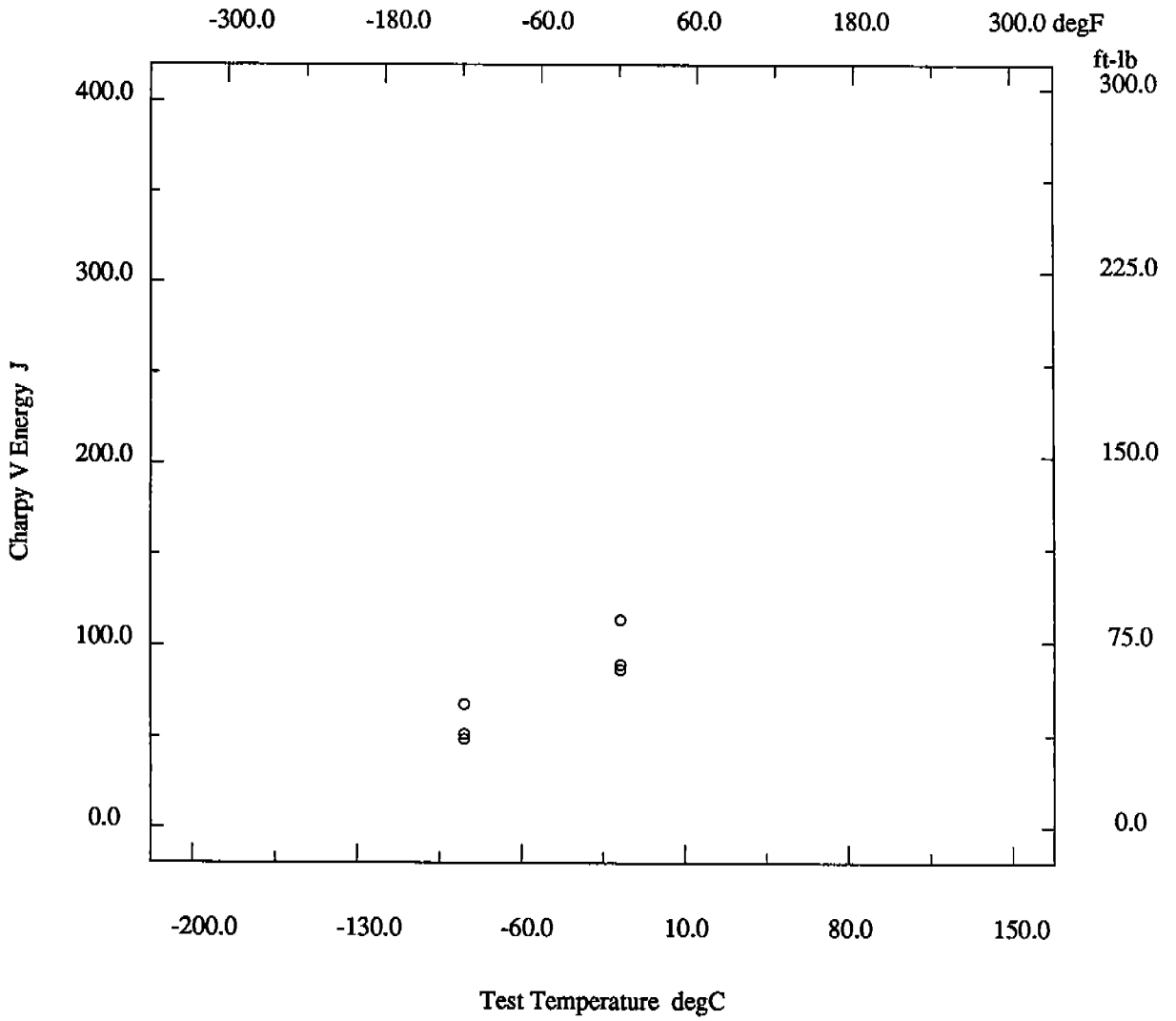
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	36
T-L °	-120	38
T-L °	-120	50
T-L °	0	64
T-L °	0	66
T-L °	0	84

* - not reported

Material HY80

Description

Material Code	001.007.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	6.5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8601-5
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.007.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	6.5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8601-5
Reference	USN-1		

Composition

See Page 17100.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Bottom	Killing Process	*
Process Temperature	1650 degF	Process Time	6.5 hr
Rolling Conditions	81 %	Final Processing	A,Q,T
Final Temperature	1180 degF	Final Time	6.5 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	105.5	86.7	*	21	64.5

* - not reported

Material HY80

Description

Material Code	001.007.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	6.5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8601-5
Reference	USN-1		

Composition

See Page 17100.1

Fabrication History

See Page 17100.11

Property Measurements

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

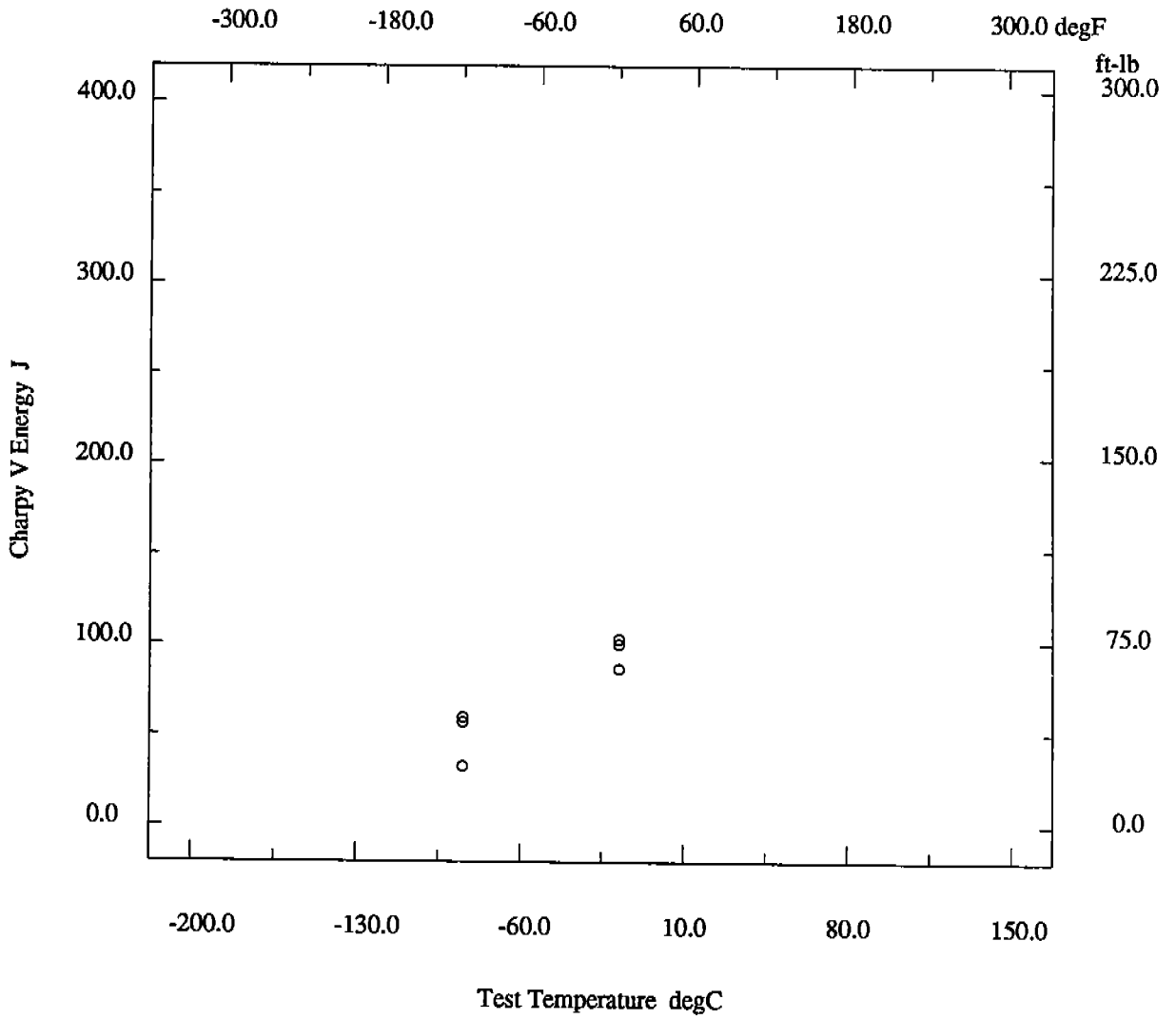
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	24
T-L °	-120	42
T-L °	-120	44
T-L °	0	64
T-L °	0	74
T-L °	0	76

* - not reported

Material HY80

Description

Material Code	001.007.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	6.5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8601-5
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.007.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	6.5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8601-5
Reference	USN-1		

Composition See Page 17100.1

Fabrication History See Page 17100.11

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	103.0	84.2	*	22	67.0

* - not reported

Material HY80

Description

Material Code	001.007.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	6.5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8601-5
Reference	USN-1		

Composition

See Page 17100.1

Fabrication History

See Page 17100.11

Property Measurements

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

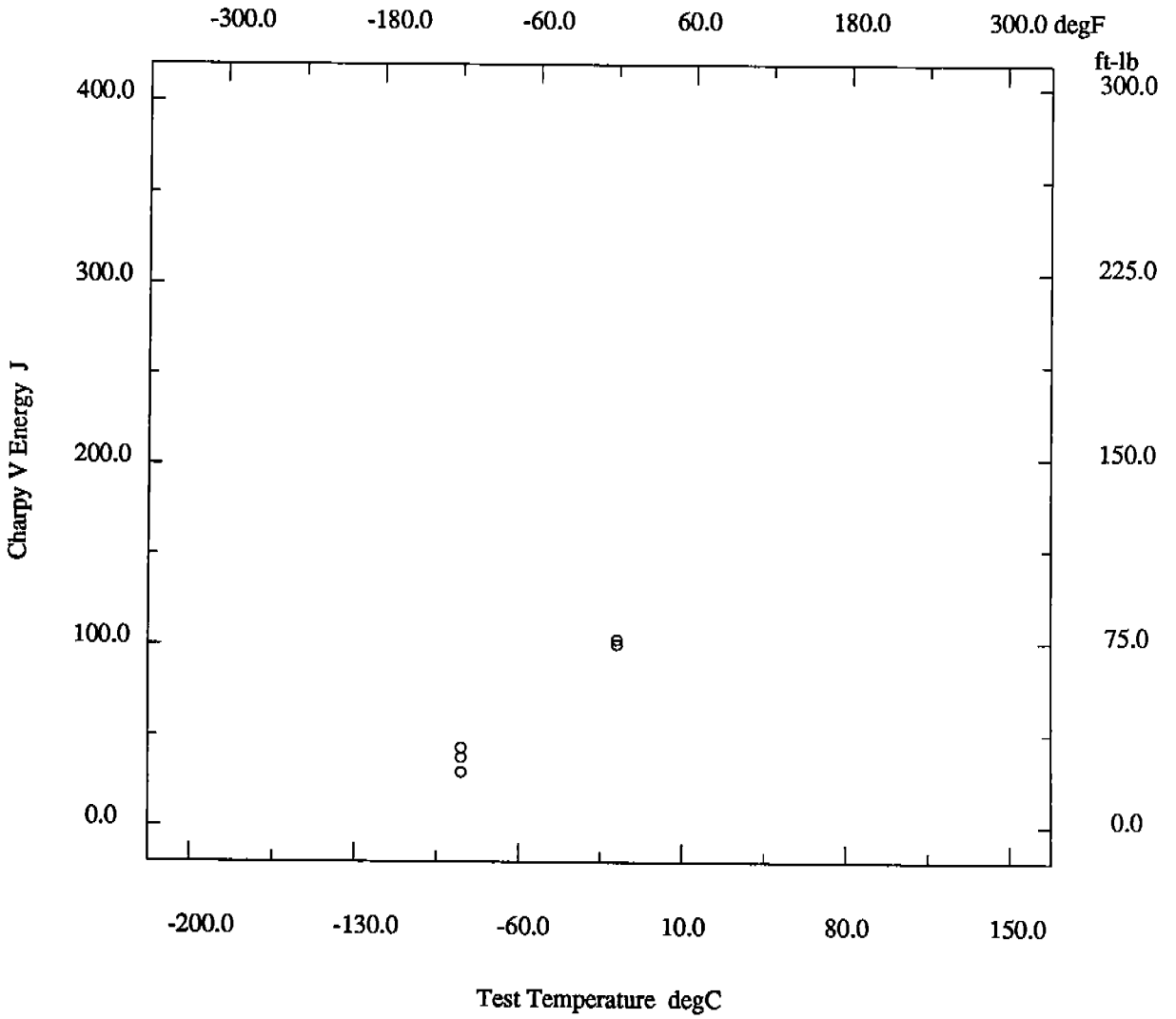
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	22
T-L °	-120	28
T-L °	-120	32
T-L °	0	74
T-L °	0	76
T-L °	0	76

* - not reported

Material HY80

Description

Material Code	001.007.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	6.5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8601-5
Reference	USN-1		



* - not reported

120

Material HY80

Description

Material Code	001.007.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	6.5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8601-5
Reference	USN-1		

Composition

See Page 17100.1

Fabrication History

See Page 17100.11

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	110.8	95.9	*	23	70.8

* - not reported

Material HY80

Description

Material Code	001.007.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	6.5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8601-5
Reference	USN-1		

Composition

See Page 17100.1

Fabrication History

See Page 17100.11

Property Measurements

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

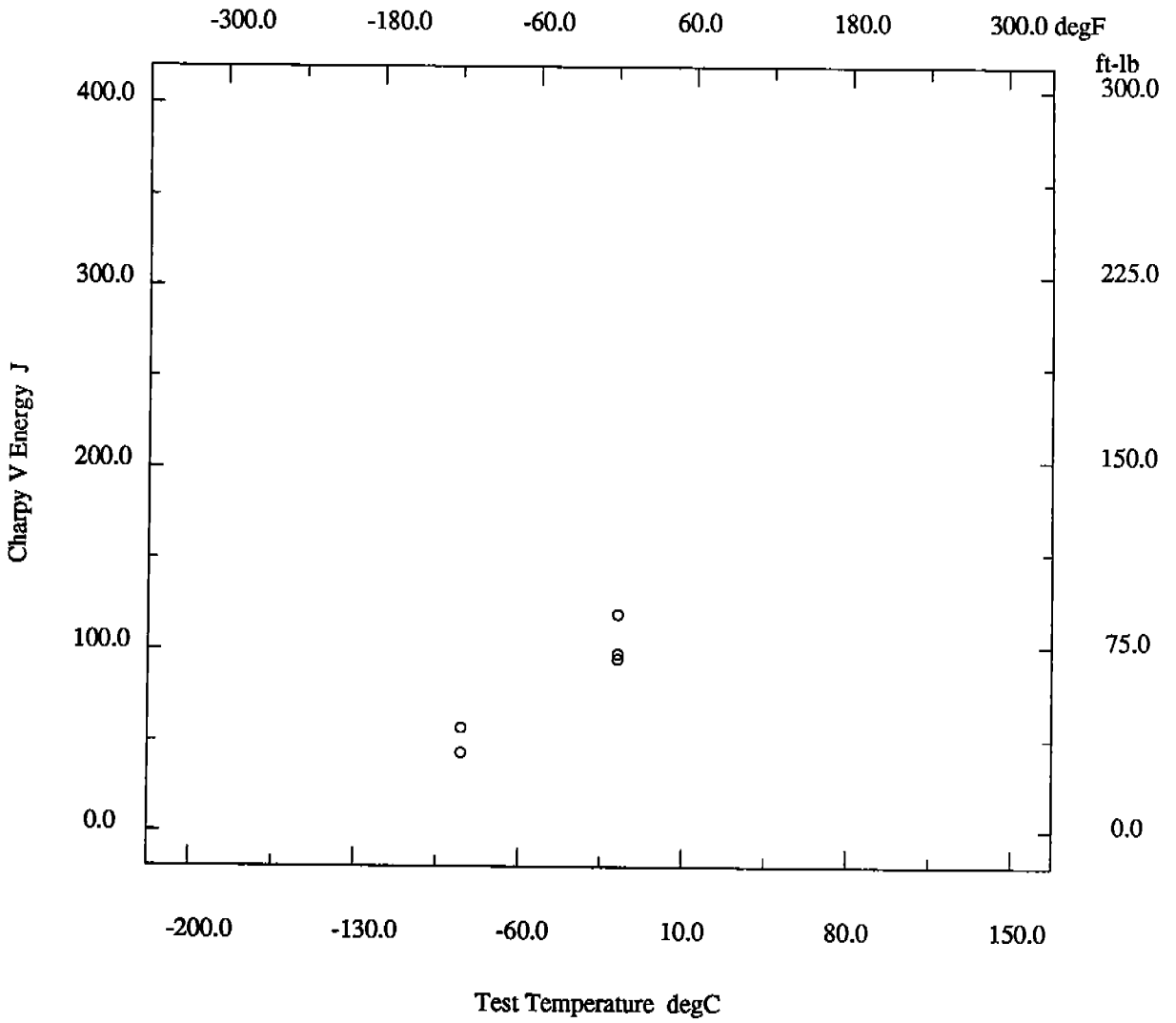
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	32
T-L °	-120	32
T-L °	-120	42
T-L °	0	70
T-L °	0	72
T-L °	0	88

* - not reported

Material HY80

Description

Material Code	001.007.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	6.5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8601-5
Reference	USN-1		



* - not reported

123
124x

Material HY80

Description

Material Code	001.008.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition

C	0.16 %	Mn	0.27 %
P	0.007 %	S	0.007 %
Si	0.24 %	Cr	1.48 %
Ni	2.83 %	Mo	0.40 %
V	0.01 %	Cu	0.11 %
Cb	*	Ti	0.003 %
B	*	Al	0.039 %
N	*	Other Components	As=0.008;Sn=0.009;Sb=0.003 %

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Top	Killing Process	*
Process Temperature	1650 degF	Process Time	6.03 hr
Rolling Conditions	85 %	Final Processing	A,Q,T
Final Temperature	1200 degF	Final Time	5 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	100.0	85.3	*	23	70.9

* - not reported

Material HY80

Description

Material Code	001.008.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition See Page 17200.1

Fabrication History See Page 17200.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
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 ○	-120	110
L-T ○	-120	116
L-T ○	-120	116
L-T ○	-120	92
L-T ○	-120	93
L-T ○	-40	140
L-T ○	-40	144
L-T ○	-40	156
L-T ○	-40	158
L-T ○	-40	160
L-T ○	0	147
L-T ○	0	155
L-T ○	0	156
L-T ○	0	160
L-T ○	0	170
L-T ○	32	153
L-T ○	32	159
L-T ○	32	162
L-T ○	32	164
L-T ○	32	166
L-T ○	70	146
L-T ○	70	150
L-T ○	70	156
L-T ○	70	158
L-T ○	70	162
T-L △	-120	86
T-L △	-120	86
T-L △	-120	91
T-L △	-120	95
T-L △	-120	96
T-L △	-40	118
T-L △	-40	120
T-L △	-40	121

(continued)

* - not reported

Material HY80

(continued)

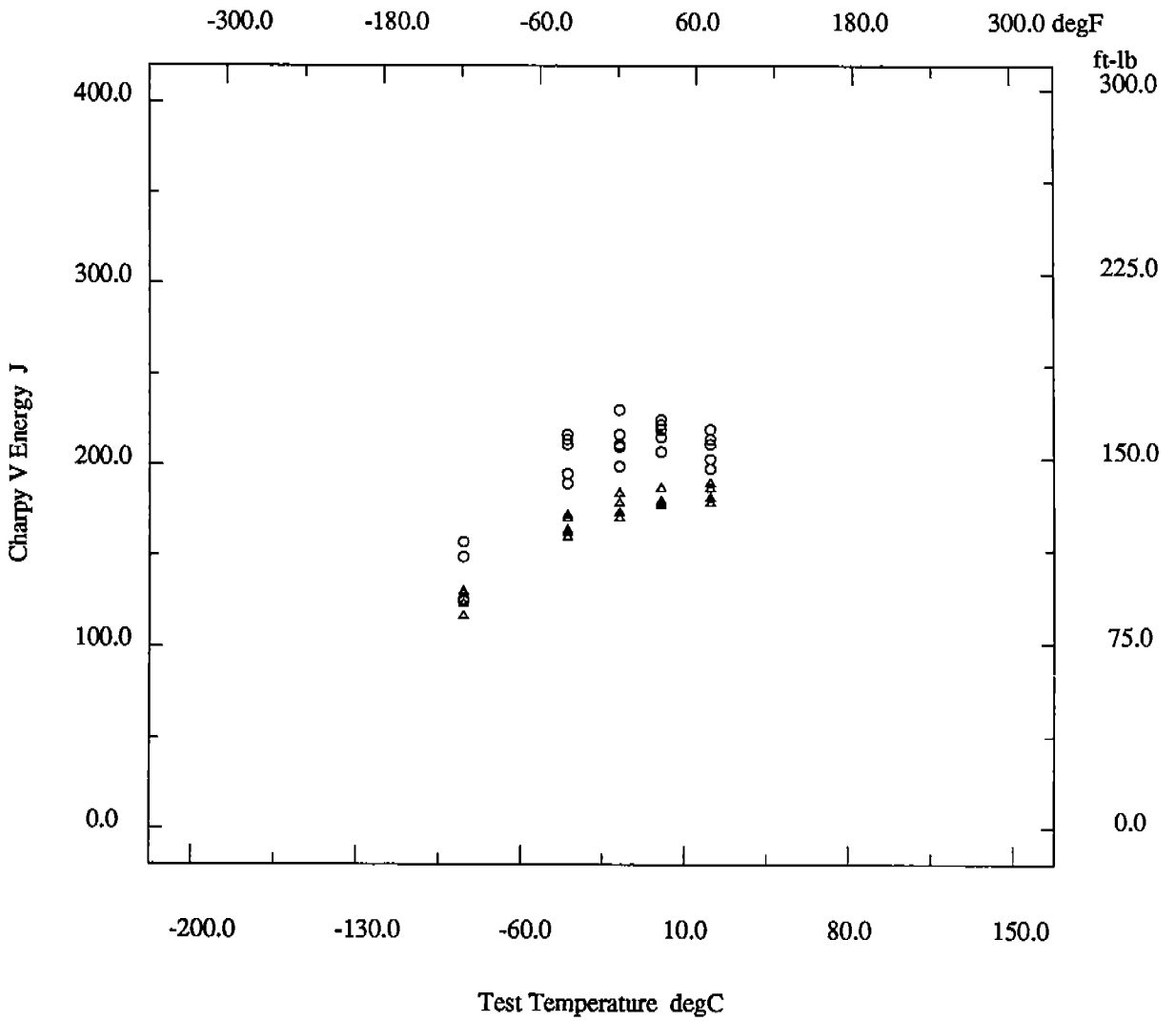
Orien	Test Temp degF	CVN Energy ft-lb
T-L △	-40	126
T-L △	-40	127
T-L △	0	126
T-L △	0	126
T-L △	0	128
T-L △	0	132
T-L △	0	136
T-L △	32	131
T-L △	32	132
T-L △	32	133
T-L △	32	138
T-L △	32	138
T-L △	70	132
T-L △	70	132
T-L △	70	134
T-L △	70	138
T-L △	70	140

* - not reported

Material HY80

Description

Material Code	001.008.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.008.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition See Page 17200.1

Fabrication History See Page 17200.1

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	*

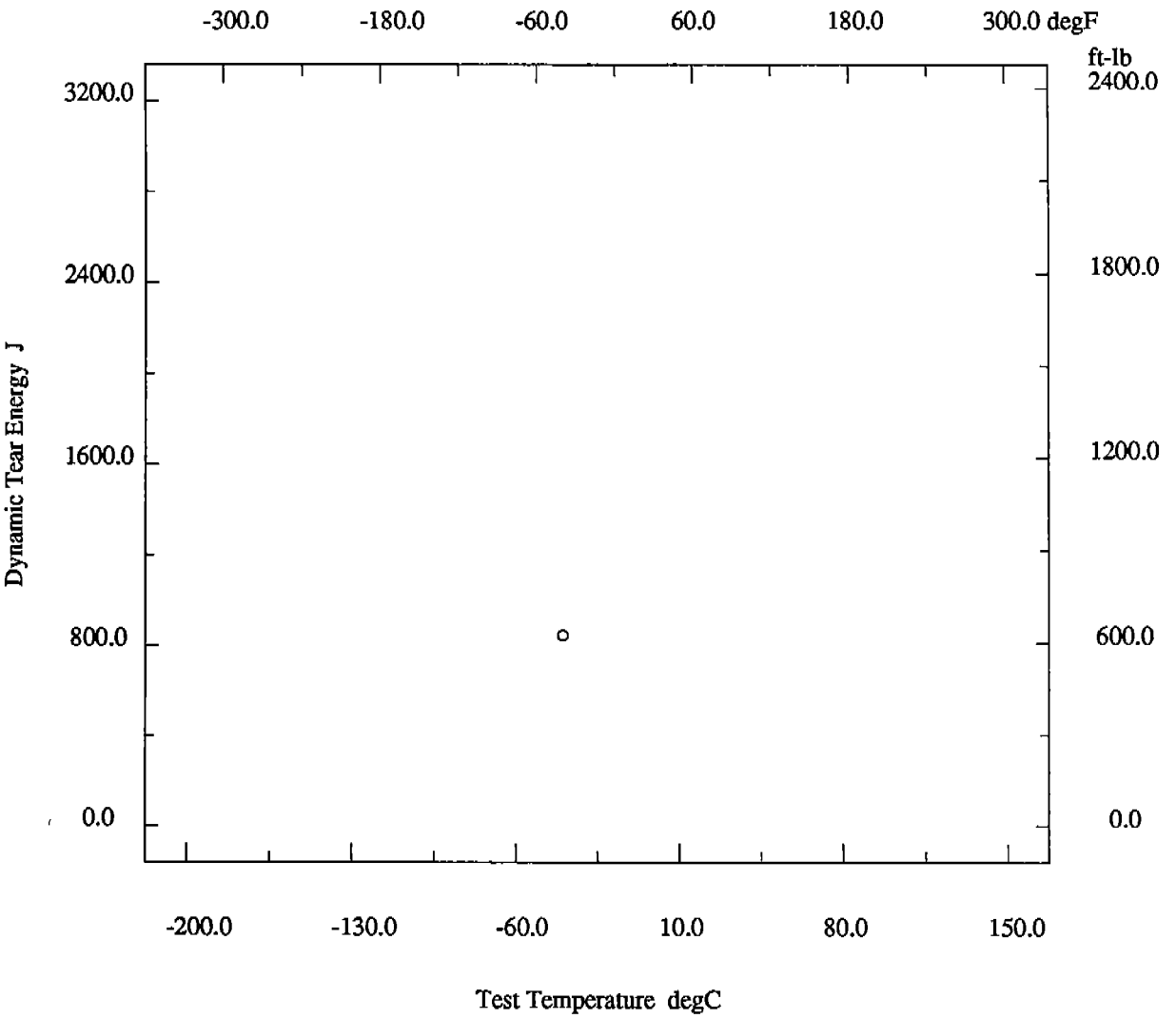
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L °	-40	625	*

* - not reported

Material HY80

Description

Material Code	001.008.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.008.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition

See Page 17200.1

Fabrication History

See Page 17200.1

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	99.0	80.1	*	25	71.8

* - not reported

Material HY80

Description

Material Code	001.008.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition See Page 17200.1

Fabrication History See Page 17200.1

Property Measurements

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

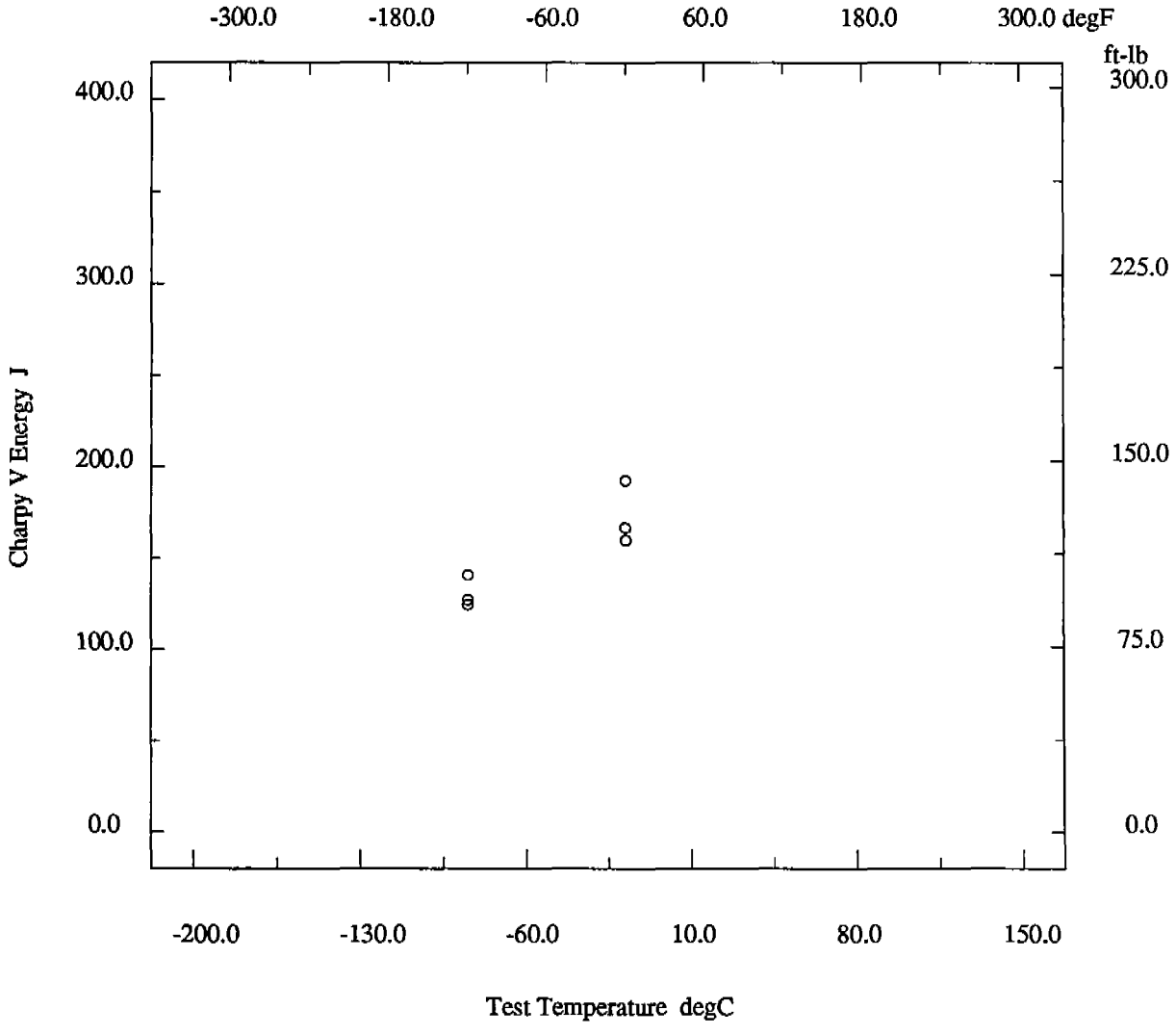
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	104
T-L °	-120	92
T-L °	-120	94
T-L °	0	118
T-L °	0	123
T-L °	0	142

* - not reported

Material HY80

Description

Material Code	001.008.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.008.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition

See Page 17200.1

Fabrication History

See Page 17200.1

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	*

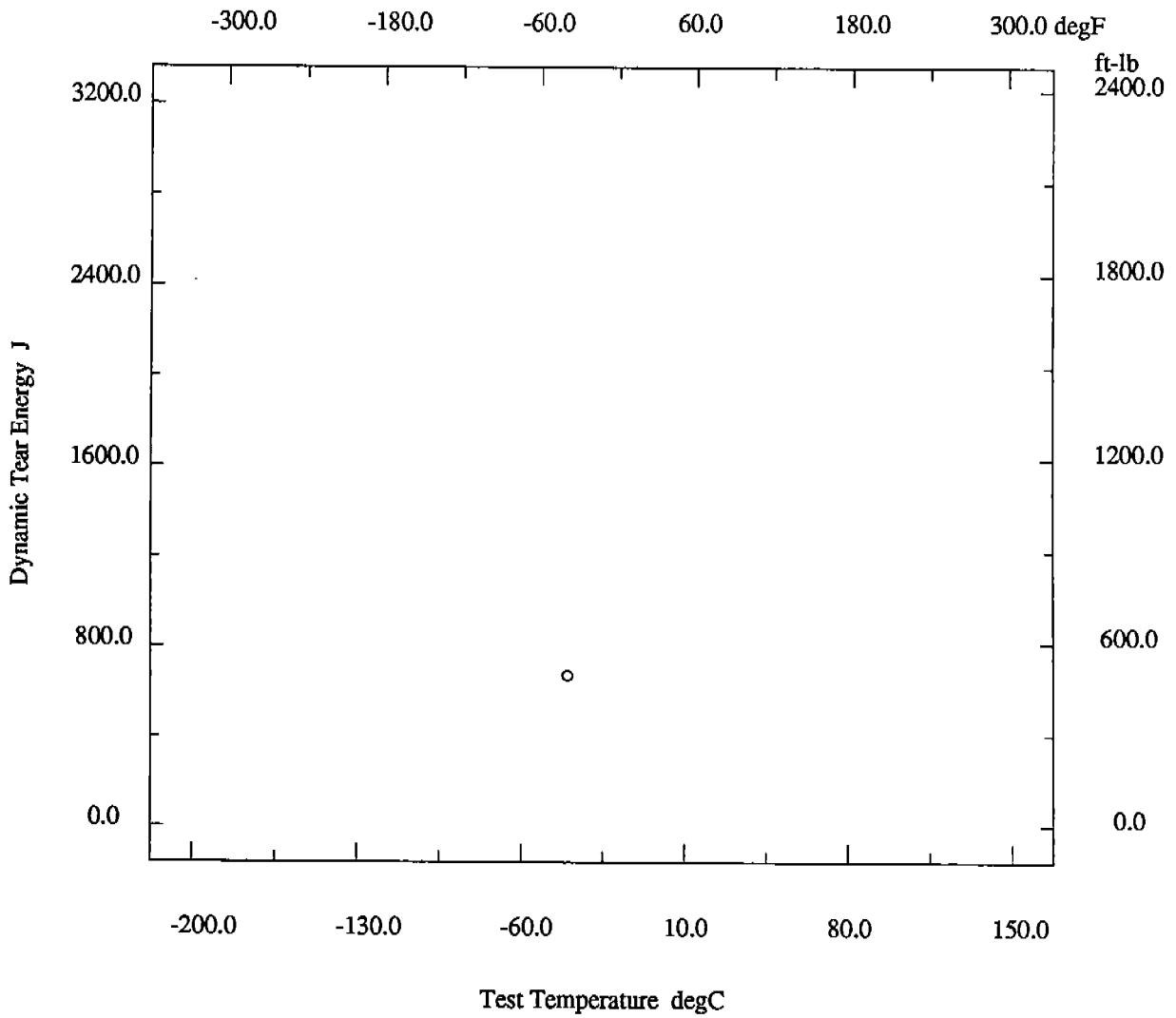
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L °	-40	495	*

* - not reported

Material HY80

Description

Material Code	001.008.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.008.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition

See Page 17200.1

Fabrication History

See Page 17200.1

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	99.0	80.2	*	25	72.8

* - not reported

Material HY80

Description

Material Code	001.008.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition See Page 17200.1

Fabrication History See Page 17200.1

Property Measurements

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

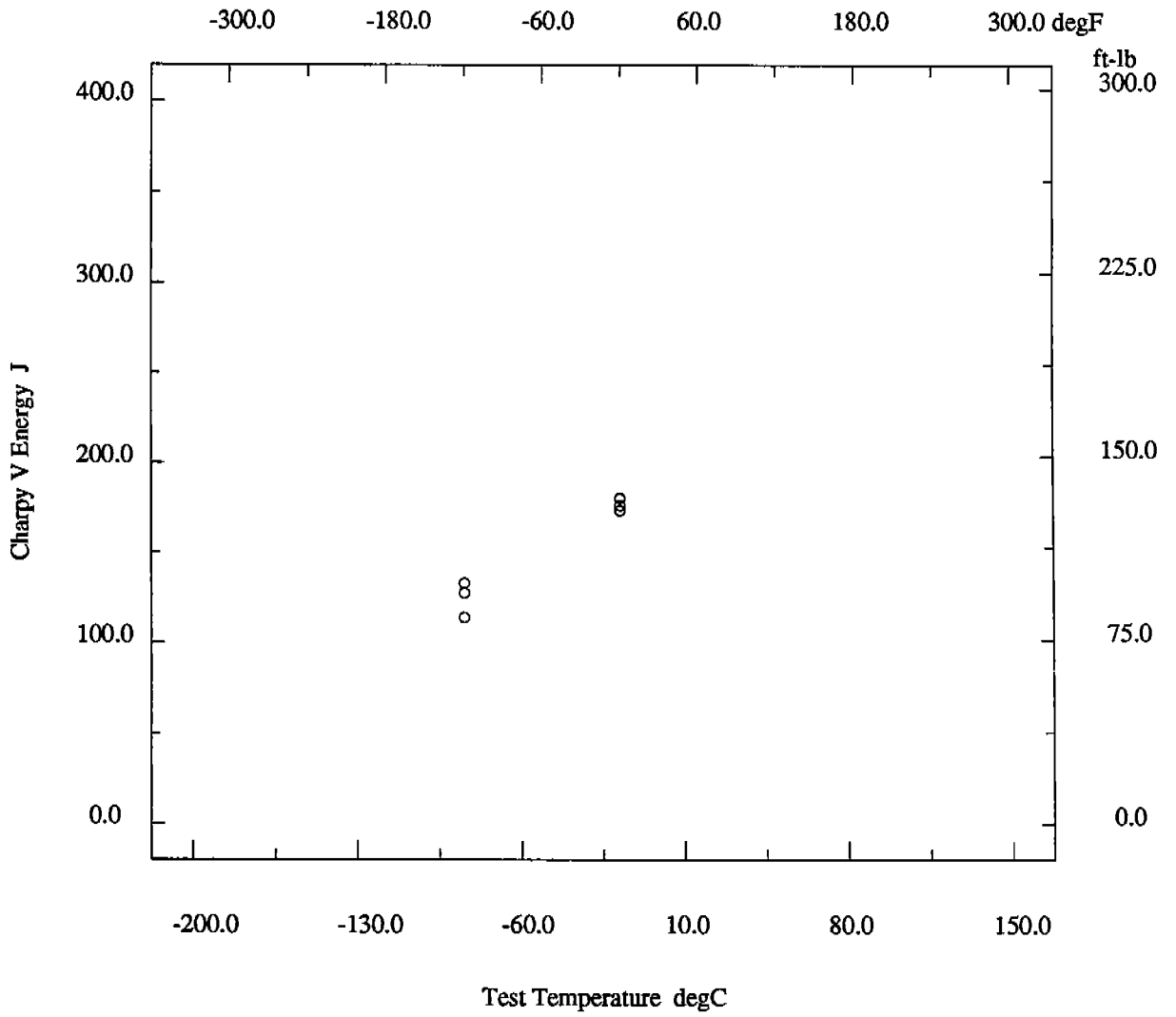
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	84
T-L °	-120	94
T-L °	-120	98
T-L °	0	128
T-L °	0	130
T-L °	0	133

* - not reported

Material HY80

Description

Material Code	001.008.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.008.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition

See Page 17200.1

Fabrication History

See Page 17200.1

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	*

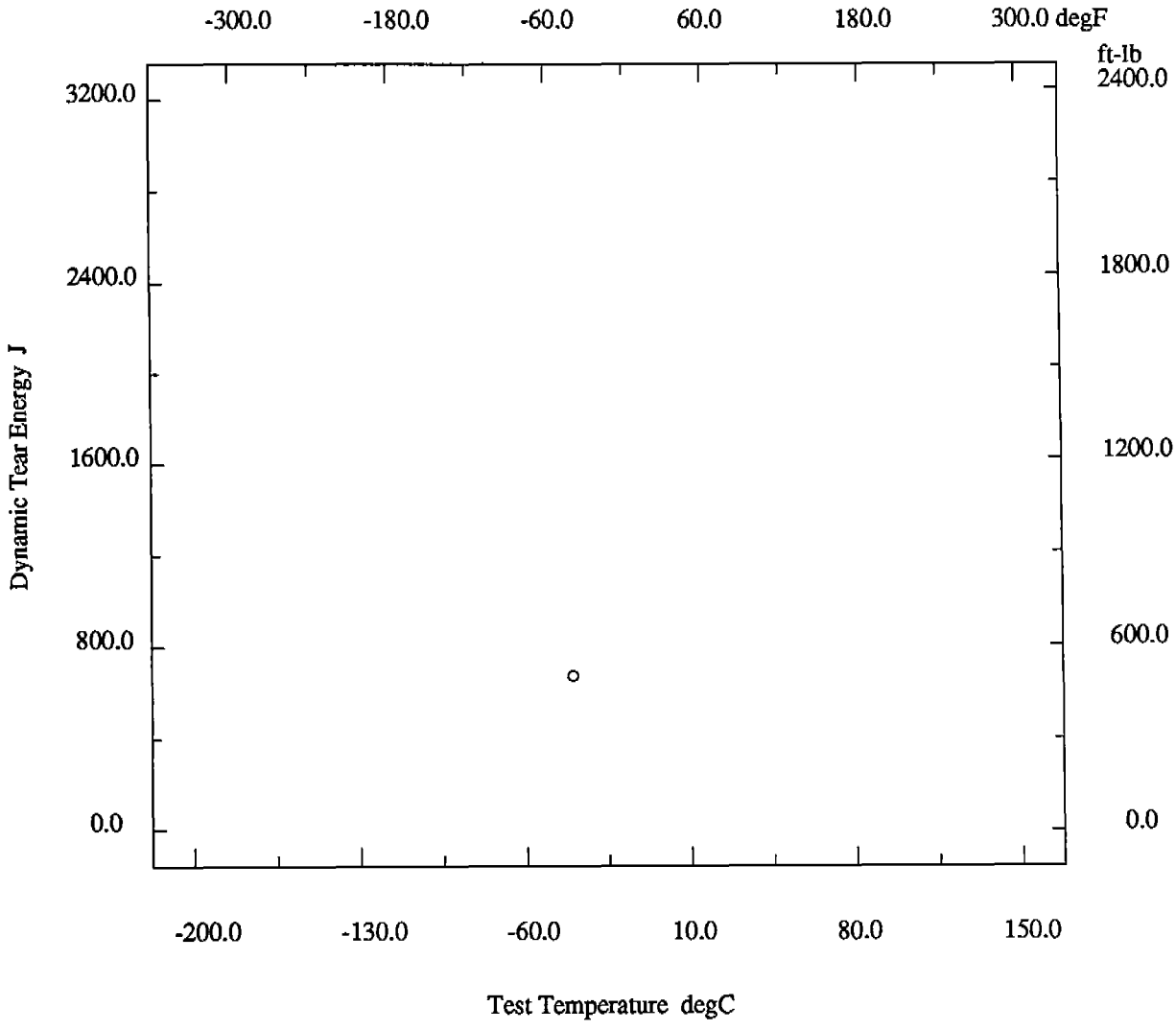
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L ○	-40	500	*

* - not reported

Material HY80

Description

Material Code	001.008.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.008.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition

See Page 17200.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Mid	Killing Process	*
Process Temperature	1650 degF	Process Time	6.03 hr
Rolling Conditions	85 %	Final Processing	A,Q,T
Final Temperature	1200 degF	Final Time	5 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	107.5	91.3	*	24	73.5

* - not reported

Material HY80

Description

Material Code	001.008.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition

See Page 17200.1

Fabrication History

See Page 17200.17

Property Measurements

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

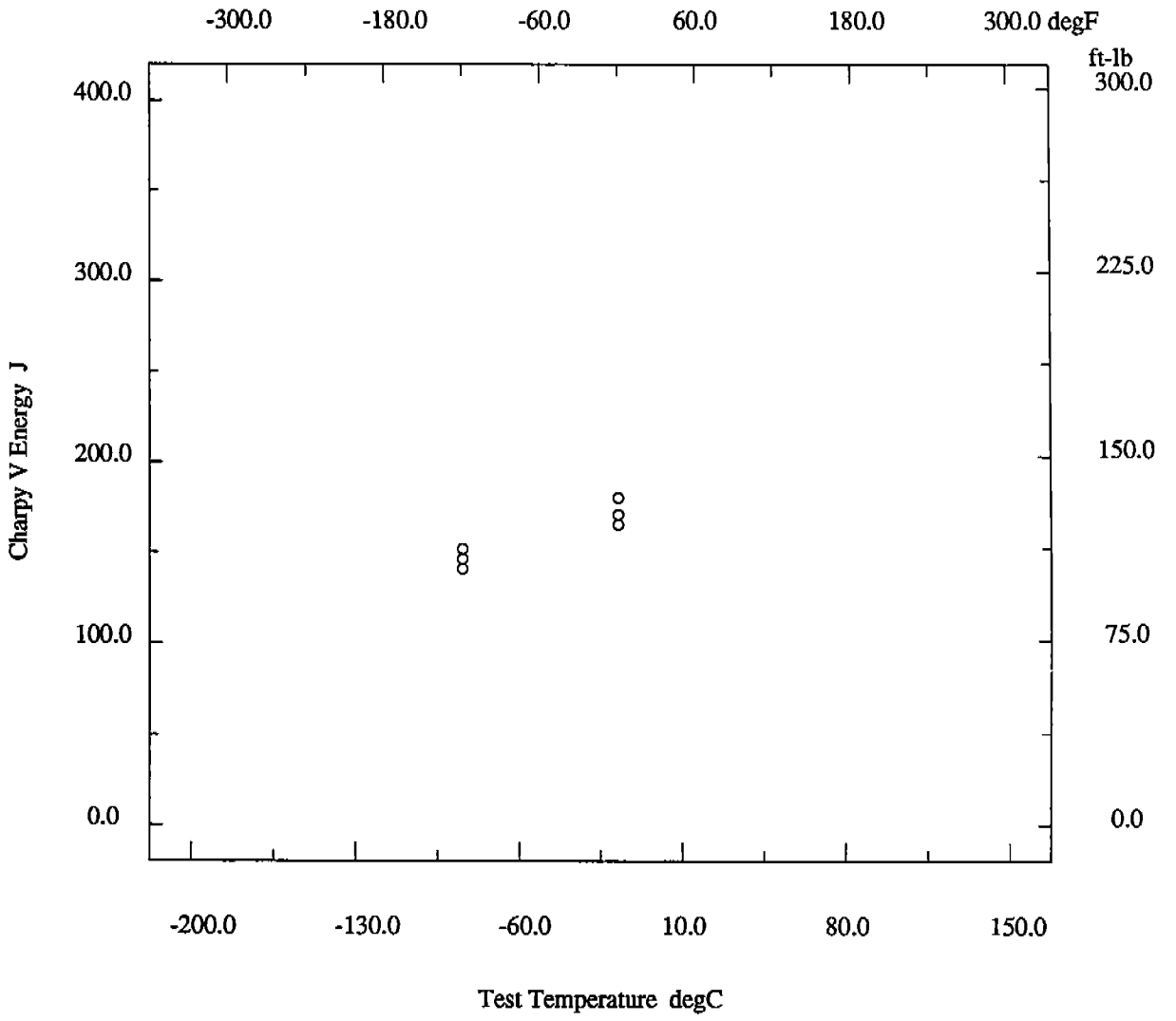
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	104
T-L °	-120	108
T-L °	-120	112
T-L °	0	122
T-L °	0	126
T-L °	0	133

* - not reported

Material HY80

Description

Material Code	001.008.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.008.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition See Page 17200.1

Fabrication History See Page 17200.17

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	*

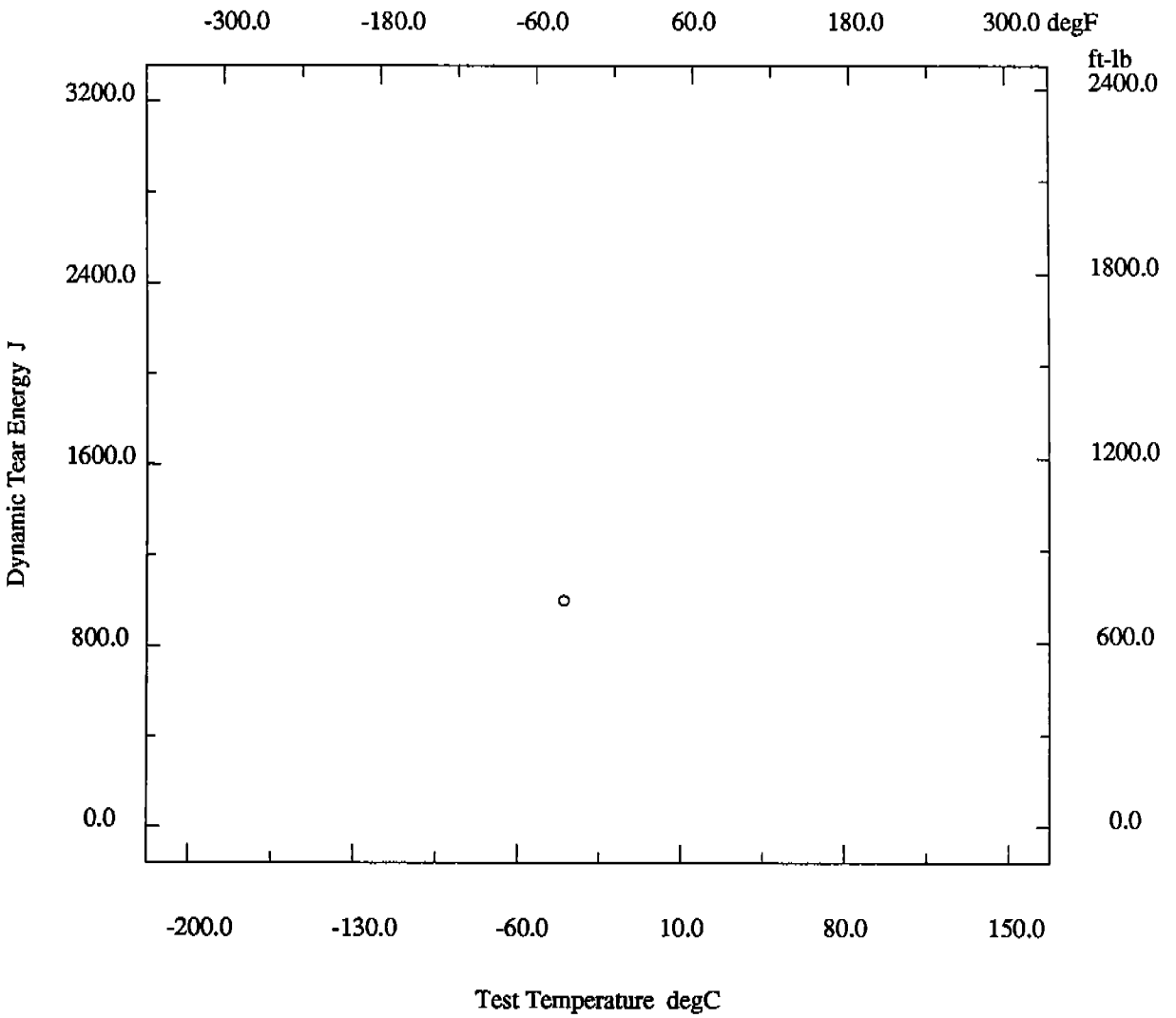
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L °	-40	740	*

* - not reported

Material HY80

Description

Material Code	001.008.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.008.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition

See Page 17200.1

Fabrication History

See Page 17200.17

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	104.5	88.9	*	24	73.5

* - not reported

Material HY80

Description

Material Code	001.008.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition

See Page 17200.1

Fabrication History

See Page 17200.17

Property Measurements

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

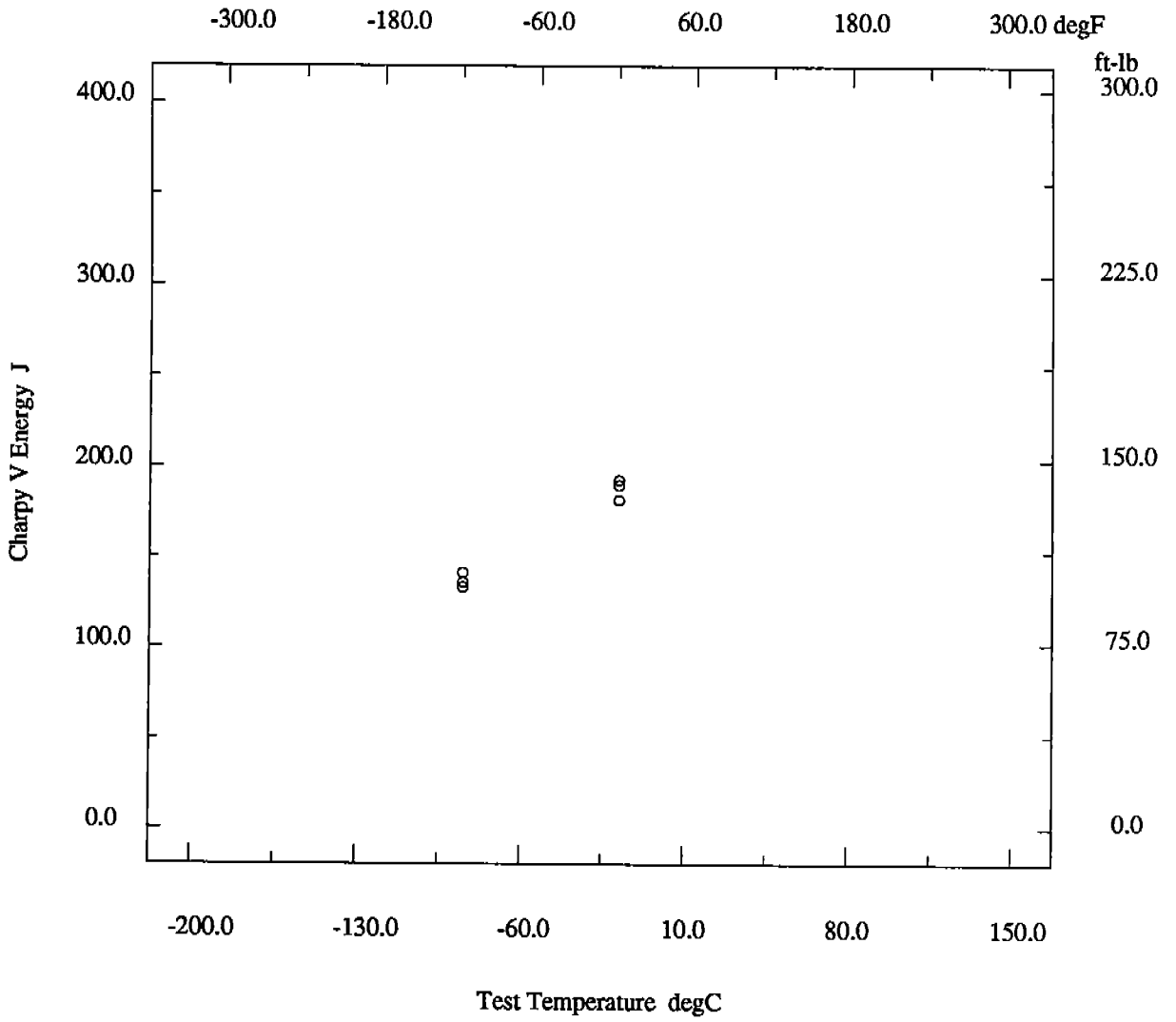
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	100
T-L °	-120	104
T-L °	-120	98
T-L °	0	134
T-L °	0	140
T-L °	0	142

* - not reported

Material HY80

Description

Material Code	001.008.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.008.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition

See Page 17200.1

Fabrication History

See Page 17200.17

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	*

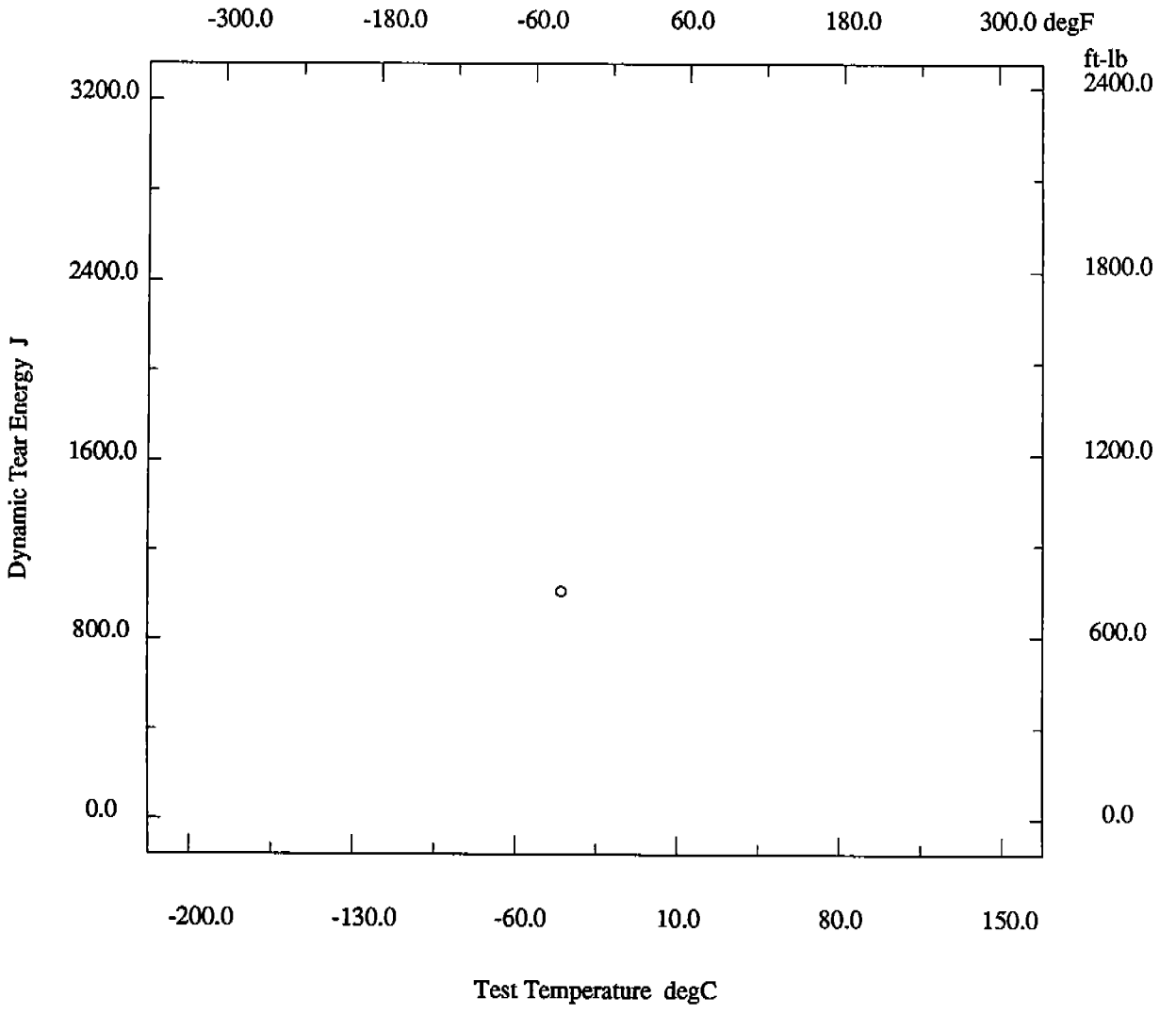
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L °	-40	750	*

* - not reported

Material HY80

Description

Material Code	001.008.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.008.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition See Page 17200.1

Fabrication History See Page 17200.17

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	102.0	83.3	*	23	70.5

* - not reported

Material HY80

Description

Material Code	001.008.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition

See Page 17200.1

Fabrication History

See Page 17200.17

Property Measurements

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

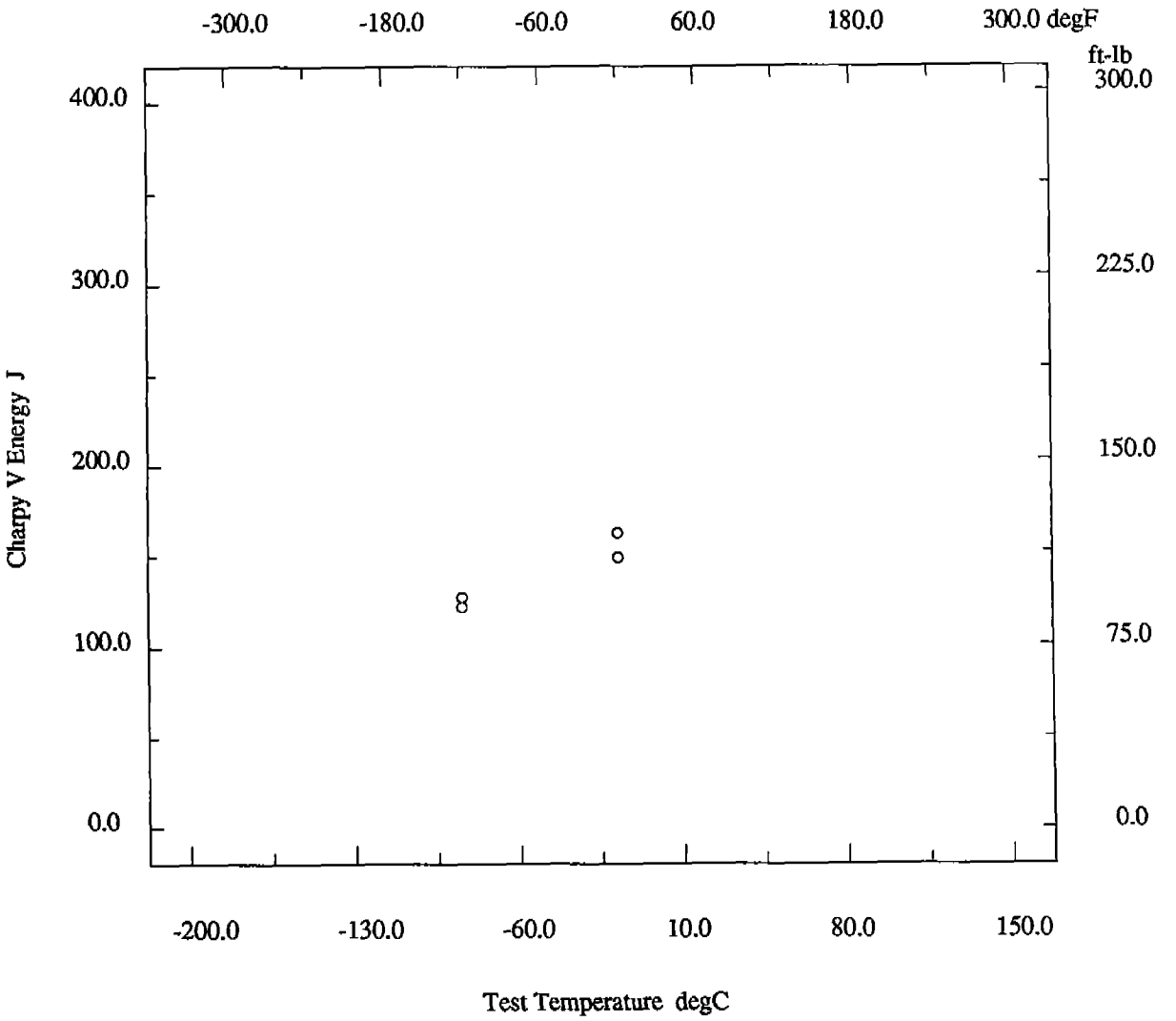
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	90
T-L °	-120	90
T-L °	-120	94
T-L °	0	110
T-L °	0	110
T-L °	0	120

* - not reported

Material HY80

Description

Material Code	001.008.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.008.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition

See Page 17200.1

Fabrication History

See Page 17200.17

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	*

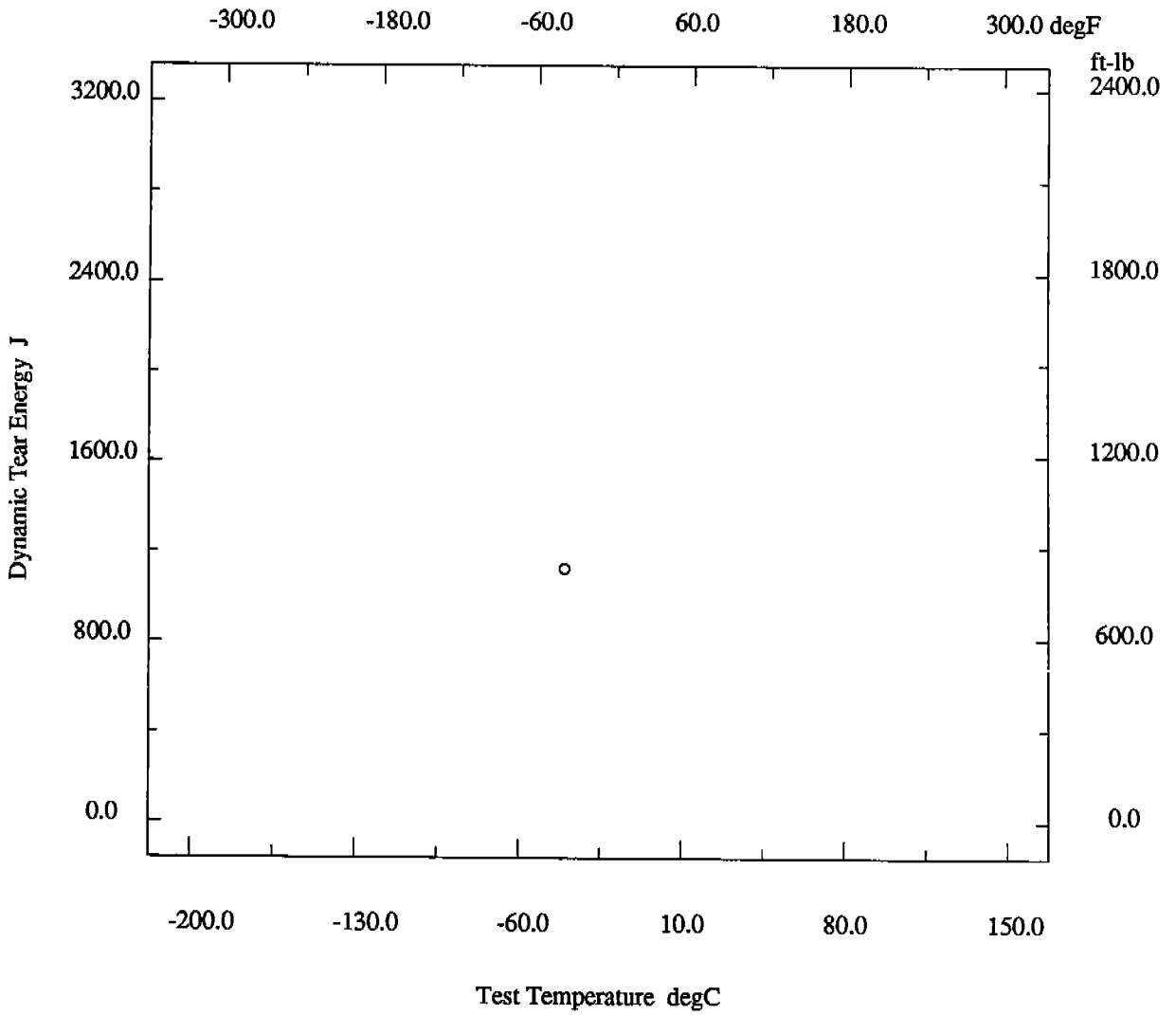
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L ○	-40	830	*

* - not reported

Material HY80

Description

Material Code	001.008.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.008.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition

See Page 17200.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Bottom	Killing Process	*
Process Temperature	1650 degF	Process Time	6.03 hr
Rolling Conditions	85 %	Final Processing	A,Q,T
Final Temperature	1200 degF	Final Time	5 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	105.0	86.5	*	23	73.6

* - not reported

Material HY80

Description

Material Code	001.008.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition

See Page 17200.1

Fabrication History

See Page 17200.32

Property Measurements

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

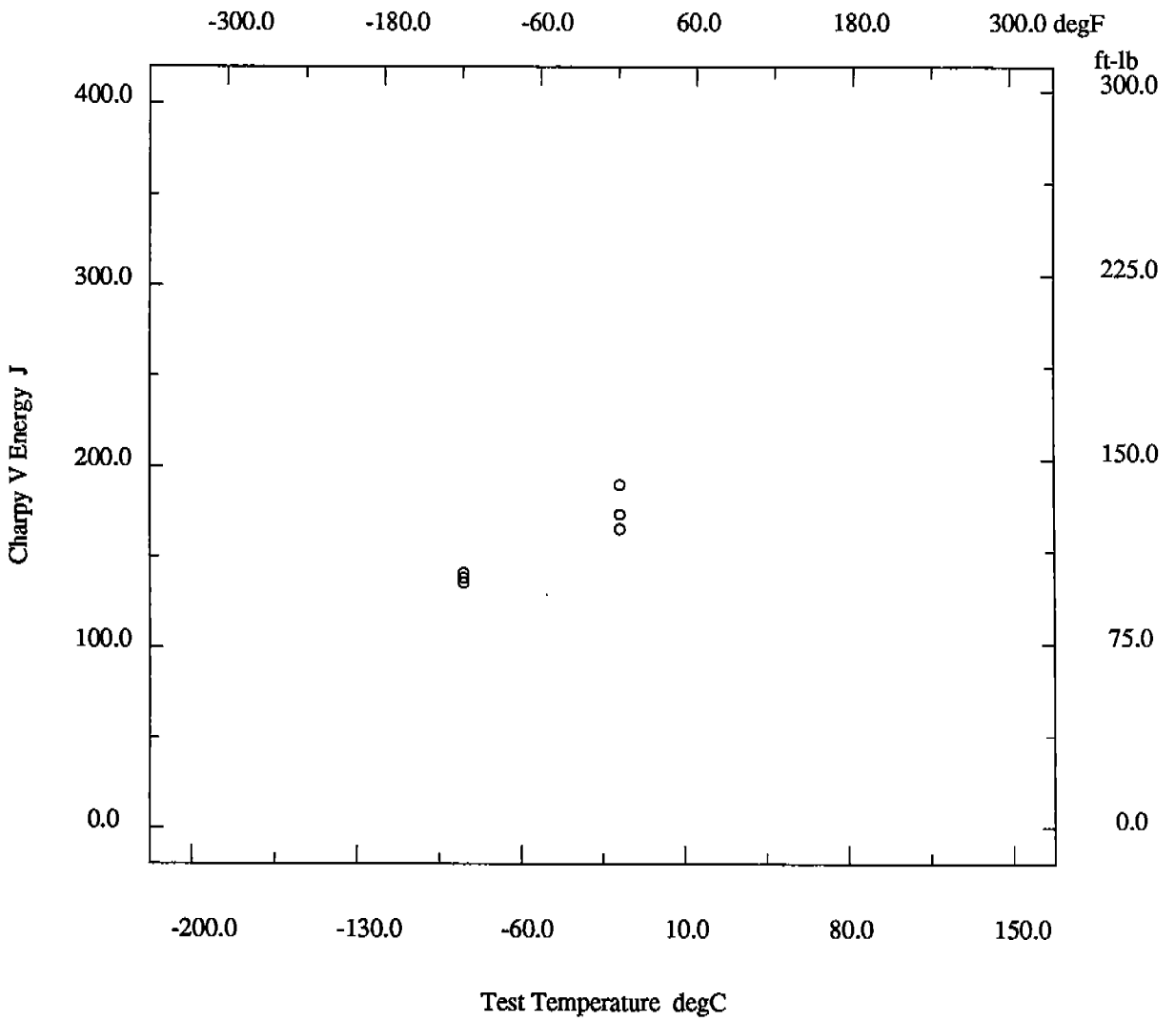
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	100
T-L °	-120	102
T-L °	-120	104
T-L °	0	122
T-L °	0	128
T-L °	0	140

* - not reported

Material HY80

Description

Material Code	001.008.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.008.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition

See Page 17200.1

Fabrication History

See Page 17200.32

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	*

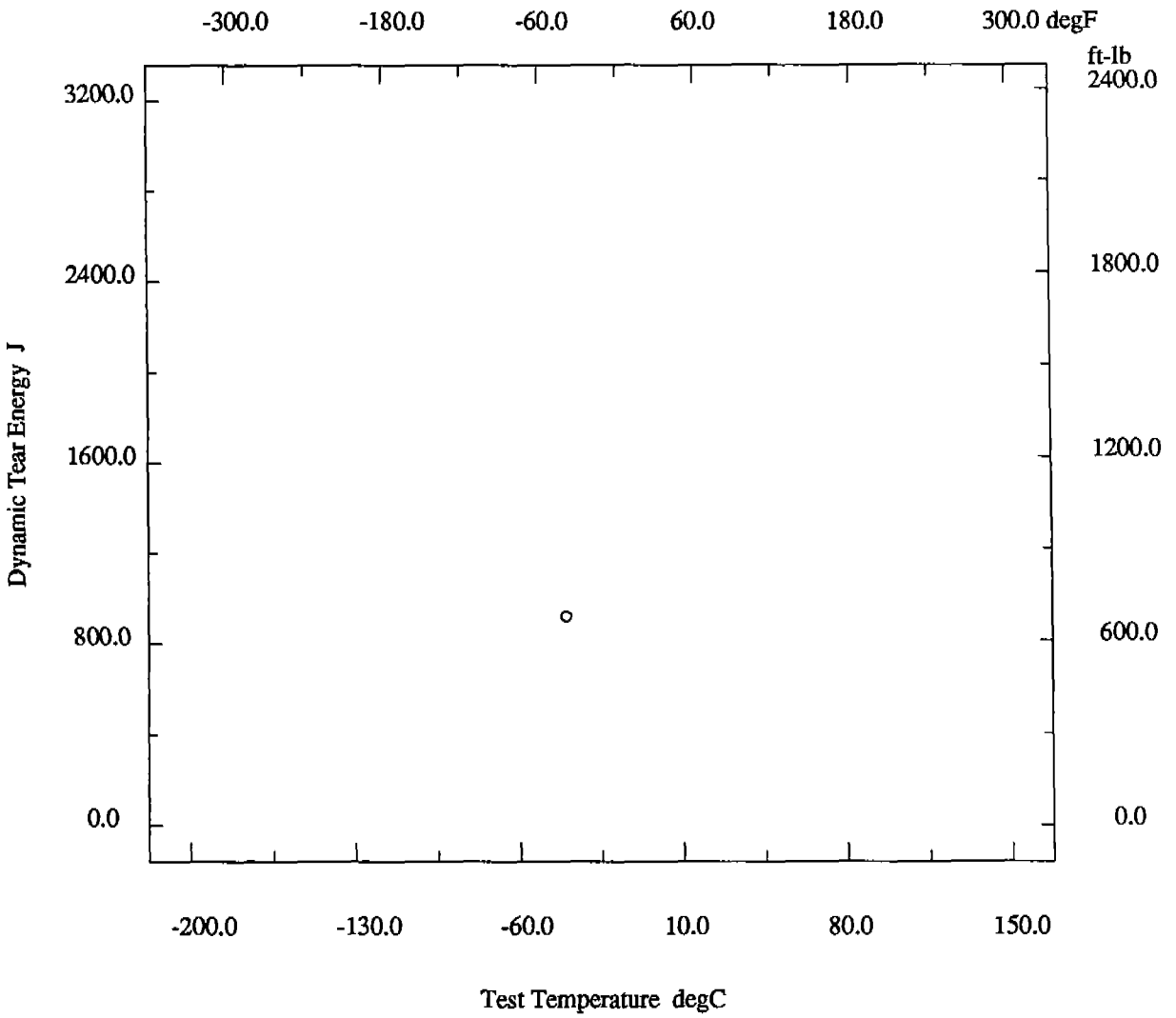
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L °	-40	680	*

* - not reported

Material HY80

Description

Material Code	001.008.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		



* - not reported

160

Material HY80

Description

Material Code	001.008.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition

See Page 17200.1

Fabrication History

See Page 17200.32

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	105.5	88.3	*	23	72.5

* - not reported

Material HY80

Description

Material Code	001.008.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition

See Page 17200.1

Fabrication History

See Page 17200.32

Property Measurements

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

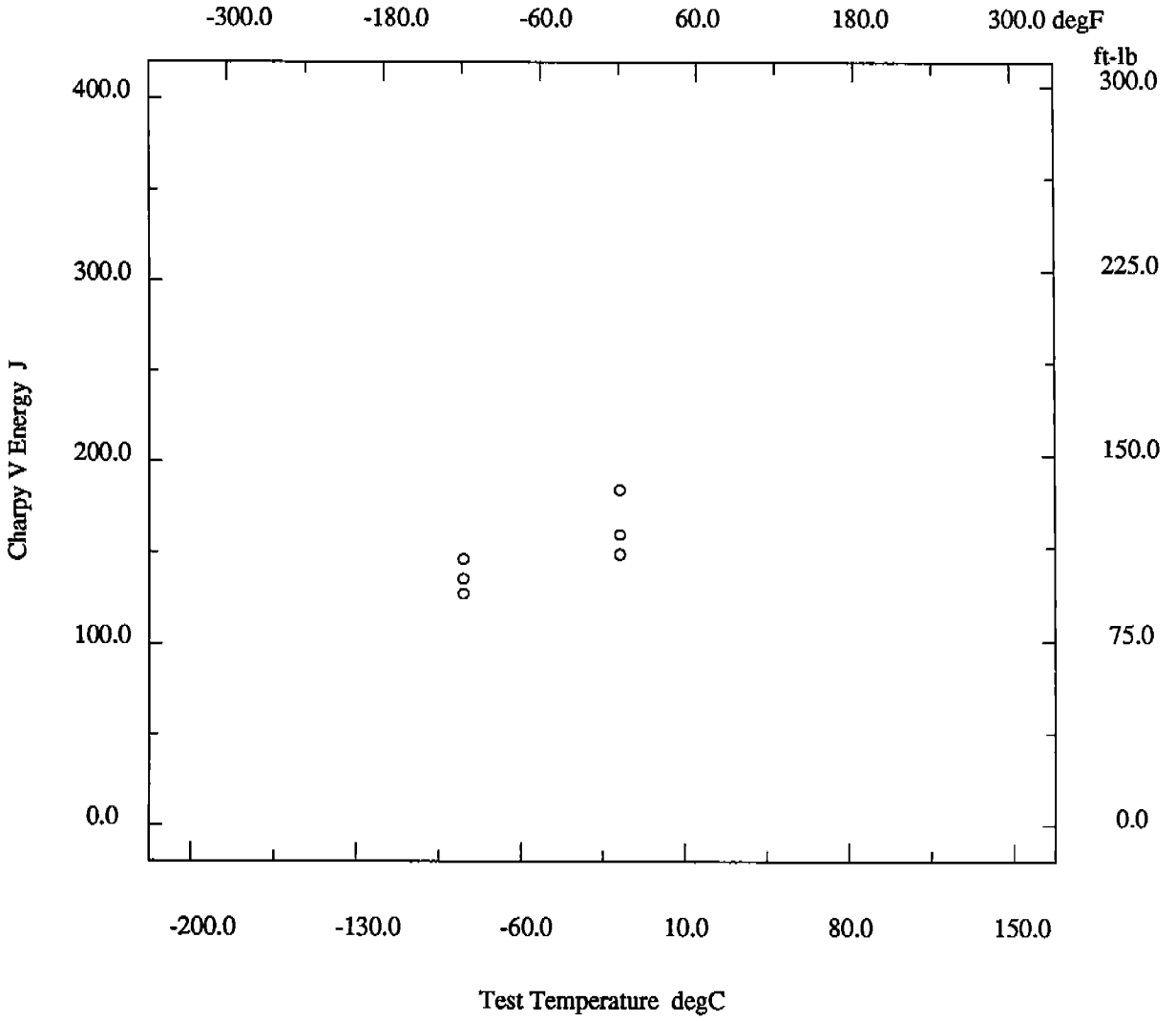
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	100
T-L °	-120	108
T-L °	-120	94
T-L °	0	110
T-L °	0	118
T-L °	0	136

* - not reported

Material HY80

Description

Material Code	001.008.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.008.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition See Page 17200.1

Fabrication History See Page 17200.32

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	*

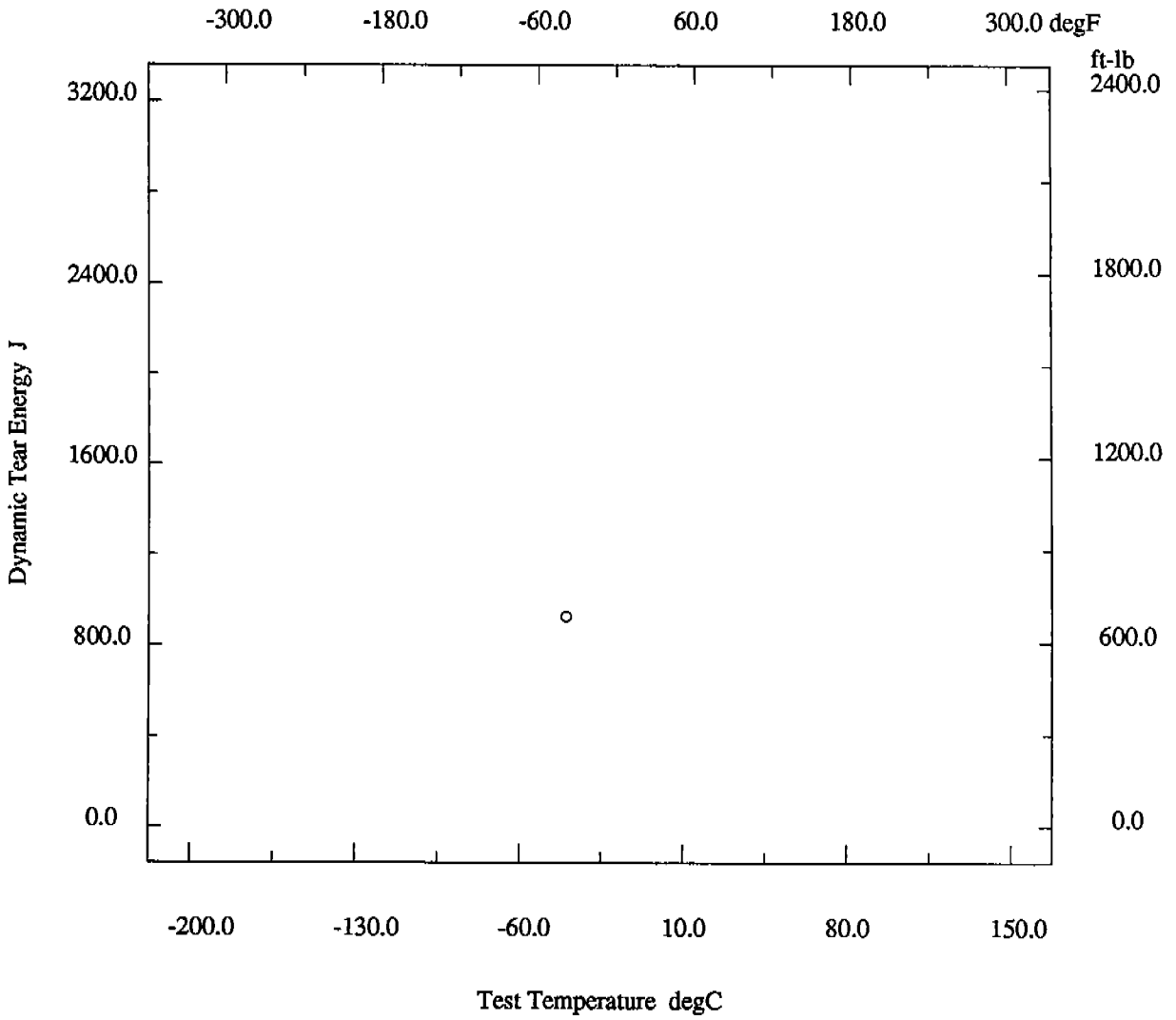
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L °	-40	685	*

* - not reported

Material HY80

Description

Material Code	001.008.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.008.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition

See Page 17200.1

Fabrication History

See Page 17200.32

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	106.0	89.1	*	23	73.4

* - not reported

Material HY80

Description

Material Code	001.008.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition

See Page 17200.1

Fabrication History

See Page 17200.32

Property Measurements

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

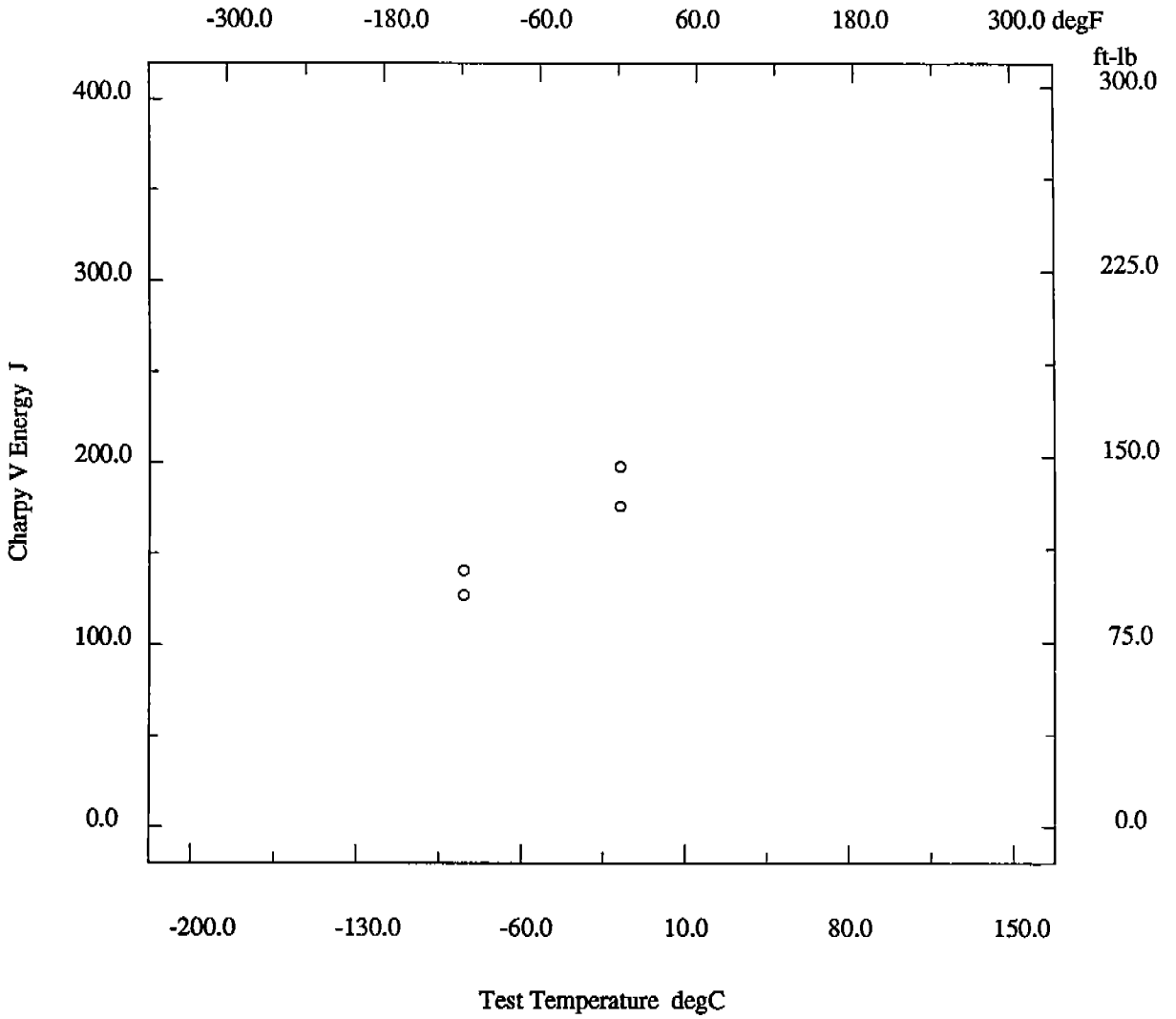
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	104
T-L °	-120	104
T-L °	-120	94
T-L °	0	130
T-L °	0	146
T-L °	0	146

* - not reported

Material HY80

Description

Material Code	001.008.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.008.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		

Composition

See Page 17200.1

Fabrication History

See Page 17200.32

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	*

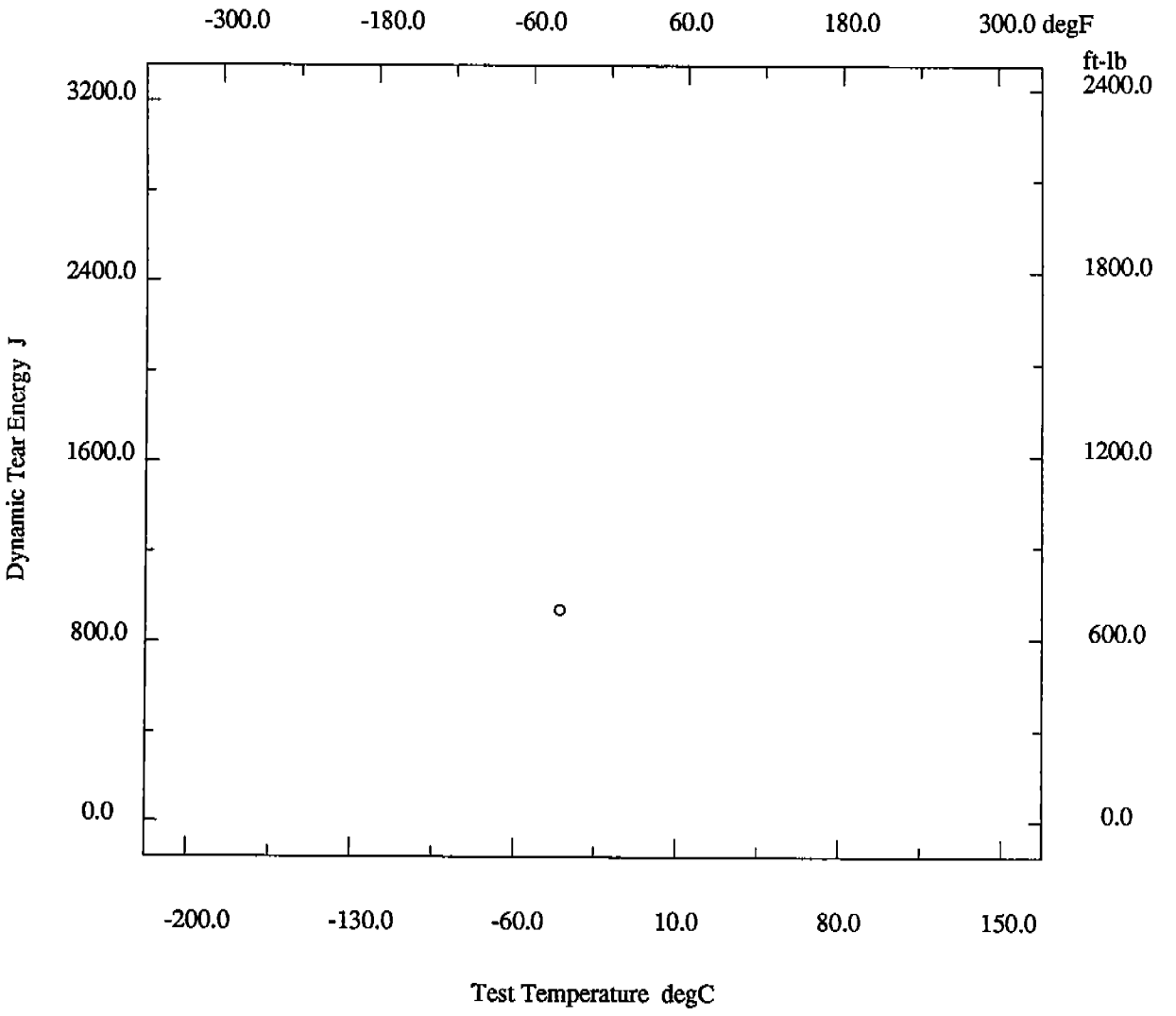
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L °	-40	695	*

* - not reported

Material HY80

Description

Material Code	001.008.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8740-2
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.009.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8563-4
Reference	USN-1		

Composition

C	0.17 %	Mn	0.35 %
P	0.012 %	S	0.01 %
Si	0.20 %	Cr	1.54 %
Ni	2.67 %	Mo	0.39 %
V	0.01 %	Cu	0.14 %
Cb	*	Ti	0.003 %
B	*	Al	0.009 %
N	*	Other Components	As=0.009;Sn=0.013;Sb=0.004 %

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Top	Killing Process	*
Process Temperature	1650 degF	Process Time	5.25 hr
Rolling Conditions	85 %	Final Processing	A,Q,T
Final Temperature	1200 degF	Final Time	6.08 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	105.0	89.2	*	23	66.8

* - not reported

Material HY80

Description

Material Code	001.009.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8563-4
Reference	USN-1		

Composition See Page 17300.1

Fabrication History See Page 17300.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
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 ○	-120	84
L-T ○	-120	88
L-T ○	-120	94
L-T ○	-120	96
L-T ○	-120	98
L-T ○	-40	122
L-T ○	-40	126
L-T ○	-40	126
L-T ○	-40	127
L-T ○	-40	128
L-T ○	0	124
L-T ○	0	125
L-T ○	0	125
L-T ○	0	138
L-T ○	0	140
L-T ○	32	136
L-T ○	32	138
L-T ○	32	140
L-T ○	32	140
L-T ○	32	142
L-T ○	70	128
L-T ○	70	130
L-T ○	70	130
L-T ○	70	130
L-T ○	70	131
T-L △	-120	50
T-L △	-120	58
T-L △	-120	68
T-L △	-120	76
T-L △	-120	80
T-L △	-40	102
T-L △	-40	104
T-L △	-40	104

(continued)

* - not reported

Material HY80

(continued)

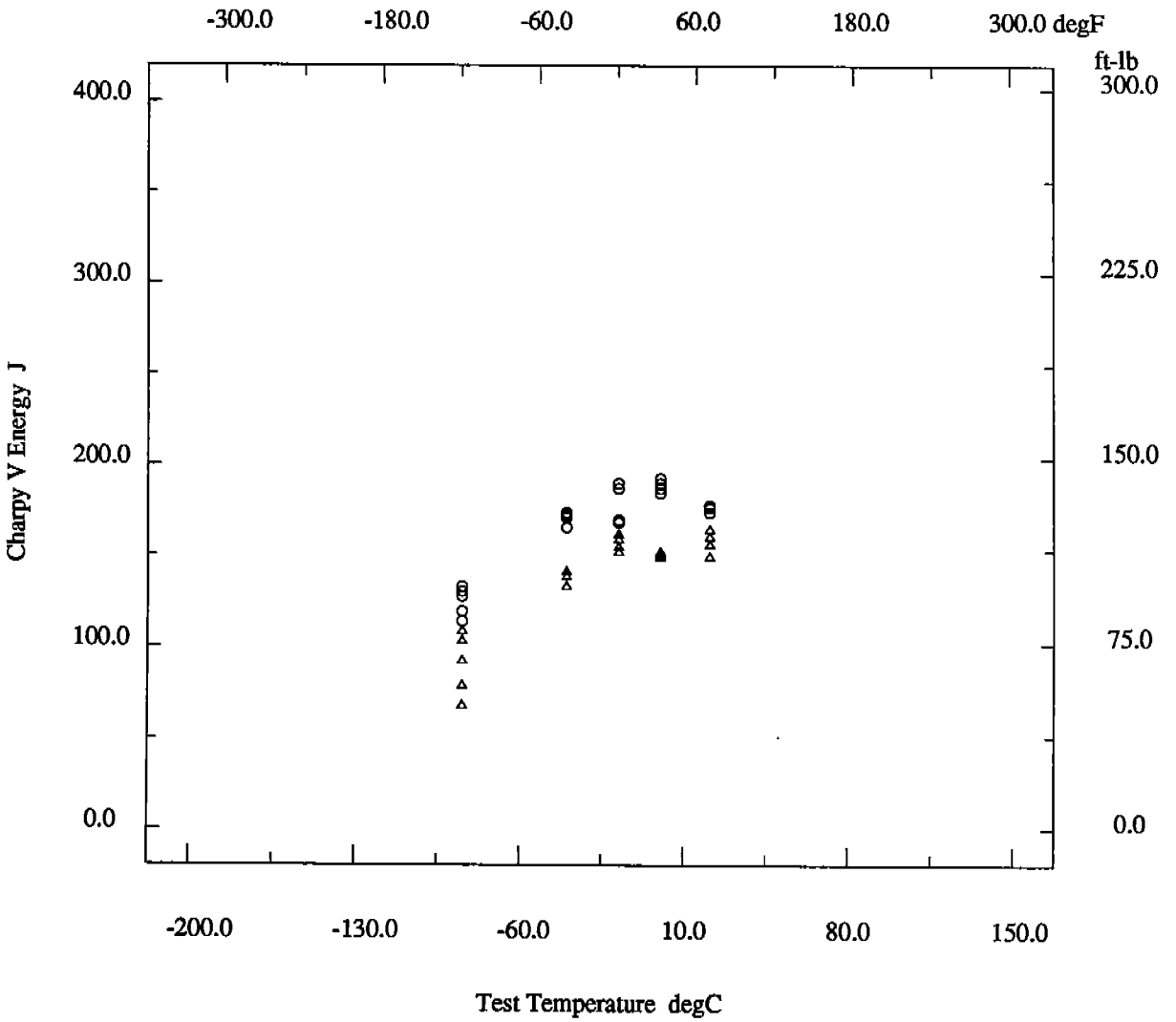
Orien	Test Temp degF	CVN Energy ft-lb
T-L △	-40	104
T-L △	-40	98
T-L △	0	112
T-L △	0	112
T-L △	0	114
T-L △	0	117
T-L △	0	119
T-L △	32	110
T-L △	32	110
T-L △	32	111
T-L △	32	112
T-L △	32	112
T-L △	70	110
T-L △	70	115
T-L △	70	115
T-L △	70	118
T-L △	70	121

* - not reported

Material HY80

Description

Material Code	001.009.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8563-4
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.009.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8563-4
Reference	USN-1		

Composition

See Page 17300.1

Fabrication History

See Page 17300.1

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	106.0	88.0	*	23	69.0

* - not reported

Material HY80

Description

Material Code	001.009.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8563-4
Reference	USN-1		

Composition

See Page 17300.1

Fabrication History

See Page 17300.1

Property Measurements

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

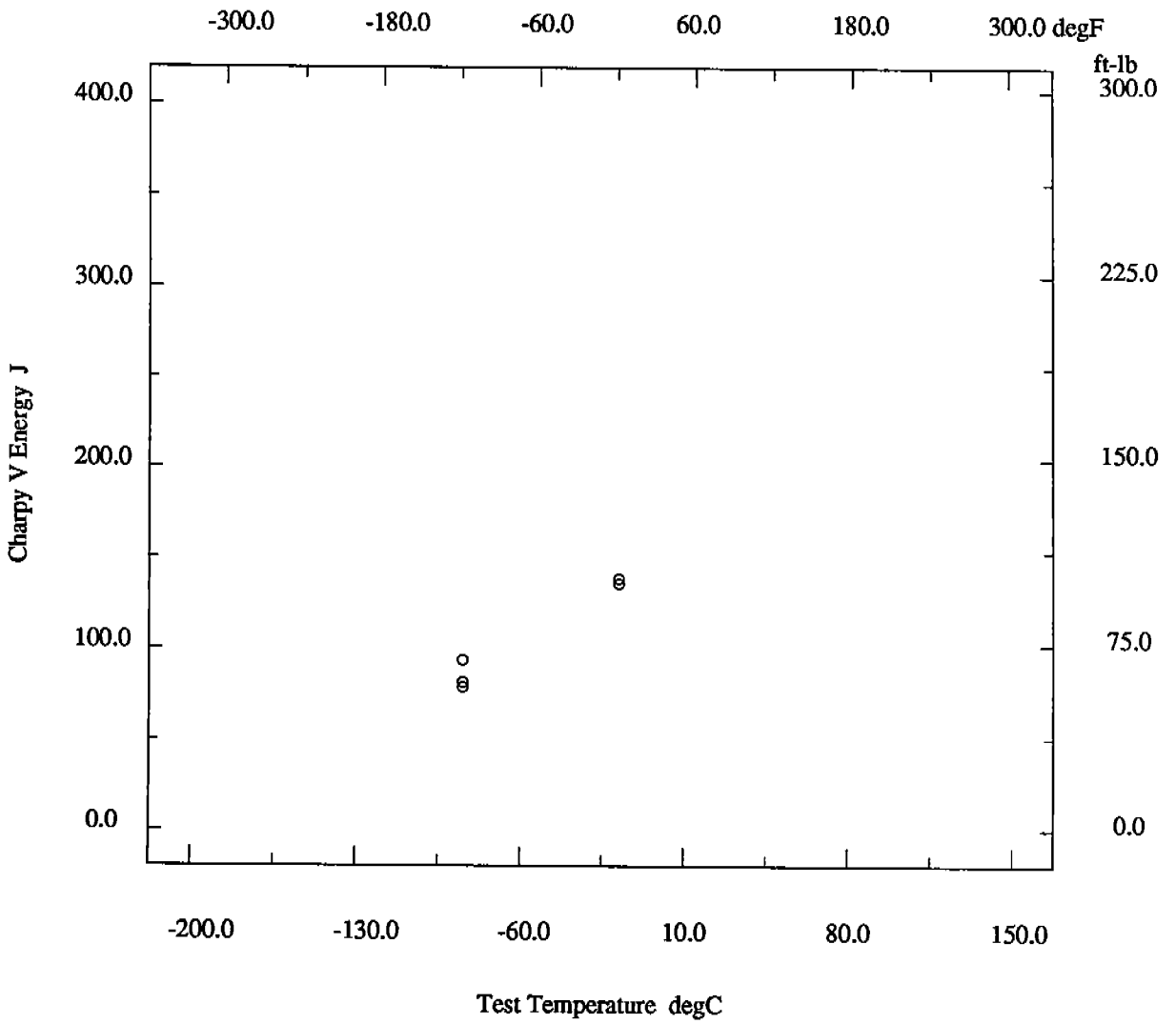
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	58
T-L °	-120	60
T-L °	-120	69
T-L °	0	100
T-L °	0	100
T-L °	0	102

* - not reported

Material HY80

Description

Material Code	001.009.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8563-4
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.009.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8563-4
Reference	USN-1		

Composition

See Page 17300.1

Fabrication History

See Page 17300.1

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	107.0	90.3	*	24	69.0

* - not reported

Material HY80

Description

Material Code	001.009.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8563-4
Reference	USN-1		

Composition

See Page 17300.1

Fabrication History

See Page 17300.1

Property Measurements

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

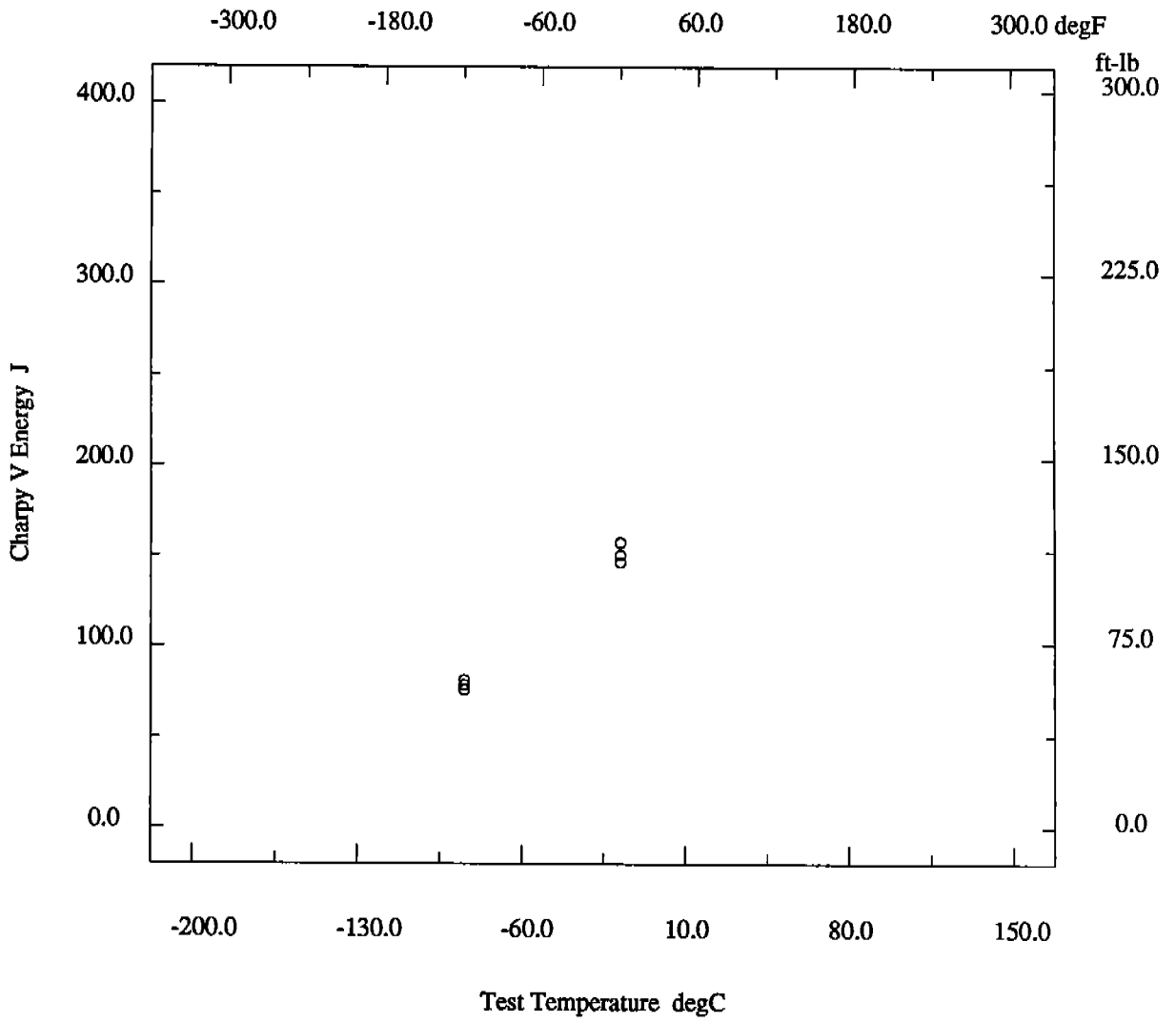
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	56
T-L °	-120	58
T-L °	-120	60
T-L °	0	108
T-L °	0	111
T-L °	0	116

* - not reported

Material HY80

Description

Material Code	001.009.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8563-4
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.009.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8563-4
Reference	USN-1		

Composition

See Page 17300.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Bottom	Killing Process	*
Process Temperature	1650 degF	Process Time	5.25 hr
Rolling Conditions	85 %	Final Processing	A,Q,T
Final Temperature	1200 degF	Final Time	6.08 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	104.0	91.4	*	22	71.5

* - not reported

Material HY80

Description

Material Code	001.009.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8563-4
Reference	USN-1		

Composition

See Page 17300.1

Fabrication History

See Page 17300.11

Property Measurements

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

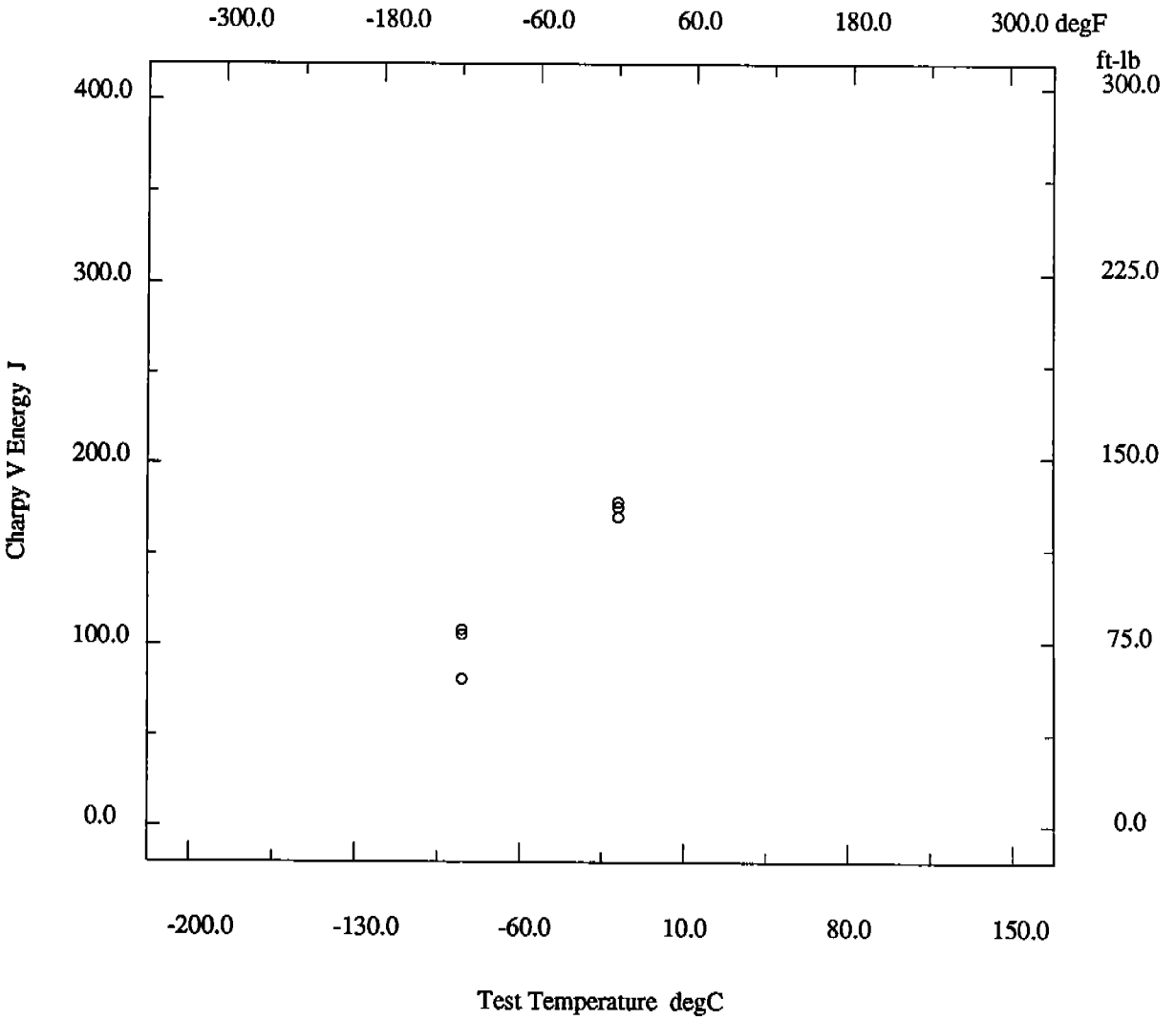
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	60
T-L °	-120	78
T-L °	-120	80
T-L °	0	126
T-L °	0	130
T-L °	0	132

* - not reported

Material HY80

Description

Material Code	001.009.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8563-4
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.009.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8563-4
Reference	USN-1		

Composition

See Page 17300.1

Fabrication History

See Page 17300.11

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	106.5	95.9	*	22	67.0

* - not reported

Material HY80

Description

Material Code	001.009.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8563-4
Reference	USN-1		

Composition

See Page 17300.1

Fabrication History

See Page 17300.11

Property Measurements

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

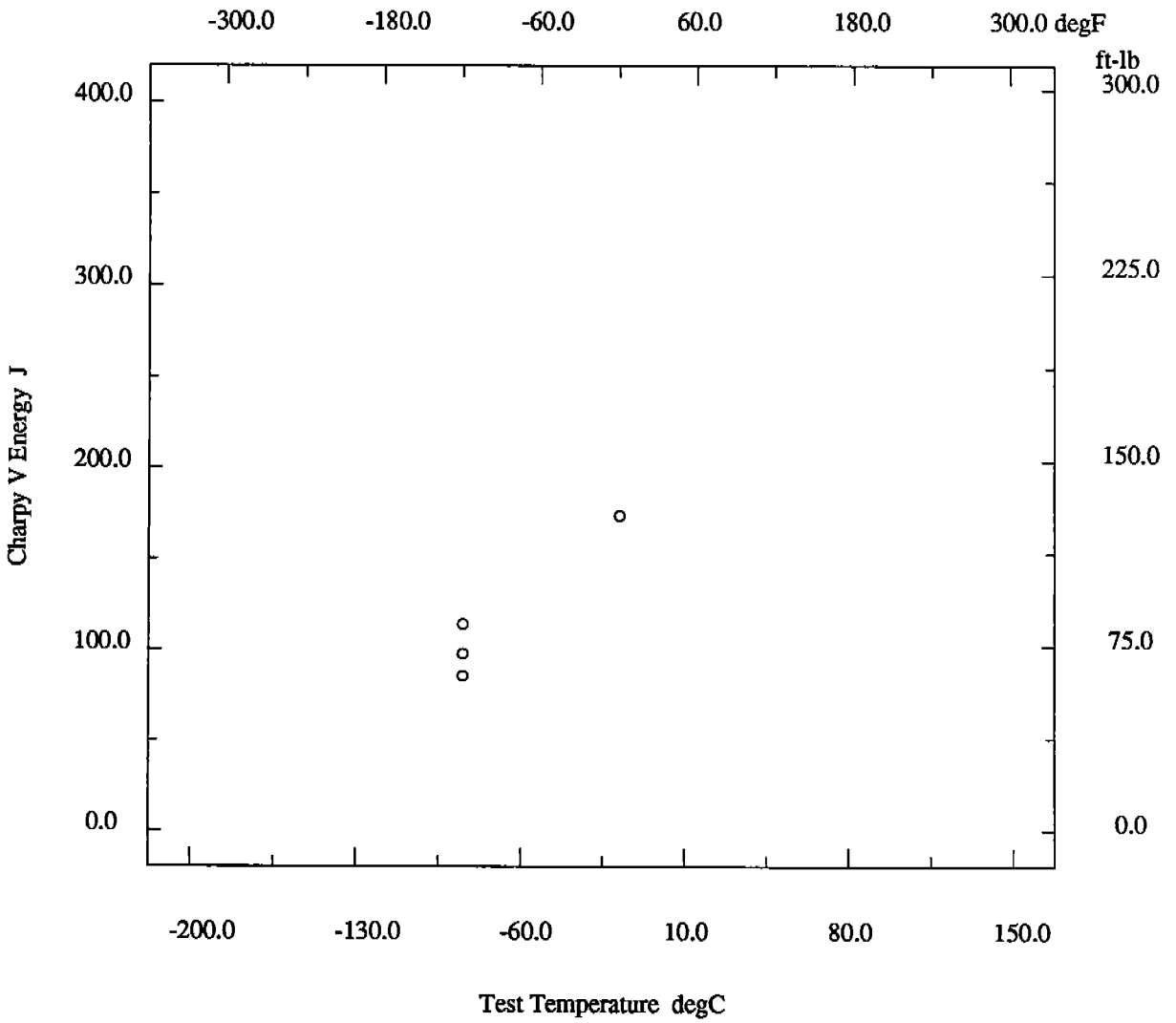
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	63
T-L °	-120	72
T-L °	-120	84
T-L °	0	128
T-L °	0	128
T-L °	0	128

* - not reported

Material HY80

Description

Material Code	001.009.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8563-4
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.009.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8563-4
Reference	USN-1		

Composition

See Page 17300.1

Fabrication History

See Page 17300.11

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	105.0	87.2	*	21	67.0

* - not reported

Material HY80

Description

Material Code	001.009.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8563-4
Reference	USN-1		

Composition

See Page 17300.1

Fabrication History

See Page 17300.11

Property Measurements

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

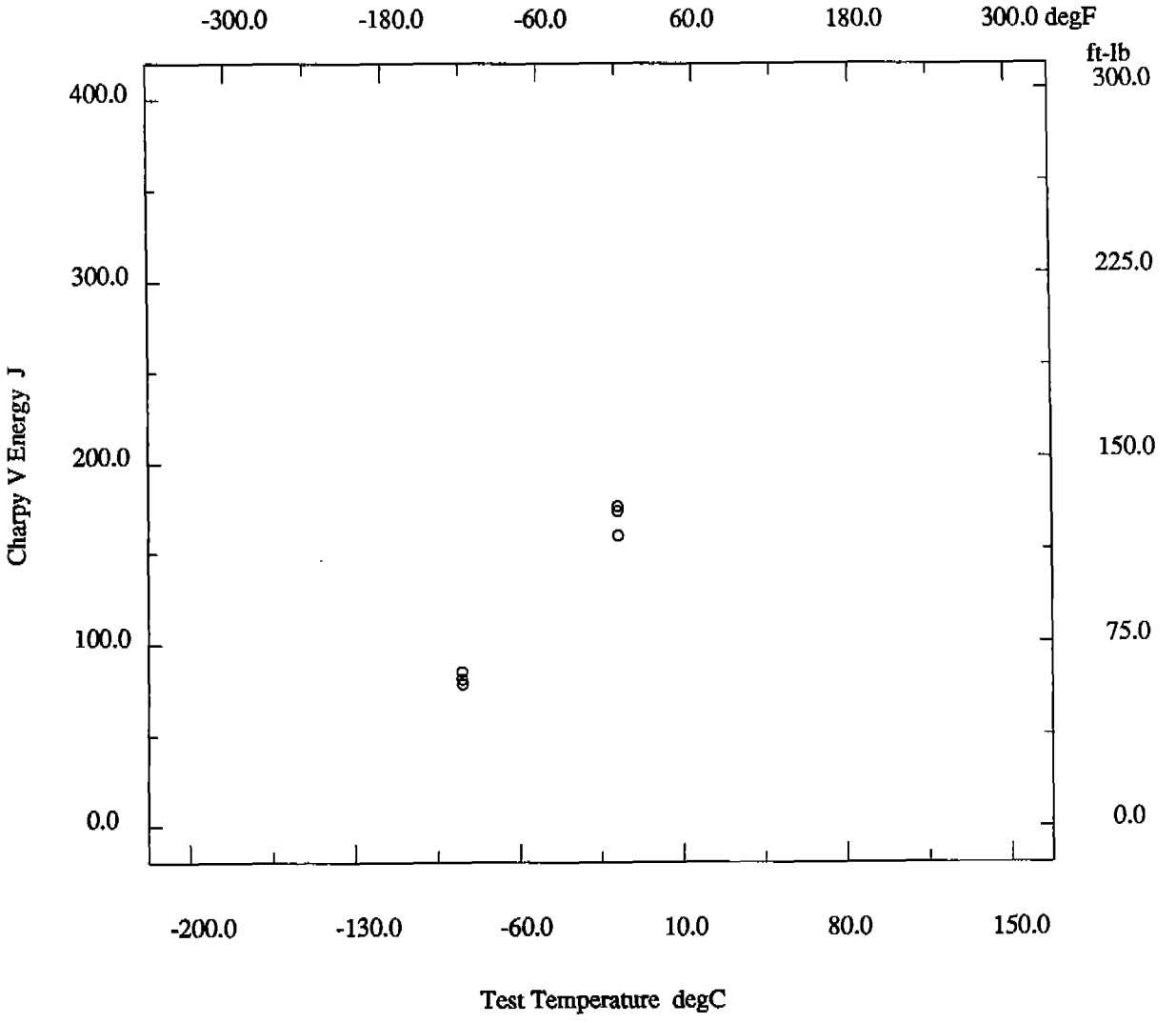
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	58
T-L °	-120	60
T-L °	-120	63
T-L °	0	118
T-L °	0	128
T-L °	0	130

* - not reported

Material HY80

Description

Material Code	001.009.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8563-4
Reference	USN-1		



* - not reported

189

Material HY80

Description

Material Code	001.010.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		

Composition

C	0.15 %	Mn	0.27 %
P	0.006 %	S	0.013 %
Si	0.23 %	Cr	1.47 %
Ni	2.75 %	Mo	0.38 %
V	0.00 %	Cu	0.15 %
Cb	*	Ti	0.003 %
B	*	Al	0.027 %
N	*	Other Components	As=0.007;Sn=0.010;Sb=0.008 %

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1981	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Top	Killing Process	*
Process Temperature	1660 degF	Process Time	3.25 hr
Rolling Conditions	90 %	Final Processing	A,Q,T
Final Temperature	1220 degF	Final Time	3.25 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	105.0	84.4	*	23	66.8

* - not reported

Material HY80

Description

Material Code	001.010.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		

Composition

See Page 17400.1

Fabrication History

See Page 17400.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
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 ○	-120	112
L-T ○	-120	120
L-T ○	-120	120
L-T ○	-120	124
L-T ○	-120	132
L-T ○	-40	142
L-T ○	-40	143
L-T ○	-40	144
L-T ○	-40	146
L-T ○	-40	148
L-T ○	0	140
L-T ○	0	140
L-T ○	0	140
L-T ○	0	141
L-T ○	0	152
L-T ○	32	134
L-T ○	32	140
L-T ○	32	148
L-T ○	32	152
L-T ○	32	152
L-T ○	70	138
L-T ○	70	138
L-T ○	70	142
L-T ○	70	144
L-T ○	70	148
T-L △	-120	72
T-L △	-120	82
T-L △	-120	88
T-L △	-120	90
T-L △	-120	96
T-L △	-40	100
T-L △	-40	101
T-L △	-40	108

(continued)

* - not reported

Material HY80

(continued)

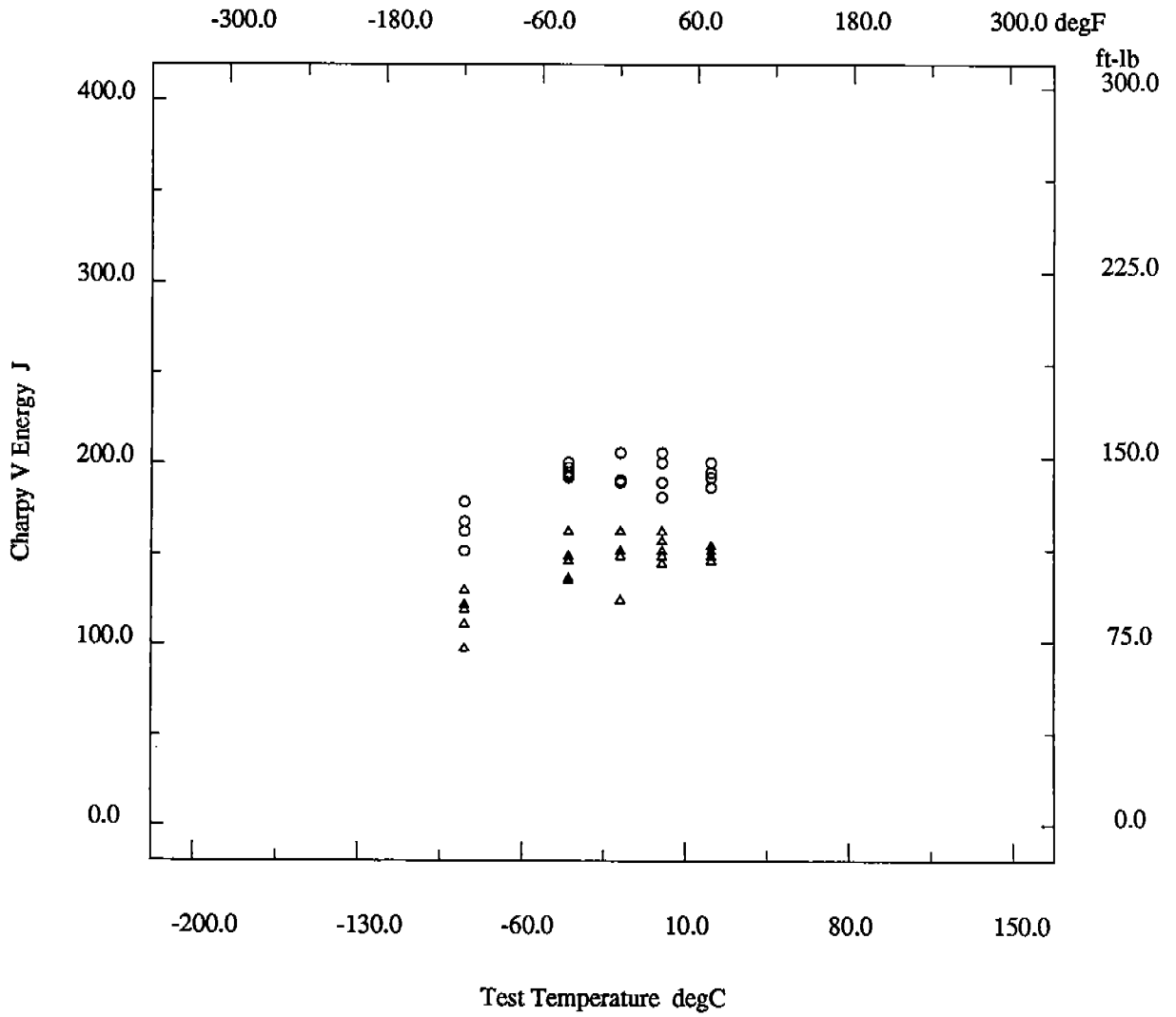
Orien	Test Temp degF	CVN Energy ft-lb
T-L △	-40	110
T-L △	-40	120
T-L △	0	110
T-L △	0	112
T-L △	0	120
T-L △	0	120
T-L △	0	92
T-L △	32	107
T-L △	32	110
T-L △	32	112
T-L △	32	116
T-L △	32	120
T-L △	70	108
T-L △	70	108
T-L △	70	110
T-L △	70	112
T-L △	70	114

* - not reported

Material HY80

Description

Material Code	001.010.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.010.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		

Composition

See Page 17400.1

Fabrication History

See Page 17400.1

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	107.0	89.7	*	23	70.5

* - not reported

Material HY80

Description

Material Code	001.010.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		

Composition

See Page 17400.1

Fabrication History

See Page 17400.1

Property Measurements

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

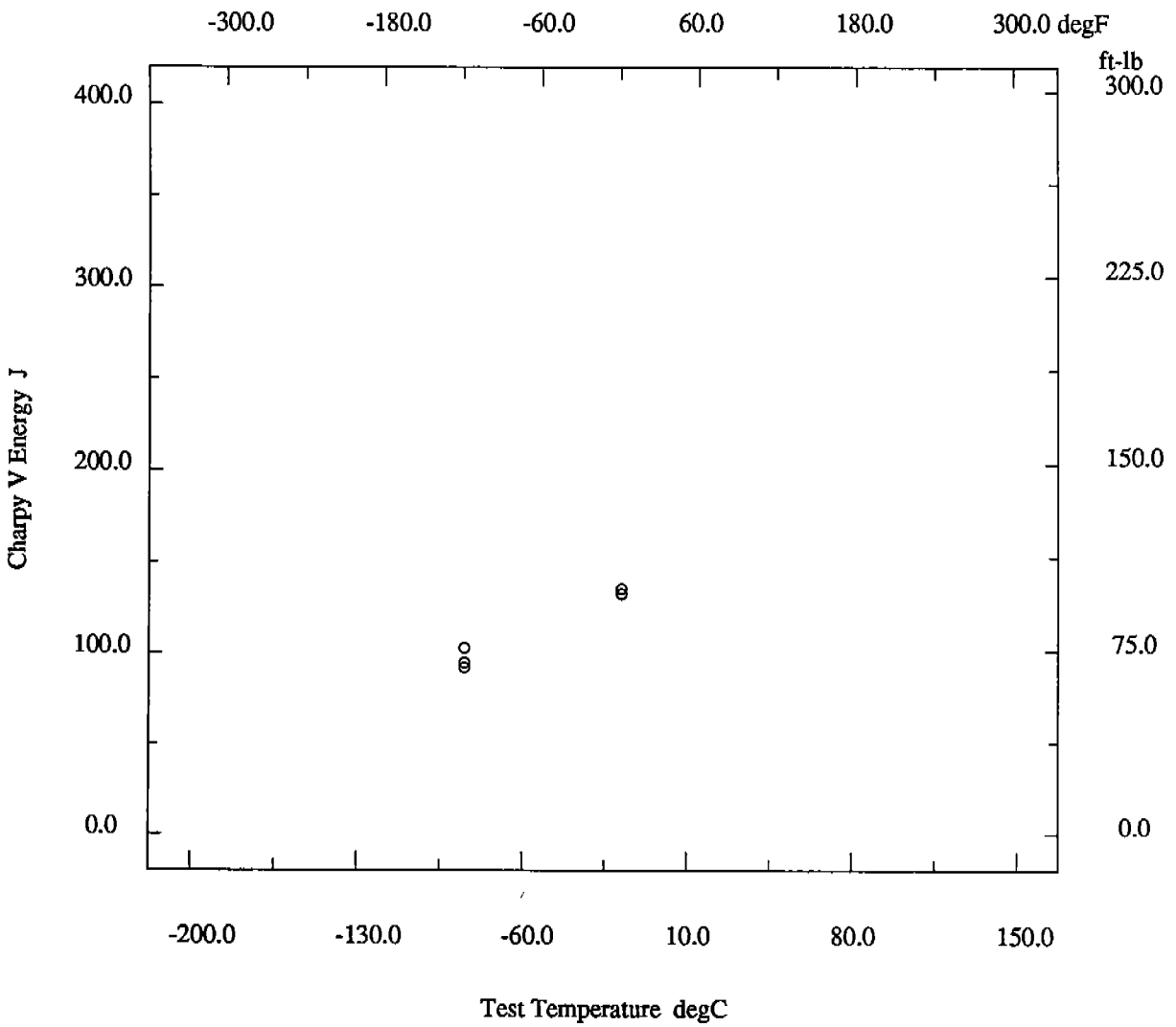
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	68
T-L °	-120	70
T-L °	-120	76
T-L °	0	100
T-L °	0	100
T-L °	0	98

* - not reported

Material HY80

Description

Material Code	001.010.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.010.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		

Composition

See Page 17400.1

Fabrication History

See Page 17400.1

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	105.0	86.7	*	24	68.7

* - not reported

Material HY80

Description

Material Code	001.010.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		

Composition

See Page 17400.1

Fabrication History

See Page 17400.1

Property Measurements

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

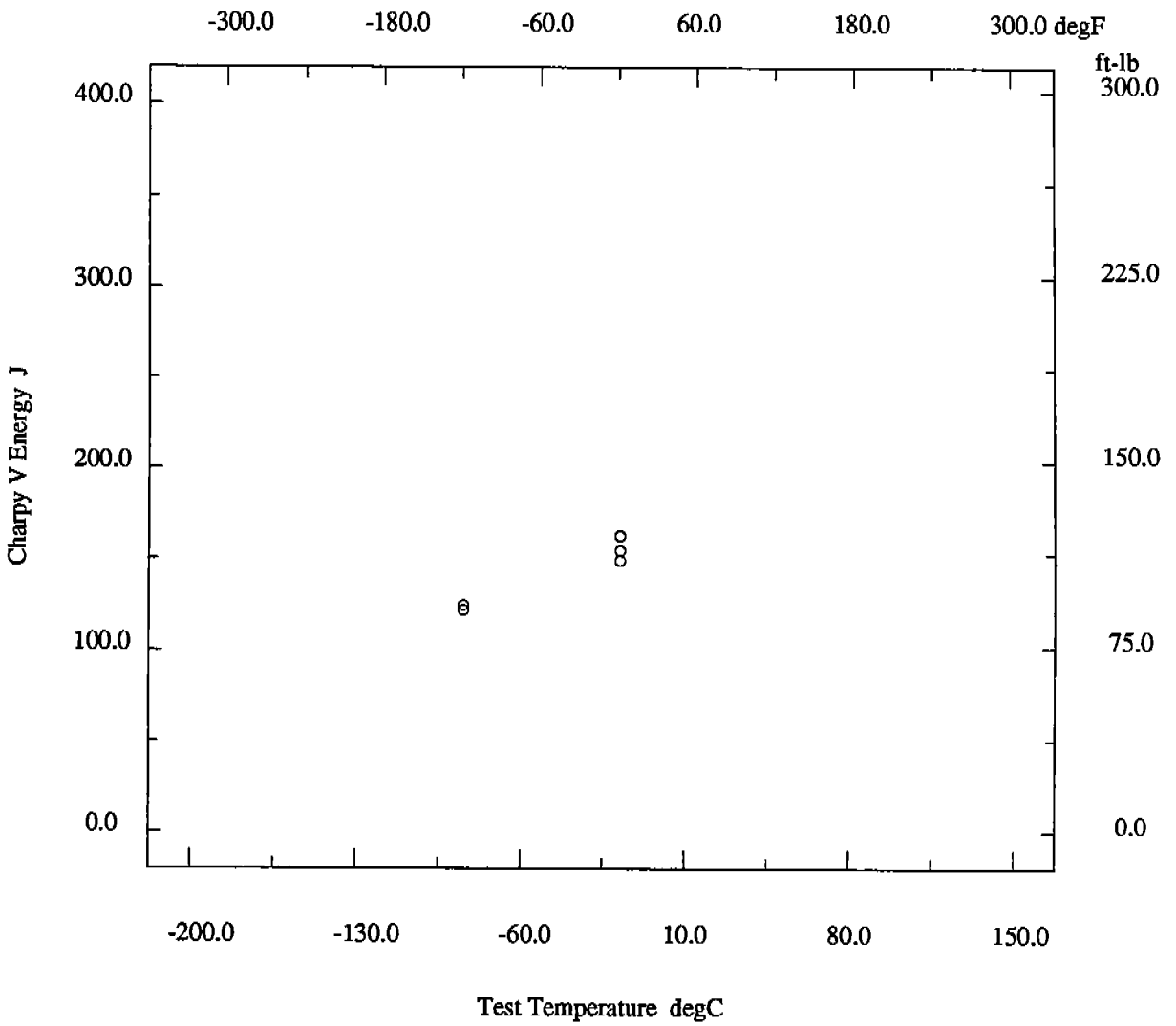
Orien	Test Temp degF	CVN Energy ft-lb
T-L ○	-120	90
T-L ○	-120	90
T-L ○	-120	92
T-L ○	0	110
T-L ○	0	114
T-L ○	0	120

* - not reported

Material HY80

Description

Material Code	001.010.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.010.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		

Composition

See Page 17400.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1981	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Mid	Killing Process	*
Process Temperature	1660 degF	Process Time	3.25 hr
Rolling Conditions	90 %	Final Processing	A,Q,T
Final Temperature	1220 degF	Final Time	3.25 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	105.0	85.5	*	24	68.5

* - not reported

Material HY80

Description

Material Code	001.010.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		

Composition

See Page 17400.1

Fabrication History

See Page 17400.11

Property Measurements

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

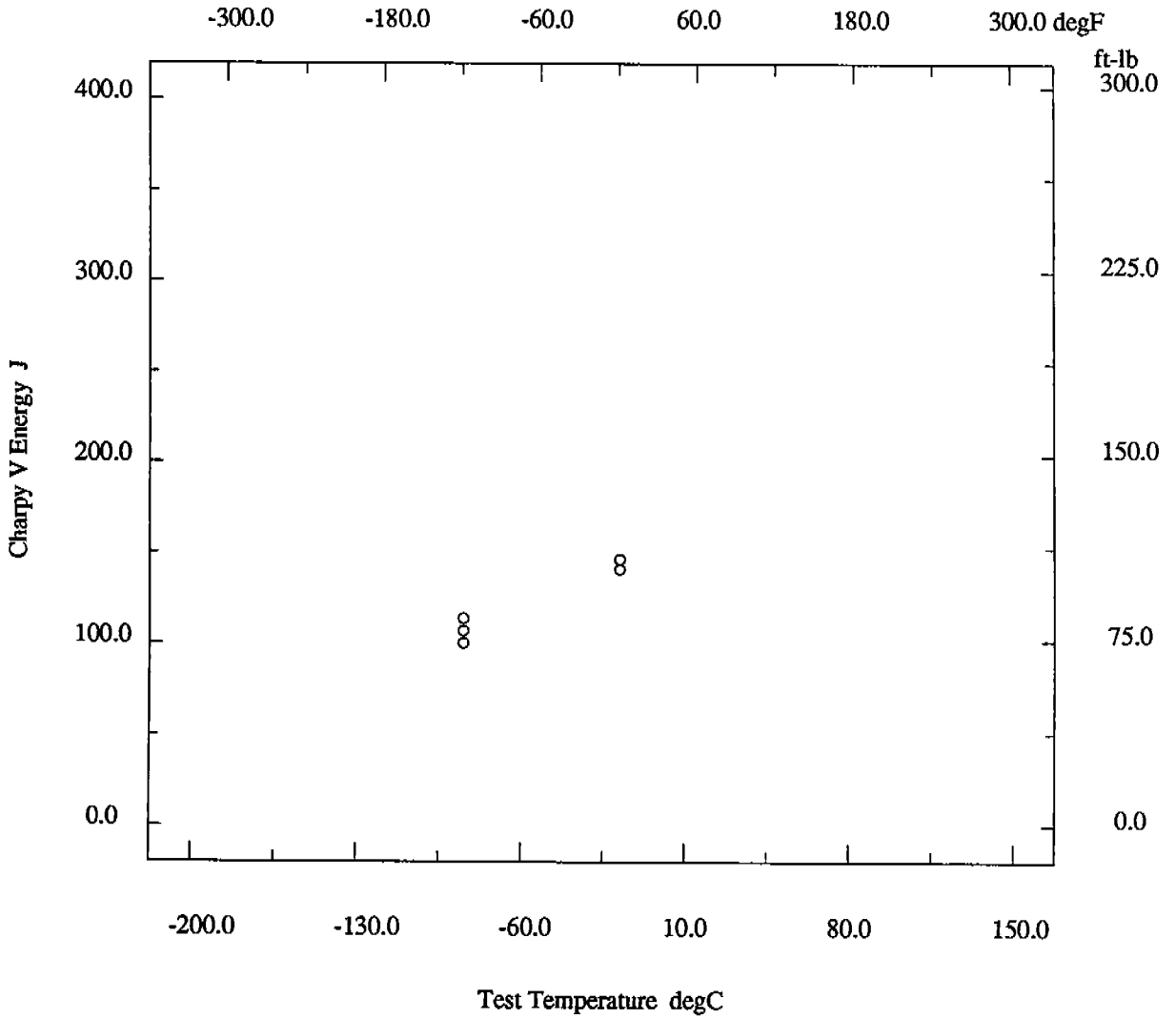
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	74
T-L °	-120	79
T-L °	-120	84
T-L °	0	104
T-L °	0	104
T-L °	0	108

* - not reported

Material HY80

Description

Material Code	001.010.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.010.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		

Composition

See Page 17400.1

Fabrication History

See Page 17400.11

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	105.5	88.2	*	24	68.8

* - not reported

Material HY80

Description

Material Code	001.010.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		

Composition See Page 17400.1

Fabrication History See Page 17400.11

Property Measurements

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

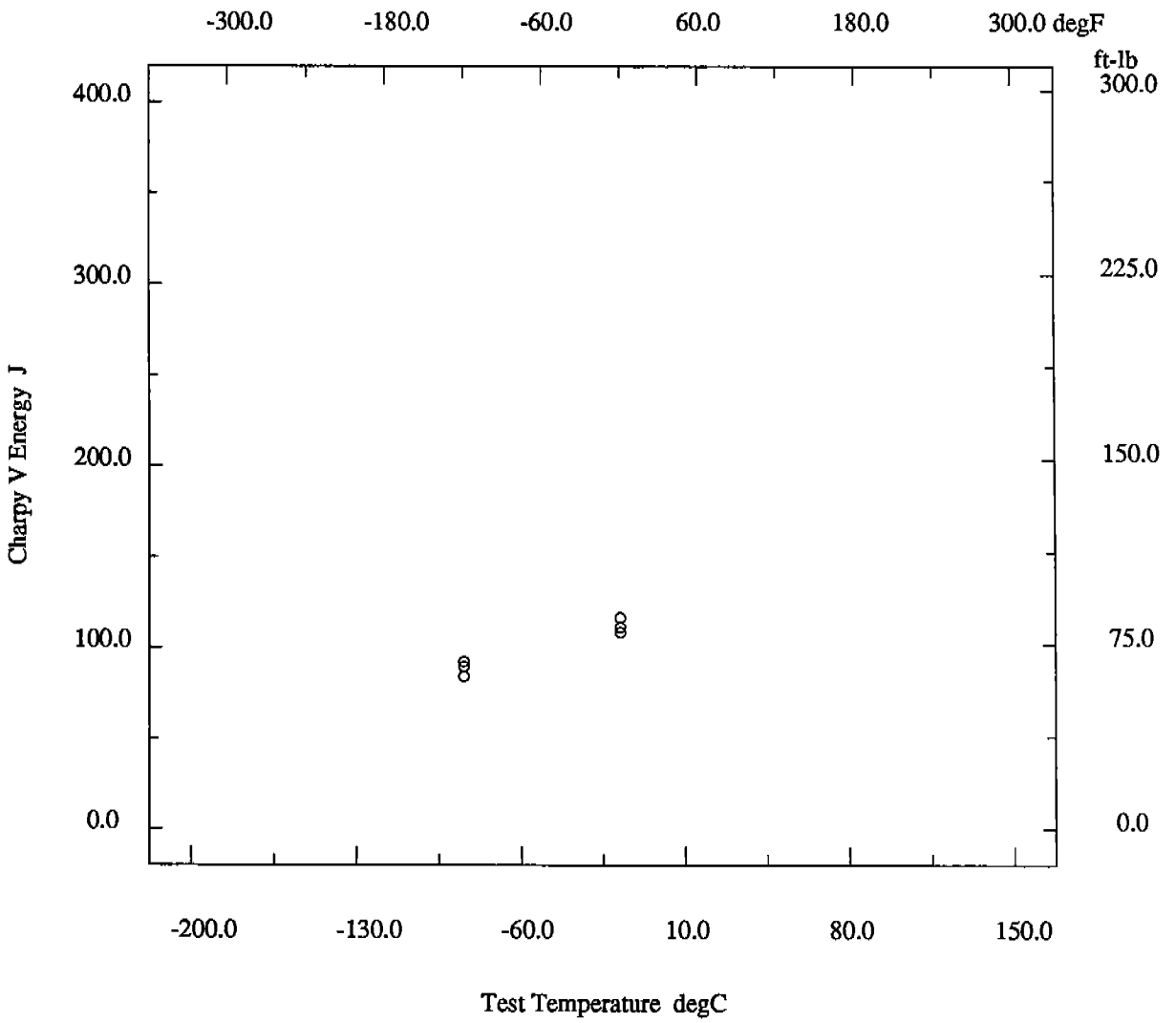
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	62
T-L °	-120	66
T-L °	-120	68
T-L °	0	80
T-L °	0	82
T-L °	0	86

* - not reported

Material HY80

Description

Material Code	001.010.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.010.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		

Composition

See Page 17400.1

Fabrication History

See Page 17400.11

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	103.5	86.1	*	23	68.0

* - not reported

Material HY80

Description

Material Code	001.010.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		

Composition

See Page 17400.1

Fabrication History

See Page 17400.11

Property Measurements

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

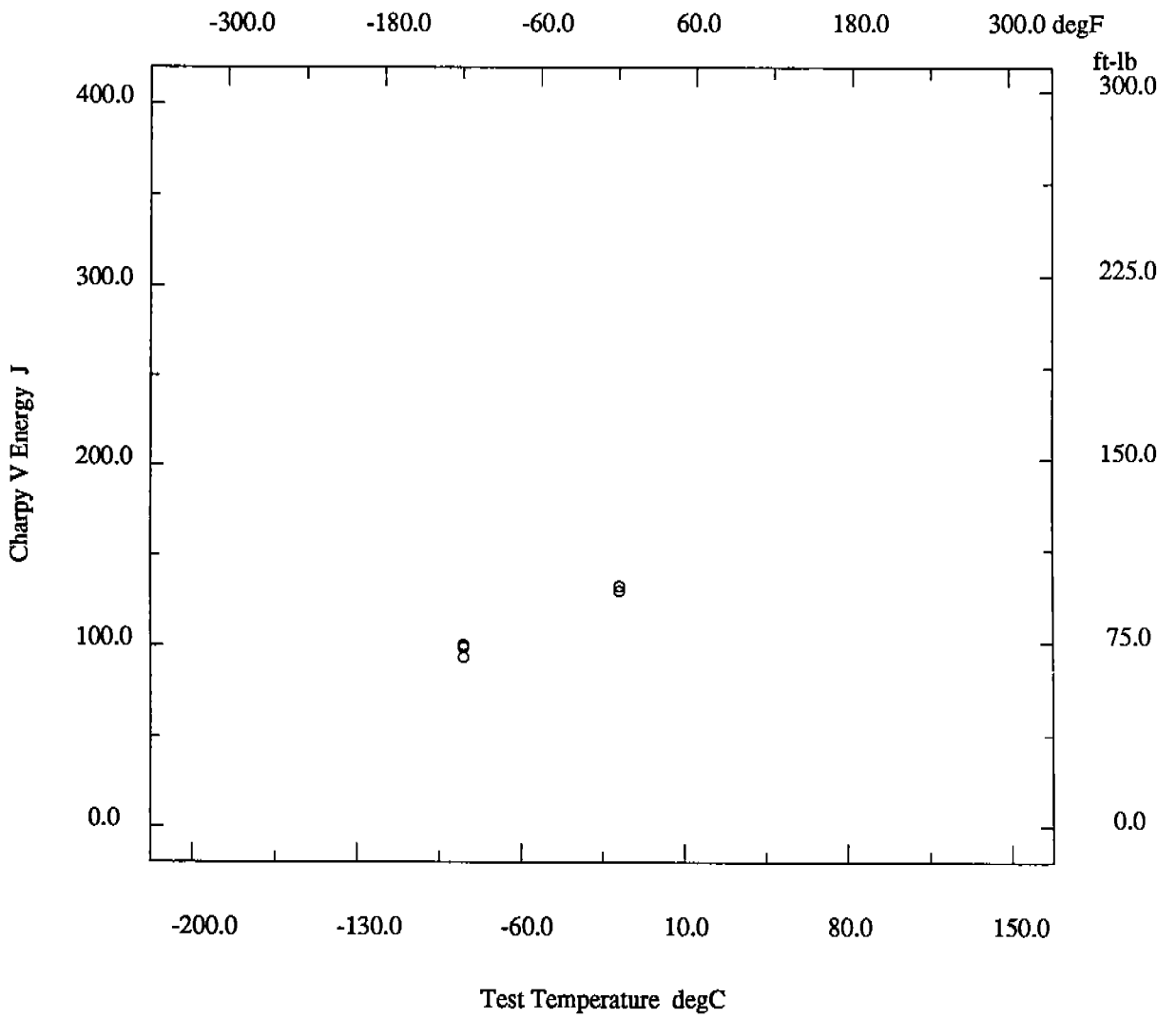
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	69
T-L °	-120	73
T-L °	-120	74
T-L °	0	96
T-L °	0	96
T-L °	0	98

* - not reported

Material HY80

Description

Material Code	001.010.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.010.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		

Composition

See Page 17400.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1981	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Bottom	Killing Process	*
Process Temperature	1660 degF	Process Time	3.25 hr
Rolling Conditions	90 %	Final Processing	A,Q,T
Final Temperature	1220 degF	Final Time	3.25 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	102.0	83.2	*	25	65.7

* - not reported

Material HY80

Description

Material Code	001.010.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		

Composition

See Page 17400.1

Fabrication History

See Page 17400.20

Property Measurements

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

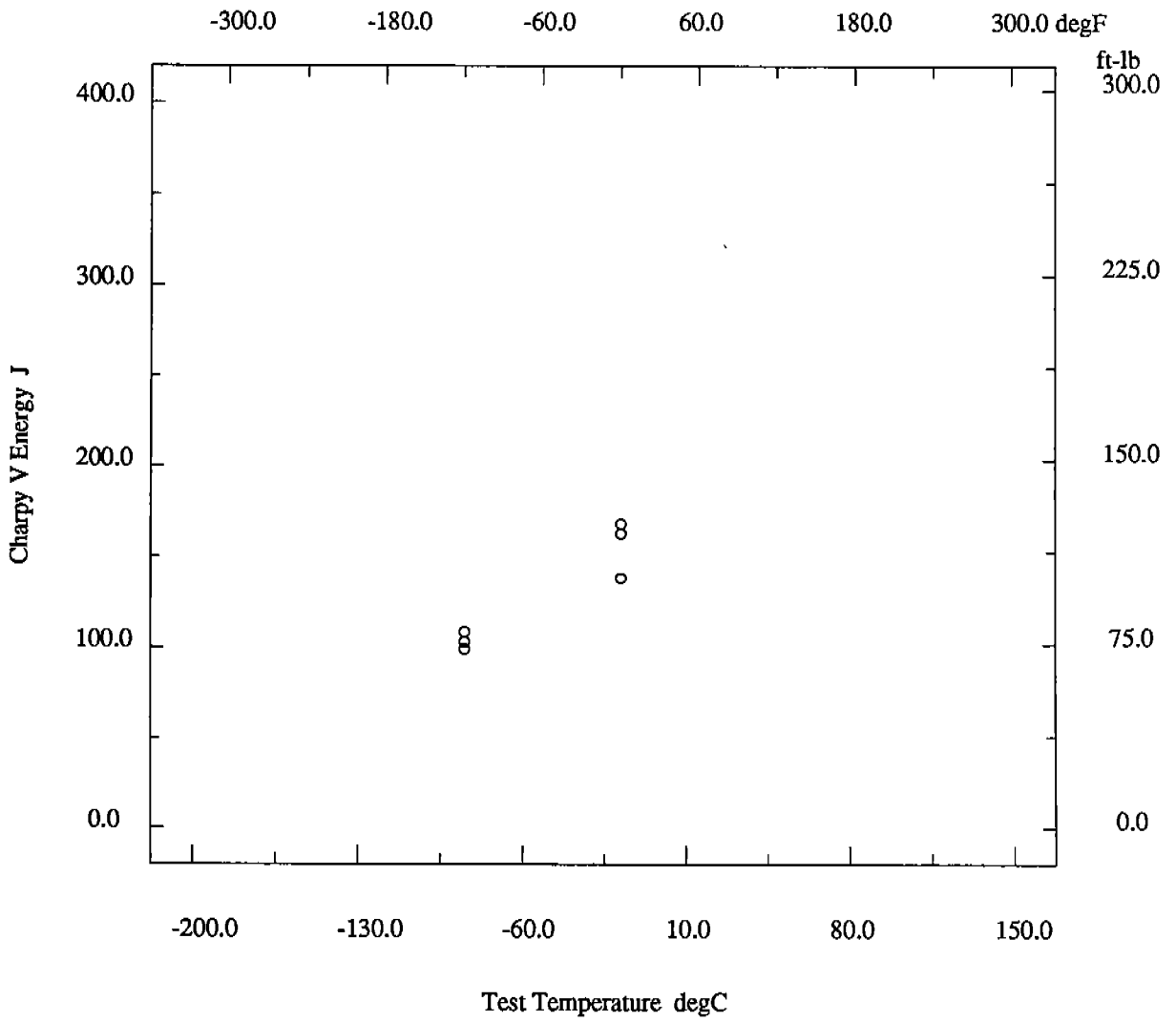
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	73
T-L °	-120	76
T-L °	-120	80
T-L °	0	102
T-L °	0	120
T-L °	0	124

* - not reported

Material HY80

Description

Material Code	001.010.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.010.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		

Composition

See Page 17400.1

Fabrication History

See Page 17400.20

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	102.5	84.8	*	24	72.0

* - not reported

Material HY80

Description

Material Code	001.010.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		

Composition

See Page 17400.1

Fabrication History

See Page 17400.20

Property Measurements

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

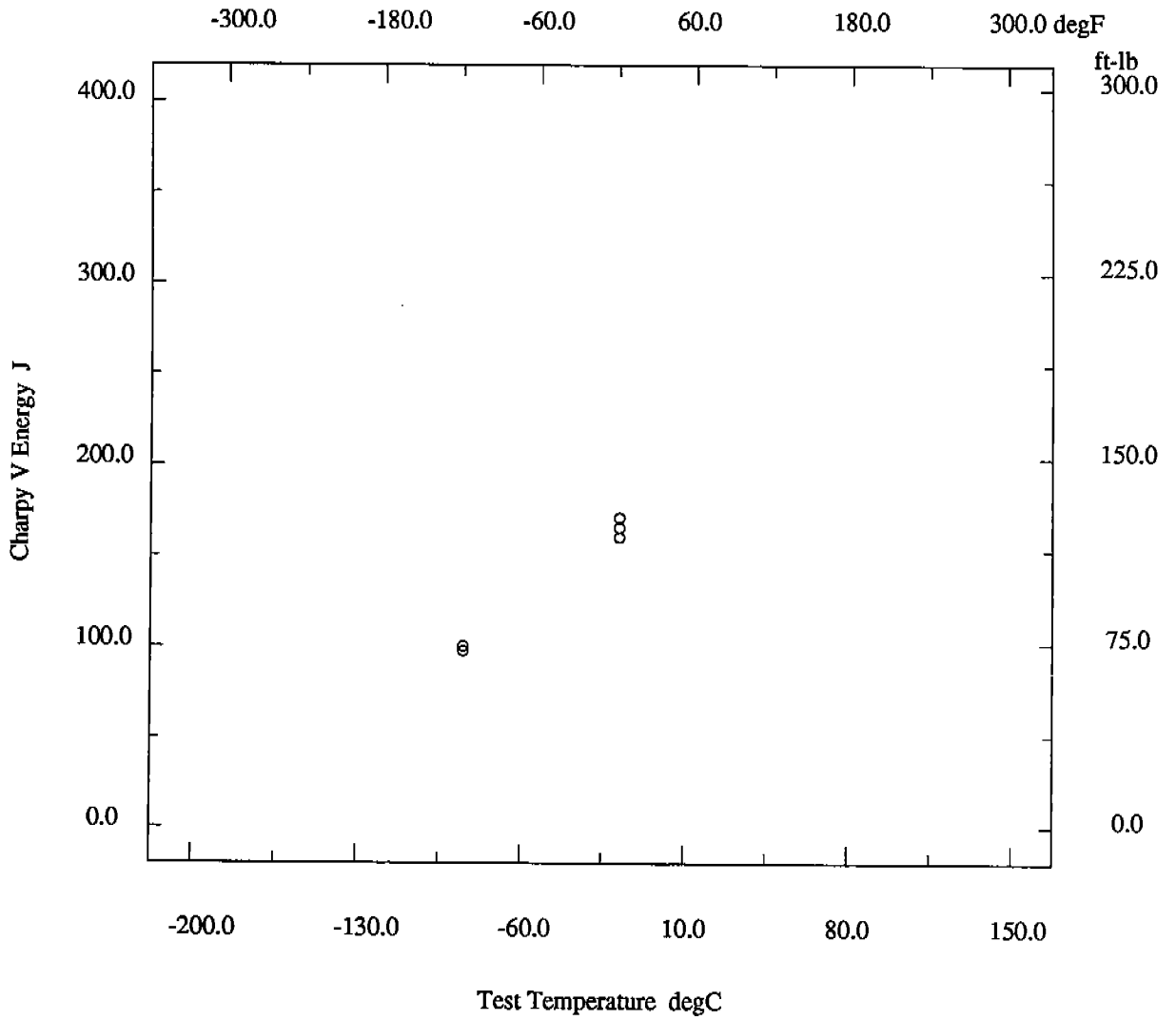
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	72
T-L °	-120	72
T-L °	-120	74
T-L °	0	118
T-L °	0	122
T-L °	0	126

* - not reported

Material HY80

Description

Material Code	001.010.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.010.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		

Composition

See Page 17400.1

Fabrication History

See Page 17400.20

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	103.0	84.4	*	24	71.8

* - not reported

Material HY80

Description

Material Code	001.010.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		

Composition

See Page 17400.1

Fabrication History

See Page 17400.20

Property Measurements

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

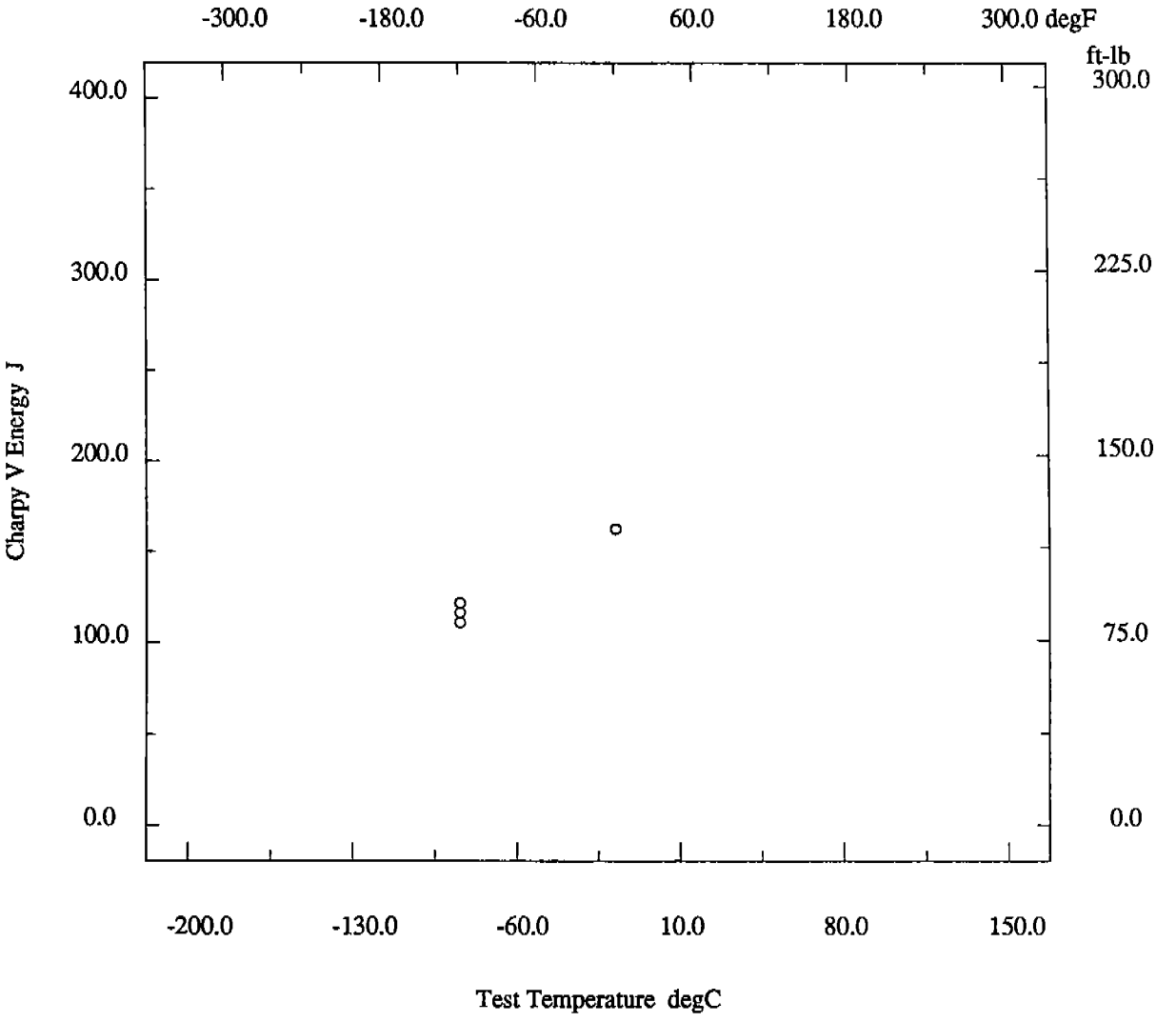
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	82
T-L °	-120	86
T-L °	-120	90
T-L °	0	120
T-L °	0	120
T-L °	0	120

* - not reported

Material HY80

Description

Material Code	001.010.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D2580-4
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.011.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8490-2
Reference	USN-1		

Composition

C	0.15 %	Mn	0.34 %
P	0.013 %	S	0.01 %
Si	0.25 %	Cr	1.53 %
Ni	2.74 %	Mo	0.40 %
V	0.01 %	Cu	0.15 %
Cb	*	Ti	0.006 %
B	*	Al	0.038 %
N	*	Other Components	As=0.006;Sn=0.013;Sb=0.004 %

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Top	Killing Process	*
Process Temperature	1660 degF	Process Time	3 hr
Rolling Conditions	91 %	Final Processing	A,Q,T
Final Temperature	1220 degF	Final Time	3 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	111.4	96.2	*	21	68.2

* - not reported

Material HY80

Description

Material Code	001.011.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8490-2
Reference	USN-1		

Composition See Page 17500.1

Fabrication History See Page 17500.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
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 ○	-120	90
L-T ○	-120	94
L-T ○	-120	94
L-T ○	-120	97
L-T ○	-120	98
L-T ○	-40	104
L-T ○	-40	104
L-T ○	-40	104
L-T ○	-40	106
L-T ○	-40	110
L-T ○	0	108
L-T ○	0	111
L-T ○	0	111
L-T ○	0	114
L-T ○	0	115
L-T ○	32	121
L-T ○	32	122
L-T ○	32	123
L-T ○	32	124
L-T ○	32	131
L-T ○	70	126
L-T ○	70	128
L-T ○	70	128
L-T ○	70	128
L-T ○	70	135
T-L △	-120	84
T-L △	-120	85
T-L △	-120	87
T-L △	-120	87
T-L △	-120	89
T-L △	-40	102
T-L △	-40	103
T-L △	-40	104

(continued)

* - not reported

Material HY80

(continued)

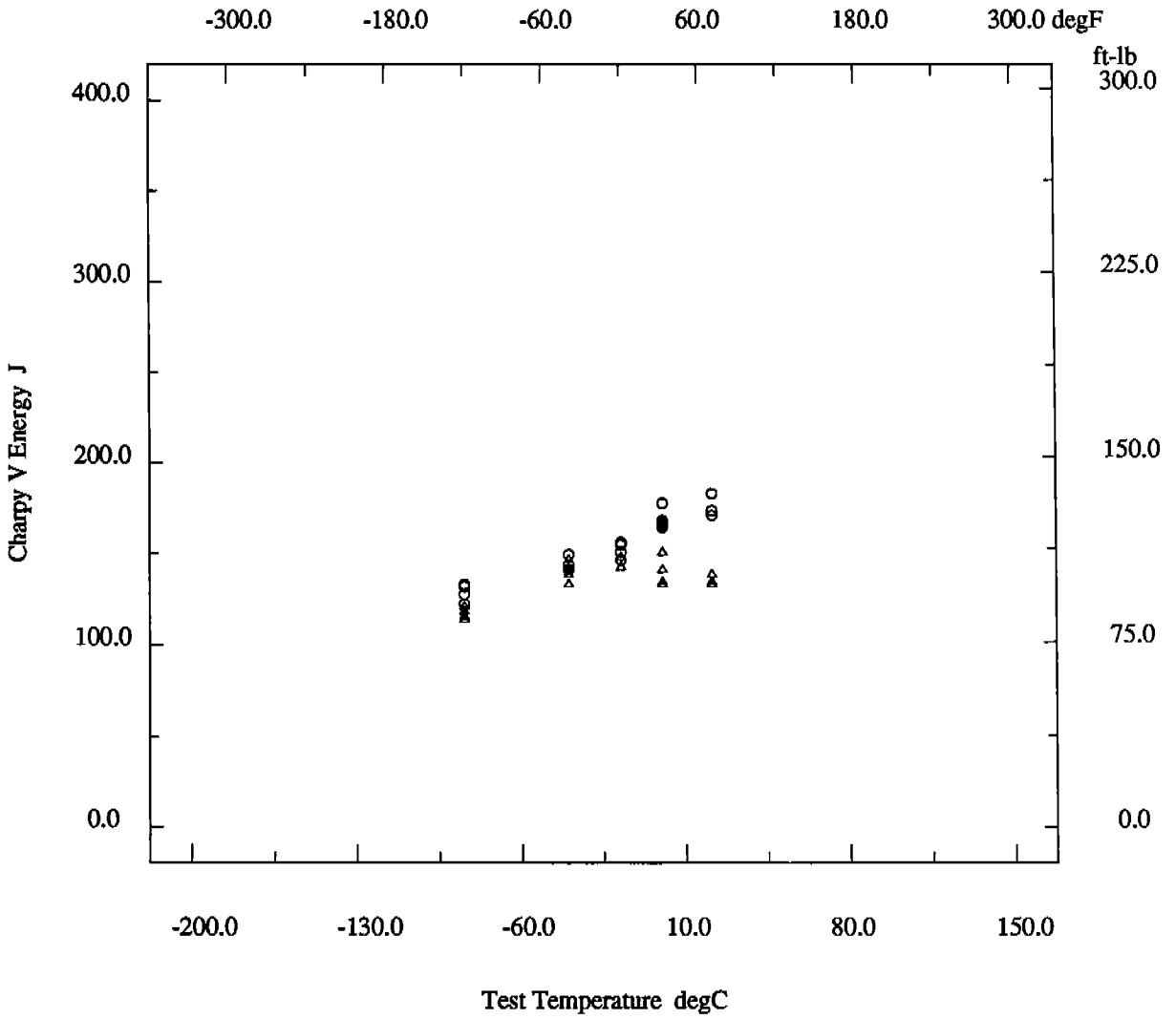
Orien	Test Temp degF	CVN Energy ft-lb
T-L △	-40	108
T-L △	-40	98
T-L △	0	105
T-L △	0	109
T-L △	0	109
T-L △	0	109
T-L △	0	109
T-L △	32	104
T-L △	32	111
T-L △	32	98
T-L △	32	99
T-L △	32	99
T-L △	70	102
T-L △	70	98
T-L △	70	98
T-L △	70	99
T-L △	70	99

* - not reported

Material HY80

Description

Material Code	001.011.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8490-2
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.011.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8490-2
Reference	USN-1		

Composition

See Page 17500.1

Fabrication History

See Page 17500.1

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	112.5	98.7	*	22	69.0

* - not reported

Material HY80

Description

Material Code	001.011.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8490-2
Reference	USN-1		

Composition See Page 17500.1

Fabrication History See Page 17500.1

Property Measurements

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

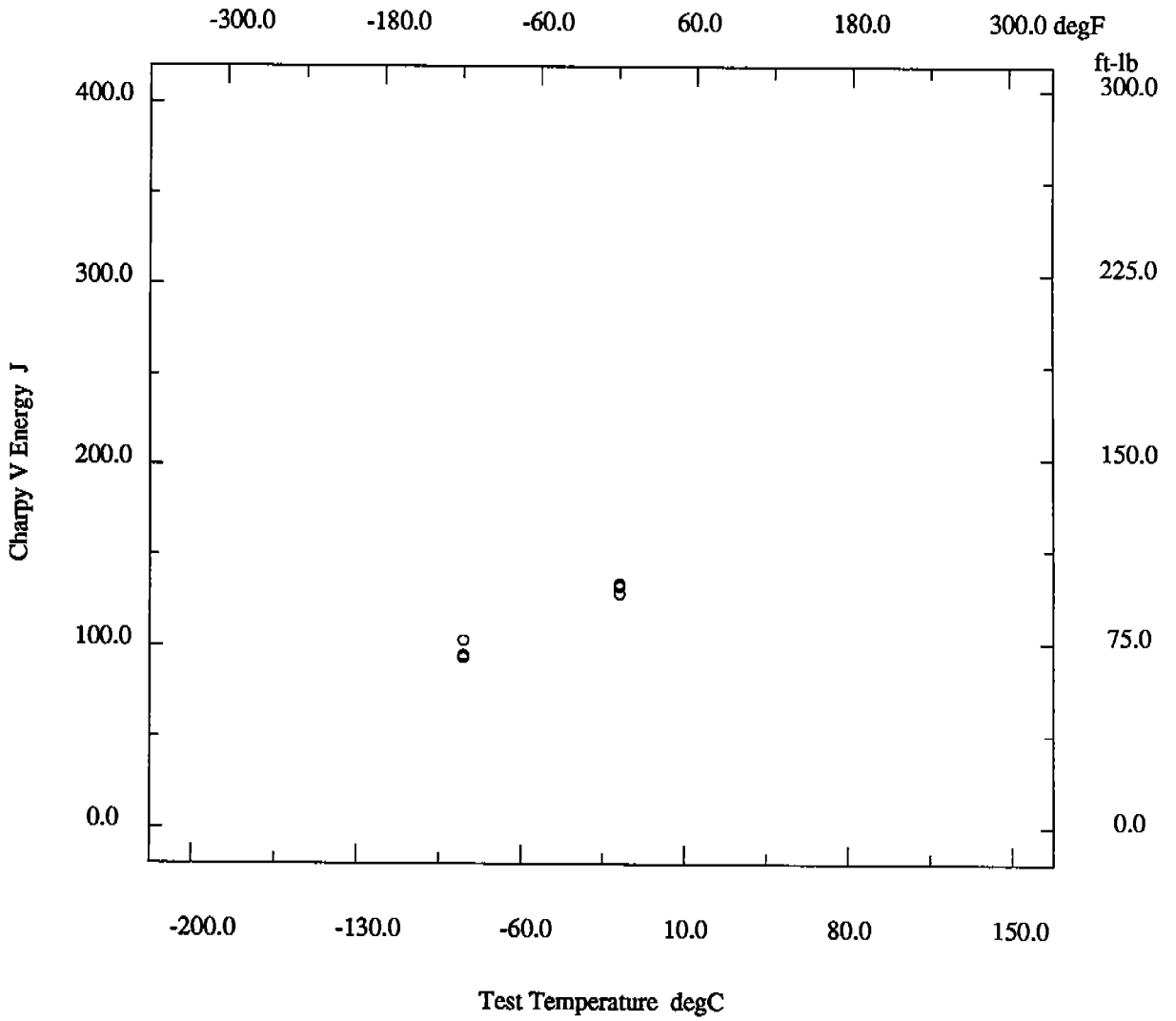
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	69
T-L °	-120	70
T-L °	-120	76
T-L °	0	95
T-L °	0	98
T-L °	0	99

* - not reported

Material HY80

Description

Material Code	001.011.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8490-2
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.011.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8490-2
Reference	USN-1		

Composition

See Page 17500.1

Fabrication History

See Page 17500.1

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	113.4	99.4	*	22	62.0

* - not reported

Material HY80

Description

Material Code	001.011.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8490-2
Reference	USN-1		

Composition

See Page 17500.1

Fabrication History

See Page 17500.1

Property Measurements

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

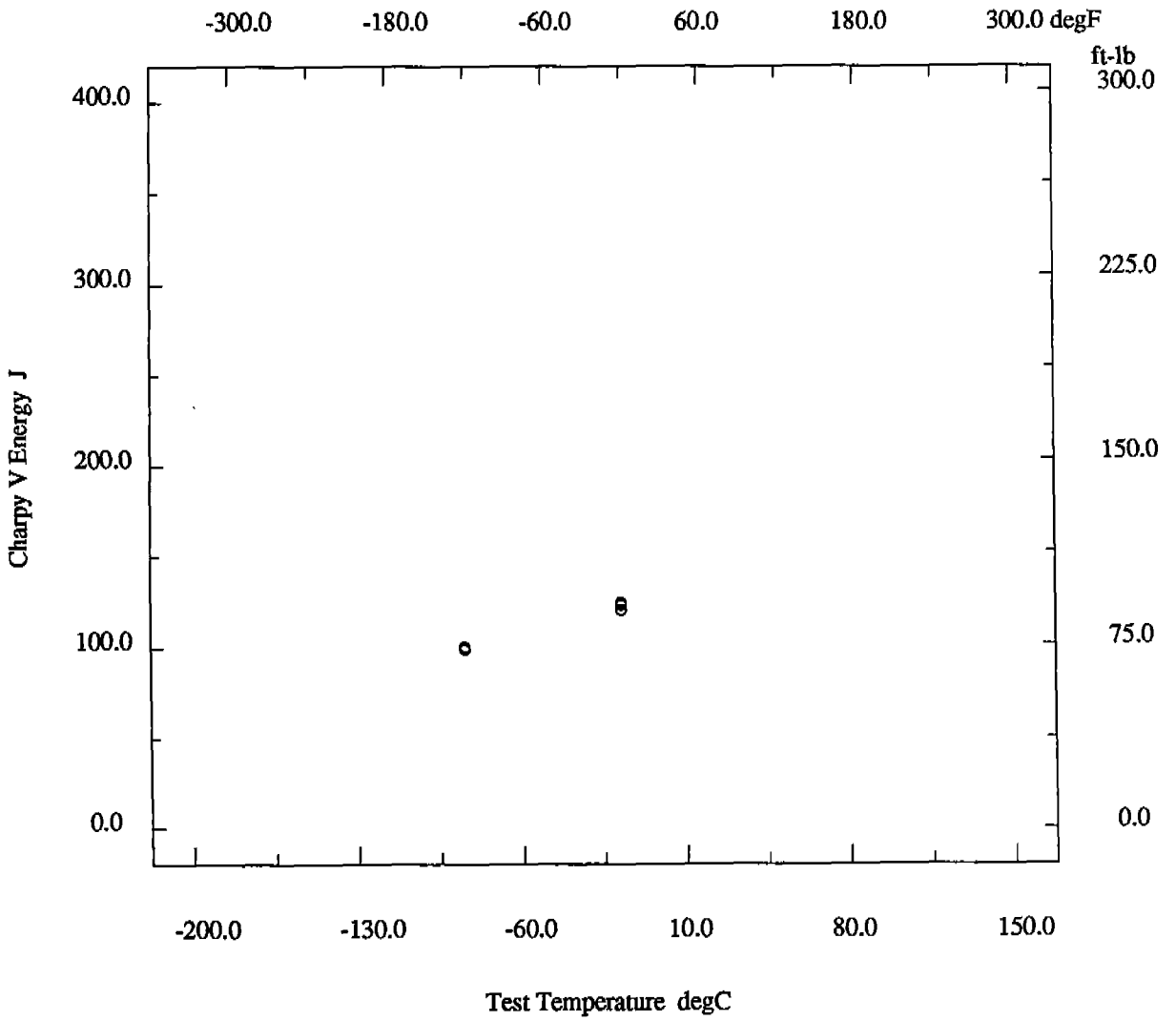
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	73
T-L °	-120	74
T-L °	-120	74
T-L °	0	89
T-L °	0	91
T-L °	0	92

* - not reported

Material HY80

Description

Material Code	001.011.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8490-2
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.011.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8490-2
Reference	USN-1		

Composition

See Page 17500.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Bottom	Killing Process	*
Process Temperature	1660 degF	Process Time	3 hr
Rolling Conditions	91 %	Final Processing	A,Q,T
Final Temperature	1220 degF	Final Time	3 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	109.6	93.8	*	21	67.6

* - not reported

Material HY80

Description

Material Code	001.011.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8490-2
Reference	USN-1		

Composition

See Page 17500.1

Fabrication History

See Page 17500.11

Property Measurements

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

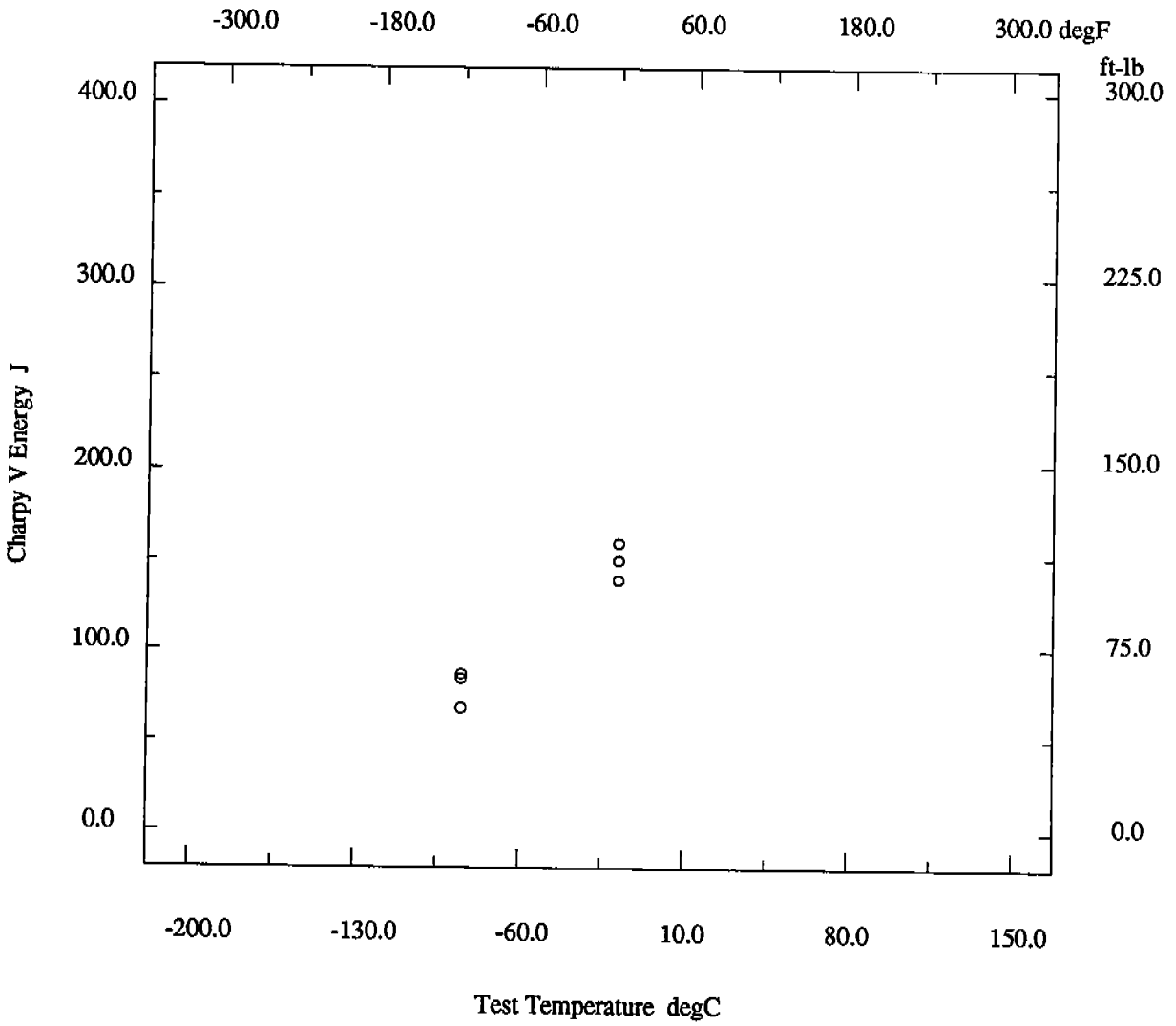
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	50
T-L °	-120	62
T-L °	-120	64
T-L °	0	103
T-L °	0	111
T-L °	0	118

* - not reported

Material HY80

Description

Material Code	001.011.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8490-2
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.011.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8490-2
Reference	USN-1		

Composition

See Page 17500.1

Fabrication History

See Page 17500.11

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	109.0	94.3	*	23	69.0

* - not reported

Material HY80

Description

Material Code	001.011.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8490-2
Reference	USN-1		

Composition

See Page 17500.1

Fabrication History

See Page 17500.11

Property Measurements

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

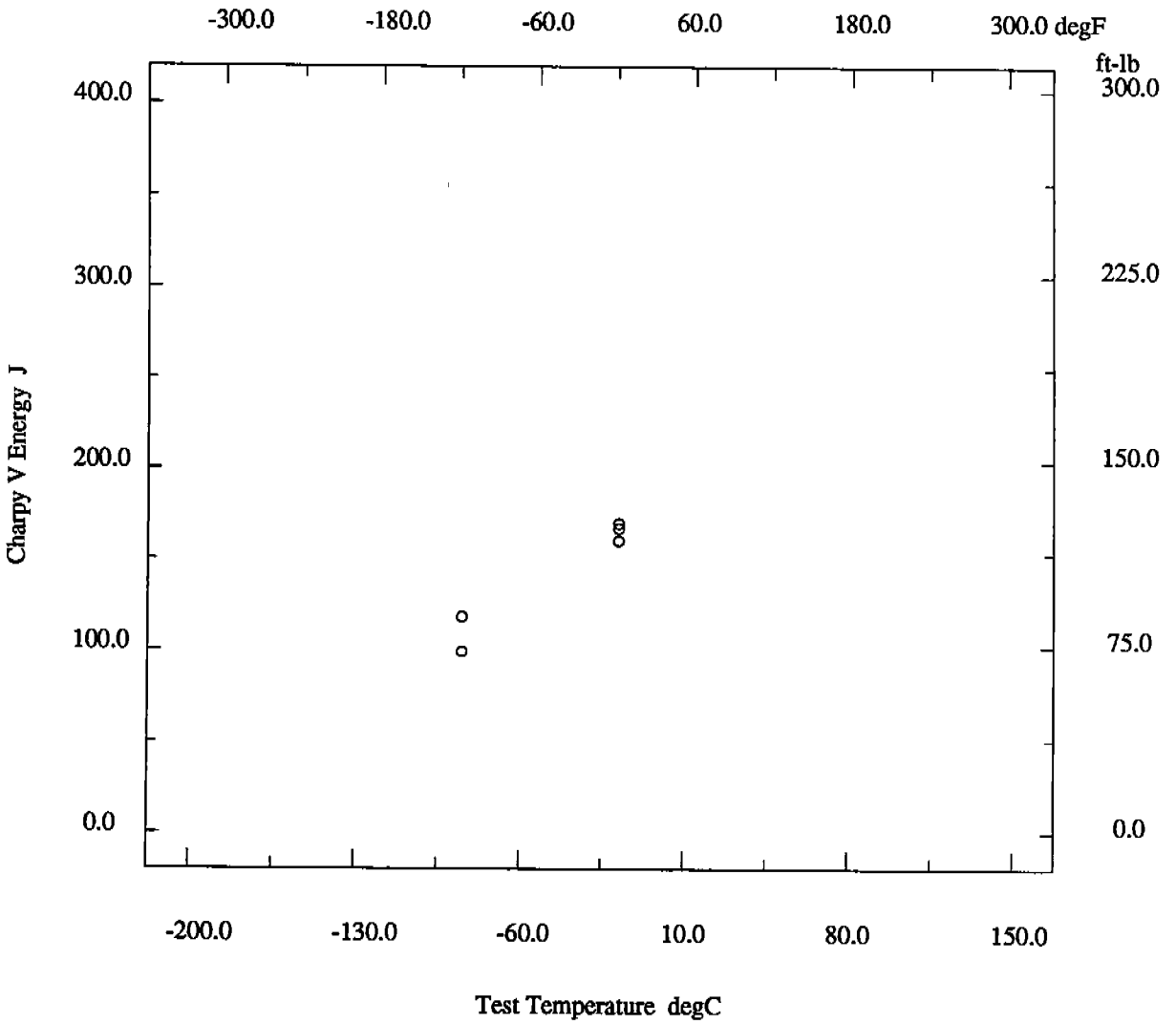
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	73
T-L °	-120	87
T-L °	-120	87
T-L °	0	118
T-L °	0	123
T-L °	0	125

* - not reported

Material HY80

Description

Material Code	001.011.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8490-2
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.011.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8490-2
Reference	USN-1		

Composition

See Page 17500.1

Fabrication History

See Page 17500.11

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	108.0	93.4	*	21	67.0

* - not reported

Material HY80

Description

Material Code	001.011.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8490-2
Reference	USN-1		

Composition

See Page 17500.1

Fabrication History

See Page 17500.11

Property Measurements

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

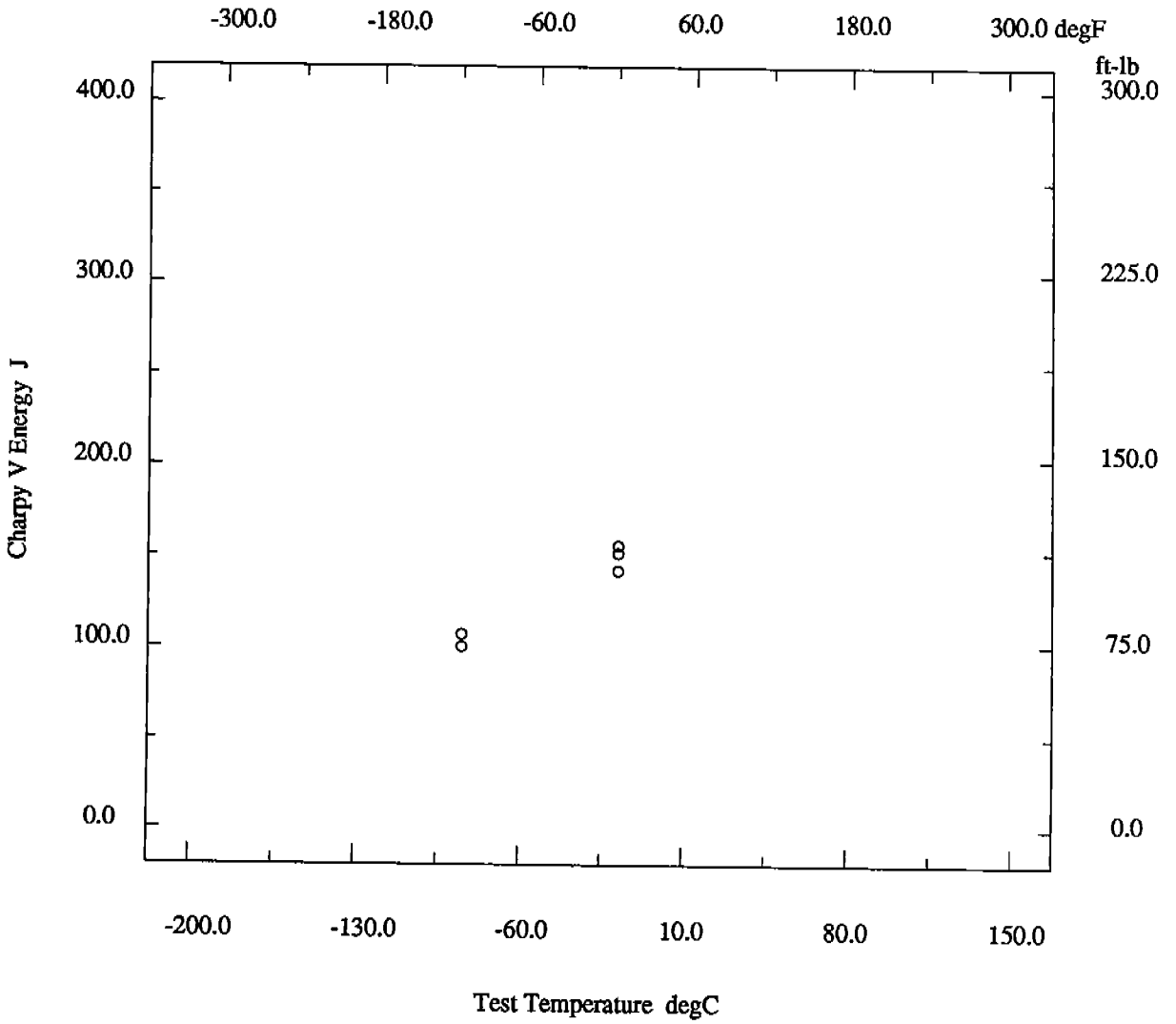
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	74
T-L °	-120	79
T-L °	-120	79
T-L °	0	105
T-L °	0	112
T-L °	0	115

* - not reported

Material HY80

Description

Material Code	001.011.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8490-2
Reference	USN-1		



* - not reported

237
238X

Material HY80

Description

Material Code	001.012.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8687-1
Reference	USN-1		

Composition

C	0.17 %	Mn	0.28 %
P	0.009 %	S	0.016 %
Si	0.22 %	Cr	1.48 %
Ni	2.69 %	Mo	0.39 %
V	0.01 %	Cu	0.14 %
Cb	*	Ti	0.003 %
B	*	Al	0.033 %
N	*	Other Components	As=0.009;Sn=0.012;Sb=0.005 %

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Top	Killing Process	*
Process Temperature	1660 degF	Process Time	2.5 hr
Rolling Conditions	89 %	Final Processing	A,Q,T
Final Temperature	1260 degF	Final Time	2.5 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	106	89.3	*	24	71.3

* - not reported

Material HY80

Description

Material Code	001.012.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8687-1
Reference	USN-1		

Composition See Page 17600.1

Fabrication History See Page 17600.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
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 ○	-120	61
L-T ○	-120	63
L-T ○	-120	64
L-T ○	-120	67
L-T ○	-120	69
L-T ○	-40	60
L-T ○	-40	68
L-T ○	-40	70
L-T ○	-40	72
L-T ○	-40	72
L-T ○	0	60
L-T ○	0	60
L-T ○	0	60
L-T ○	0	70
L-T ○	0	78
L-T ○	32	68
L-T ○	32	70
L-T ○	32	72
L-T ○	32	82
L-T ○	32	82
L-T ○	70	64
L-T ○	70	66
L-T ○	70	72
L-T ○	70	73
L-T ○	70	78
T-L △	-120	54
T-L △	-120	56
T-L △	-120	56
T-L △	-120	56
T-L △	-120	60
T-L △	-40	68
T-L △	-40	68
T-L △	-40	68

* - not reported

(continued)

Material HY80

(continued)

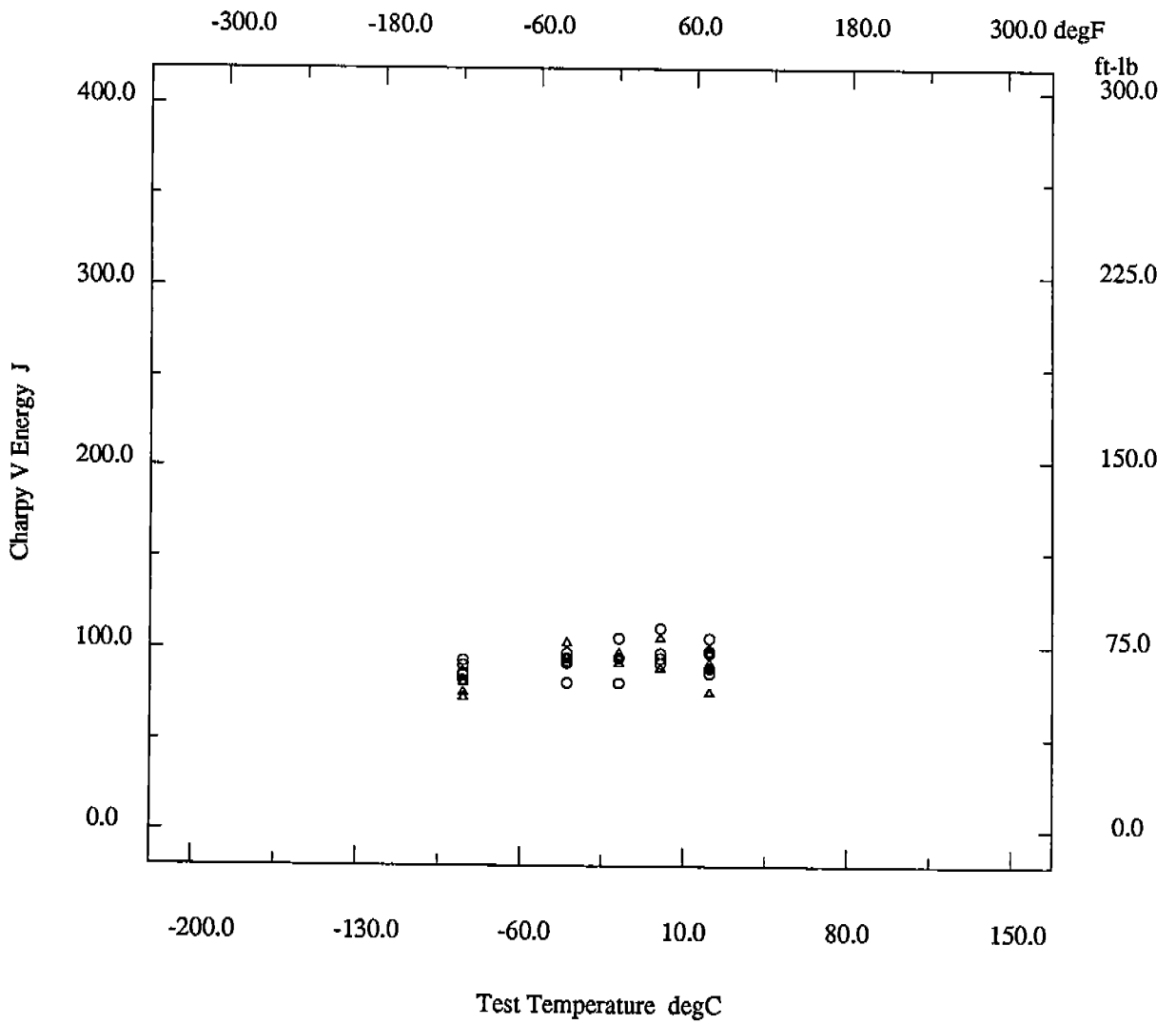
Orien	Test Temp degF	CVN Energy ft-lb
T-L △	-40	70
T-L △	-40	76
T-L △	0	68
T-L △	0	70
T-L △	0	70
T-L △	0	72
T-L △	0	72
T-L △	32	66
T-L △	32	66
T-L △	32	78
T-L △	32	78
T-L △	32	78
T-L △	70	56
T-L △	70	66
T-L △	70	68
T-L △	70	72
T-L △	70	74

* - not reported

Material HY80

Description

Material Code	001.012.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8687-1
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.012.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8687-1
Reference	USN-1		

Composition

See Page 17600.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Bottom	Killing Process	*
Process Temperature	1660 degF	Process Time	2.5 hr
Rolling Conditions	89 %	Final Processing	A,Q,T
Final Temperature	1260 degF	Final Time	2.5 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	104	86.7	*	25	70.5

* - not reported

Material HY80

Description

Material Code	001.012.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8687-1
Reference	USN-1		

Composition

See Page 17600.1

Fabrication History

See Page 17600.5

Property Measurements

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

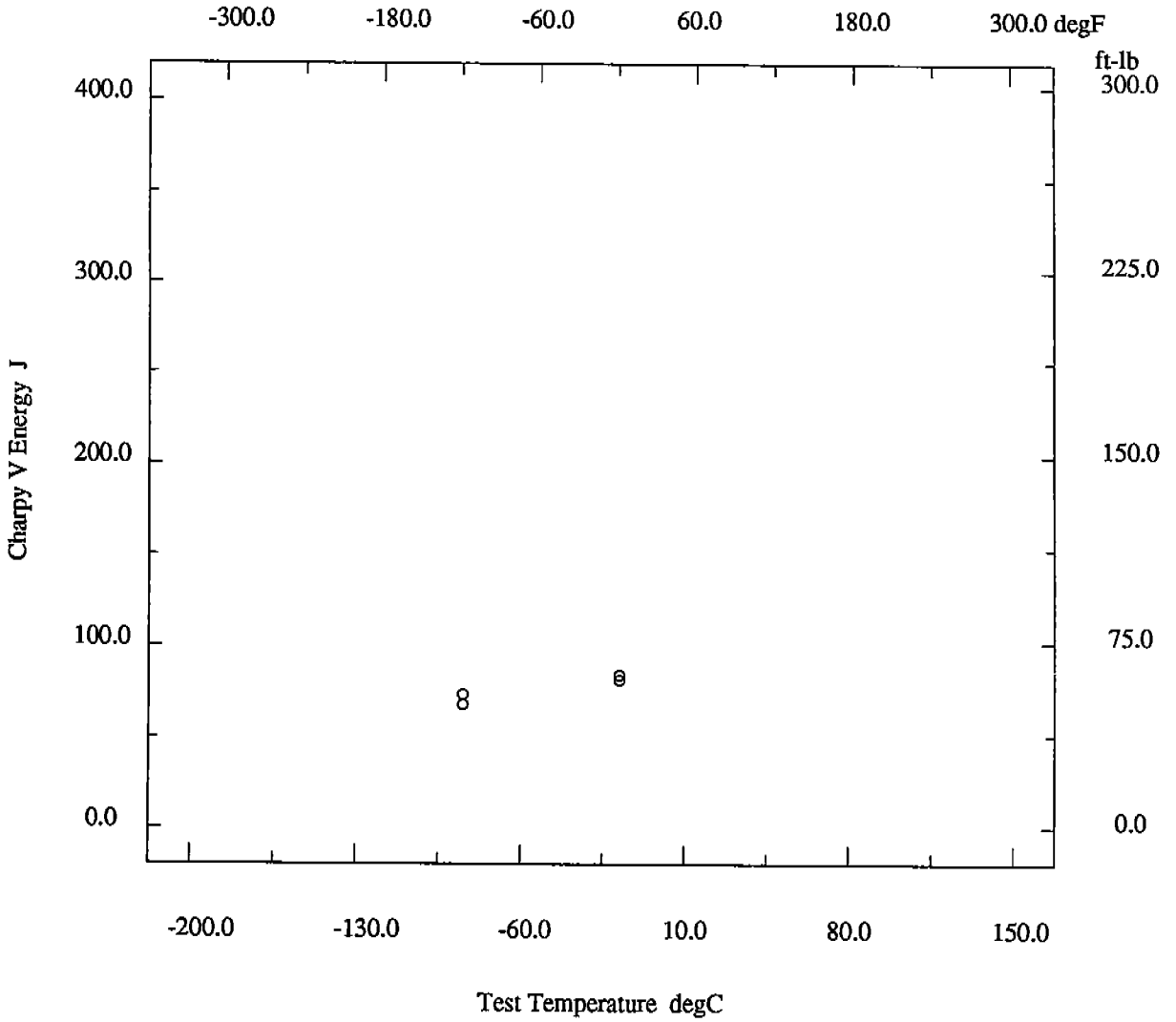
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	50
T-L °	-120	50
T-L °	-120	54
T-L °	0	60
T-L °	0	60
T-L °	0	62

* - not reported

Material HY80

Description

Material Code	001.012.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.5 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8687-1
Reference	USN-1		



* - not reported

245

246X

Material HY80

Description

Material Code	001.013.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		

Composition

C	0.15 %	Mn	0.33 %
P	0.013 %	S	0.018 %
Si	0.23 %	Cr	1.56 %
Ni	2.82 %	Mo	0.40 %
V	0.01 %	Cu	0.15 %
Cb	*	Ti	0.003 %
B	*	Al	0.026 %
N	*	Other Components	As=0.008;Sn=0.014;Sb=0.007 %

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Top	Killing Process	*
Process Temperature	1660 degF	Process Time	2.46 hr
Rolling Conditions	75 %	Final Processing	A,Q,T
Final Temperature	1280 degF	Final Time	2.25 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	100.5	84.4	*	24	68.5

* - not reported

Material HY80

Description

Material Code	001.013.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		

Composition

See Page 17700.1

Fabrication History

See Page 17700.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
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 ○	-120	108
L-T ○	-120	110
L-T ○	-120	112
L-T ○	-120	112
L-T ○	-120	118
L-T ○	-40	112
L-T ○	-40	114
L-T ○	-40	116
L-T ○	-40	118
L-T ○	-40	122
L-T ○	0	116
L-T ○	0	120
L-T ○	0	120
L-T ○	0	120
L-T ○	0	122
L-T ○	32	120
L-T ○	32	124
L-T ○	32	124
L-T ○	32	124
L-T ○	32	126
L-T ○	70	116
L-T ○	70	118
L-T ○	70	118
L-T ○	70	120
L-T ○	70	122
T-L △	-120	50
T-L △	-120	54
T-L △	-120	60
T-L △	-120	62
T-L △	-120	64
T-L △	-40	58
T-L △	-40	58
T-L △	-40	60

(continued)

* - not reported

Material HY80

(continued)

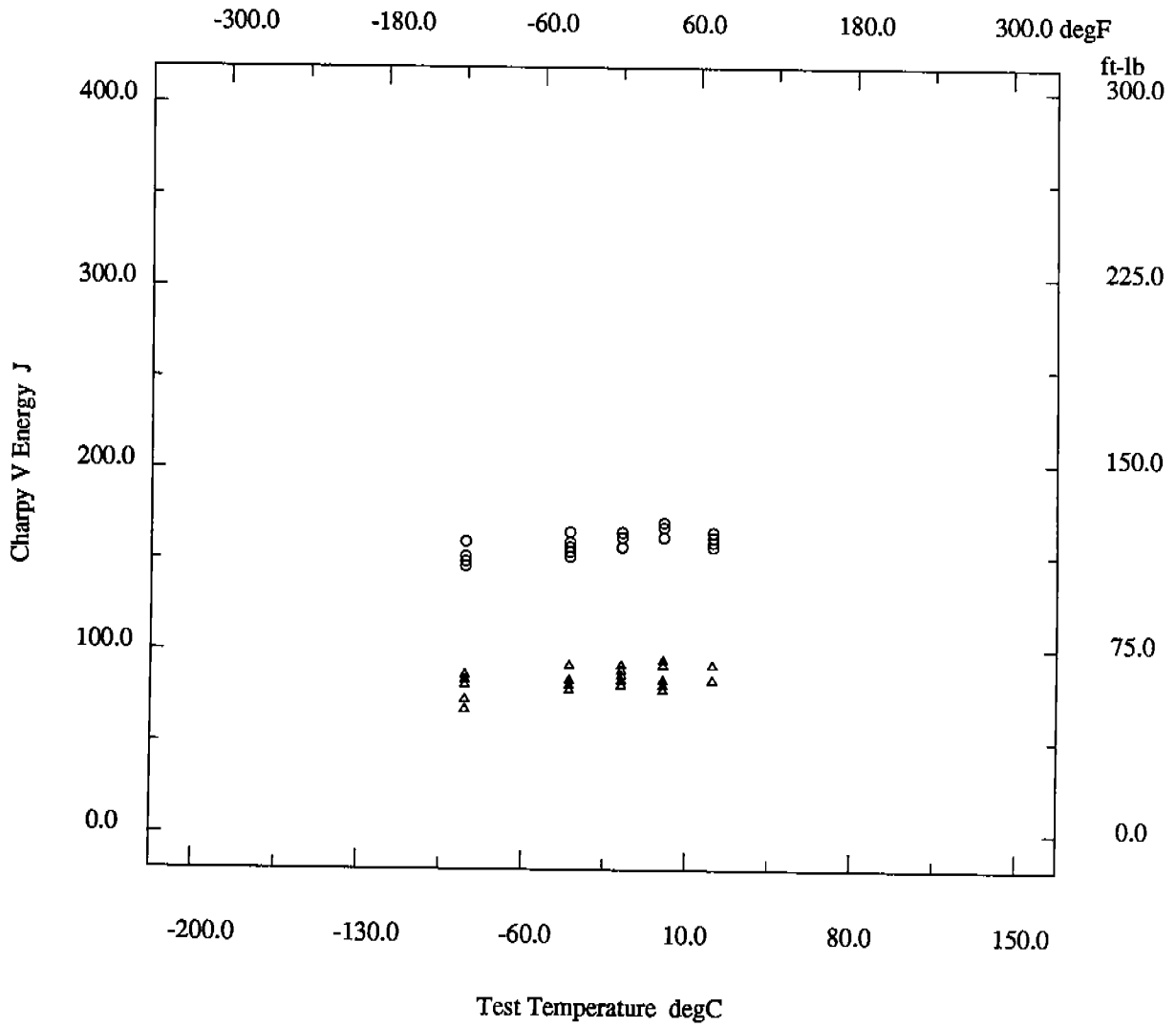
Orien	Test Temp degF	CVN Energy ft-lb
T-L △	-40	62
T-L △	-40	68
T-L △	0	60
T-L △	0	62
T-L △	0	64
T-L △	0	66
T-L △	0	68
T-L △	32	58
T-L △	32	60
T-L △	32	62
T-L △	32	68
T-L △	32	70
T-L △	70	62
T-L △	70	62
T-L △	70	62
T-L △	70	68
T-L △	70	68

* - not reported

Material HY80

Description

Material Code	001.013.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.013.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		

Composition

See Page 17700.1

Fabrication History

See Page 17700.1

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	106.0	90.1	*	22	64.5

* - not reported

Material HY80

Description

Material Code	001.013.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		

Composition

See Page 17700.1

Fabrication History

See Page 17700.1

Property Measurements

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

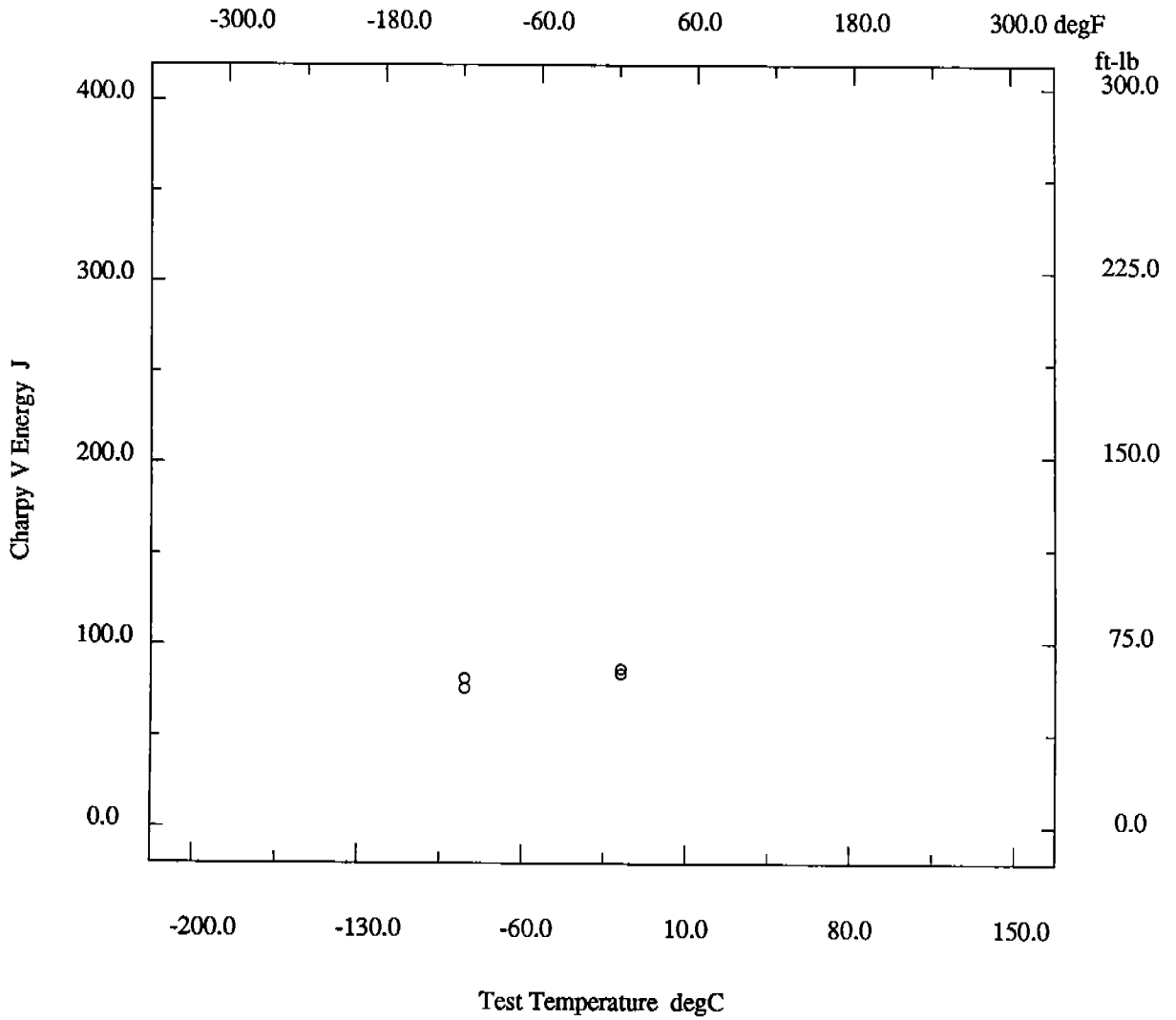
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	56
T-L °	-120	60
T-L °	-120	60
T-L °	0	62
T-L °	0	62
T-L °	0	64

* - not reported

Material HY80

Description

Material Code	001.013.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.013.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		

Composition

See Page 17700.1

Fabrication History

See Page 17700.1

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	105.7	89.9	*	23	63.6

* - not reported

Material HY80

Description

Material Code	001.013.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		

Composition

See Page 17700.1

Fabrication History

See Page 17700.1

Property Measurements

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

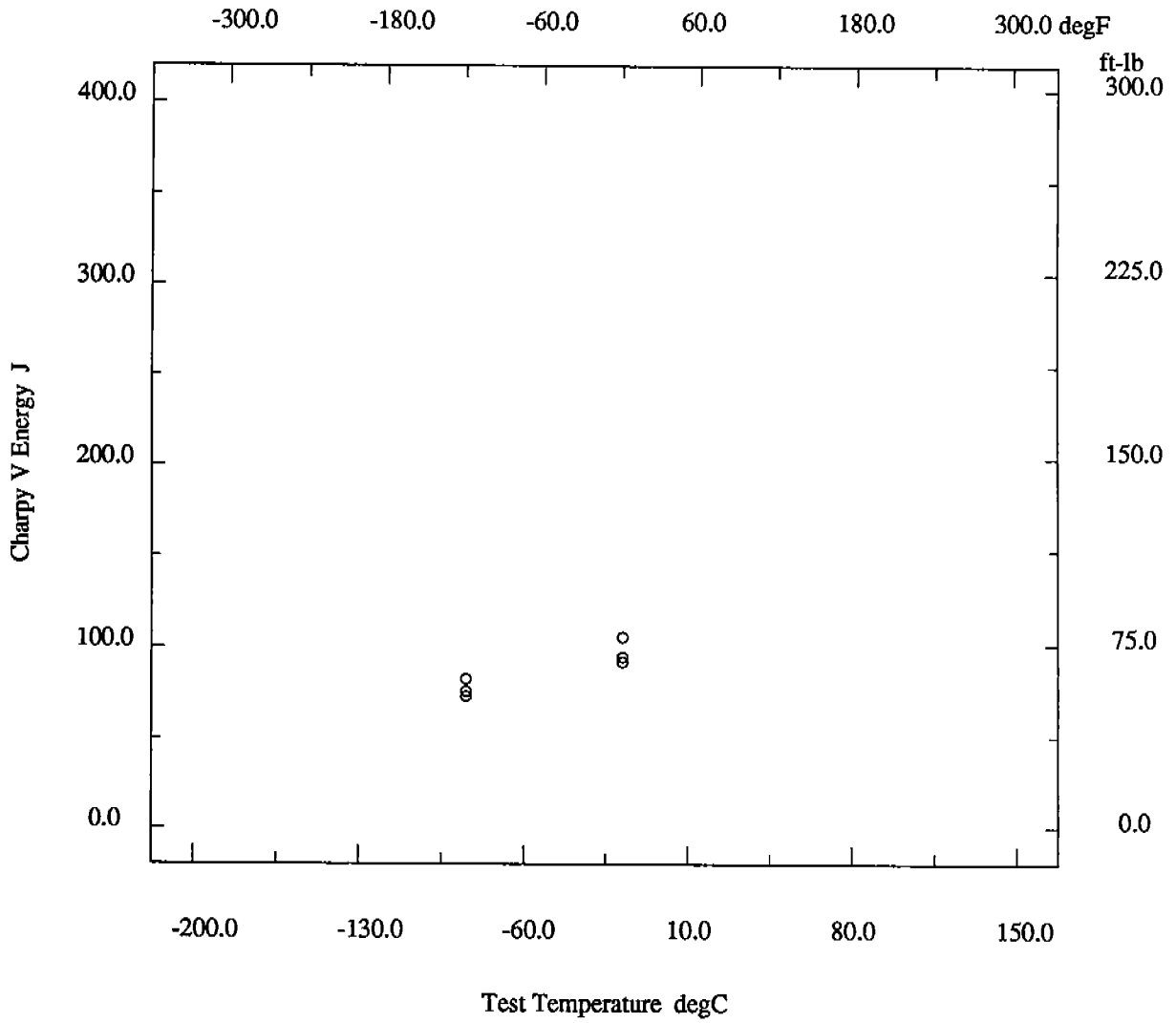
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	54
T-L °	-120	56
T-L °	-120	61
T-L °	0	68
T-L °	0	70
T-L °	0	78

* - not reported

Material HY80

Description

Material Code	001.013.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.013.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		

Composition

See Page 17700.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Mid	Killing Process	*
Process Temperature	1660 degF	Process Time	2.46 hr
Rolling Conditions	75 %	Final Processing	A,Q,T
Final Temperature	1280 degF	Final Time	2.25 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	101.5	87.8	*	23	66.7

* - not reported

Material HY80

Description

Material Code	001.013.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		

Composition

See Page 17700.1

Fabrication History

See Page 17700.11

Property Measurements

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

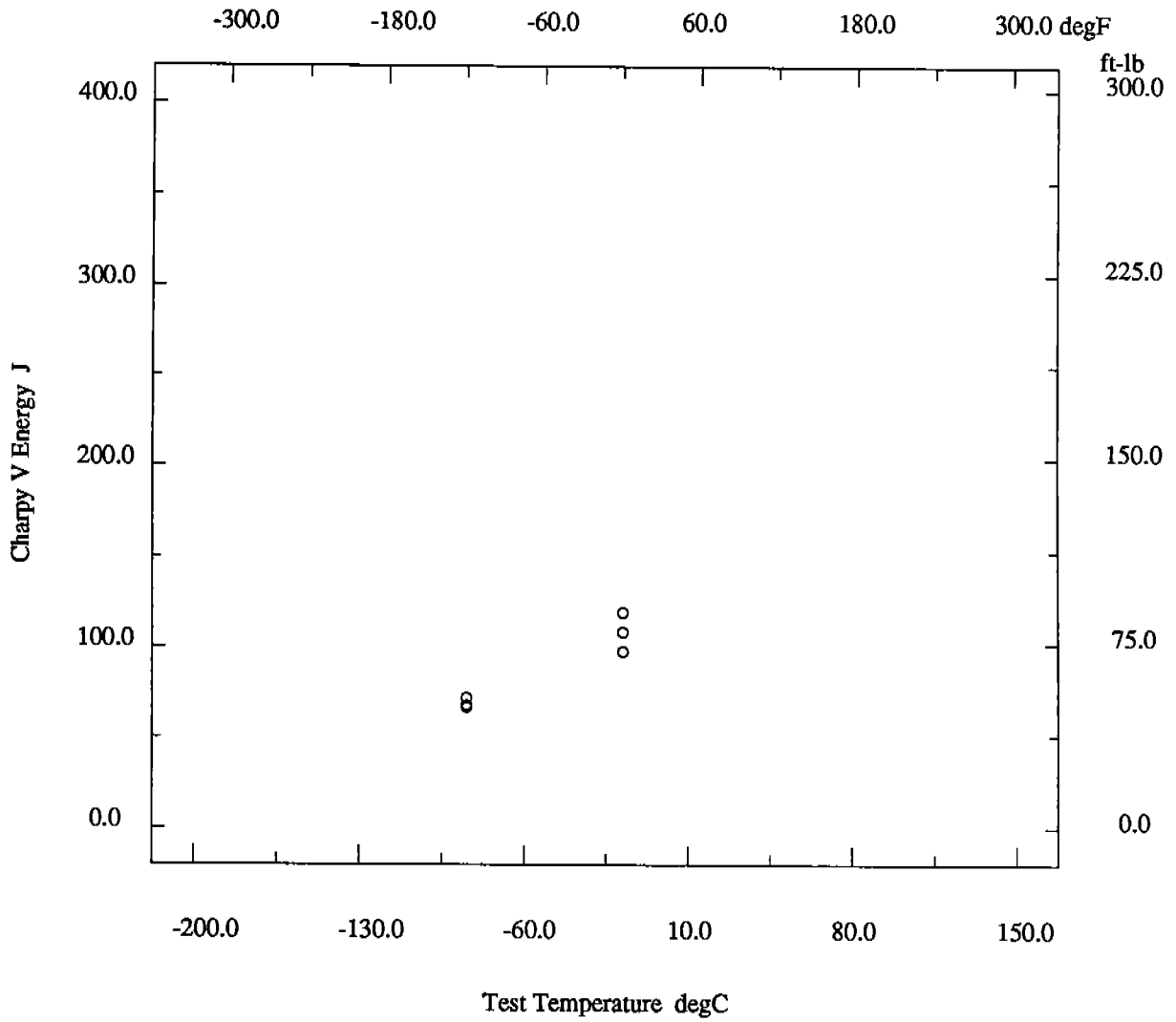
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	49
T-L °	-120	50
T-L °	-120	53
T-L °	0	72
T-L °	0	80
T-L °	0	88

* - not reported

Material HY80

Description

Material Code	001.013.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.013.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		

Composition

See Page 17700.1

Fabrication History

See Page 17700.11

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	108.5	93.7	*	23	64.4

* - not reported

Material HY80

Description

Material Code	001.013.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		

Composition

See Page 17700.1

Fabrication History

See Page 17700.11

Property Measurements

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

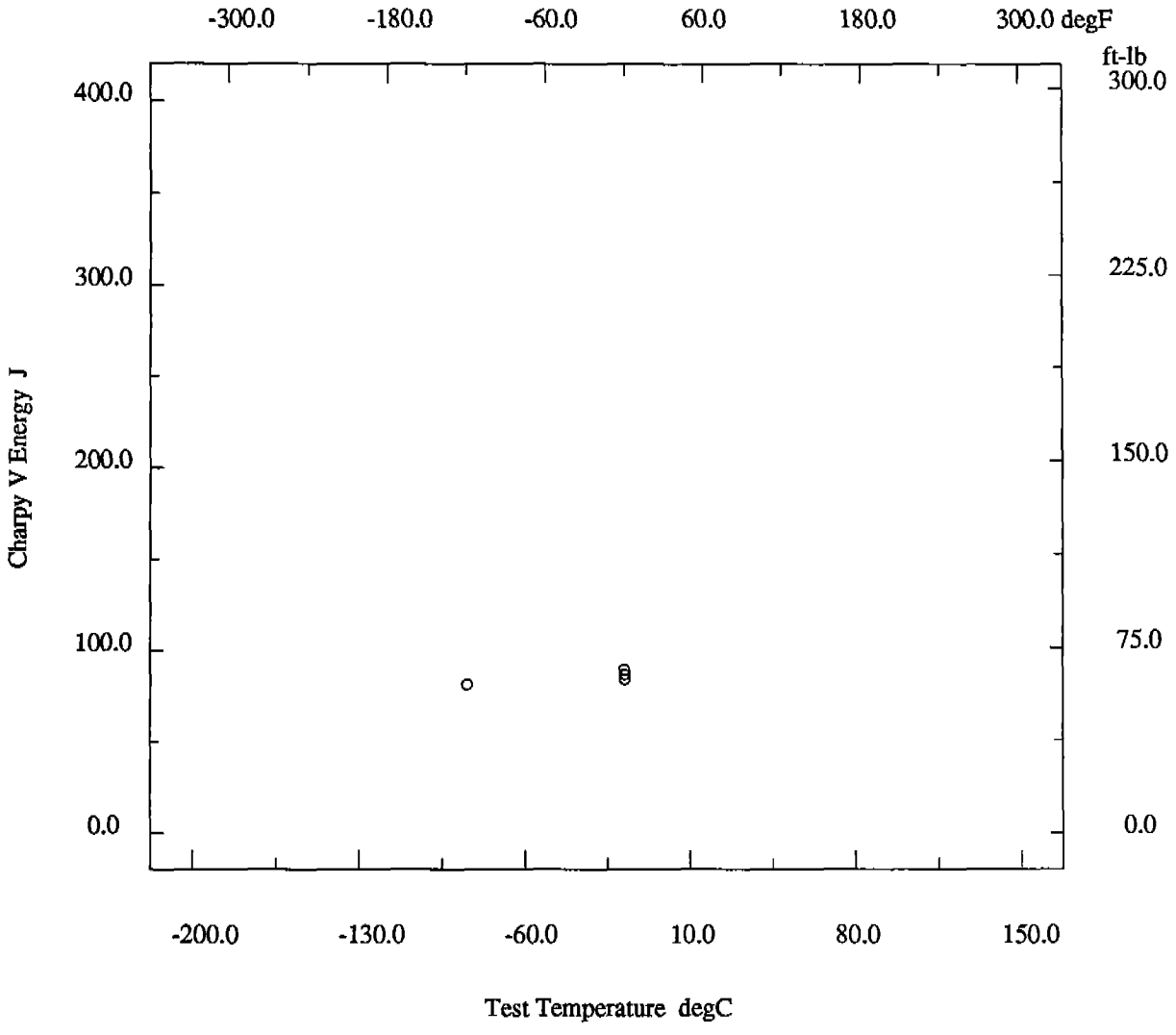
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	60
T-L °	-120	60
T-L °	-120	60
T-L °	0	62
T-L °	0	64
T-L °	0	66

* - not reported

Material HY80

Description

Material Code	001.013.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		



* - not reported

262

Material HY80

Description

Material Code	001.013.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		

Composition

See Page 17700.1

Fabrication History

See Page 17700.11

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	106.1	90.5	*	22	64.2

* - not reported

Material HY80

Description

Material Code	001.013.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		

Composition

See Page 17700.1

Fabrication History

See Page 17700.11

Property Measurements

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

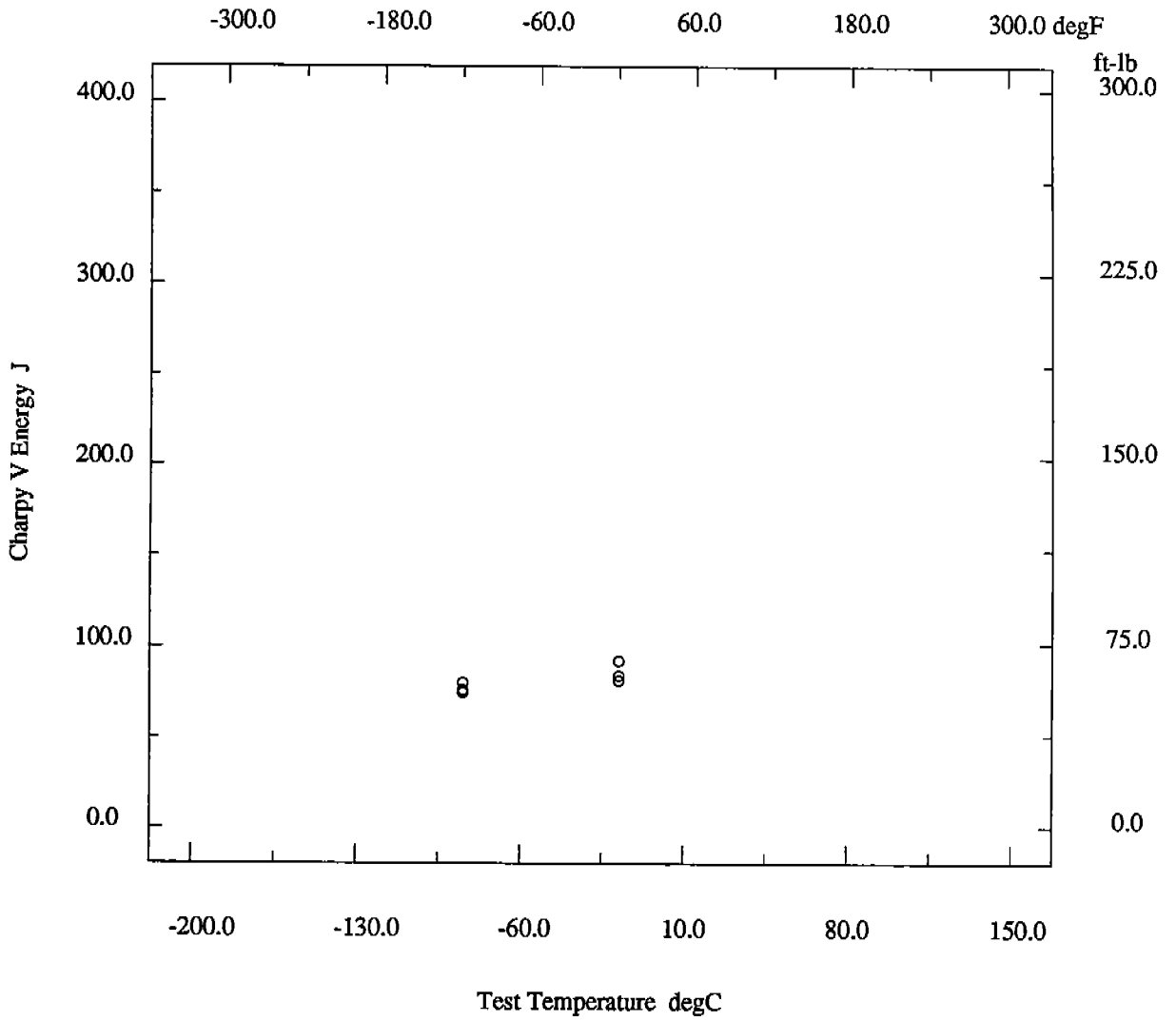
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	55
T-L °	-120	56
T-L °	-120	59
T-L °	0	60
T-L °	0	62
T-L °	0	68

* - not reported

Material HY80

Description

Material Code	001.013.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.013.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		

Composition

See Page 17700.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Bottom	Killing Process	*
Process Temperature	1660 degF	Process Time	2.46 hr
Rolling Conditions	75 %	Final Processing	A,Q,T
Final Temperature	1280 degF	Final Time	2.25 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	101.5	87.3	*	23	66.8

* - not reported

Material HY80

Description

Material Code	001.013.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		

Composition

See Page 17700.1

Fabrication History

See Page 17700.20

Property Measurements

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

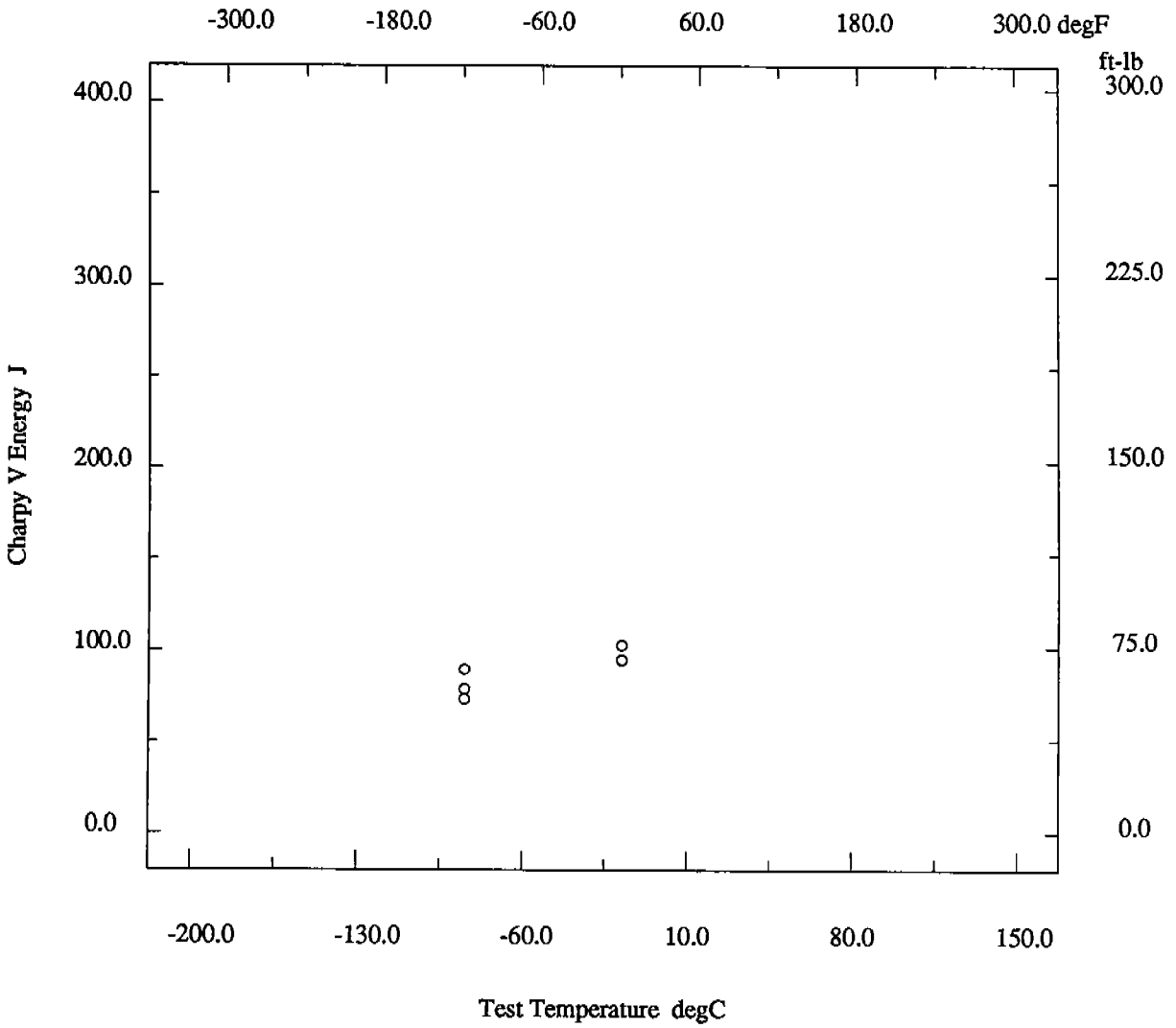
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	54
T-L °	-120	58
T-L °	-120	66
T-L °	0	70
T-L °	0	76
T-L °	0	76

* - not reported

Material HY80

Description

Material Code	001.013.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.013.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		

Composition

See Page 17700.1

Fabrication History

See Page 17700.20

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	106.0	90.2	*	22	64.3

* - not reported

Material HY80

Description

Material Code	001.013.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		

Composition

See Page 17700.1

Fabrication History

See Page 17700.20

Property Measurements

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

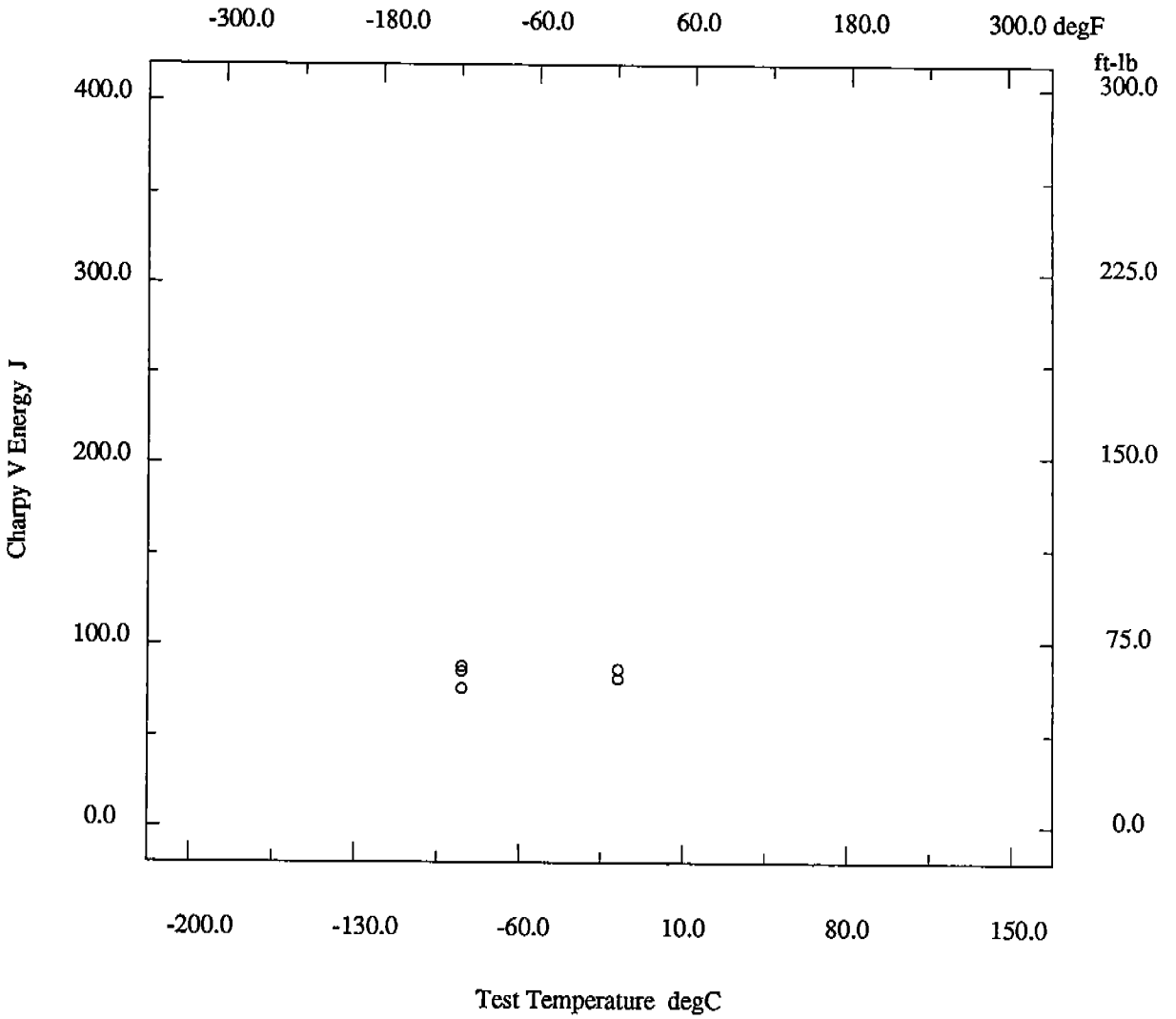
Orien	Test Temp degF	CVN Energy ft-lb
T-L ○	-120	56
T-L ○	-120	63
T-L ○	-120	65
T-L ○	0	60
T-L ○	0	60
T-L ○	0	64

* - not reported

Material HY80

Description

Material Code	001.013.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.013.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		

Composition

See Page 17700.1

Fabrication History

See Page 17700.20

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	107.0	92.8	*	22	62.5

* - not reported

Material HY80

Description

Material Code	001.013.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		

Composition

See Page 17700.1

Fabrication History

See Page 17700.20

Property Measurements

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

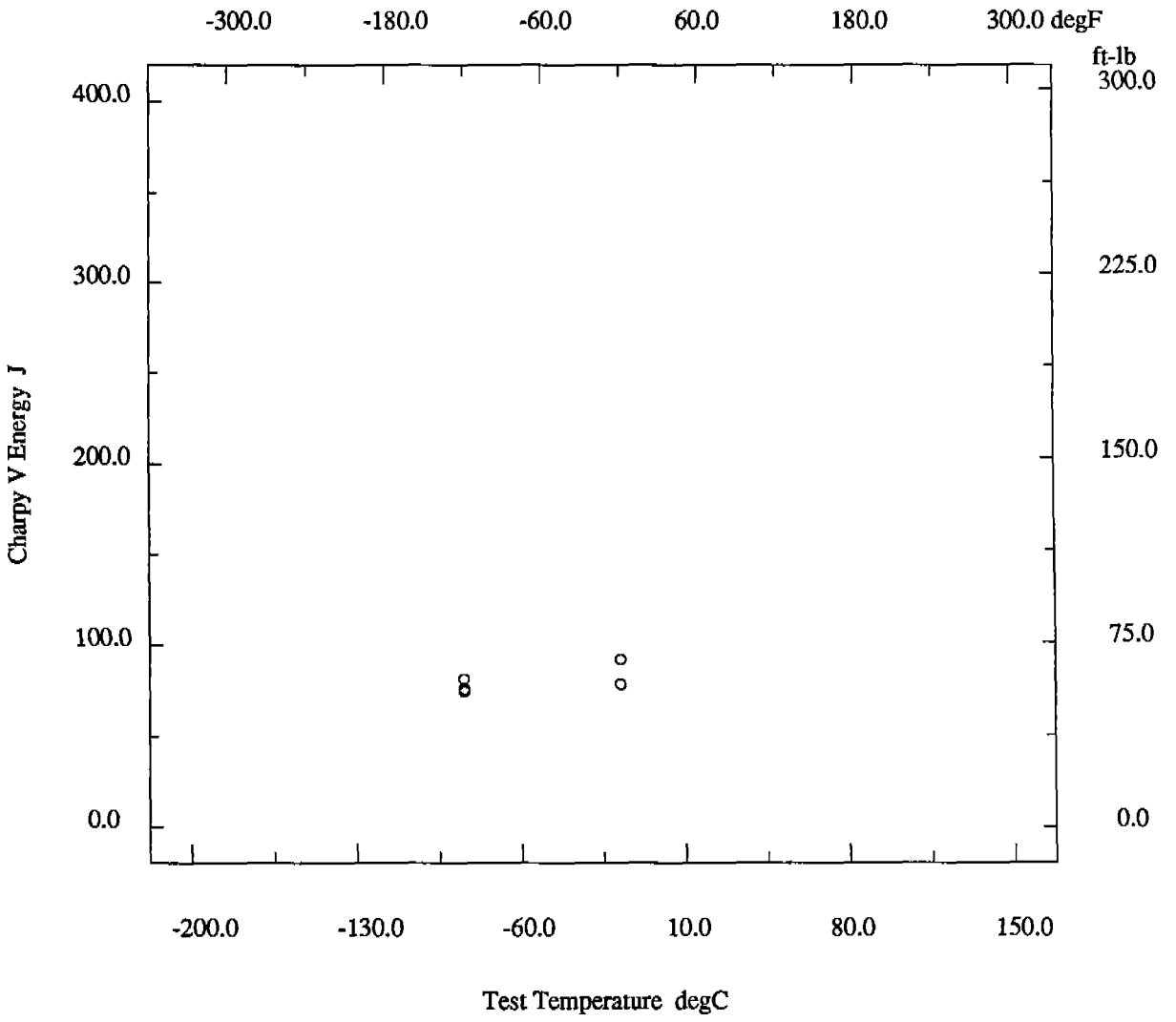
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	55
T-L °	-120	56
T-L °	-120	60
T-L °	0	58
T-L °	0	68
T-L °	0	68

* - not reported

Material HY80

Description

Material Code	001.013.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.25 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3975-3E
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.014.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.13 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8478-3
Reference	USN-1		

Composition

C	0.15 %	Mn	0.29 %
P	0.013 %	S	0.011 %
Si	0.28 %	Cr	1.47 %
Ni	2.72 %	Mo	0.39 %
V	0.007 %	Cu	0.15 %
Cb	*	Ti	0.003 %
B	*	Al	0.023 %
N	*	Other Components	As=0.007;Sn=0.013;Sb=0.005 %

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Top	Killing Process	*
Process Temperature	1660 degF	Process Time	2.3 hr
Rolling Conditions	92 %	Final Processing	A,Q,T
Final Temperature	1260 degF	Final Time	2.3 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	109.0	93.5	*	24	68

* - not reported

Material HY80

Description

Material Code	001.014.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.13 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8478-3
Reference	USN-1		

Composition

See Page 17800.1

Fabrication History

See Page 17800.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
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 ○	-120	46
L-T ○	-120	49
L-T ○	-120	51
L-T ○	-120	53
L-T ○	-120	71
L-T ○	-40	76
L-T ○	-40	77
L-T ○	-40	85
L-T ○	-40	87
L-T ○	-40	88
L-T ○	0	78
L-T ○	0	81
L-T ○	0	91
L-T ○	0	92
L-T ○	0	93
L-T ○	32	80
L-T ○	32	81
L-T ○	32	82
L-T ○	32	86
L-T ○	32	93
L-T ○	70	83
L-T ○	70	84
L-T ○	70	86
L-T ○	70	88
L-T ○	70	93
T-L △	-120	47
T-L △	-120	66
T-L △	-120	67
T-L △	-120	68
T-L △	-120	71
T-L △	-40	68
T-L △	-40	71
T-L △	-40	73

* - not reported

(continued)

Material HY80

(continued)

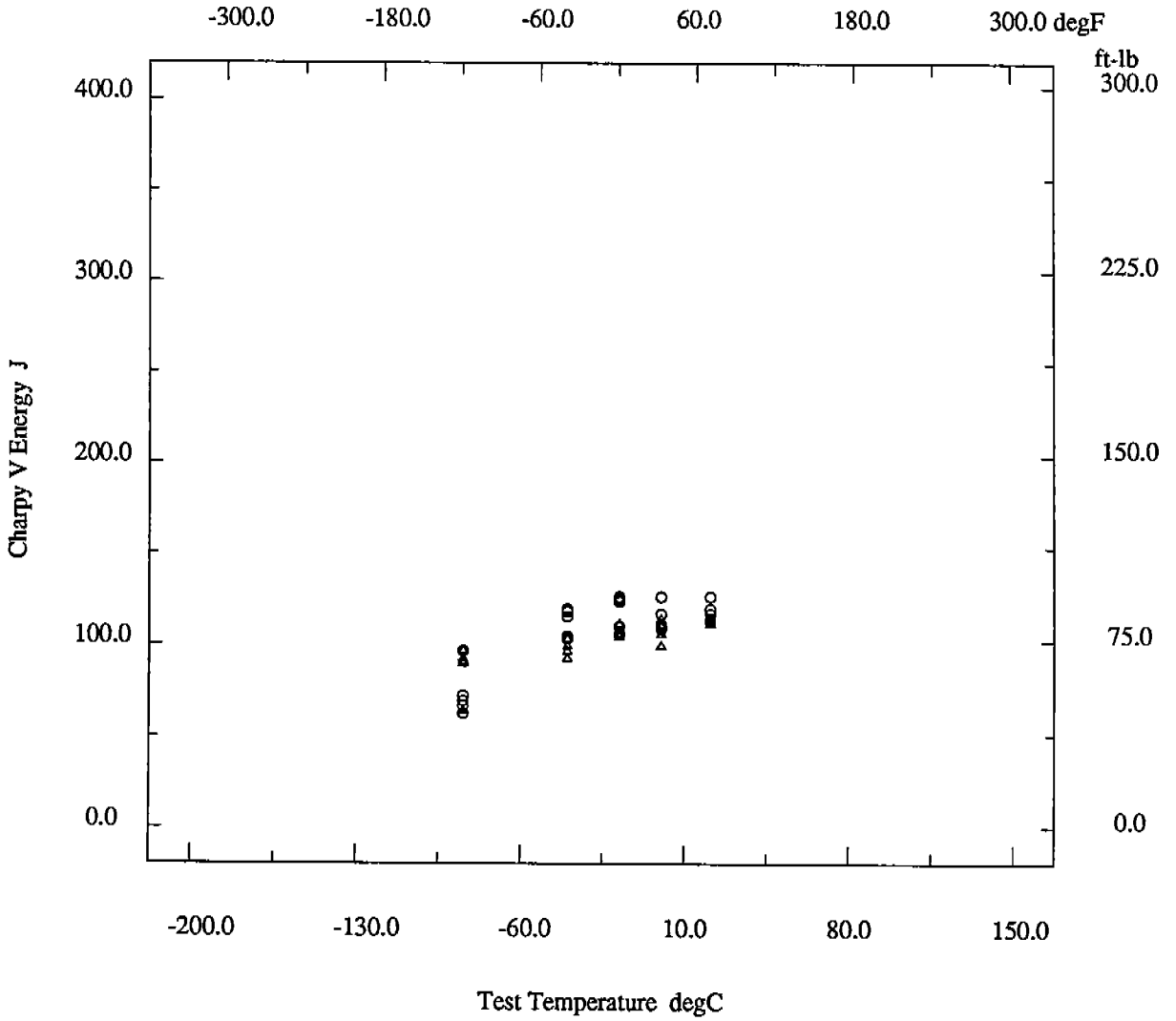
Orien	Test Temp degF	CVN Energy ft-lb
T-L △	-40	76
T-L △	-40	76
T-L △	0	77
T-L △	0	78
T-L △	0	78
T-L △	0	78
T-L △	0	82
T-L △	32	73
T-L △	32	78
T-L △	32	78
T-L △	32	82
T-L △	32	84
T-L △	70	82
T-L △	70	82
T-L △	70	83
T-L △	70	84
T-L △	70	84

* - not reported

Material HY80

Description

Material Code	001.014.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.13 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8478-3
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.014.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.13 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8478-3
Reference	USN-1		

Composition

See Page 17800.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Bottom	Killing Process	*
Process Temperature	1660 degF	Process Time	2.3 hr
Rolling Conditions	92 %	Final Processing	A,Q,T
Final Temperature	1260 degF	Final Time	2.3 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	111.5	96.5	*	22	66

* - not reported

Material HY80

Description

Material Code	001.014.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.13 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8478-3
Reference	USN-1		

Composition

See Page 17800.1

Fabrication History

See Page 17800.5

Property Measurements

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

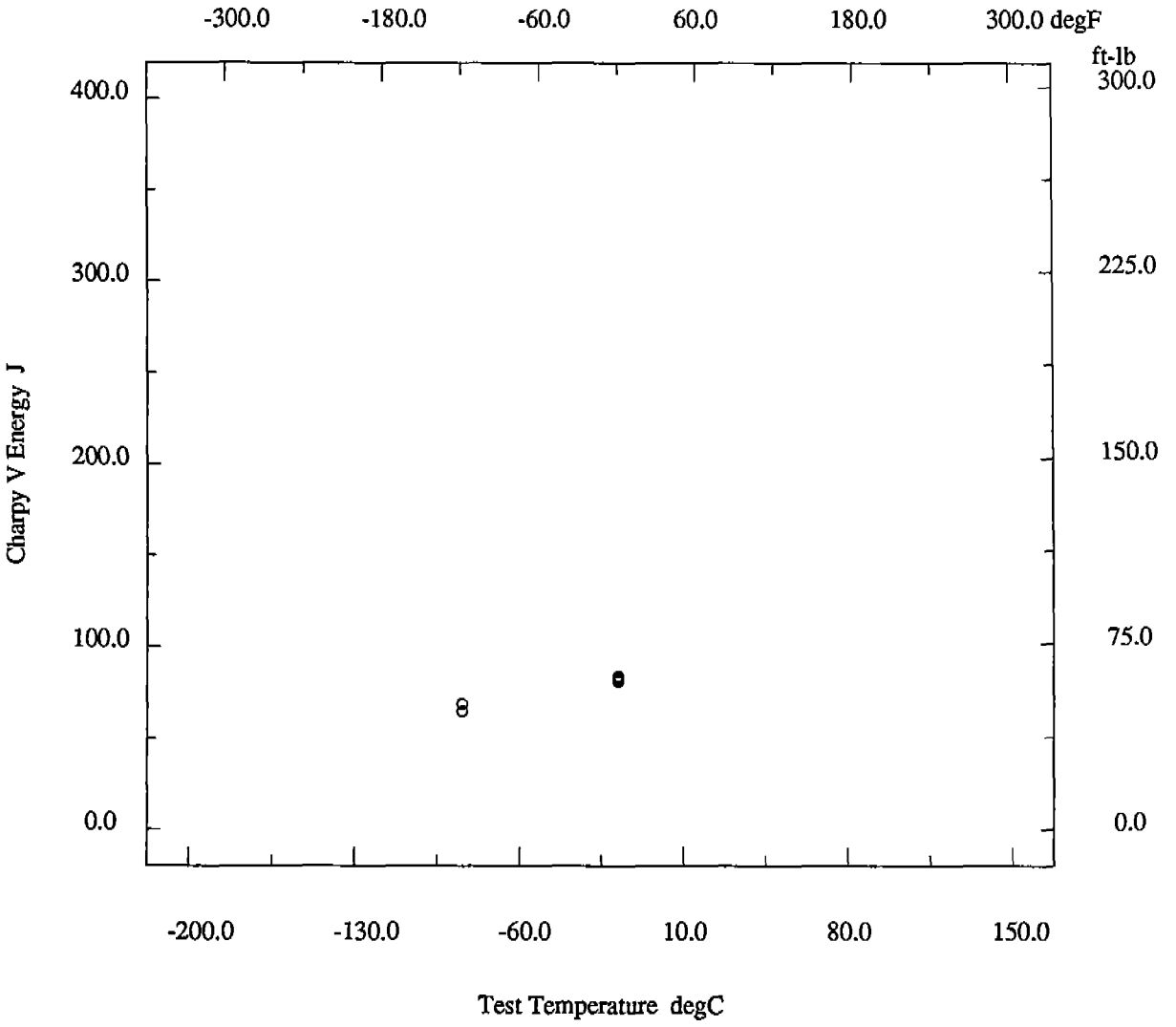
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	48
T-L °	-120	48
T-L °	-120	51
T-L °	0	60
T-L °	0	61
T-L °	0	62

* - not reported

Material HY80

Description

Material Code	001.014.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.13 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8478-3
Reference	USN-1		



* - not reported

281
282X

Material HY80

Description

Material Code	001.015.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition

C	0.15 %	Mn	0.23 %
P	0.009 %	S	0.01 %
Si	0.20 %	Cr	1.42 %
Ni	2.78 %	Mo	0.38 %
V	0.01 %	Cu	0.13 %
Cb	*	Ti	0.002 %
B	*	Al	0.022 %
N	*	Other Components	As=0.009;Sn=0.008;Sb=0.003 %

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Top	Killing Process	*
Process Temperature	1660 degF	Process Time	2.15 hr
Rolling Conditions	83 %	Final Processing	A,Q,T
Final Temperature	1280 degF	Final Time	2.35 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	105.0	90.5	*	23	65.7

* - not reported

Material HY80

Description

Material Code	001.015.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition

See Page 17900.1

Fabrication History

See Page 17900.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
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 ○	-120	130
L-T ○	-120	131
L-T ○	-120	138
L-T ○	-120	139
L-T ○	-120	146
L-T ○	-40	122
L-T ○	-40	138
L-T ○	-40	142
L-T ○	-40	149
L-T ○	-40	158
L-T ○	0	108
L-T ○	0	112
L-T ○	0	120
L-T ○	0	126
L-T ○	0	90
L-T ○	32	120
L-T ○	32	122
L-T ○	32	129
L-T ○	32	130
L-T ○	32	138
L-T ○	70	112
L-T ○	70	120
L-T ○	70	122
L-T ○	70	138
L-T ○	70	140
T-L △	-120	72
T-L △	-120	88
T-L △	-120	90
T-L △	-120	92
T-L △	-120	99
T-L △	-40	70
T-L △	-40	72
T-L △	-40	85

(continued)

* - not reported

Material HY80

(continued)

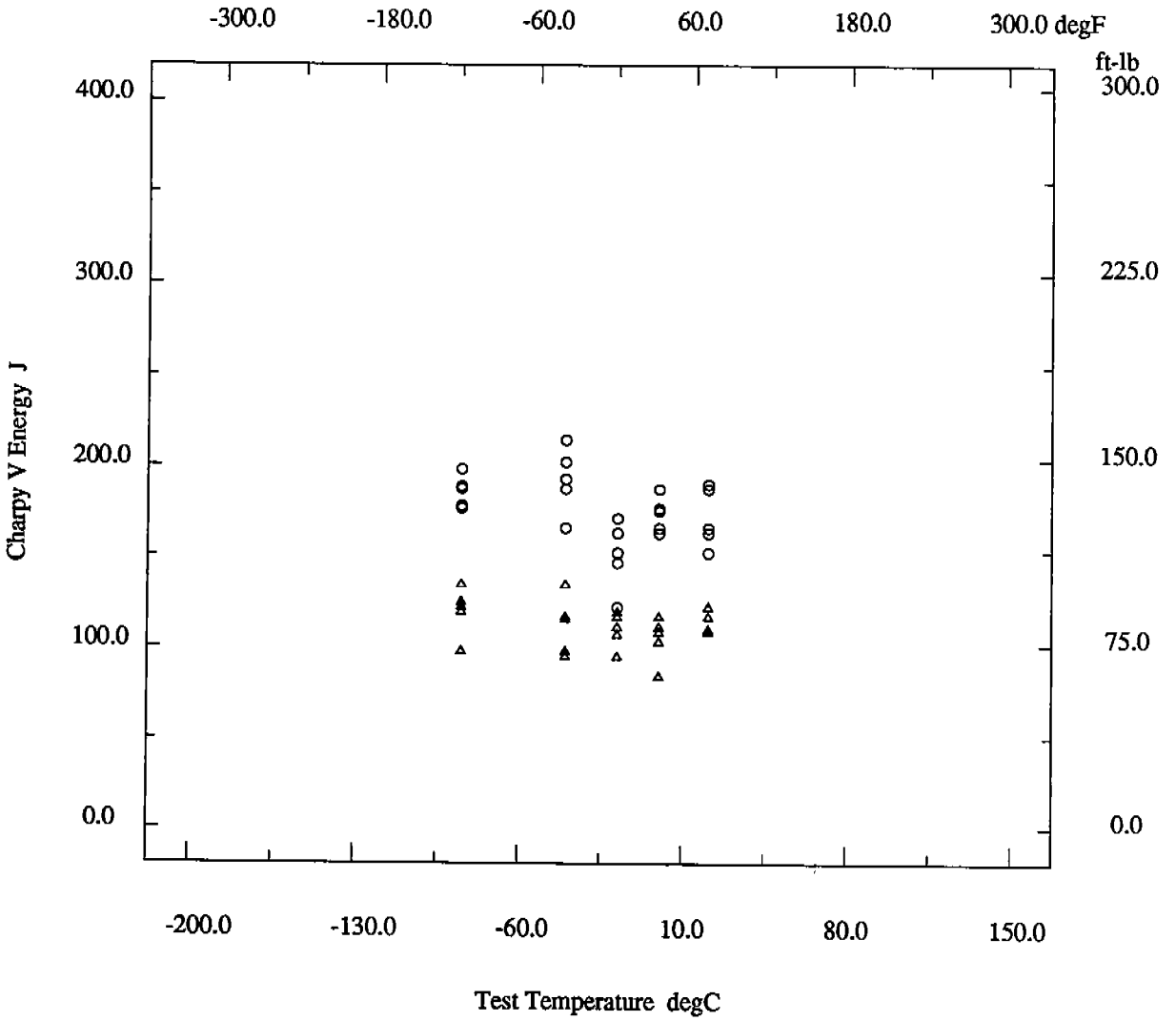
Orien	Test Temp degF	CVN Energy ft-lb
T-L △	-40	86
T-L △	-40	99
T-L △	0	70
T-L △	0	79
T-L △	0	82
T-L △	0	86
T-L △	0	88
T-L △	32	62
T-L △	32	76
T-L △	32	80
T-L △	32	82
T-L △	32	86
T-L △	70	80
T-L △	70	81
T-L △	70	86
T-L △	70	86
T-L △	70	90

* - not reported

Material HY80

Description

Material Code	001.015.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.015.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition See Page 17900.1

Fabrication History See Page 17900.1

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	*

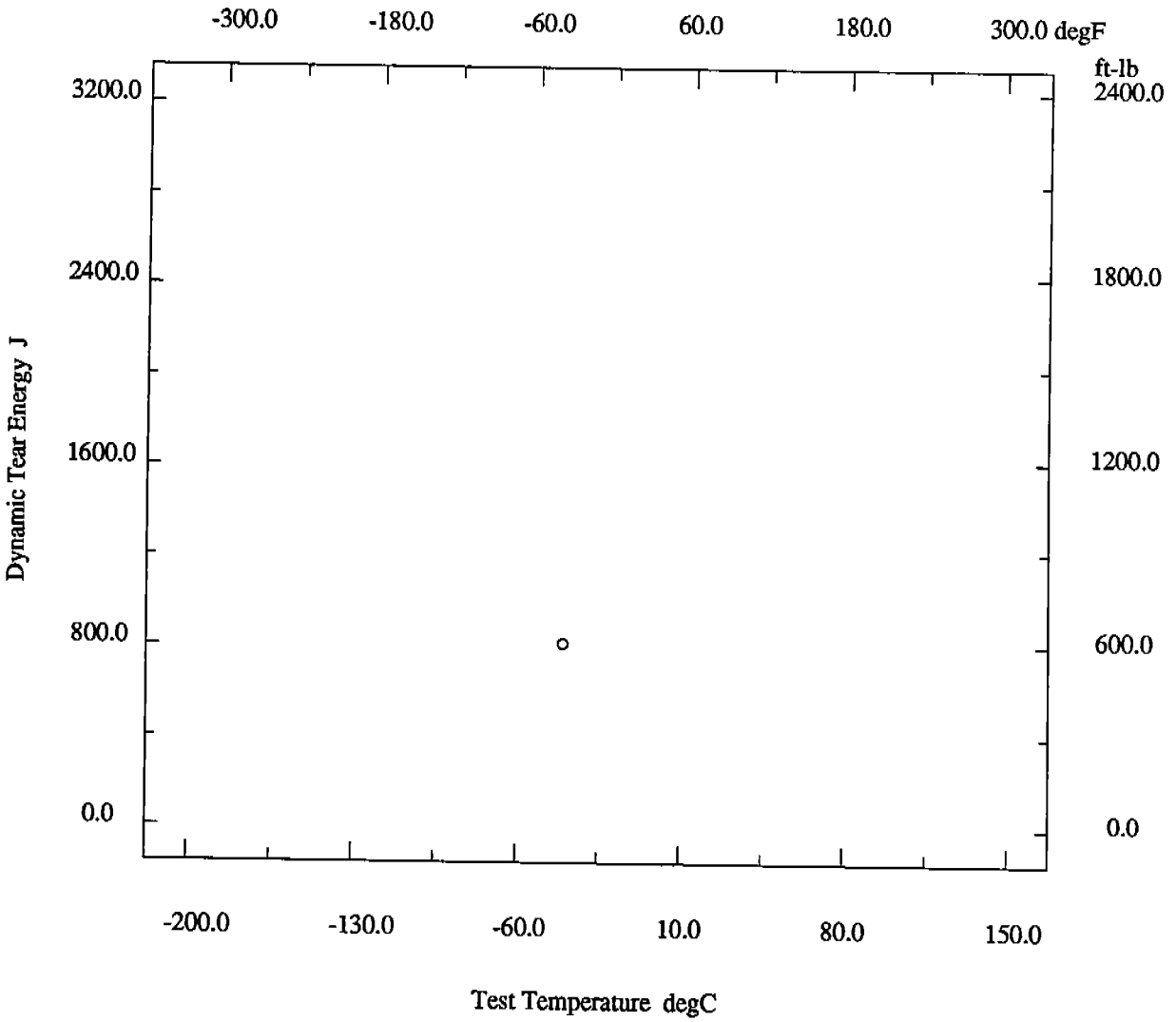
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L °	-40	600	*

* - not reported

Material HY80

Description

Material Code	001.015.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.015.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition See Page 17900.1

Fabrication History See Page 17900.1

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	103.5	88.8	*	23	70.5

* - not reported

Material HY80

Description

Material Code	001.015.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition

See Page 17900.1

Fabrication History

See Page 17900.1

Property Measurements

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

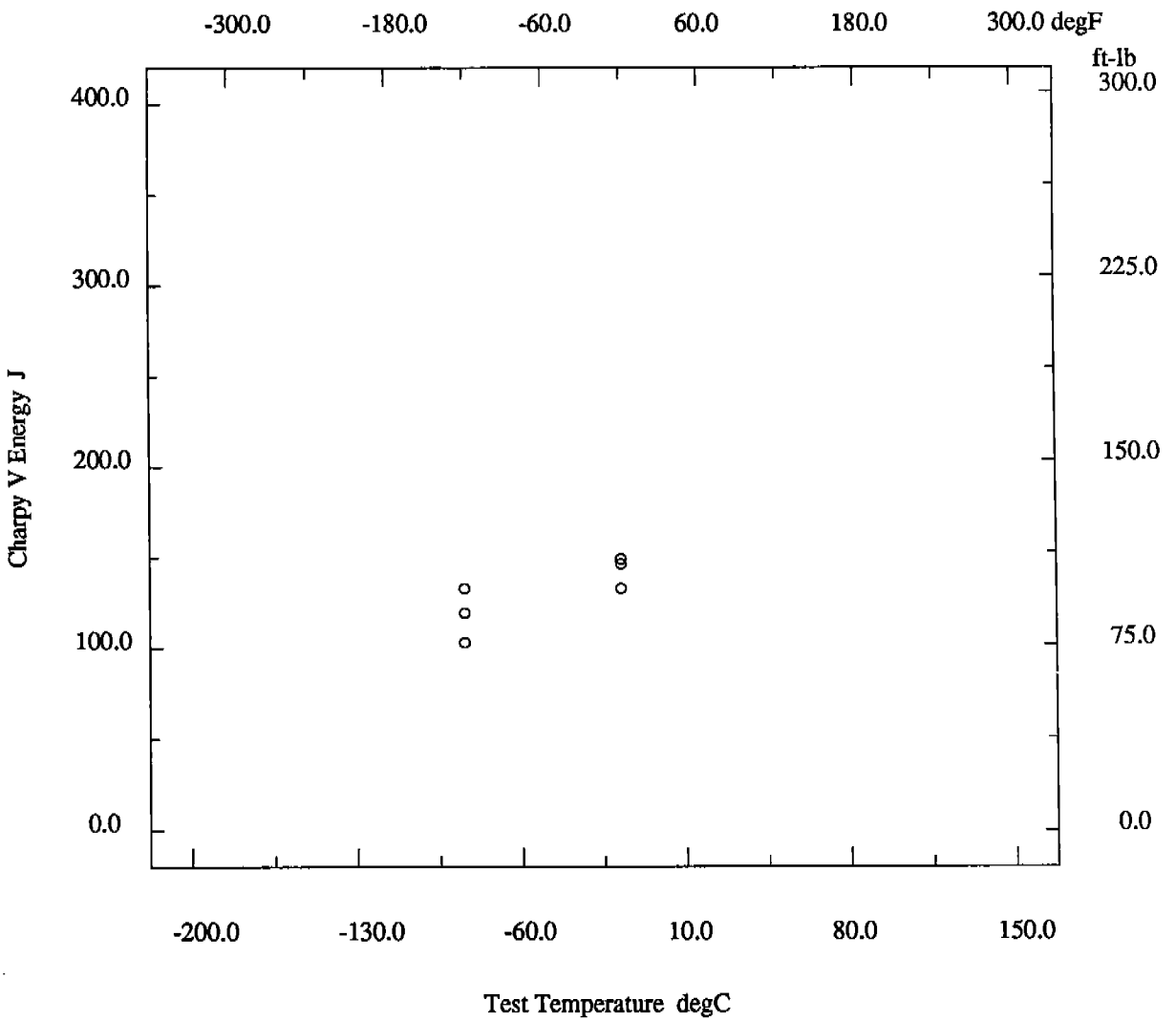
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	76
T-L °	-120	88
T-L °	-120	98
T-L °	0	108
T-L °	0	110
T-L °	0	98

* - not reported

Material HY80

Description

Material Code	001.015.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.015.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition See Page 17900.1

Fabrication History See Page 17900.1

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	*

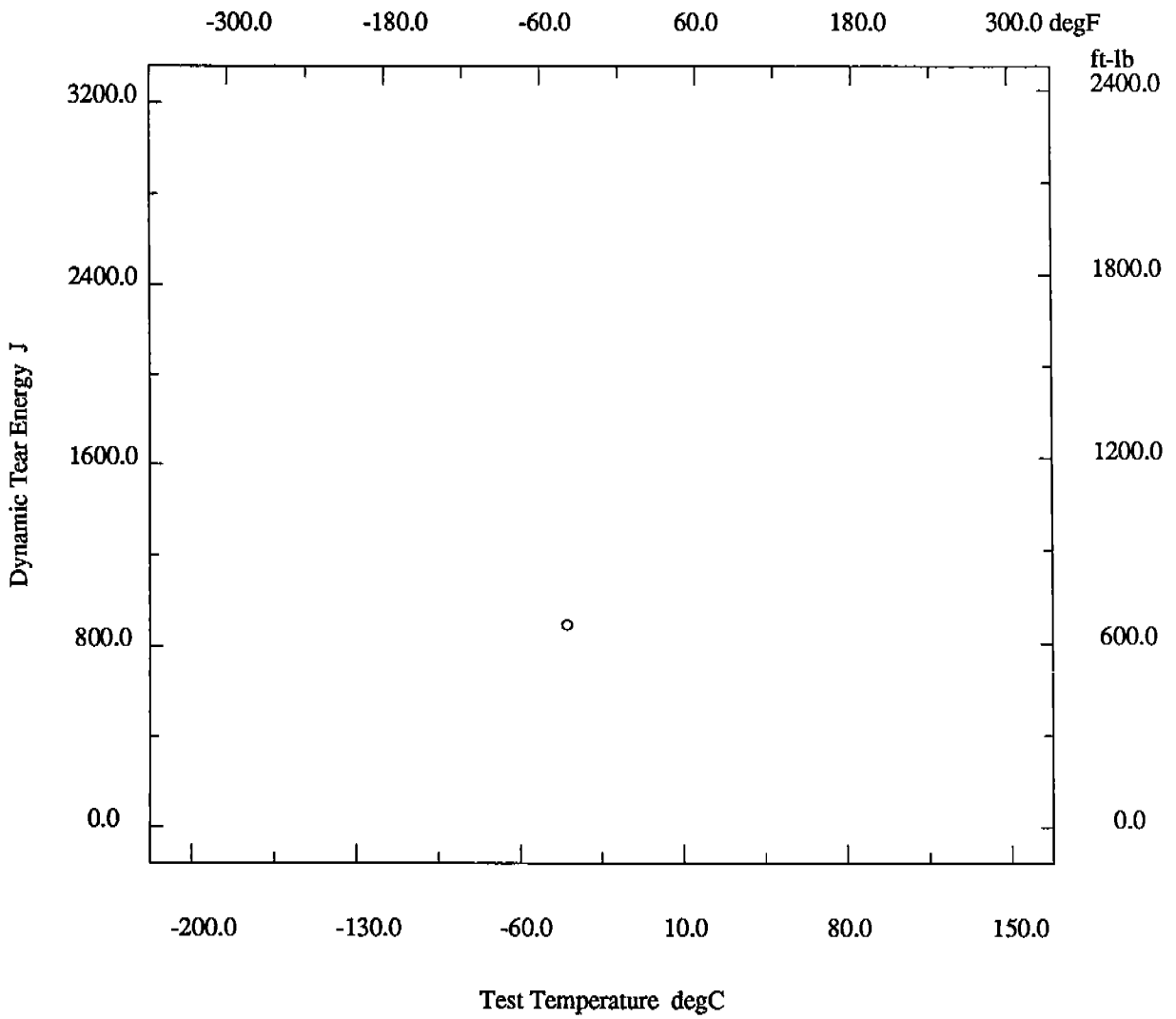
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L °	-40	660	*

* - not reported

Material HY80

Description

Material Code	001.015.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.015.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition See Page 17900.1

Fabrication History See Page 17900.1

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	103.0	88.9	*	24	70.4

* - not reported

Material HY80

Description

Material Code	001.015.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition

See Page 17900.1

Fabrication History

See Page 17900.1

Property Measurements

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

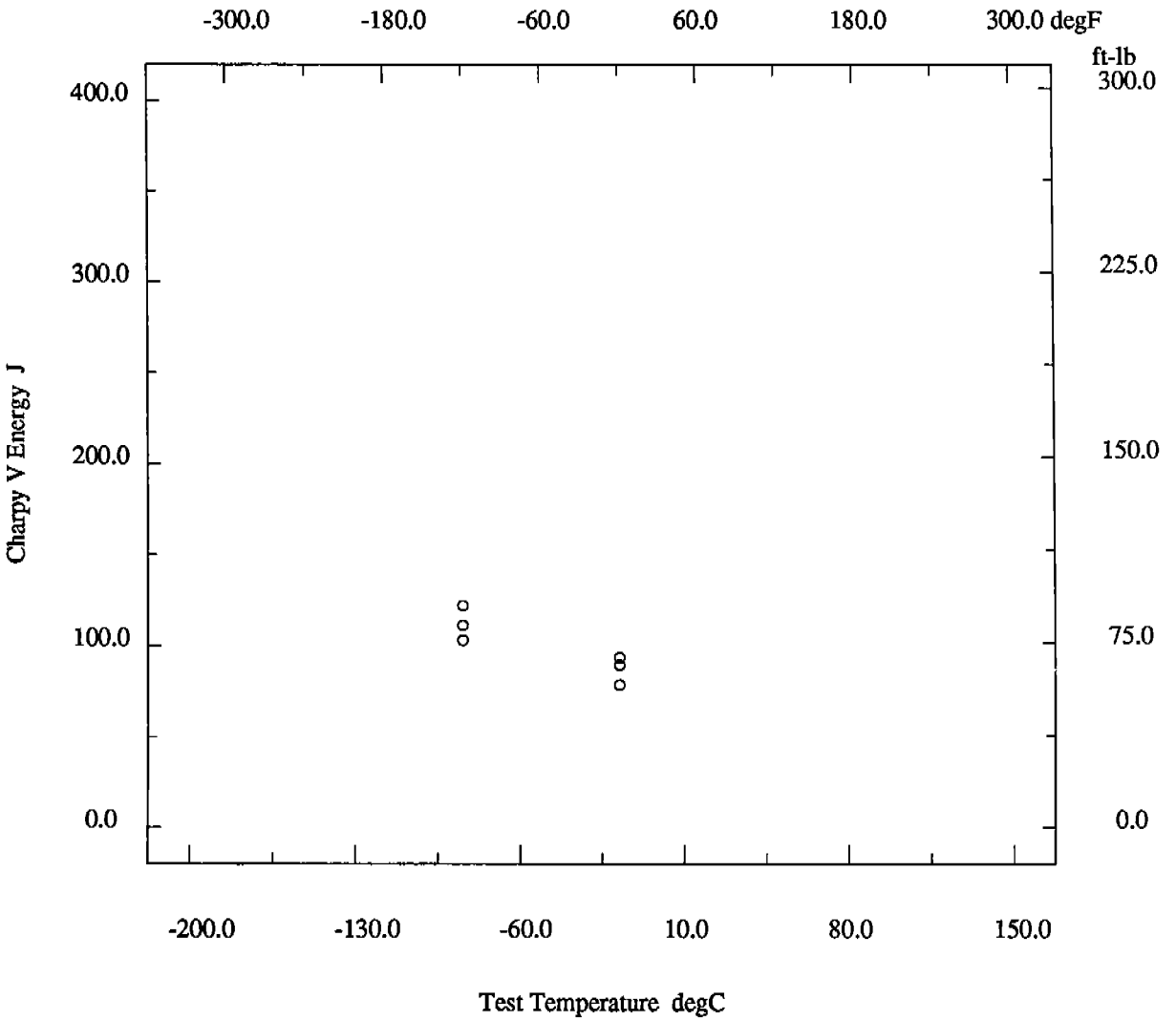
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	76
T-L °	-120	82
T-L °	-120	90
T-L °	0	58
T-L °	0	66
T-L °	0	69

* - not reported

Material HY80

Description

Material Code	001.015.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.015.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition

See Page 17900.1

Fabrication History

See Page 17900.1

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	*

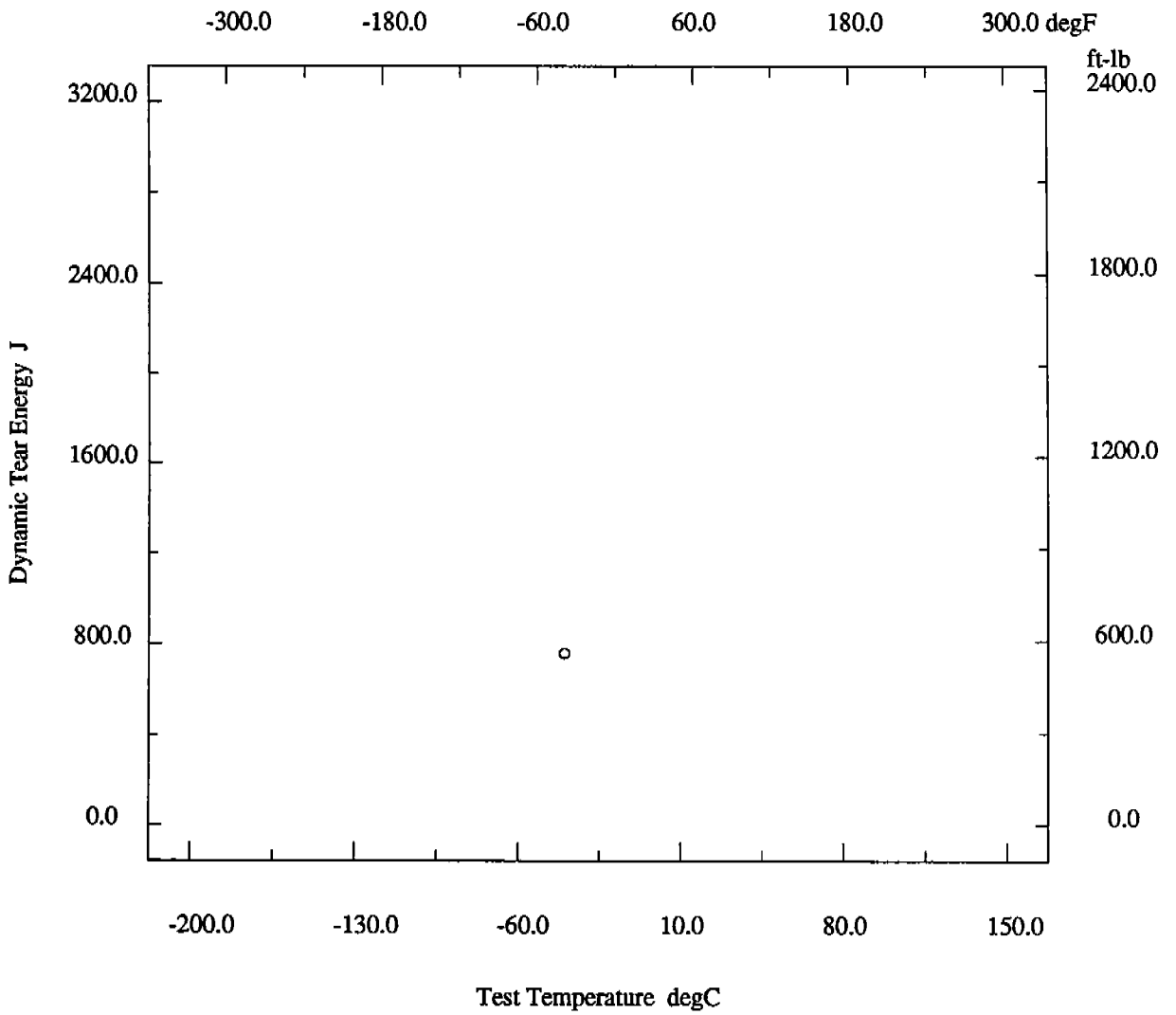
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L ○	-40	560	*

* - not reported

Material HY80

Description

Material Code	001.015.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.015.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition

See Page 17900.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Mid	Killing Process	*
Process Temperature	1660 degF	Process Time	2.15 hr
Rolling Conditions	83 %	Final Processing	A,Q,T
Final Temperature	1280 degF	Final Time	2.35 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	106.5	91.8	*	23	68.0

* - not reported

Material HY80

Description

Material Code	001.015.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition See Page 17900.1

Fabrication History See Page 17900.17

Property Measurements

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

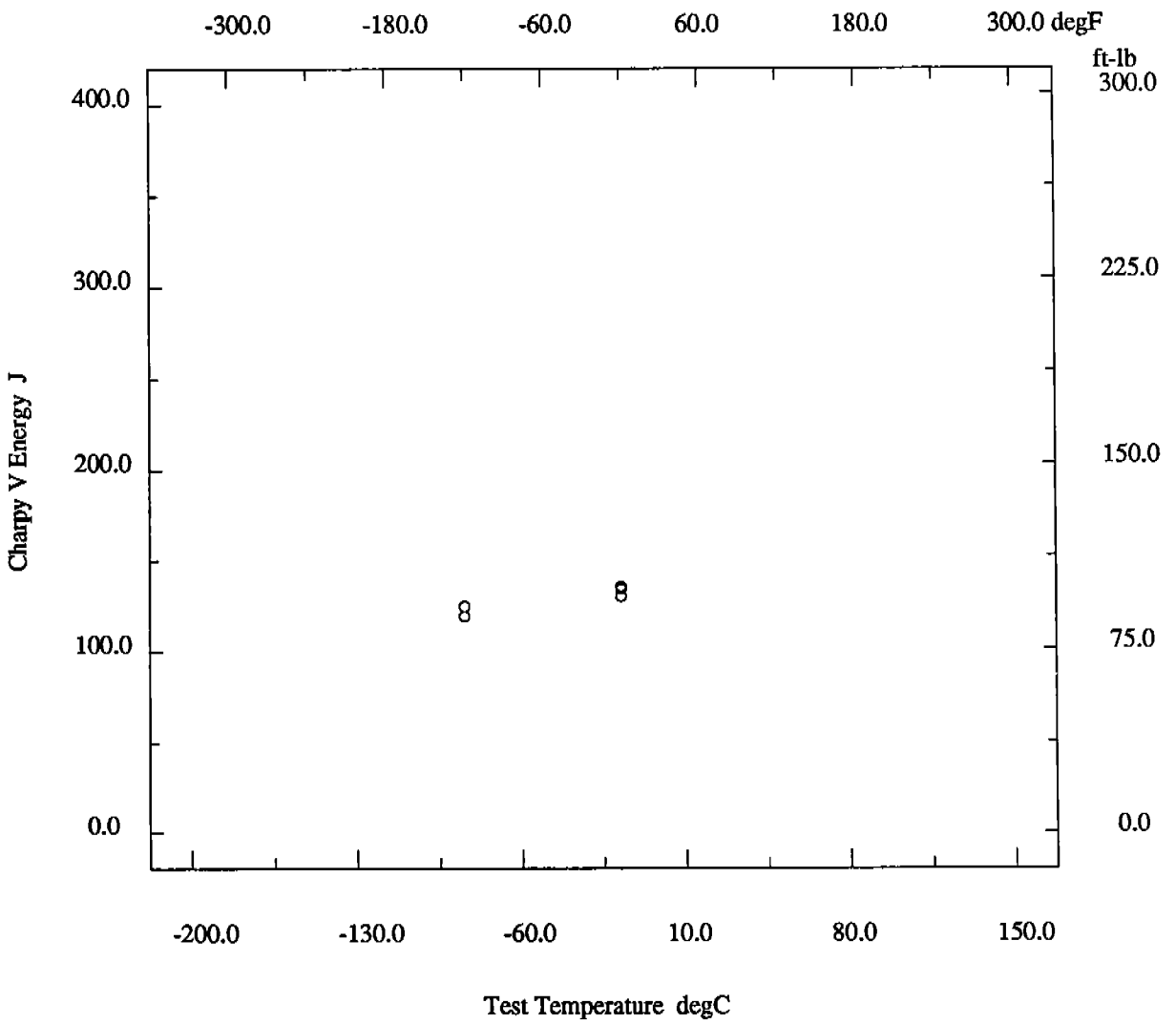
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	88
T-L °	-120	92
T-L °	-120	92
T-L °	0	100
T-L °	0	96
T-L °	0	99

* - not reported

Material HY80

Description

Material Code	001.015.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.015.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition See Page 17900.1

Fabrication History See Page 17900.17

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	*

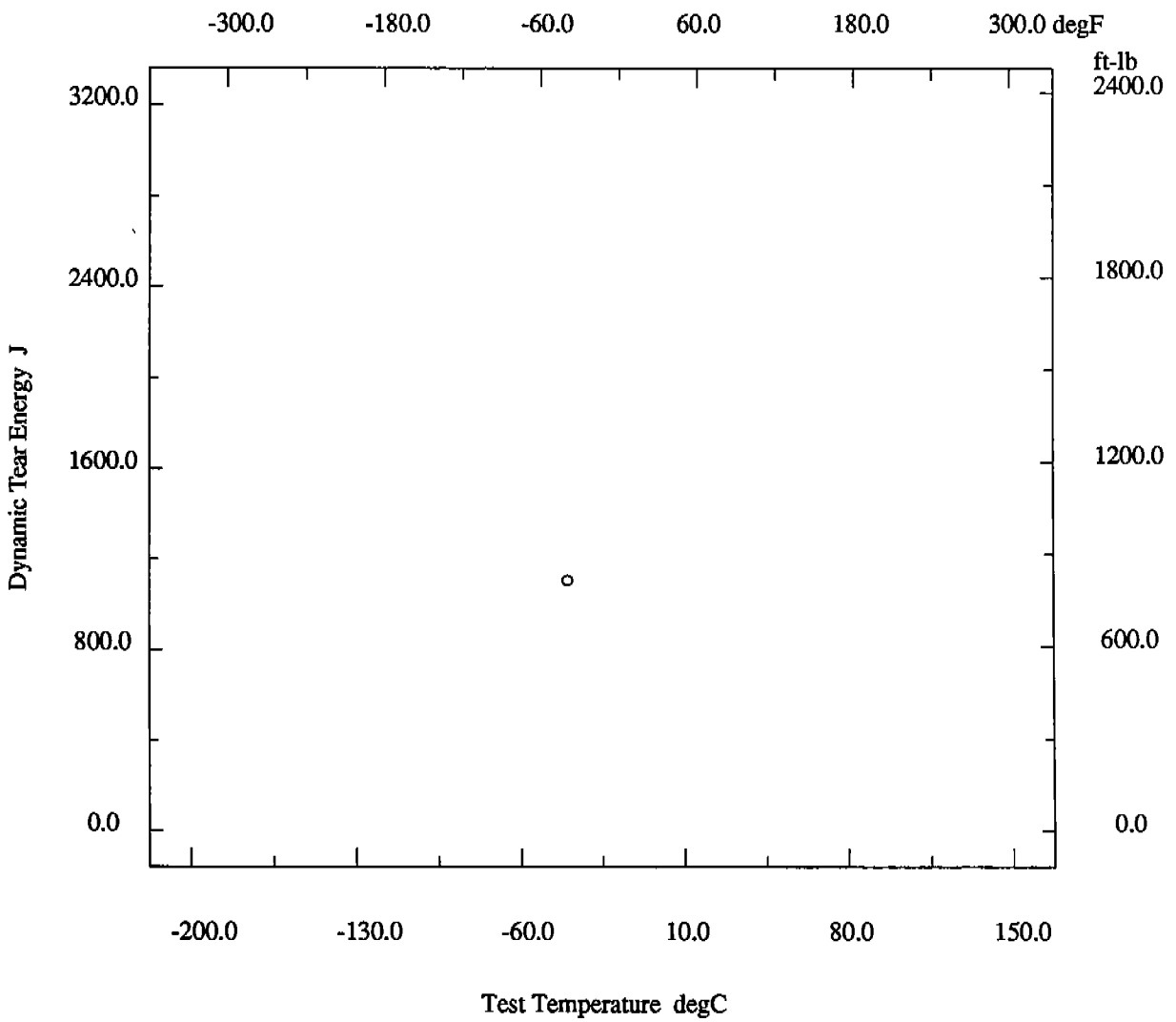
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L ○	-40	815	*

* - not reported

Material HY80

Description

Material Code	001.015.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.015.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition

See Page 17900.1

Fabrication History

See Page 17900.17

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	106.5	91.7	*	23	66.9

* - not reported

Material HY80

Description

Material Code	001.015.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition

See Page 17900.1

Fabrication History

See Page 17900.17

Property Measurements

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

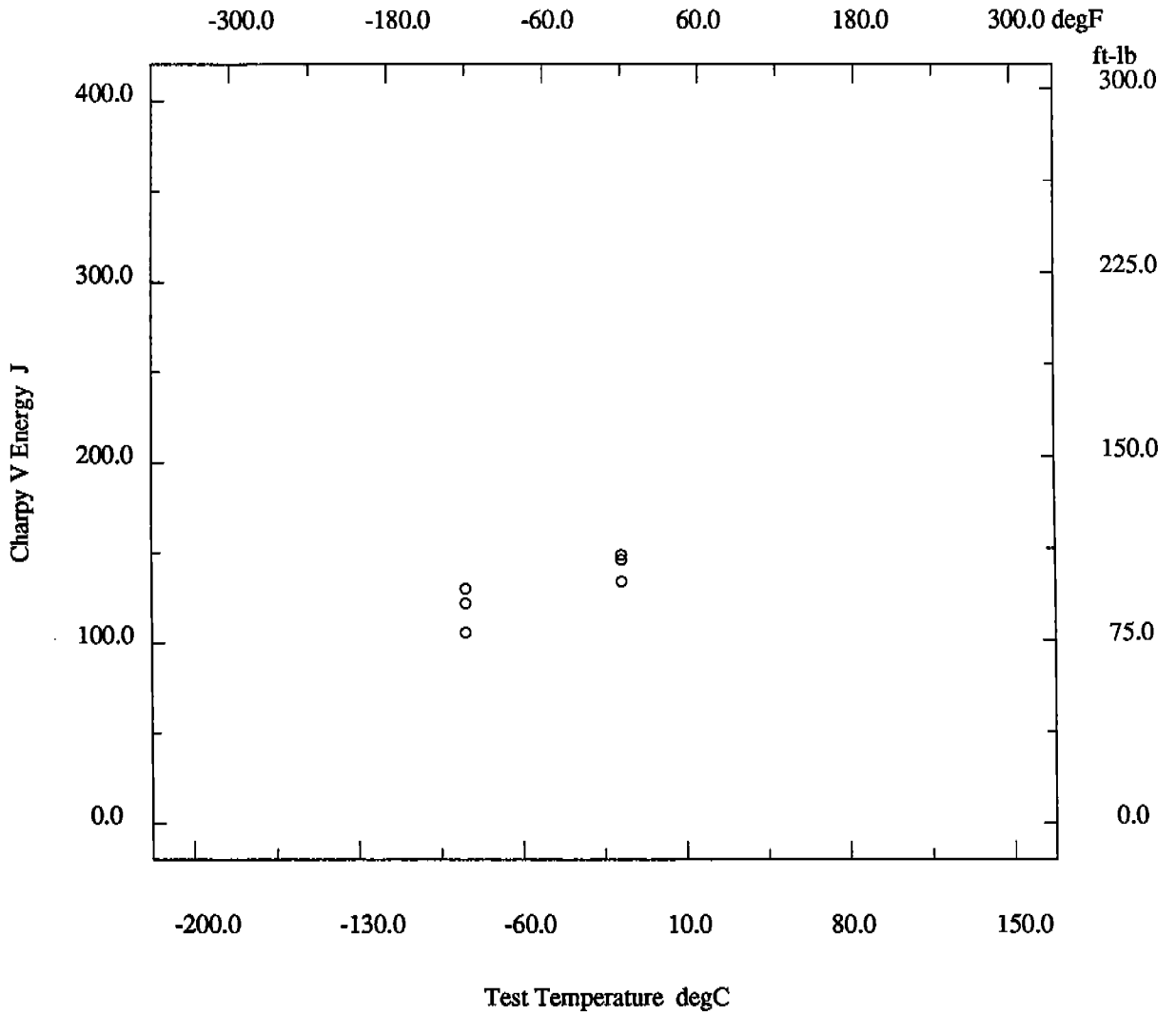
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	78
T-L °	-120	90
T-L °	-120	96
T-L °	0	108
T-L °	0	110
T-L °	0	99

* - not reported

Material HY80

Description

Material Code	001.015.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.015.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition

See Page 17900.1

Fabrication History

See Page 17900.17

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	*

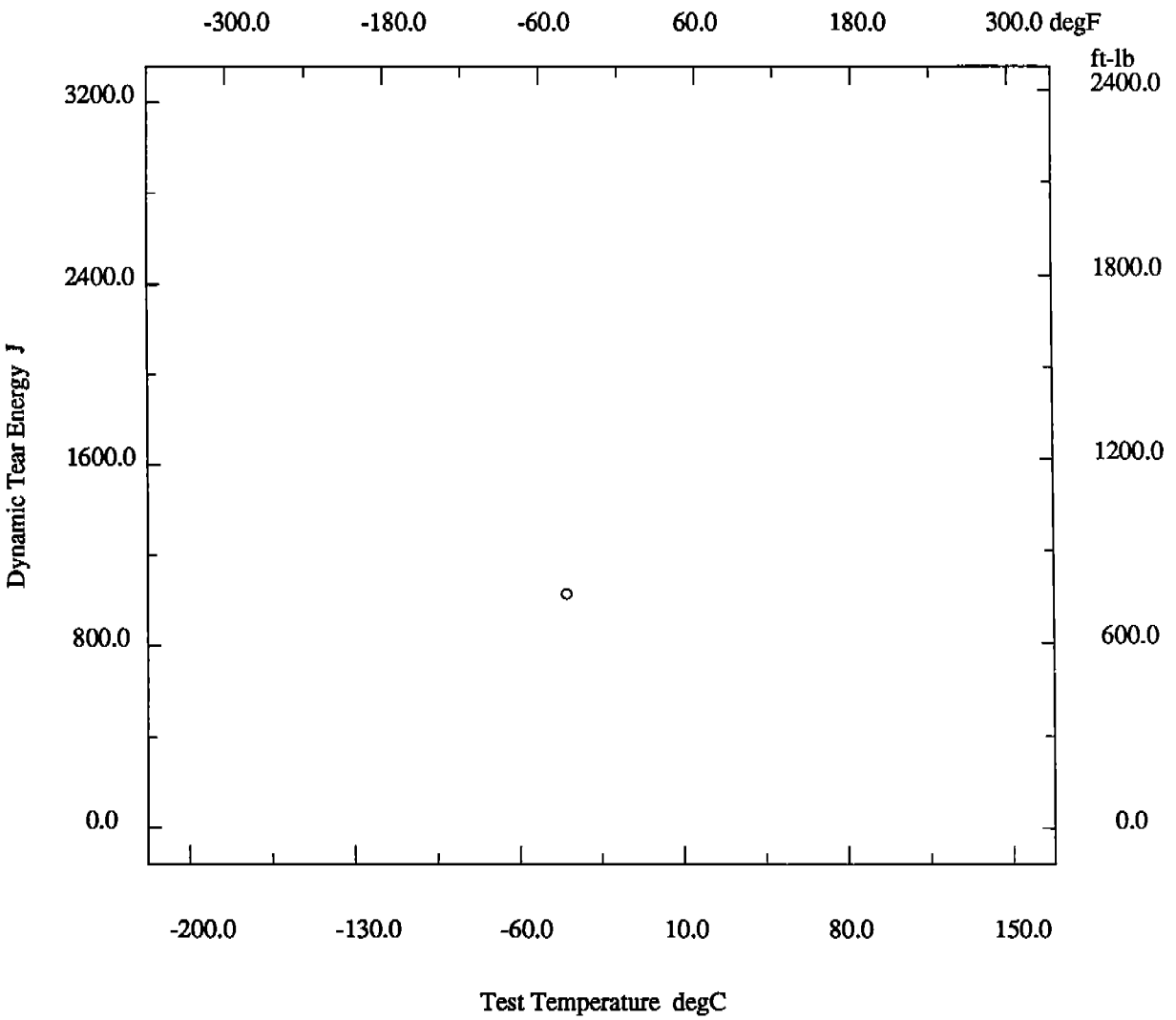
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L °	-40	760	*

* - not reported

Material HY80

Description

Material Code	001.015.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.015.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition See Page 17900.1

Fabrication History See Page 17900.17

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	107.0	92.3	*	24	69.2

* - not reported

309

Material HY80

Description

Material Code	001.015.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition See Page 17900.1

Fabrication History See Page 17900.17

Property Measurements

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

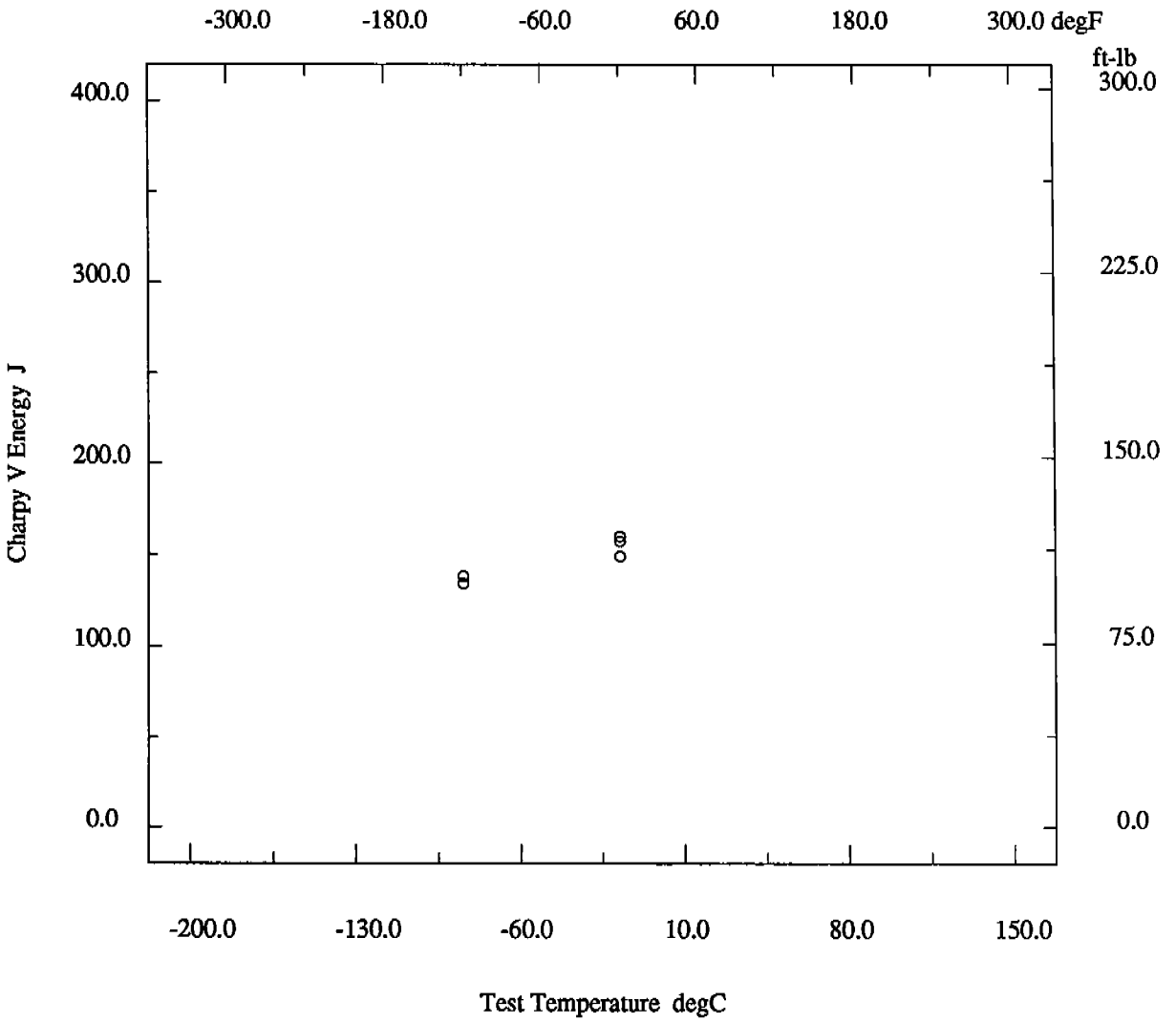
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	102
T-L °	-120	99
T-L °	-120	99
T-L °	0	110
T-L °	0	116
T-L °	0	118

* - not reported

Material HY80

Description

Material Code	001.015.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.015.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition See Page 17900.1

Fabrication History See Page 17900.17

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	*

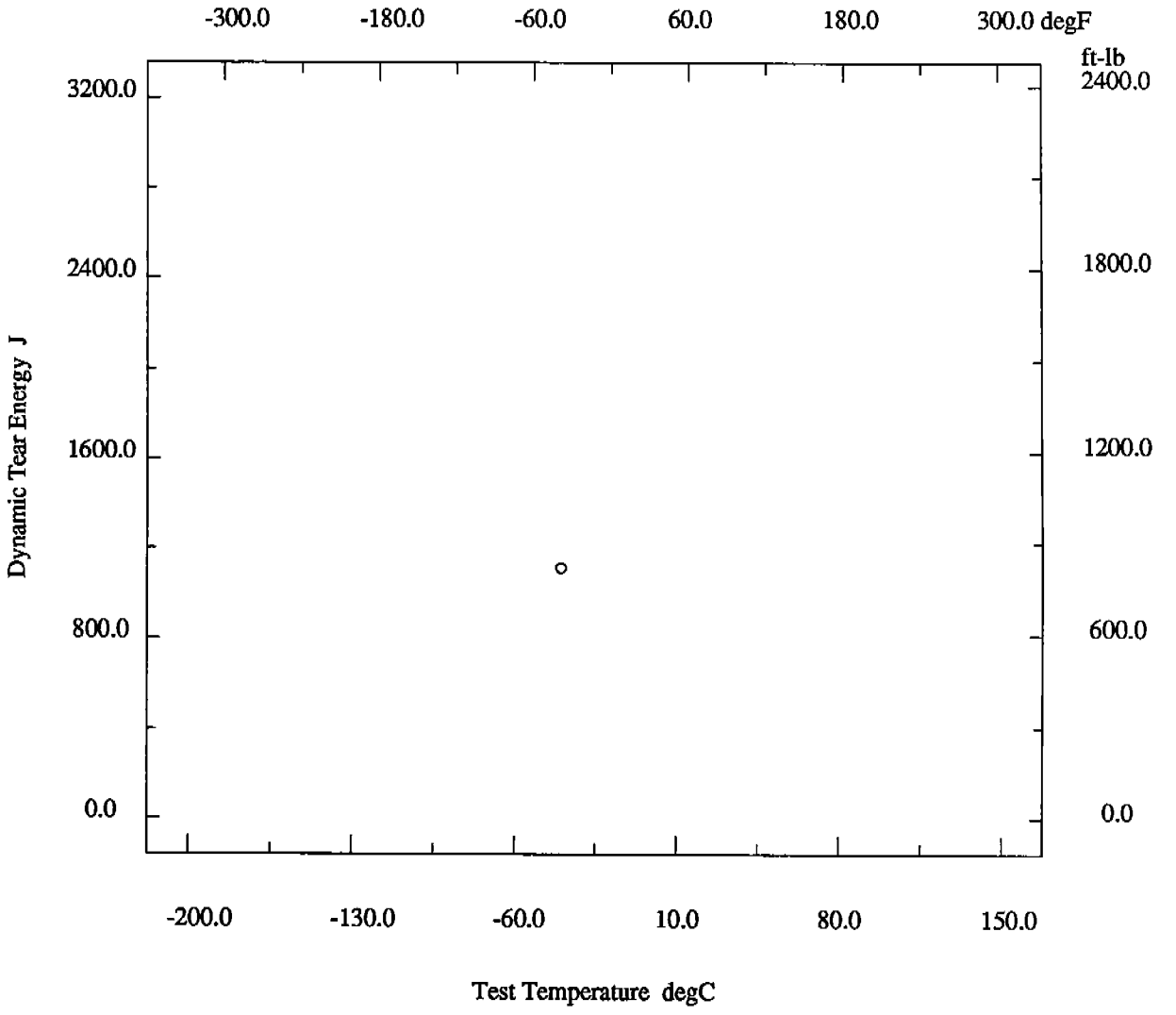
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L °	-40	820	*

* - not reported

Material HY80

Description

Material Code	001.015.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.015.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition

See Page 17900.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Bottom	Killing Process	*
Process Temperature	1660 degF	Process Time	2.15 hr
Rolling Conditions	83 %	Final Processing	A,Q,T
Final Temperature	1280 degF	Final Time	2.35 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	105.5	90.4	*	23	68.9

* - not reported

Material HY80

Description

Material Code	001.015.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition

See Page 17900.1

Fabrication History

See Page 17900.32

Property Measurements

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

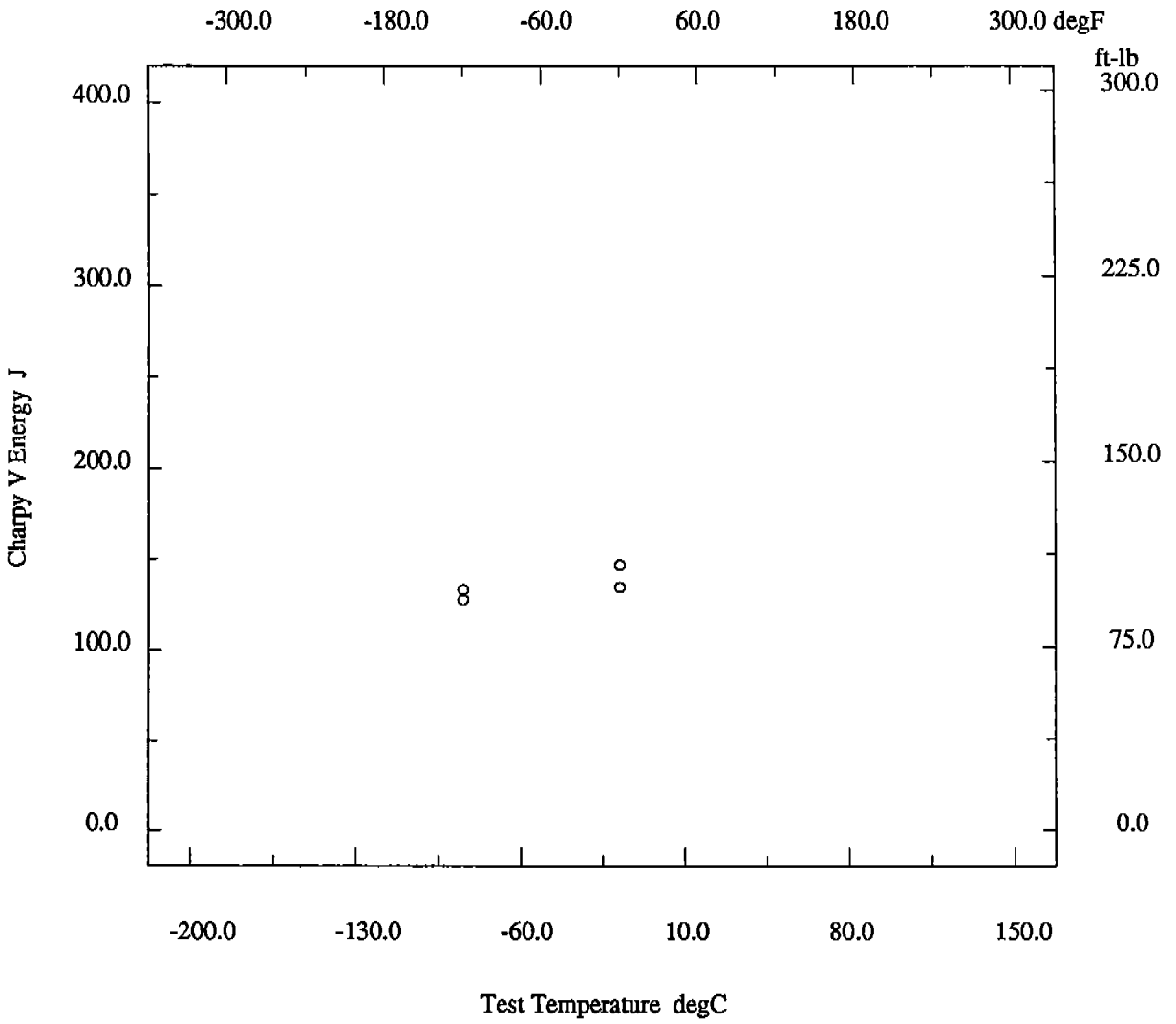
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	94
T-L °	-120	98
T-L °	-120	98
T-L °	0	108
T-L °	0	99
T-L °	0	99

* - not reported

Material HY80

Description

Material Code	001.015.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.015.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition

See Page 17900.1

Fabrication History

See Page 17900.32

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	*

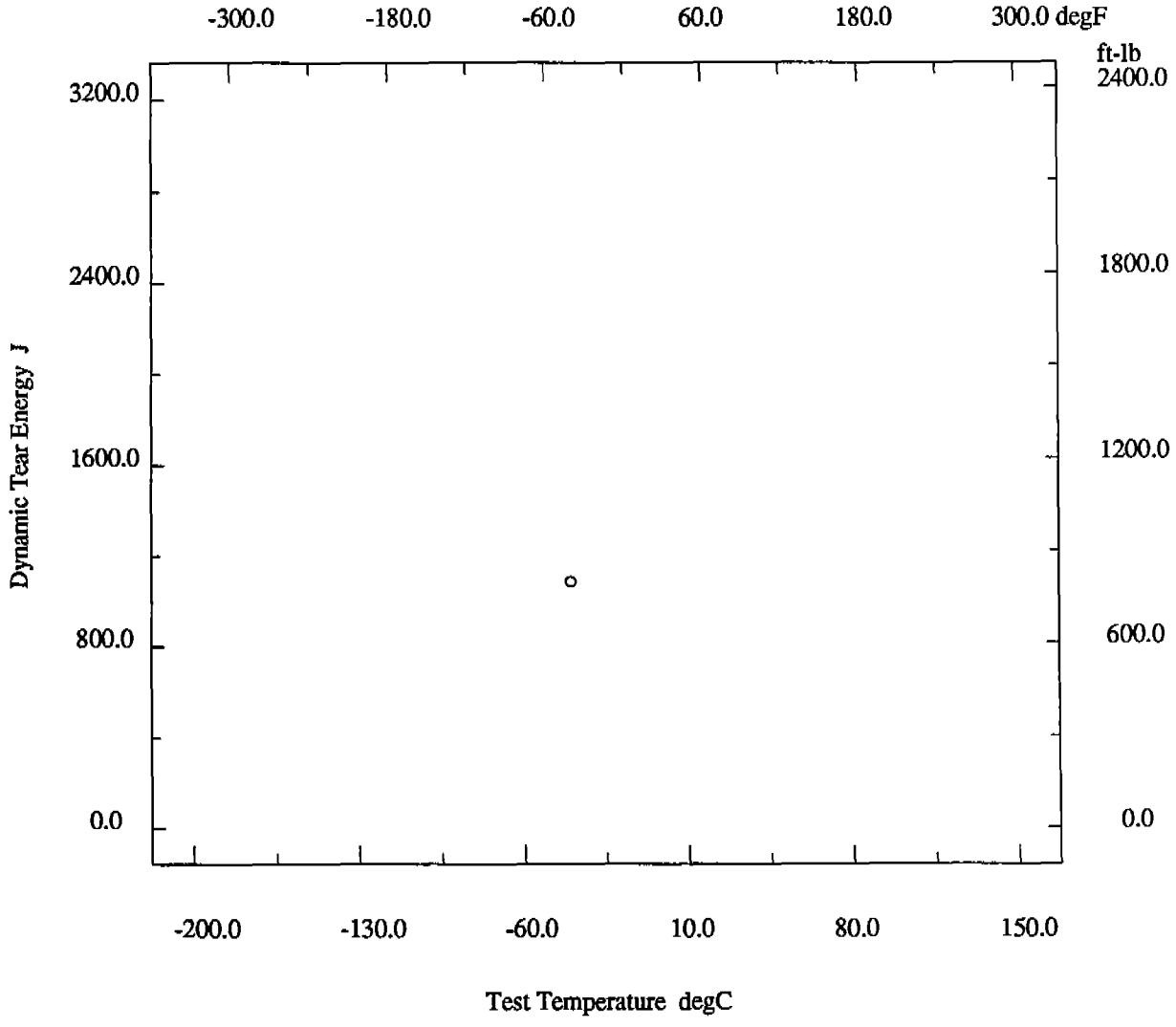
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L °	-40	800	*

* - not reported

Material HY80

Description

Material Code	001.015.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.015.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition

See Page 17900.1

Fabrication History

See Page 17900.32

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	105.5	90.5	*	23	70.4

* - not reported

Material HY80

Description

Material Code	001.015.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition

See Page 17900.1

Fabrication History

See Page 17900.32

Property Measurements

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

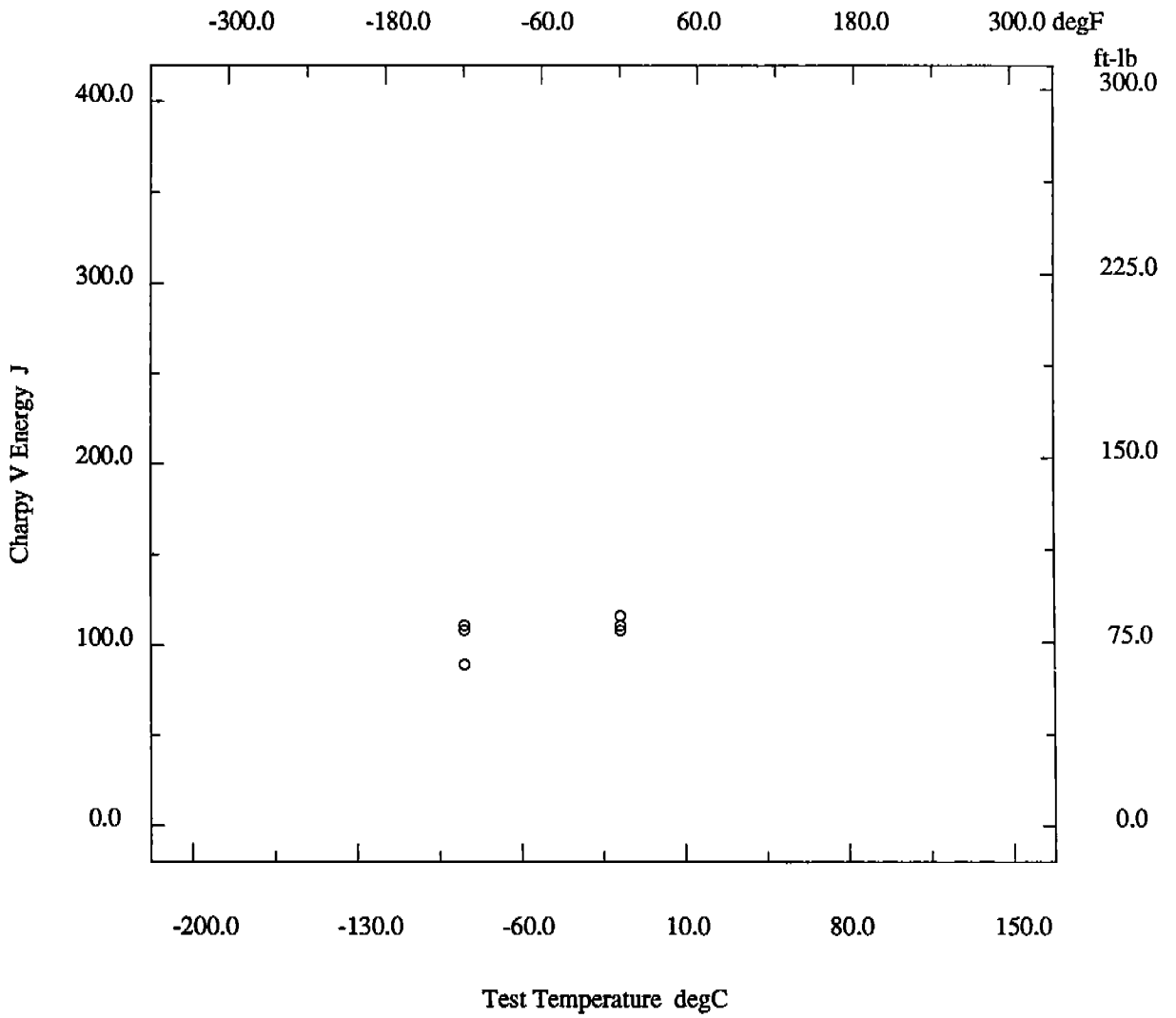
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	66
T-L °	-120	80
T-L °	-120	82
T-L °	0	80
T-L °	0	82
T-L °	0	86

* - not reported

Material HY80

Description

Material Code	001.015.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.015.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition See Page 17900.1

Fabrication History See Page 17900.32

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	*

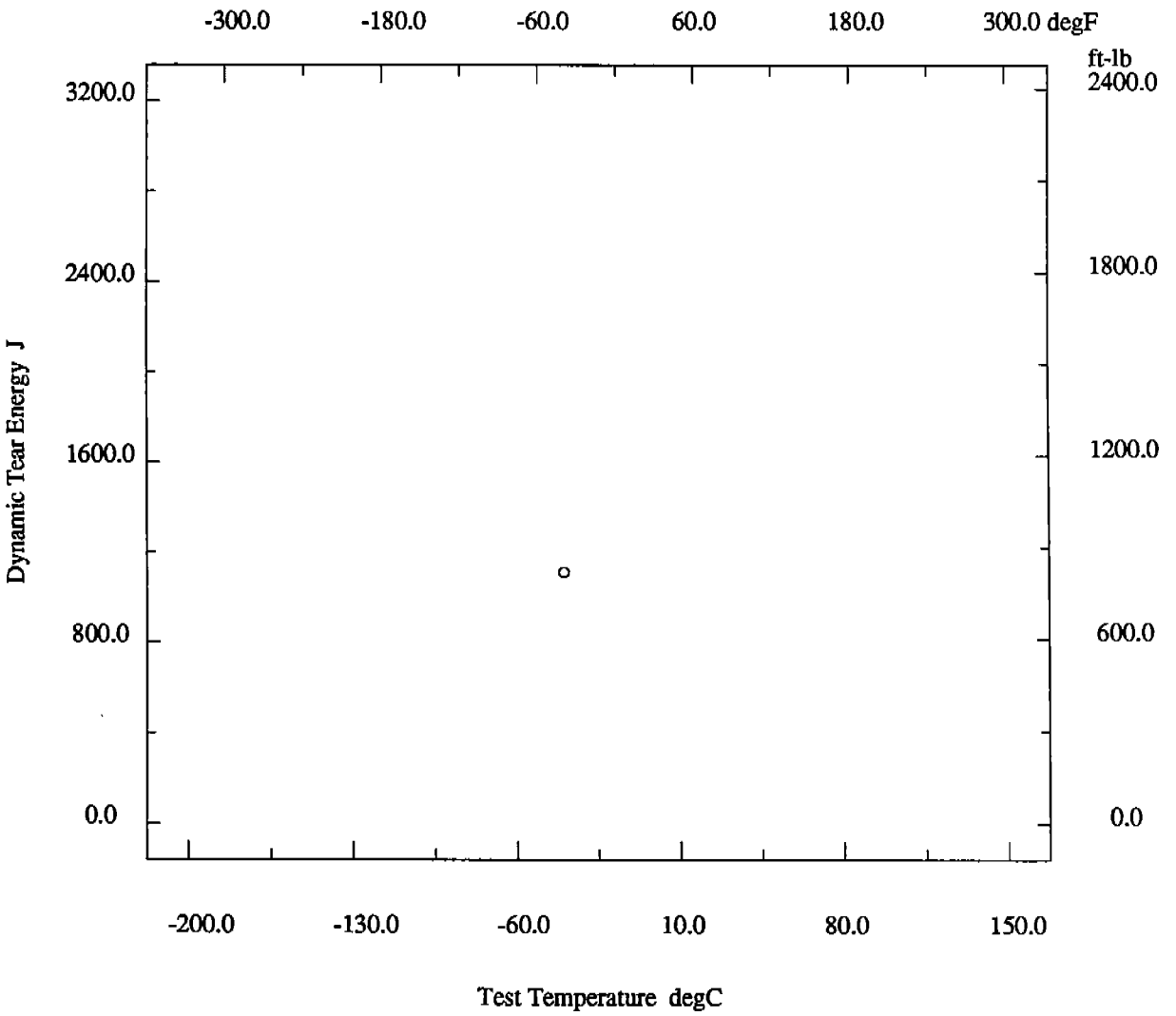
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L ○	-40	820	*

* - not reported

Material HY80

Description

Material Code	001.015.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.015.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition See Page 17900.1

Fabrication History See Page 17900.32

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	106.0	91.5	*	23	69.0

* - not reported

Material HY80

Description

Material Code	001.015.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition

See Page 17900.1

Fabrication History

See Page 17900.32

Property Measurements

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

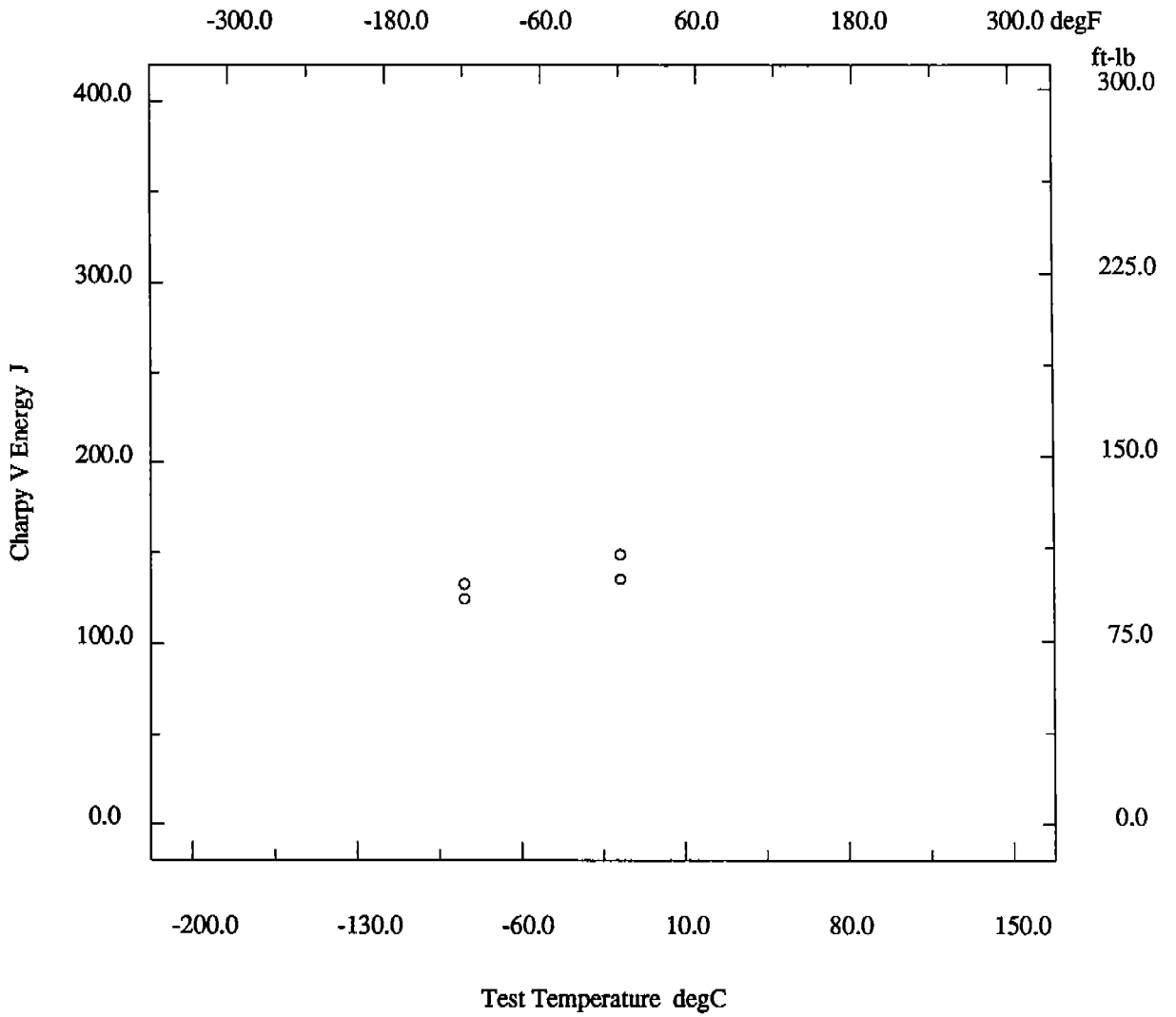
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	92
T-L °	-120	98
T-L °	-120	98
T-L °	0	100
T-L °	0	110
T-L °	0	110

* - not reported

Material HY80

Description

Material Code	001.015.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.015.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		

Composition

See Page 17900.1

Fabrication History

See Page 17900.32

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	*

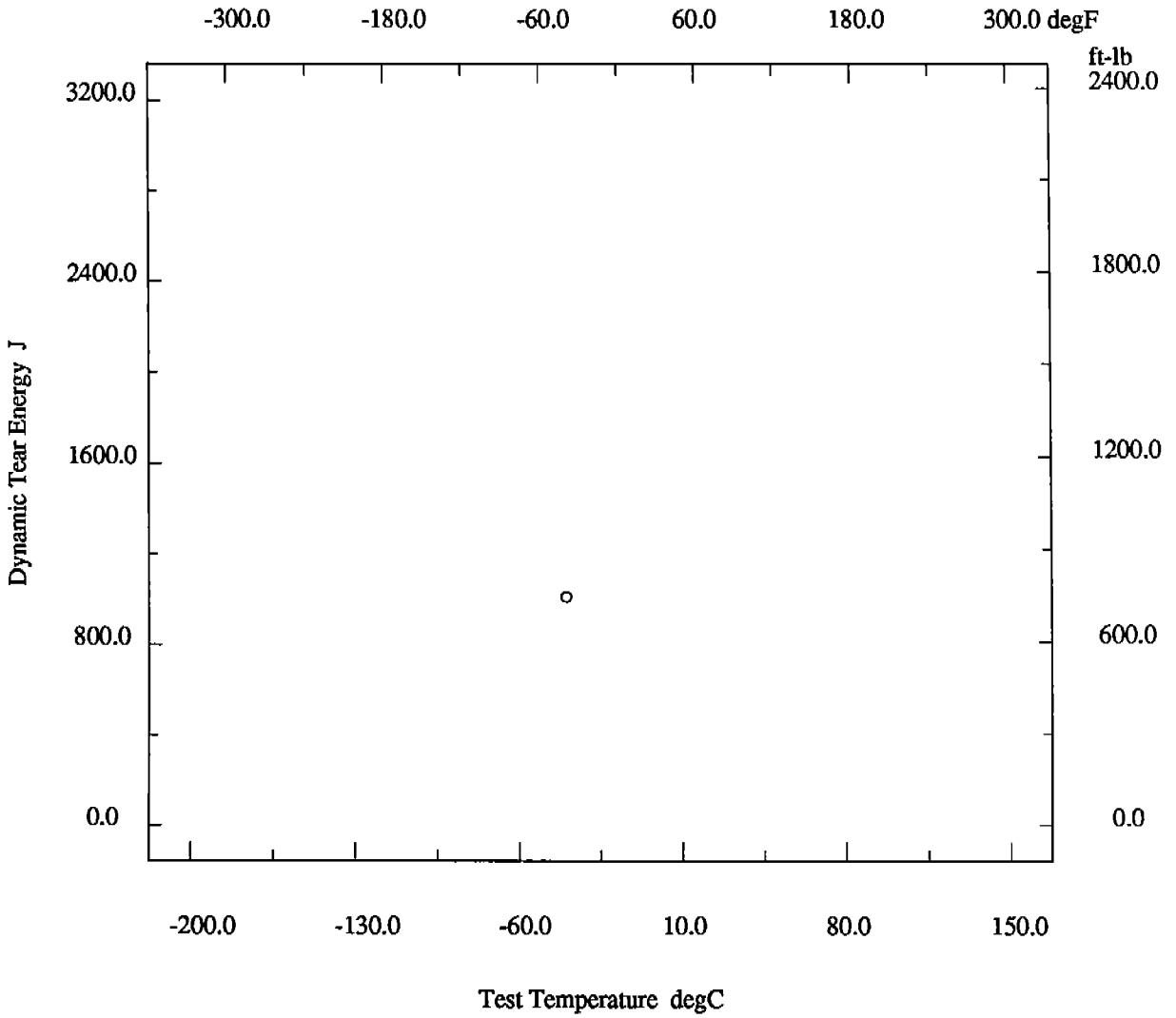
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L °	-40	745	*

* - not reported

Material HY80

Description

Material Code	001.015.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.94 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3710-42B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.016.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.1 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	DO733-1D
Reference	USN-1		

Composition

C	0.15 %	Mn	0.28 %
P	0.005 %	S	0.019 %
Si	0.22 %	Cr	1.46 %
Ni	2.73 %	Mo	0.38 %
V	0.003 %	Cu	0.18 %
Cb	*	Ti	0.003 %
B	*	Al	0.017 %
N	*	Other Components	As=0.007;Sn=0.014;Sb=0.004 %

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Top	Killing Process	*
Process Temperature	1660 degF	Process Time	1.15 hr
Rolling Conditions	90 %	Final Processing	A,Q,T
Final Temperature	1180 degF	Final Time	1.55 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	125.8	113.7	*	18	59.6

* - not reported

Material HY80

Description

Material Code	001.016.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.1 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	DO733-1D
Reference	USN-1		

Composition See Page 18000.1

Fabrication History See Page 18000.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
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 ○	-120	88
L-T ○	-120	90
L-T ○	-120	90
L-T ○	-120	94
L-T ○	-120	94
L-T ○	-40	90
L-T ○	-40	92
L-T ○	-40	93
L-T ○	-40	94
L-T ○	-40	94
L-T ○	0	90
L-T ○	0	92
L-T ○	0	94
L-T ○	0	94
L-T ○	0	94
L-T ○	32	92
L-T ○	32	94
L-T ○	32	96
L-T ○	32	96
L-T ○	32	98
L-T ○	70	100
L-T ○	70	90
L-T ○	70	92
L-T ○	70	96
L-T ○	70	98
T-L △	-120	64
T-L △	-120	66
T-L △	-120	66
T-L △	-120	66
T-L △	-120	66
T-L △	-40	60
T-L △	-40	62
T-L △	-40	68

(continued)

* - not reported

Material HY80

(continued)

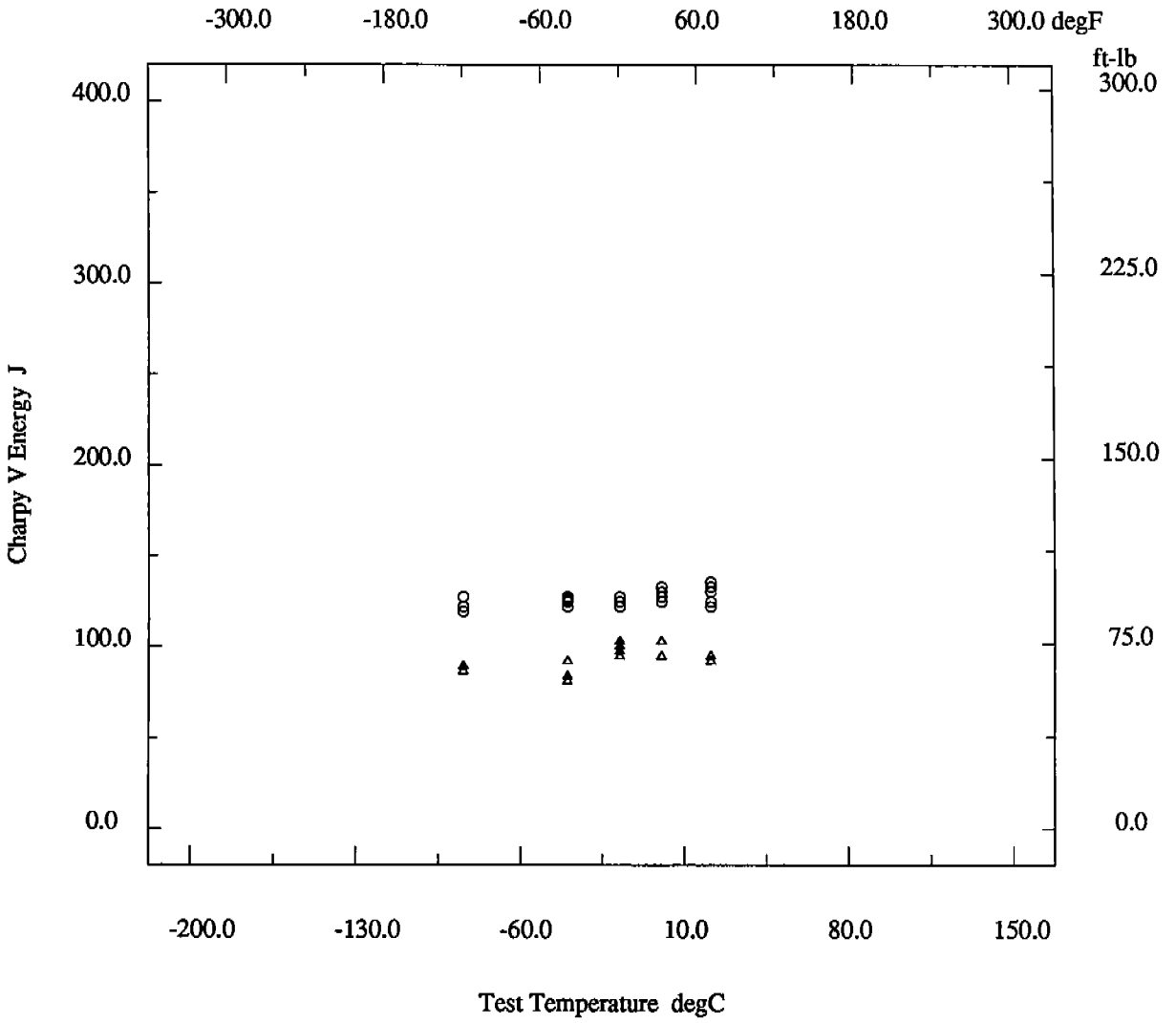
Orien	Test Temp degF	CVN Energy ft-lb
T-L △	-40	68
T-L △	-40	68
T-L △	0	70
T-L △	0	72
T-L △	0	74
T-L △	0	76
T-L △	0	76
T-L △	32	70
T-L △	32	70
T-L △	32	70
T-L △	32	76
T-L △	32	76
T-L △	70	68
T-L △	70	68
T-L △	70	68
T-L △	70	70
T-L △	70	70

* - not reported

Material HY80

Description

Material Code	001.016.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.1 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	DO733-1D
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.016.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.1 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	DO733-1D
Reference	USN-1		

Composition See Page 18000.1

Fabrication History See Page 18000.1

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	*

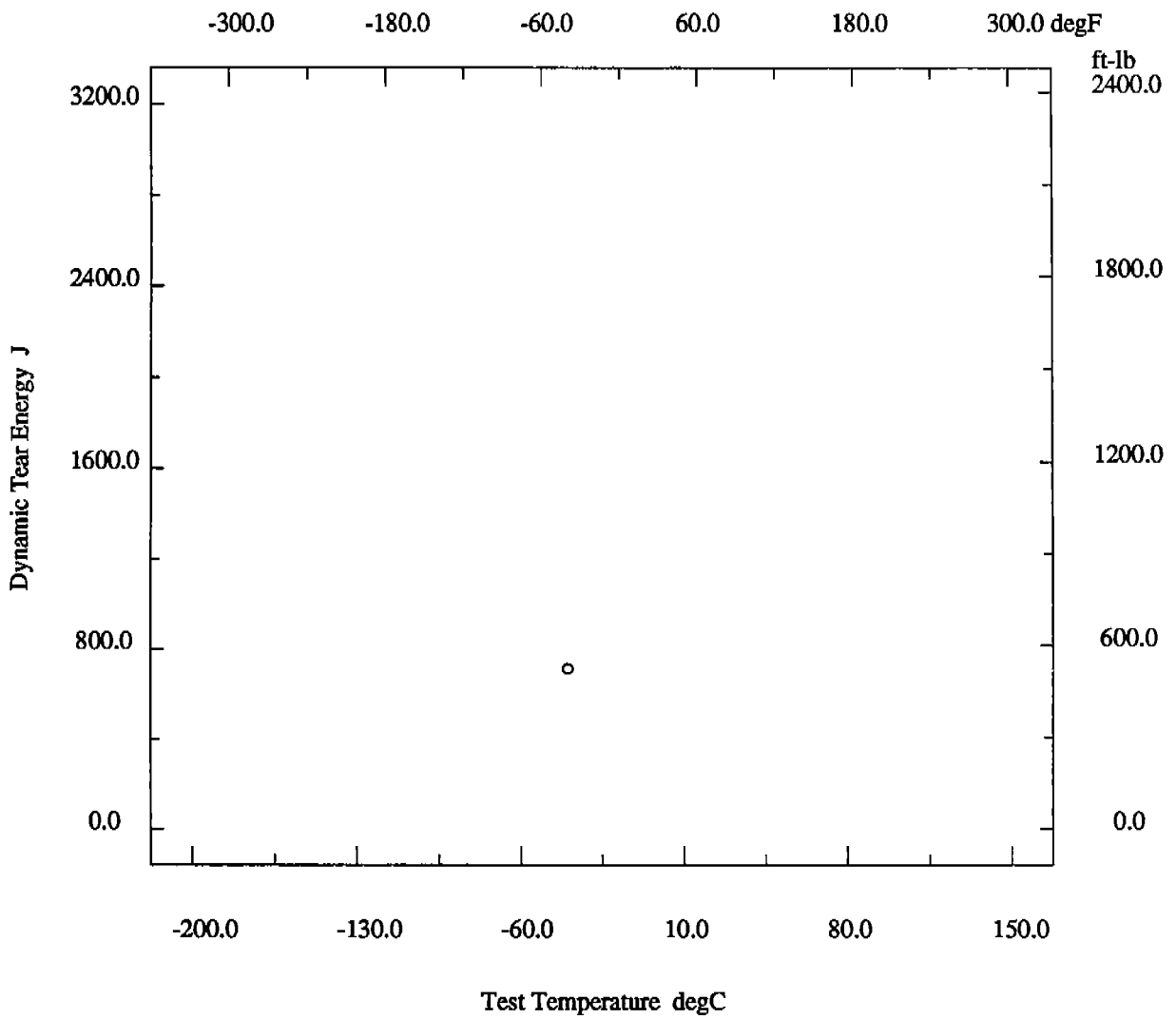
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L ○	-40	525	*

* - not reported

Material HY80

Description

Material Code	001.016.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.1 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	DO733-1D
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.016.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.1 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	DO733-1D
Reference	USN-1		

Composition

See Page 18000.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Bottom	Killing Process	*
Process Temperature	1660 degF	Process Time	1.15 hr
Rolling Conditions	90 %	Final Processing	A,Q,T
Final Temperature	1180 degF	Final Time	1.55 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	122.5	110.5	*	20	64.5

* - not reported

Material HY80

Description

Material Code	001.016.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.1 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	DO733-1D
Reference	USN-1		

Composition See Page 18000.1

Fabrication History See Page 18000.7

Property Measurements

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

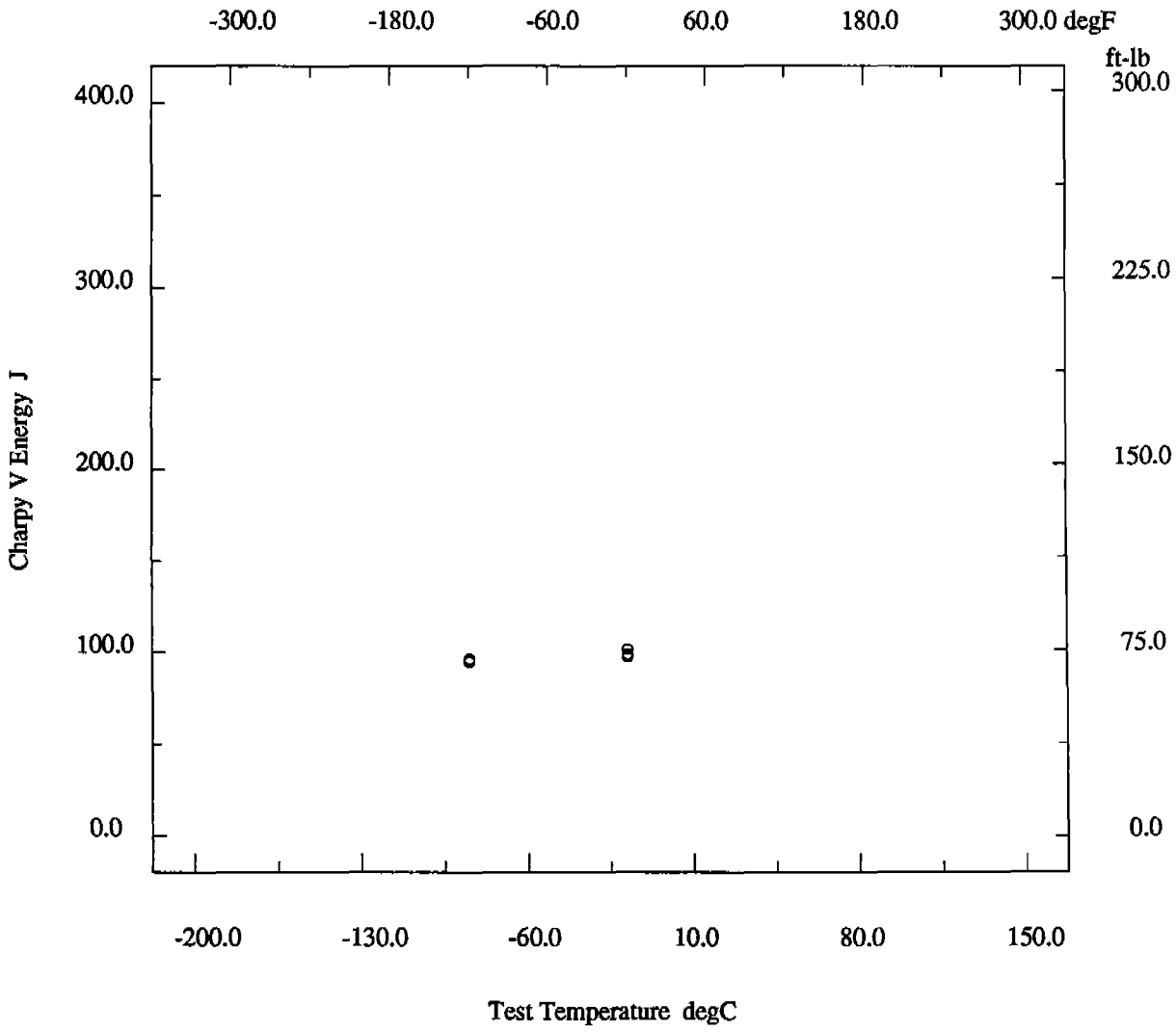
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	70
T-L °	-120	70
T-L °	-120	71
T-L °	0	72
T-L °	0	73
T-L °	0	75

* - not reported

Material HY80

Description

Material Code	001.016.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.1 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	DO733-1D
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.016.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.1 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	DO733-1D
Reference	USN-1		

Composition See Page 18000.1

Fabrication History See Page 18000.7

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	*

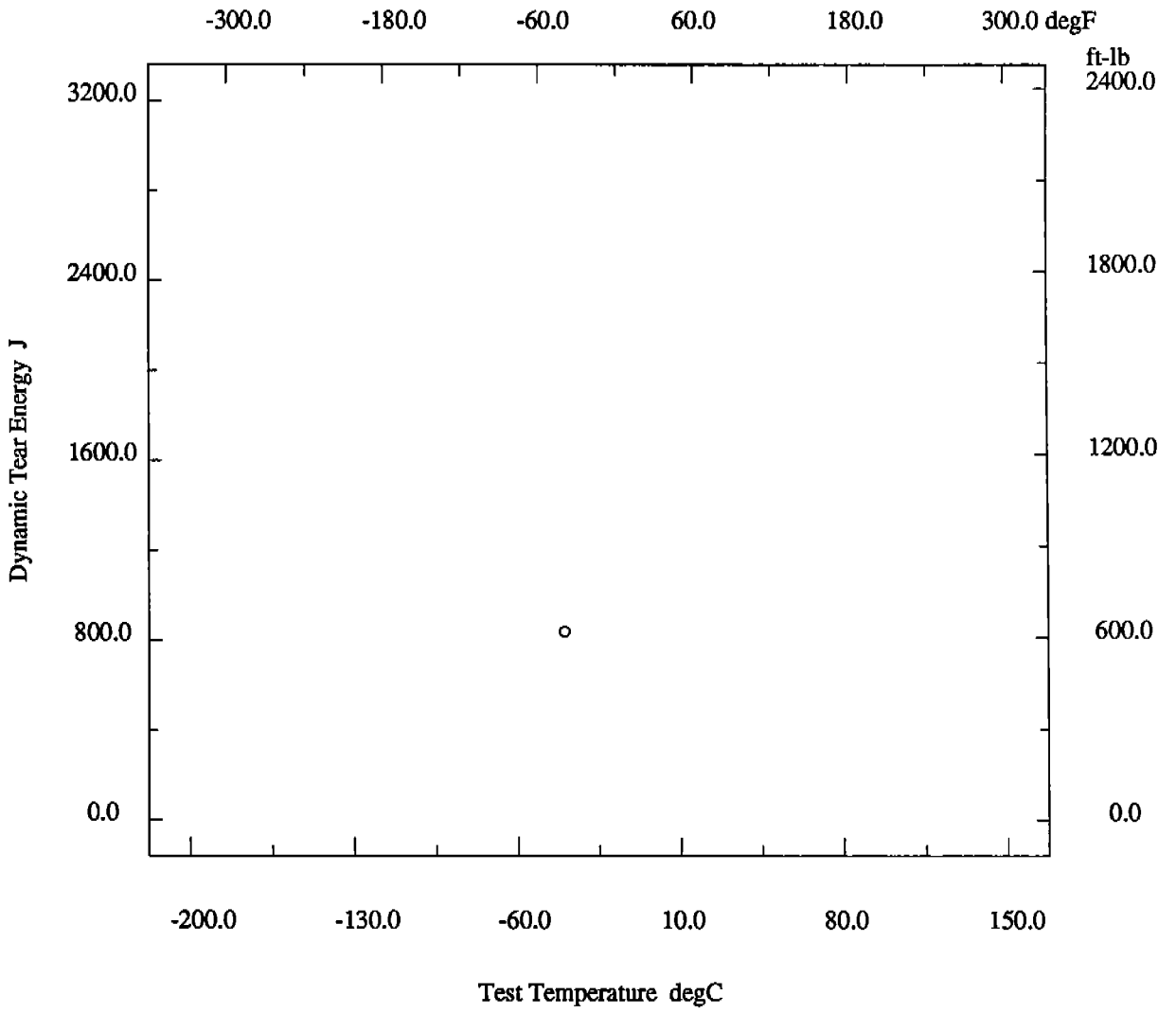
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L ○	-40	620	*

* - not reported

Material HY80

Description

Material Code	001.016.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.1 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	DO733-1D
Reference	USN-1		



* - not reported

339
340X

Material HY80

Description

Material Code	001.017.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.59 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	N8686-5
Reference	USN-1		

Composition

C	0.16 %	Mn	0.25 %
P	0.007 %	S	0.011 %
Si	0.27 %	Cr	1.45 %
Ni	2.73 %	Mo	0.39 %
V	0.01 %	Cu	0.12 %
Cb	*	Ti	0.003 %
B	*	Al	0.021 %
N	*	Other Components	As=0.01;Sn=0.01;Sb=0.005 %

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Top	Killing Process	*
Process Temperature	1660 degF	Process Time	1.65 hr
Rolling Conditions	95 %	Final Processing	A,Q,T
Final Temperature	1160 degF	Final Time	1.55 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	114.2	102.3	*	22	66.5

* - not reported

Material HY80

Description

Material Code	001.017.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.59 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	N8686-5
Reference	USN-1		

Composition See Page 18100.1

Fabrication History See Page 18100.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
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 ○	-120	110
L-T ○	-120	112
L-T ○	-120	114
L-T ○	-120	116
L-T ○	-120	118
L-T ○	-40	114
L-T ○	-40	116
L-T ○	-40	116
L-T ○	-40	118
L-T ○	-40	120
L-T ○	0	100
L-T ○	0	110
L-T ○	0	116
L-T ○	0	120
L-T ○	0	120
L-T ○	32	118
L-T ○	32	119
L-T ○	32	120
L-T ○	32	120
L-T ○	32	121
L-T ○	70	124
L-T ○	70	124
L-T ○	70	125
L-T ○	70	126
L-T ○	70	126
T-L △	-120	72
T-L △	-120	72
T-L △	-120	73
T-L △	-120	74
T-L △	-120	76
T-L △	-40	80
T-L △	-40	80
T-L △	-40	82

(continued)

* - not reported

Material HY80

(continued)

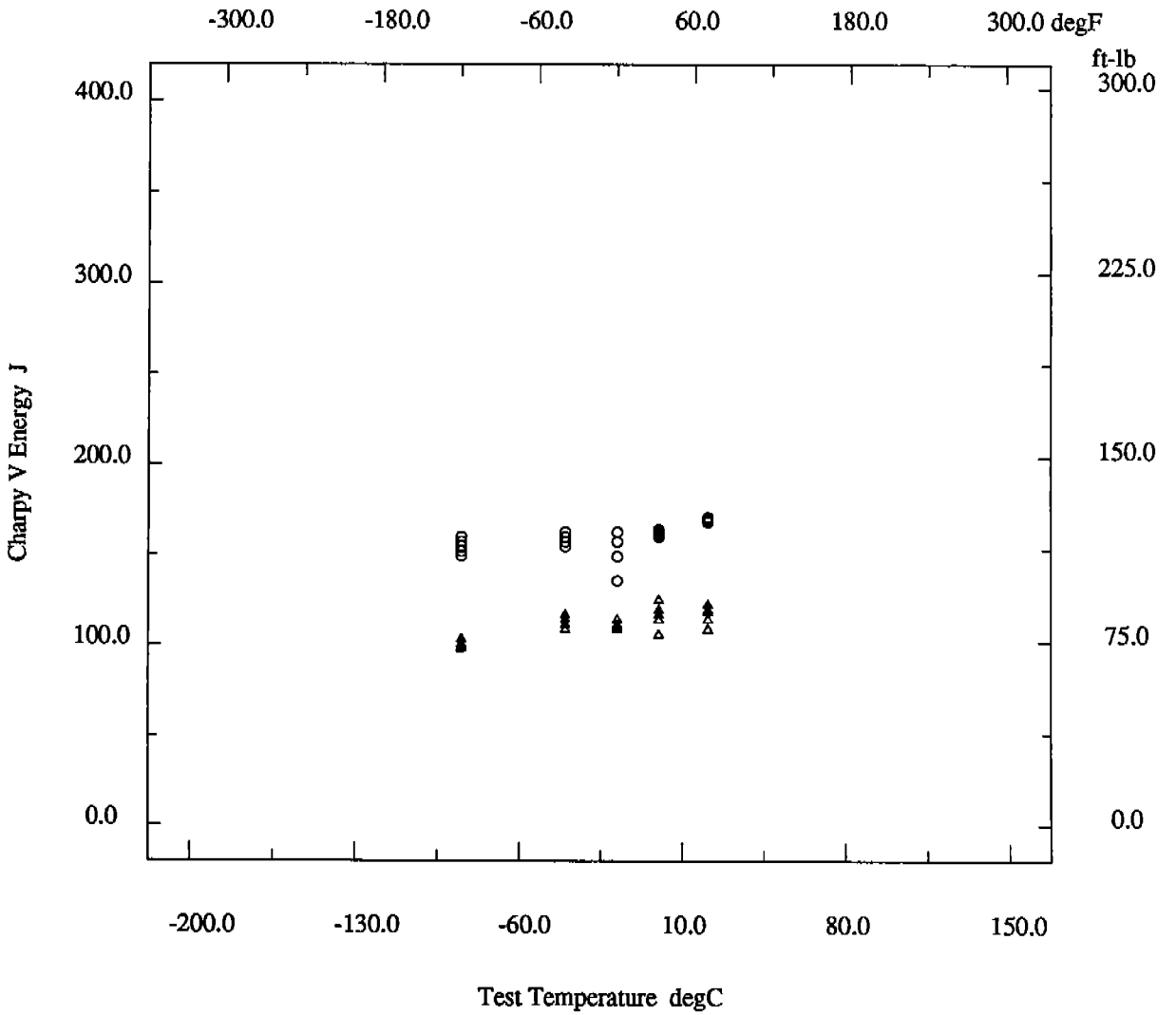
Orien	Test Temp degF	CVN Energy ft-lb
T-L △	-40	84
T-L △	-40	86
T-L △	0	80
T-L △	0	81
T-L △	0	82
T-L △	0	82
T-L △	0	84
T-L △	32	78
T-L △	32	84
T-L △	32	86
T-L △	32	88
T-L △	32	92
T-L △	70	80
T-L △	70	84
T-L △	70	87
T-L △	70	88
T-L △	70	90

* - not reported

Material HY80

Description

Material Code	001.017.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.59 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	N8686-5
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.017.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.59 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	N8686-5
Reference	USN-1		

Composition

See Page 18100.1

Fabrication History

See Page 18100.1

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	*

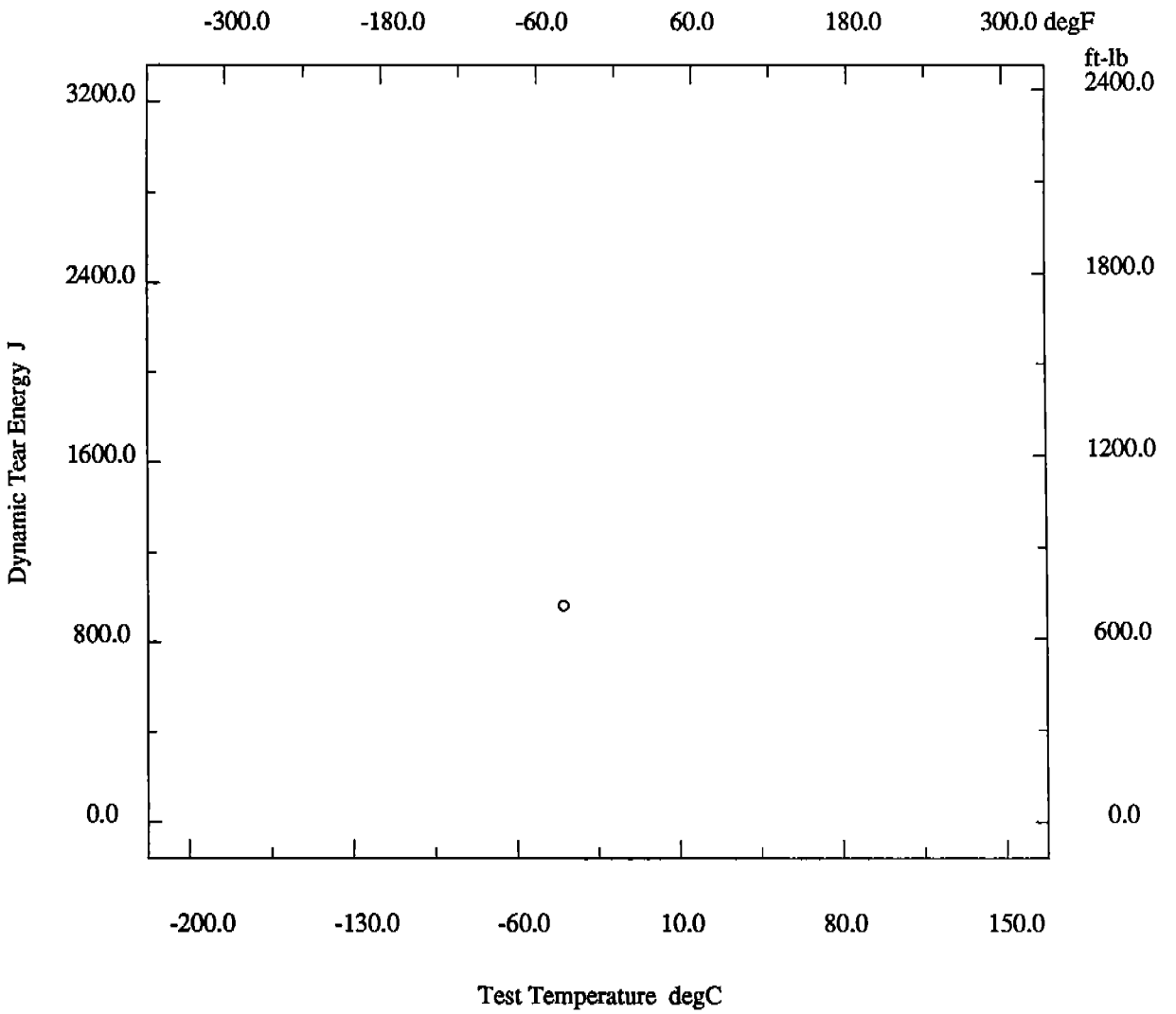
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L °	-40	710	*

* - not reported

Material HY80

Description

Material Code	001.017.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.59 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	N8686-5
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.017.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.59 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	N8686-5
Reference	USN-1		

Composition

See Page 18100.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Bottom	Killing Process	*
Process Temperature	1660 degF	Process Time	1.65 hr
Rolling Conditions	95 %	Final Processing	A,Q,T
Final Temperature	1160 degF	Final Time	1.55 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	117.7	107.0	*	21	64.0

* - not reported

Material HY80

Description

Material Code	001.017.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.59 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	N8686-5
Reference	USN-1		

Composition

See Page 18100.1

Fabrication History

See Page 18100.7

Property Measurements

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

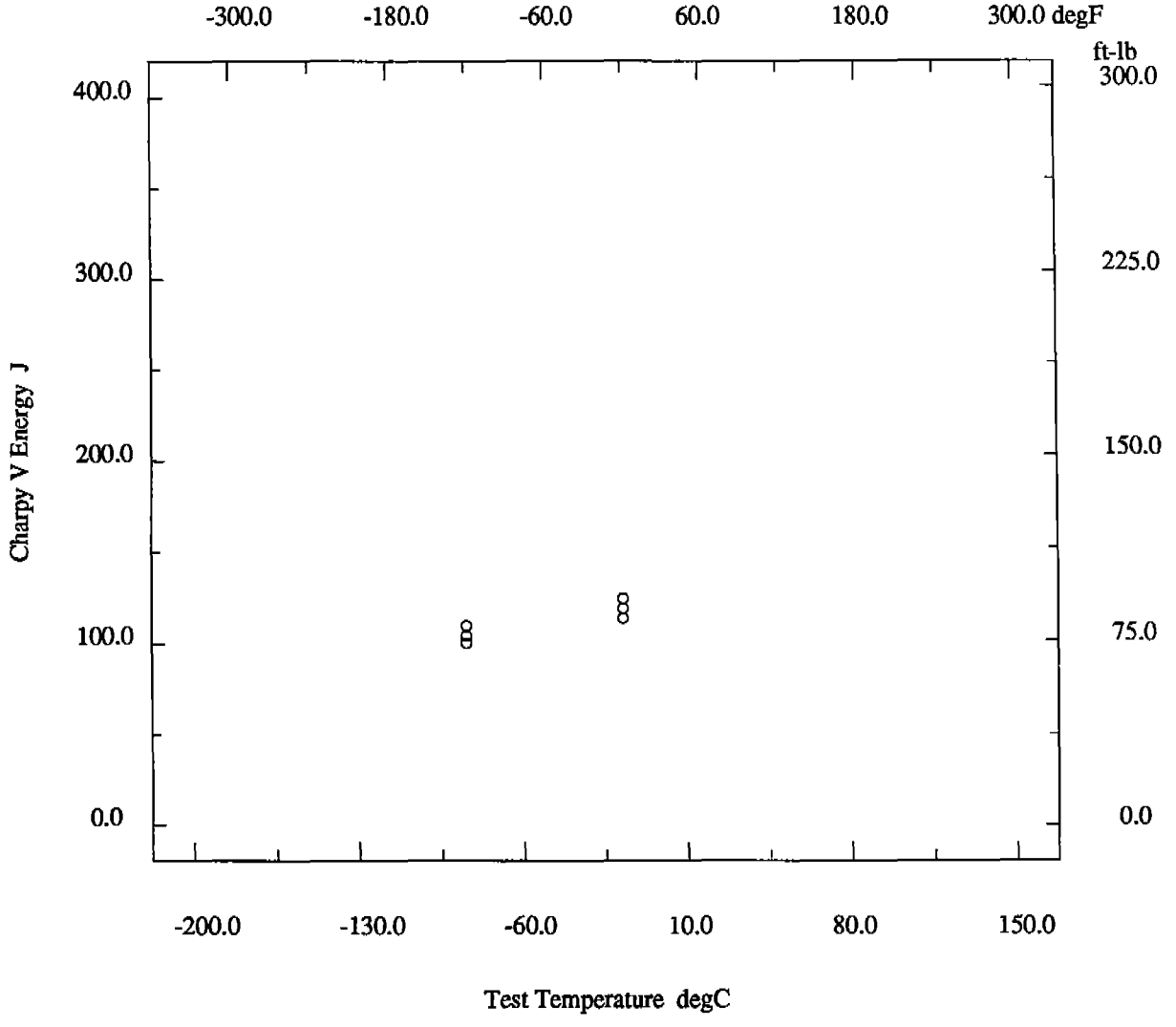
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	74
T-L °	-120	77
T-L °	-120	81
T-L °	0	84
T-L °	0	88
T-L °	0	92

* - not reported

Material HY80

Description

Material Code	001.017.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.59 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	N8686-5
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.017.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.59 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	N8686-5
Reference	USN-1		

Composition

See Page 18100.1

Fabrication History

See Page 18100.7

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	*

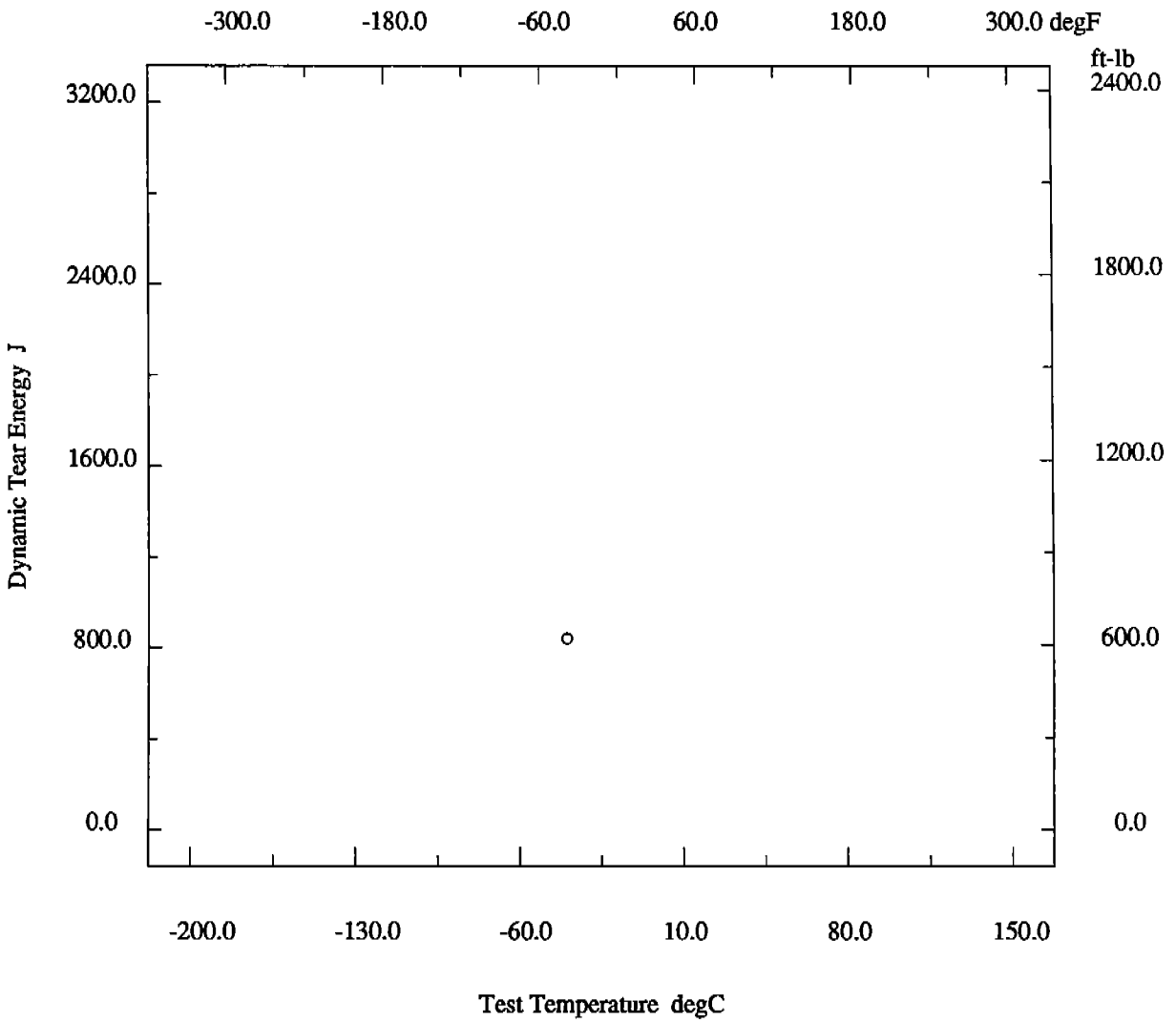
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L °	-40	620	*

* - not reported

Material HY80

Description

Material Code	001.017.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.59 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	N8686-5
Reference	USN-1		



* - not reported

351
352x

Material HY80

Description

Material Code	001.018.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		

Composition

C	0.15 %	Mn	0.31 %
P	0.013 %	S	0.017 %
Si	0.22 %	Cr	1.49 %
Ni	3.10 %	Mo	0.40 %
V	0.01 %	Cu	0.16 %
Cb	*	Ti	0.003 %
B	*	Al	0.026 %
N	*	Other Components	As=0.006;Sn=0.015;Sb=0.007 %

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Top	Killing Process	*
Process Temperature	1160 degF	Process Time	3.25 hr
Rolling Conditions	70 %	Final Processing	A,Q,T
Final Temperature	1660 degF	Final Time	3.48 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	115.5	104.5	*	18	57.0

* - not reported

Material HY80

Description

Material Code	001.018.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		

Composition

See Page 18200.1

Fabrication History

See Page 18200.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
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 ○	-120	105
L-T ○	-120	110
L-T ○	-120	110
L-T ○	-120	112
L-T ○	-120	118
L-T ○	-40	102
L-T ○	-40	105
L-T ○	-40	110
L-T ○	-40	111
L-T ○	-40	111
L-T ○	0	100
L-T ○	0	108
L-T ○	0	110
L-T ○	0	111
L-T ○	0	118
L-T ○	32	108
L-T ○	32	110
L-T ○	32	114
L-T ○	32	116
L-T ○	32	118
L-T ○	70	116
L-T ○	70	120
L-T ○	70	121
L-T ○	70	121
L-T ○	70	123
T-L △	-120	40
T-L △	-120	48
T-L △	-120	50
T-L △	-120	66
T-L △	-120	66
T-L △	-40	50
T-L △	-40	50
T-L △	-40	56

(continued)

* - not reported

Material HY80

(continued)

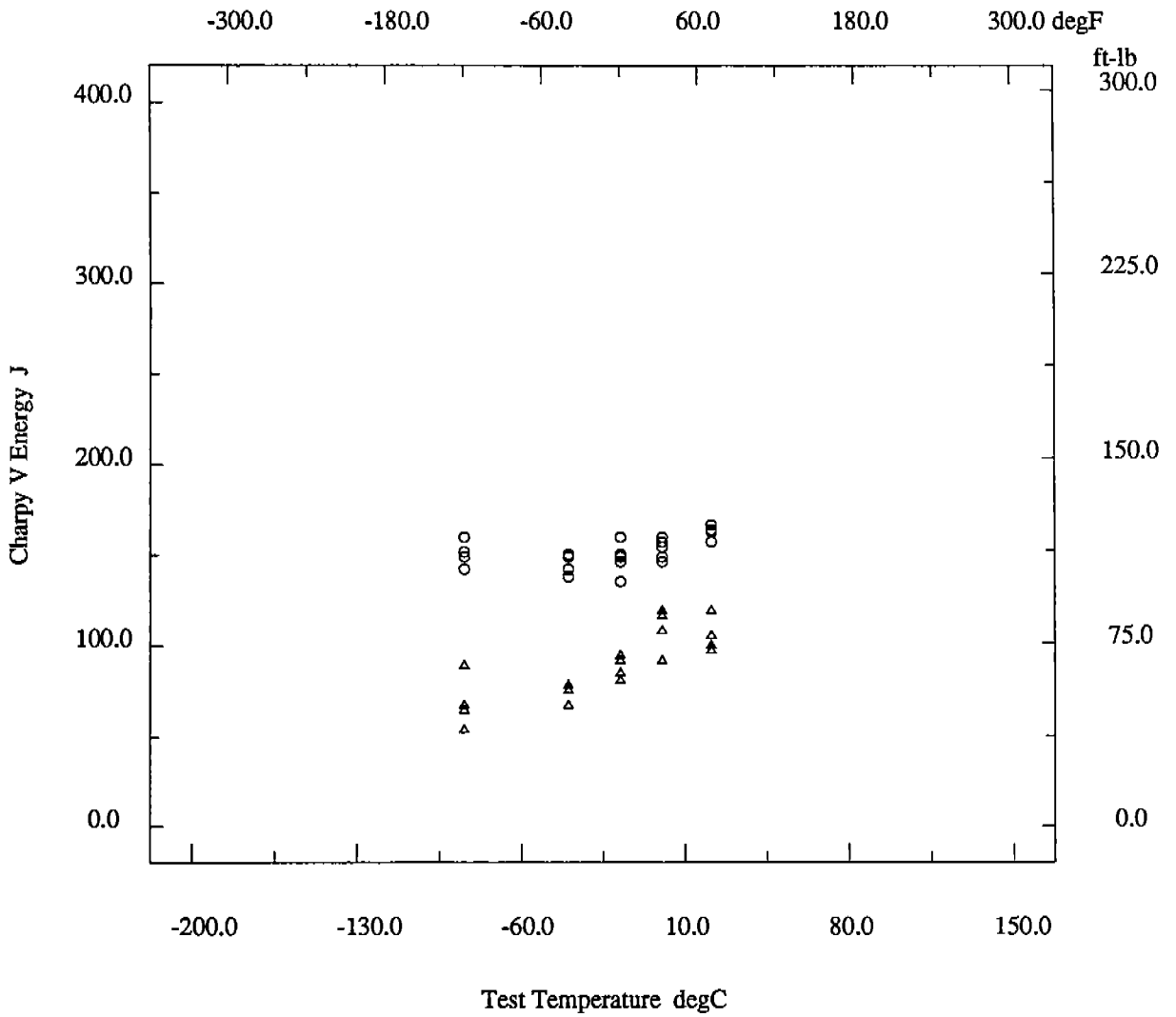
Orien	Test Temp degF	CVN Energy ft-lb
T-L △	-40	56
T-L △	-40	58
T-L △	0	60
T-L △	0	63
T-L △	0	63
T-L △	0	68
T-L △	0	70
T-L △	32	68
T-L △	32	68
T-L △	32	80
T-L △	32	86
T-L △	32	88
T-L △	70	72
T-L △	70	74
T-L △	70	78
T-L △	70	78
T-L △	70	88

* - not reported

Material HY80

Description

Material Code	001.018.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.018.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		

Composition

See Page 18200.1

Fabrication History

See Page 18200.1

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	114.9	103.5	*	18	52.5

* - not reported

Material HY80

Description

Material Code	001.018.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		

Composition

See Page 18200.1

Fabrication History

See Page 18200.1

Property Measurements

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

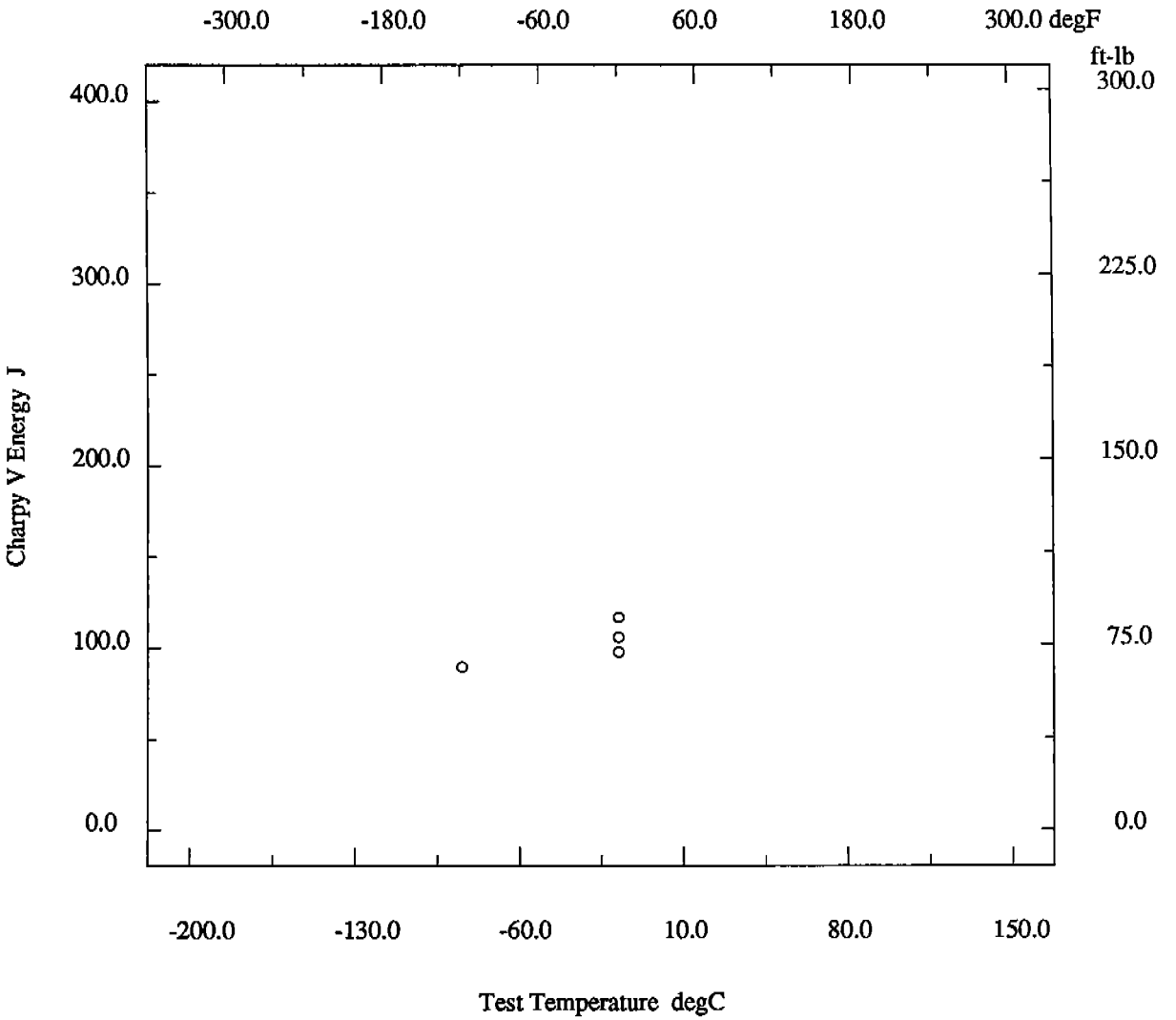
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	66
T-L °	-120	66
T-L °	-120	66
T-L °	0	72
T-L °	0	78
T-L °	0	86

* - not reported

Material HY80

Description

Material Code	001.018.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.018.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		

Composition

See Page 18200.1

Fabrication History

See Page 18200.1

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	115.8	102.8	*	20	57.6

* - not reported

Material HY80

Description

Material Code	001.018.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		

Composition

See Page 18200.1

Fabrication History

See Page 18200.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
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 °	-120	68
T-L °	-120	76
T-L °	-120	79
T-L °	0	70
T-L °	0	79
T-L °	0	86

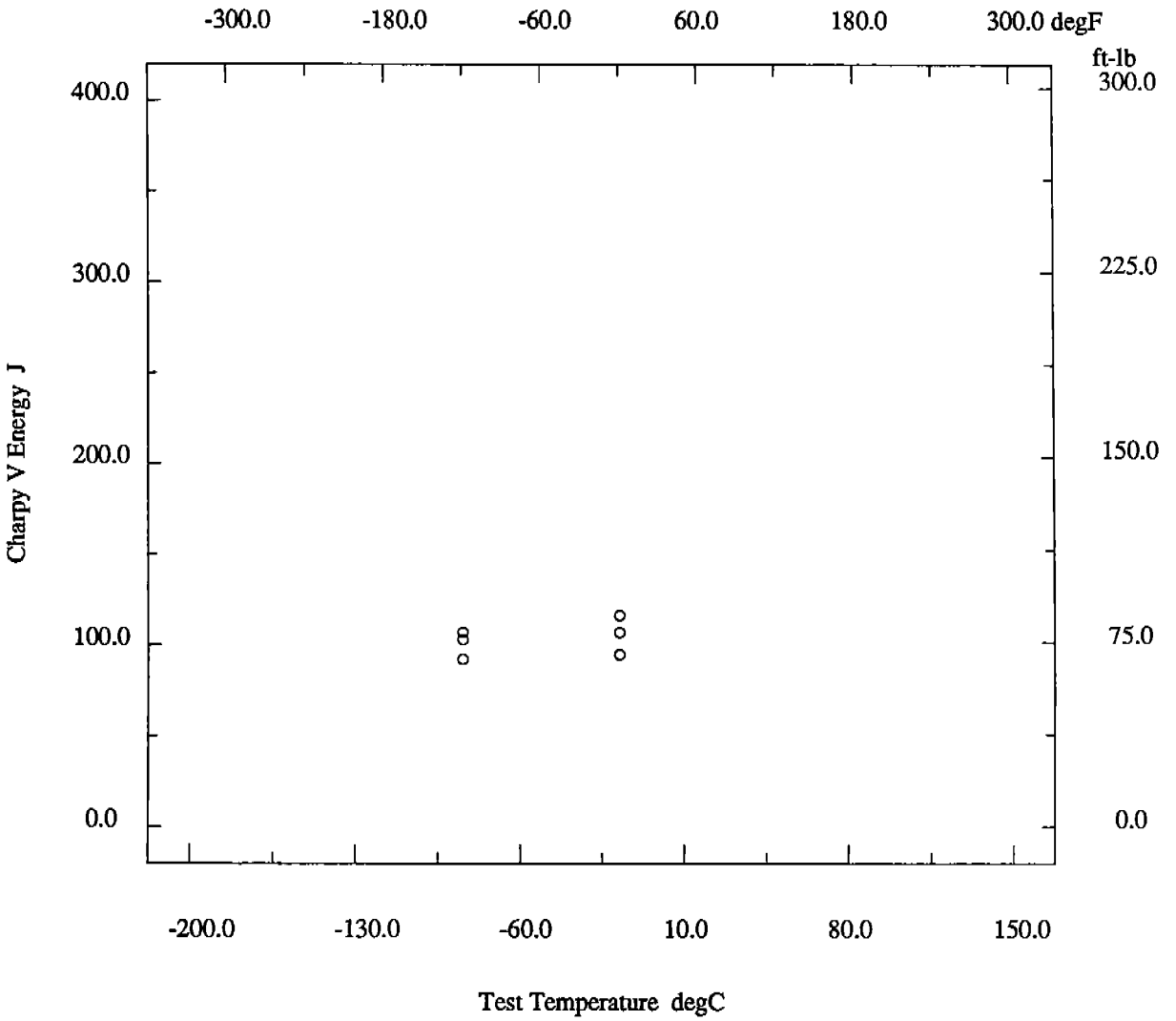
* - not reported

361

Material HY80

Description

Material Code	001.018.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.018.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		

Composition

See Page 18200.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Mid	Killing Process	*
Process Temperature	1160 degF	Process Time	3.25 hr
Rolling Conditions	70 %	Final Processing	A,Q,T
Final Temperature	1660 degF	Final Time	3.48 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	115.3	104.7	*	20	60.6

* - not reported

(26)

363

Material HY80

Description

Material Code	001.018.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		

Composition

See Page 18200.1

Fabrication History

See Page 18200.11

Property Measurements

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

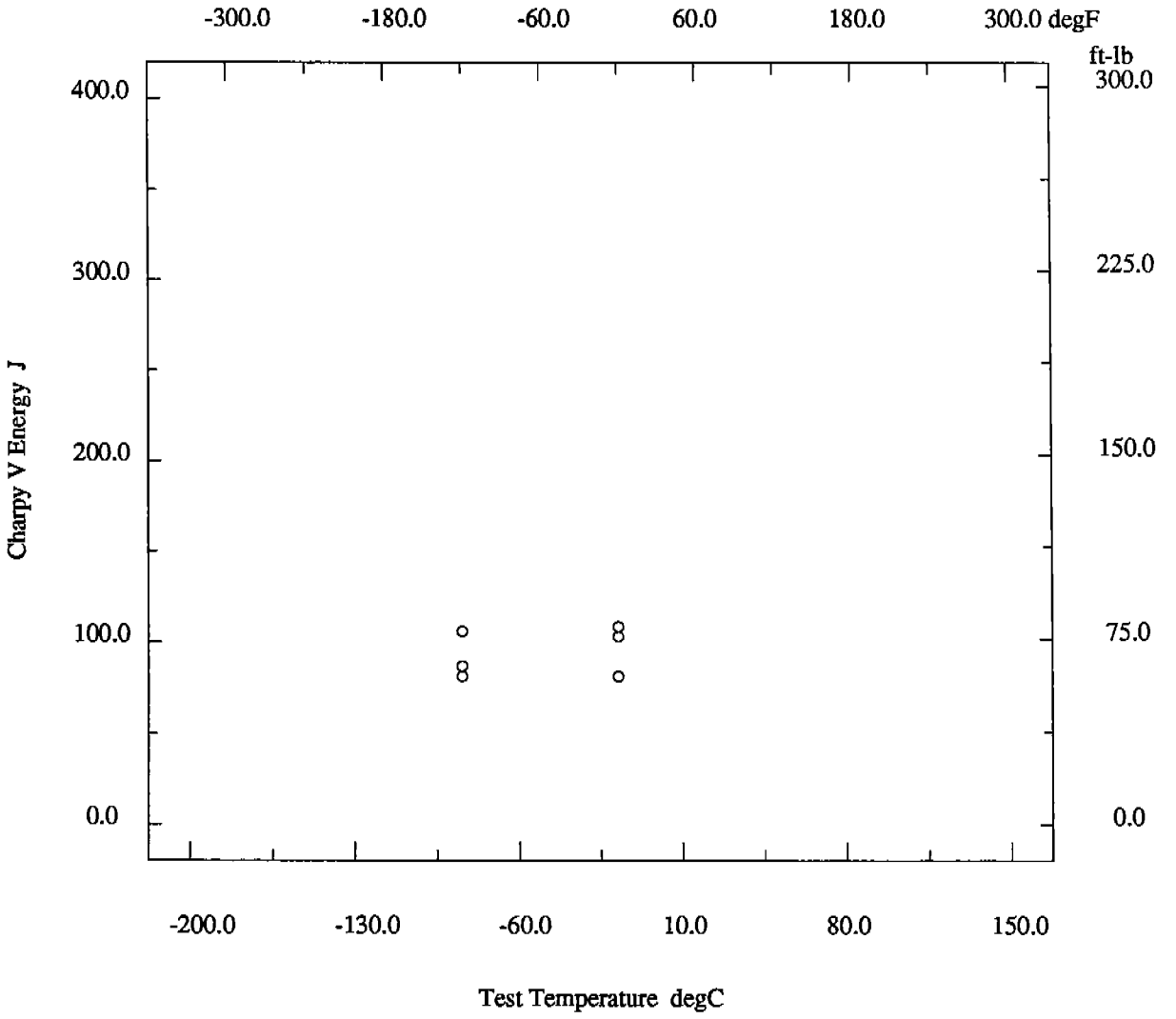
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	60
T-L °	-120	64
T-L °	-120	78
T-L °	0	60
T-L °	0	76
T-L °	0	80

* - not reported

Material HY80

Description

Material Code	001.018.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		



* - not reported

365

Material HY80

Description

Material Code	001.018.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		

Composition See Page 18200.1

Fabrication History See Page 18200.11

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	115.9	105.7	*	18	52.2

* - not reported

Material HY80

Description

Material Code	001.018.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		

Composition

See Page 18200.1

Fabrication History

See Page 18200.11

Property Measurements

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

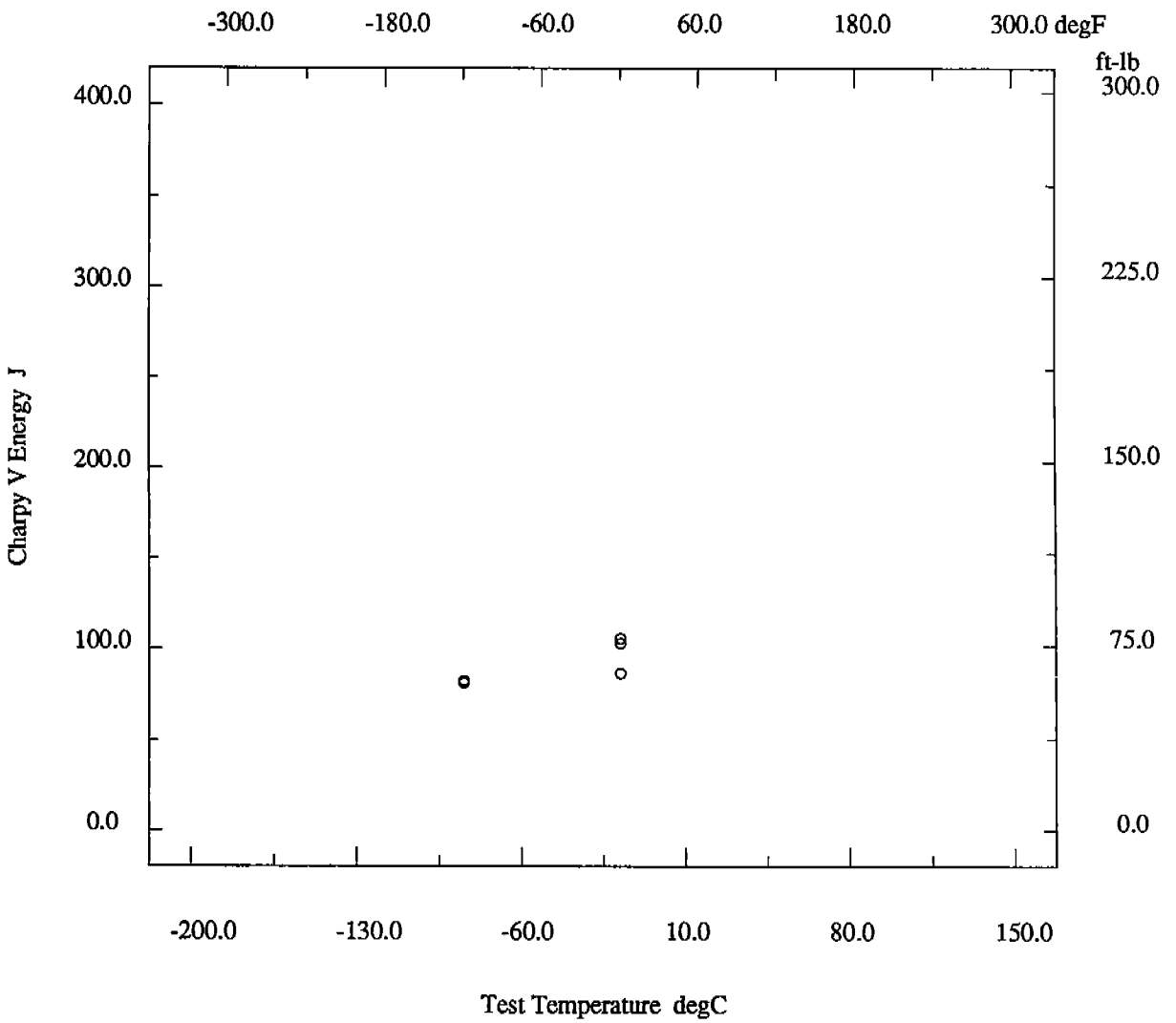
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	60
T-L °	-120	61
T-L °	-120	61
T-L °	0	64
T-L °	0	76
T-L °	0	78

* - not reported

Material HY80

Description

Material Code	001.018.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.018.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		

Composition

See Page 18200.1

Fabrication History

See Page 18200.11

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	116.9	106.7	*	18	57.2

* - not reported

Material HY80

Description

Material Code	001.018.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		

Composition

See Page 18200.1

Fabrication History

See Page 18200.11

Property Measurements

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

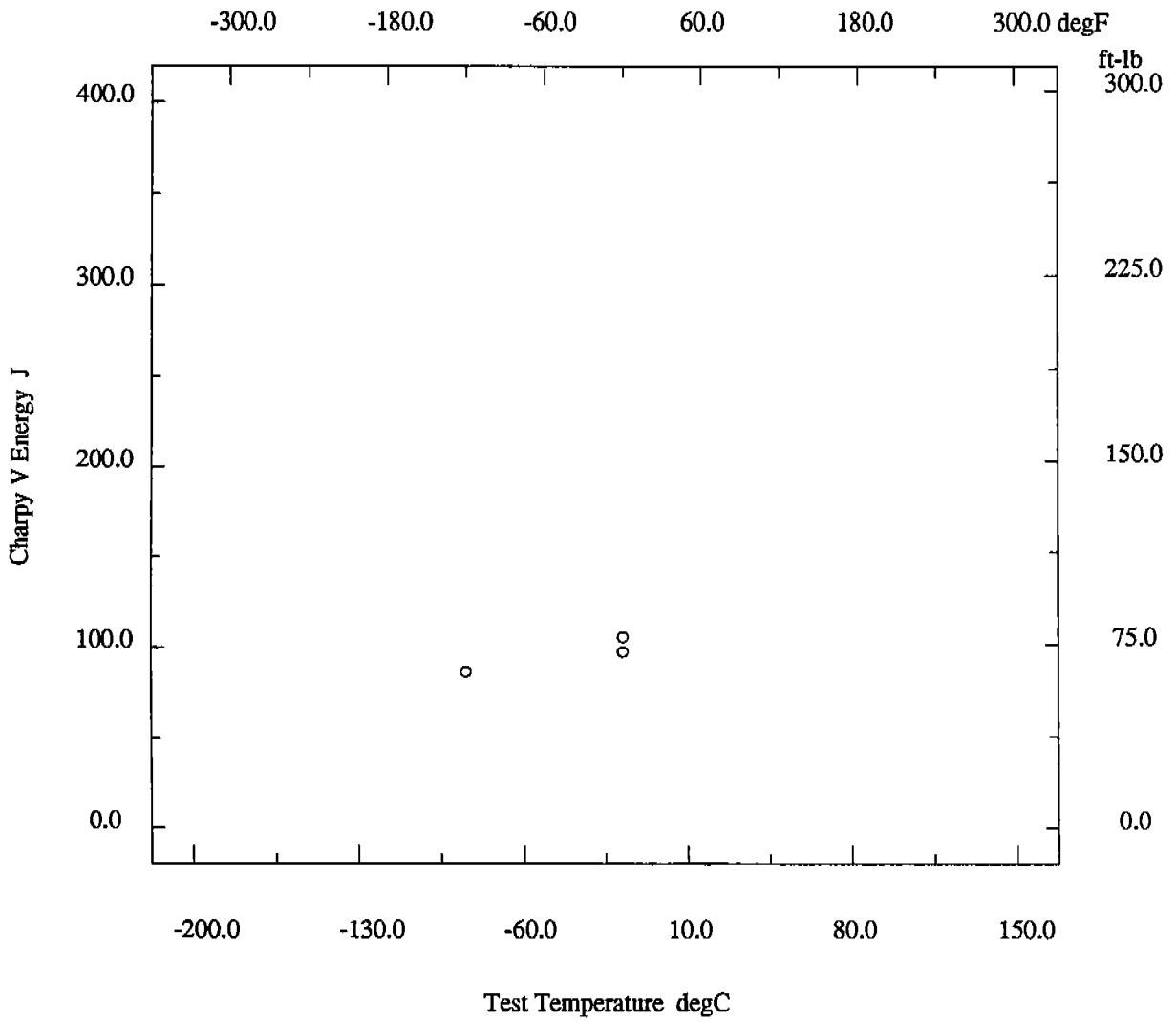
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	64
T-L °	-120	64
T-L °	-120	64
T-L °	0	72
T-L °	0	78
T-L °	0	78

* - not reported

Material HY80

Description

Material Code	001.018.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.018.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		

Composition

See Page 18200.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Bottom	Killing Process	*
Process Temperature	1160 degF	Process Time	3.25 hr
Rolling Conditions	70 %	Final Processing	A,Q,T
Final Temperature	1660 degF	Final Time	3.48 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	116.8	106.5	*	20	60.6

* - not reported

372

Material HY80

Description

Material Code	001.018.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		

Composition

See Page 18200.1

Fabrication History

See Page 18200.20

Property Measurements

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

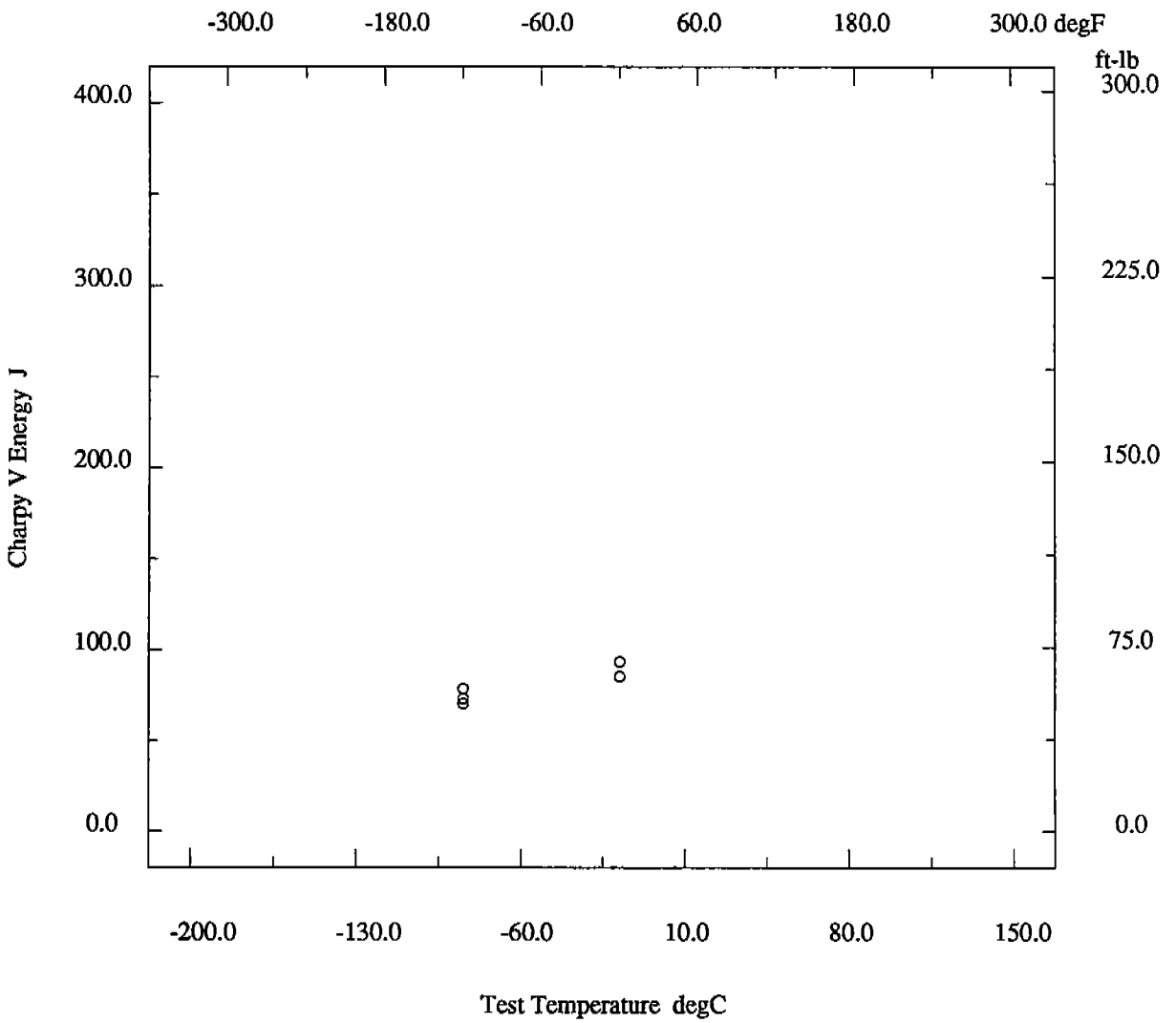
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	52
T-L °	-120	54
T-L °	-120	58
T-L °	0	63
T-L °	0	69
T-L °	0	69

* - not reported

Material HY80

Description

Material Code	001.018.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.018.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		

Composition See Page 18200.1

Fabrication History See Page 18200.20

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	117.0	106.4	*	19	64.3

* - not reported

Material HY80

Description

Material Code	001.018.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		

Composition

See Page 18200.1

Fabrication History

See Page 18200.20

Property Measurements

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

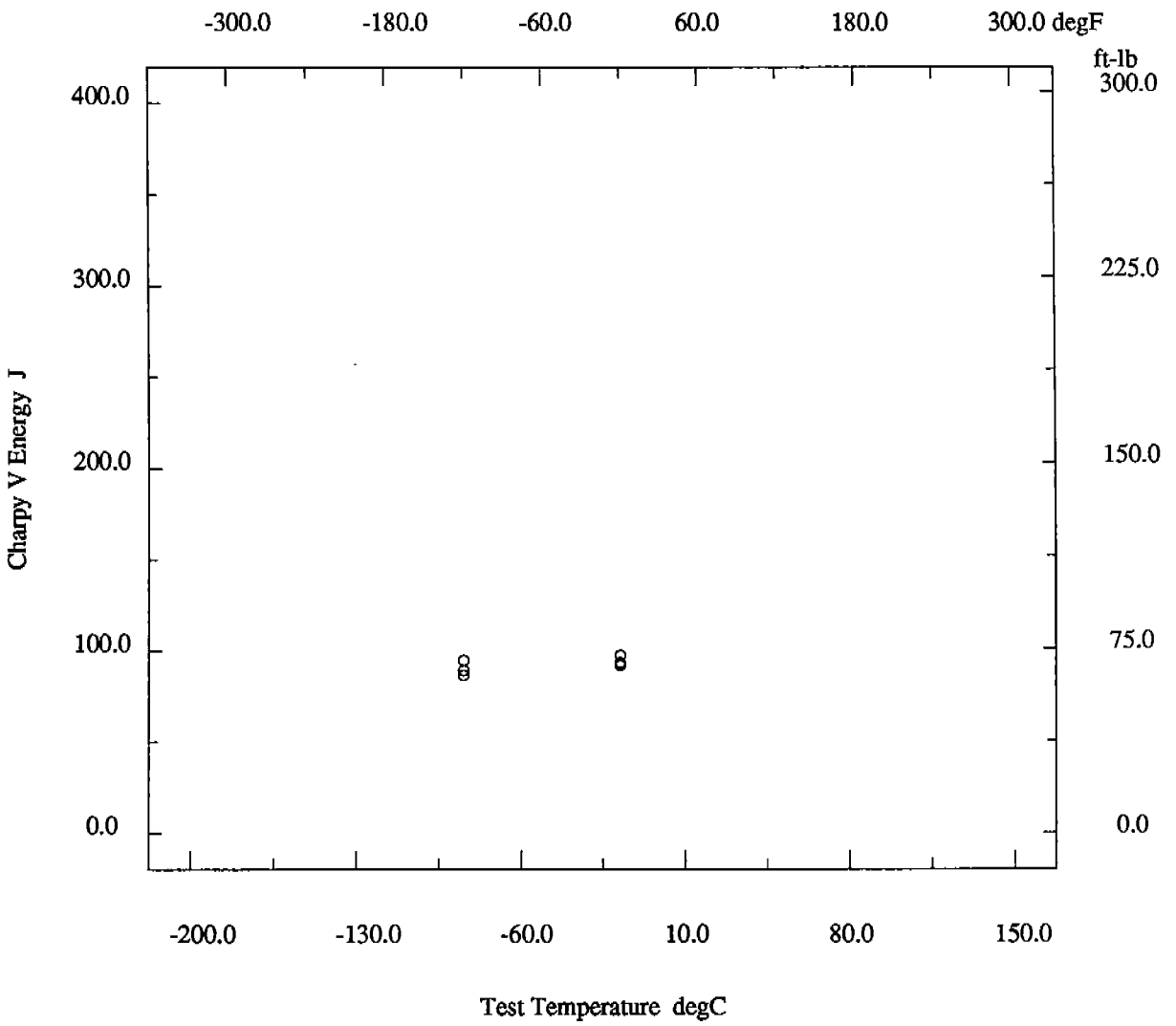
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	64
T-L °	-120	66
T-L °	-120	70
T-L °	0	68
T-L °	0	69
T-L °	0	72

* - not reported

Material HY80

Description

Material Code	001.018.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		



* - not reported

377

Material HY80

Description

Material Code	001.018.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		

Composition See Page 18200.1

Fabrication History See Page 18200.20

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	117.7	107.0	*	18	62.1

* - not reported

Material HY80

Description

Material Code	001.018.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		

Composition

See Page 18200.1

Fabrication History

See Page 18200.20

Property Measurements

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

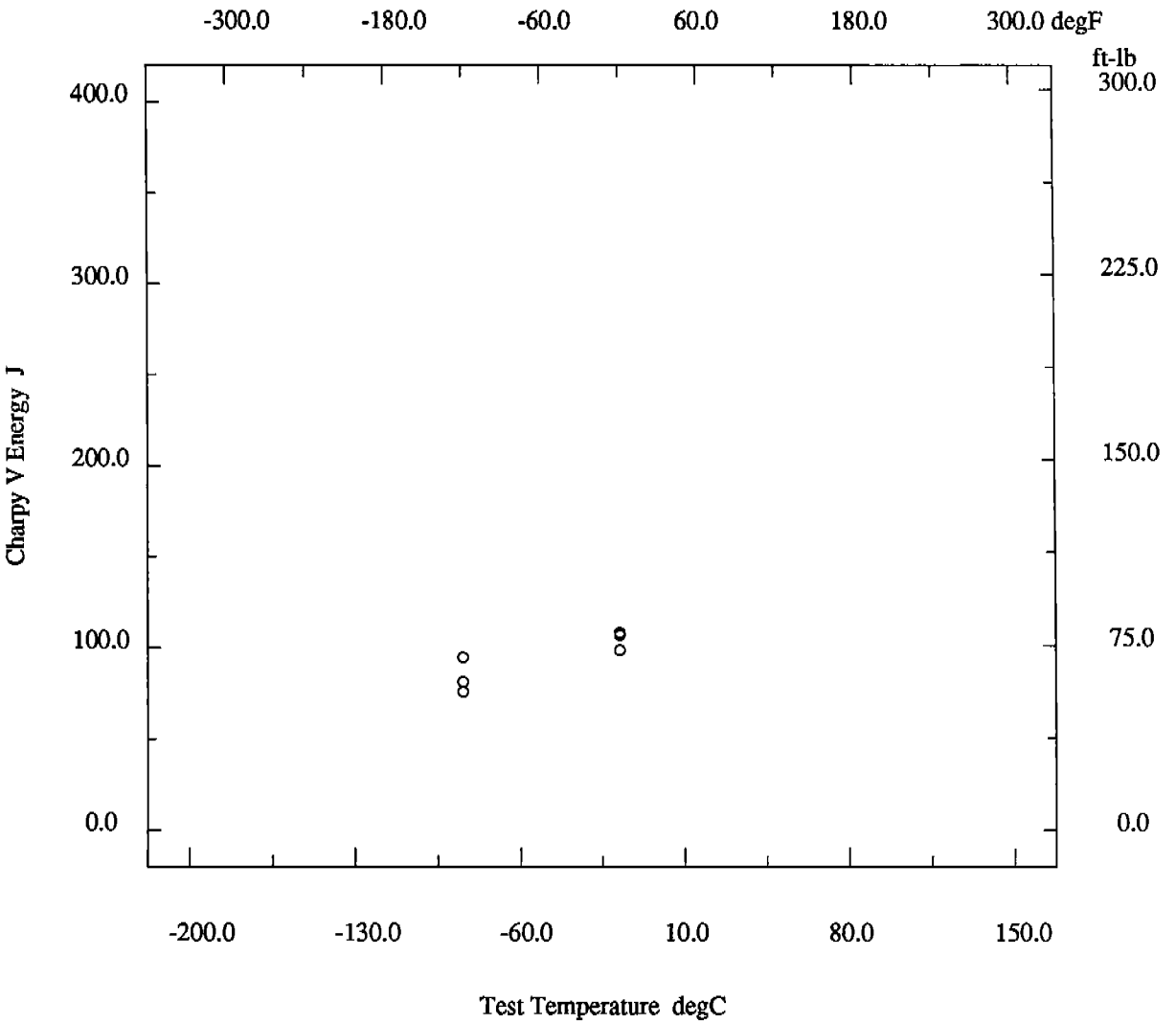
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	56
T-L °	-120	60
T-L °	-120	70
T-L °	0	73
T-L °	0	79
T-L °	0	80

* - not reported

Material HY80

Description

Material Code	001.018.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D3974-1B
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.019.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition

C	0.16 %	Mn	0.26 %
P	0.013 %	S	0.006 %
Si	0.25 %	Cr	1.64 %
Ni	3.29 %	Mo	0.54 %
V	0.009 %	Cu	0.13 %
Cb	*	Ti	0.004 %
B	*	Al	0.026 %
N	*	Other Components	As=0.009;Sn=0.013;Sb=0.006 %

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Top	Killing Process	*
Process Temperature	1650 degF	Process Time	6 hr
Rolling Conditions	66 %	Final Processing	A,Q,T
Final Temperature	1160 degF	Final Time	5 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	117.3	104.7	*	22	73.1

* - not reported

Material HY80

Description

Material Code	001.019.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition See Page 18300.1

Fabrication History See Page 18300.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
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 ○	-120	114
L-T ○	-120	116
L-T ○	-120	118
L-T ○	-120	120
L-T ○	-120	122
L-T ○	-40	126
L-T ○	-40	128
L-T ○	-40	128
L-T ○	-40	130
L-T ○	-40	132
L-T ○	0	134
L-T ○	0	138
L-T ○	0	138
L-T ○	0	140
L-T ○	0	140
L-T ○	32	140
L-T ○	32	144
L-T ○	32	144
L-T ○	32	146
L-T ○	32	148
L-T ○	70	148
L-T ○	70	152
L-T ○	70	154
L-T ○	70	154
L-T ○	70	156
T-L △	-120	82
T-L △	-120	86
T-L △	-120	88
T-L △	-120	90
T-L △	-120	90
T-L △	-40	100
T-L △	-40	102
T-L △	-40	104

(continued)

* - not reported

Material HY80

(continued)

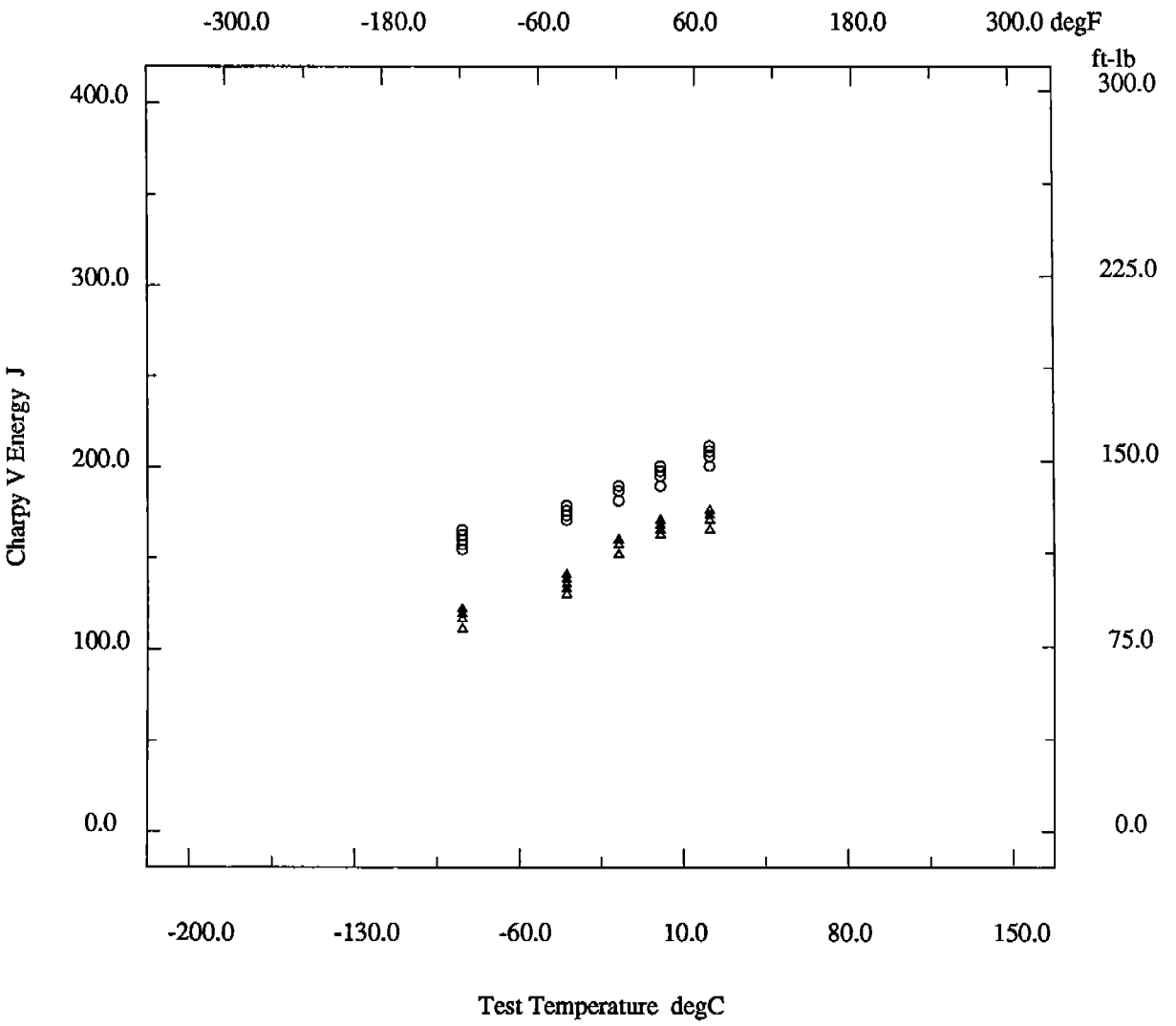
Orien	Test Temp degF	CVN Energy ft-lb
T-L △	-40	96
T-L △	-40	98
T-L △	0	112
T-L △	0	116
T-L △	0	116
T-L △	0	118
T-L △	0	118
T-L △	32	120
T-L △	32	122
T-L △	32	122
T-L △	32	124
T-L △	32	126
T-L △	70	122
T-L △	70	126
T-L △	70	128
T-L △	70	128
T-L △	70	130

* - not reported

Material HY80

Description

Material Code	001.019.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.019.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition

See Page 18300.1

Fabrication History

See Page 18300.1

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	*

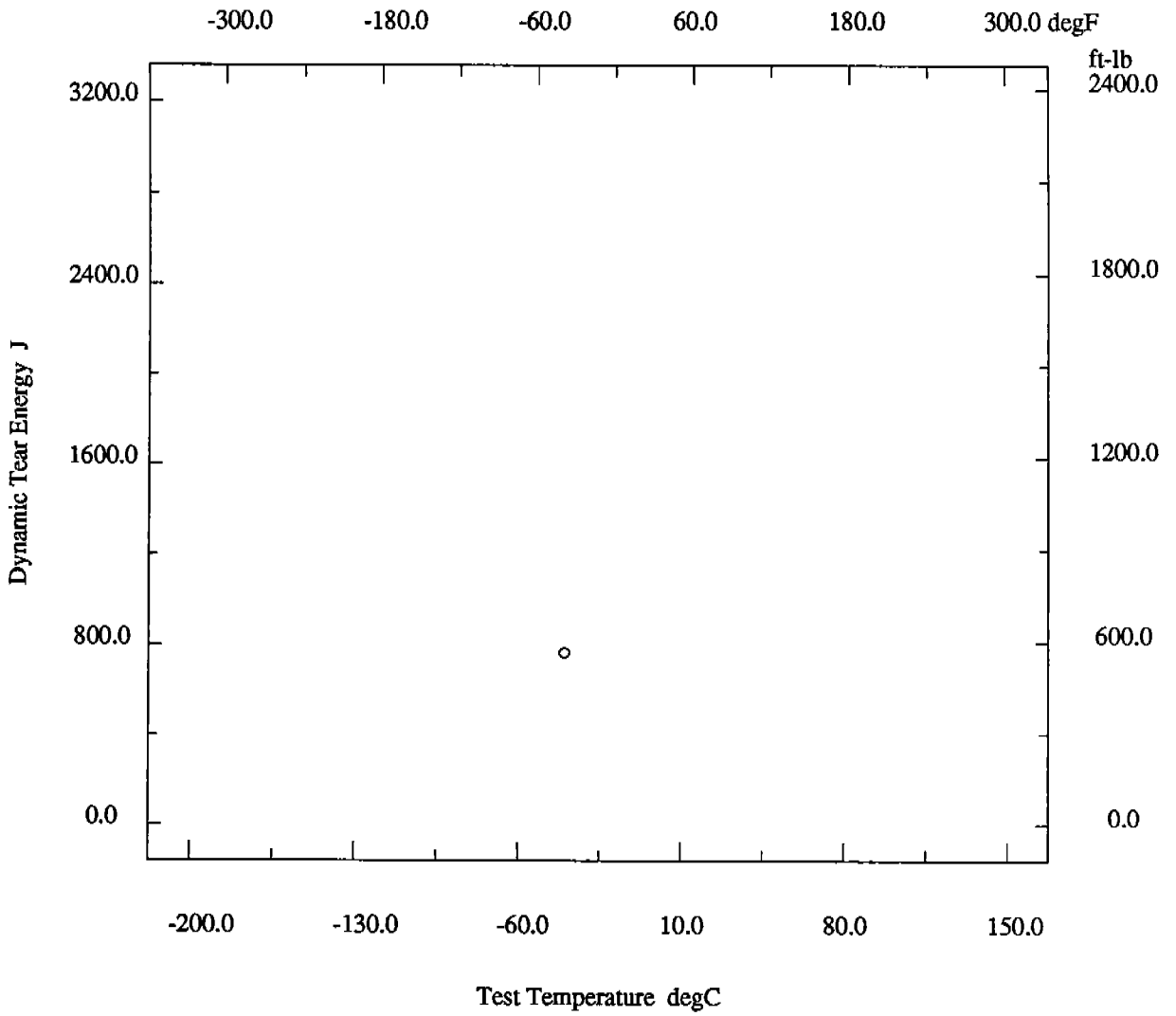
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L °	-40	565	*

* - not reported

Material HY80

Description

Material Code	001.019.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.019.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition

See Page 18300.1

Fabrication History

See Page 18300.1

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	120.2	107.0	*	20	64.1

* - not reported

Material HY80

Description

Material Code	001.019.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition

See Page 18300.1

Fabrication History

See Page 18300.1

Property Measurements

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

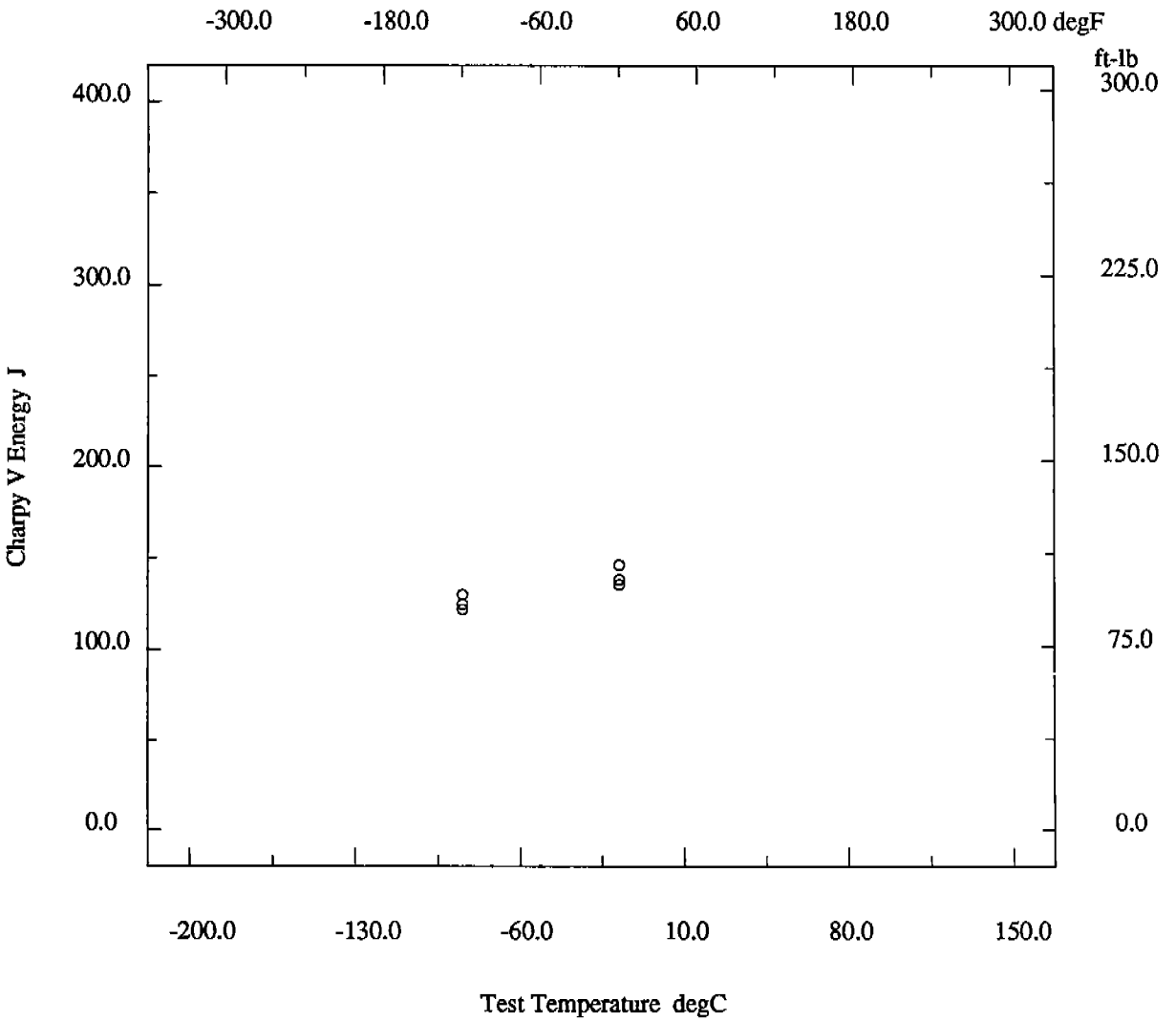
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	90
T-L °	-120	92
T-L °	-120	96
T-L °	0	100
T-L °	0	102
T-L °	0	108

* - not reported

Material HY80

Description

Material Code	001.019.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.019.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition

See Page 18300.1

Fabrication History

See Page 18300.1

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	*

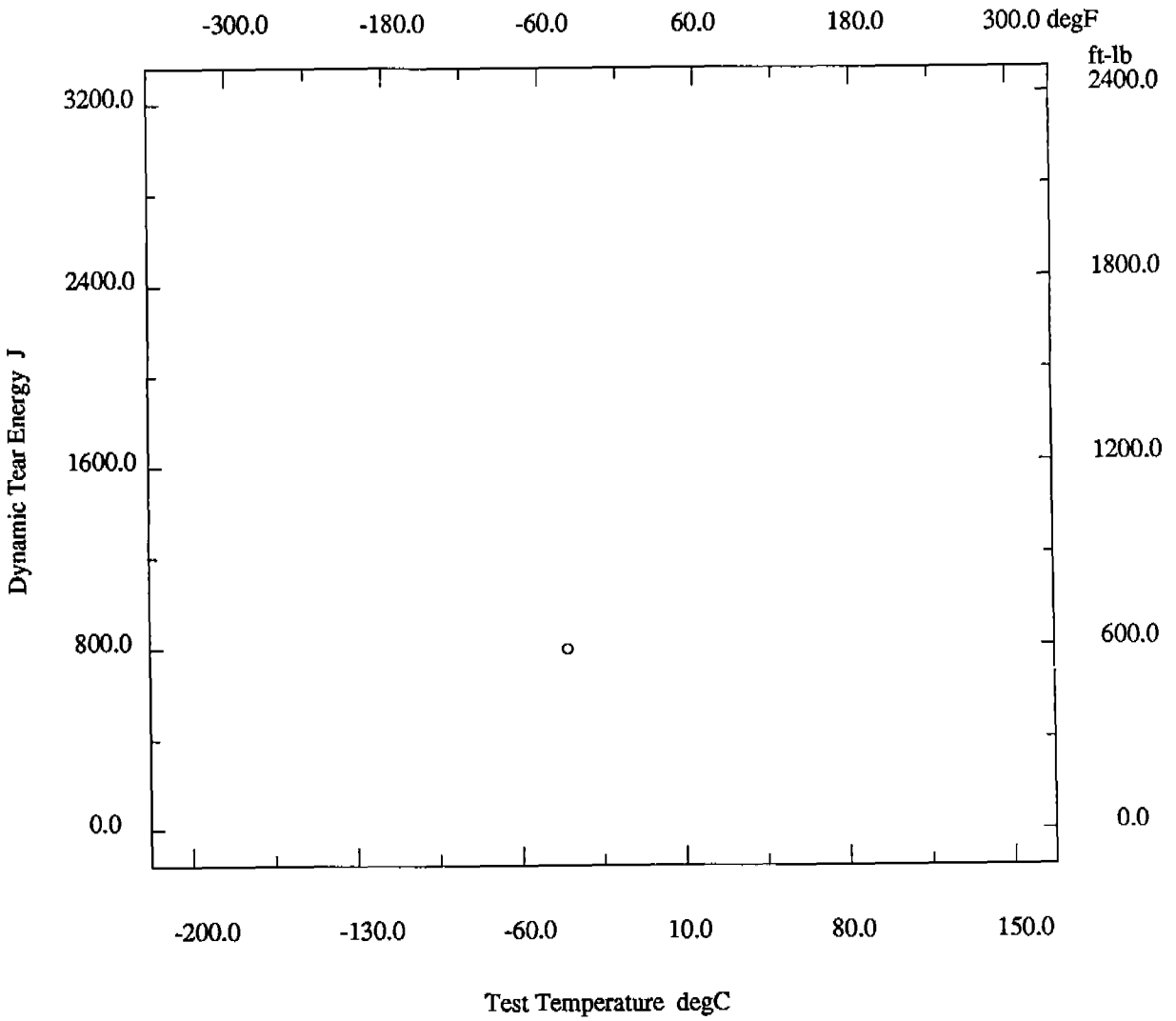
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L ○	-40	590	*

* - not reported

Material HY80

Description

Material Code	001.019.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.019.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition See Page 18300.1

Fabrication History See Page 18300.1

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	118.0	105.6	*	21	68.8

* - not reported

Material HY80

Description

Material Code	001.019.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition

See Page 18300.1

Fabrication History

See Page 18300.1

Property Measurements

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

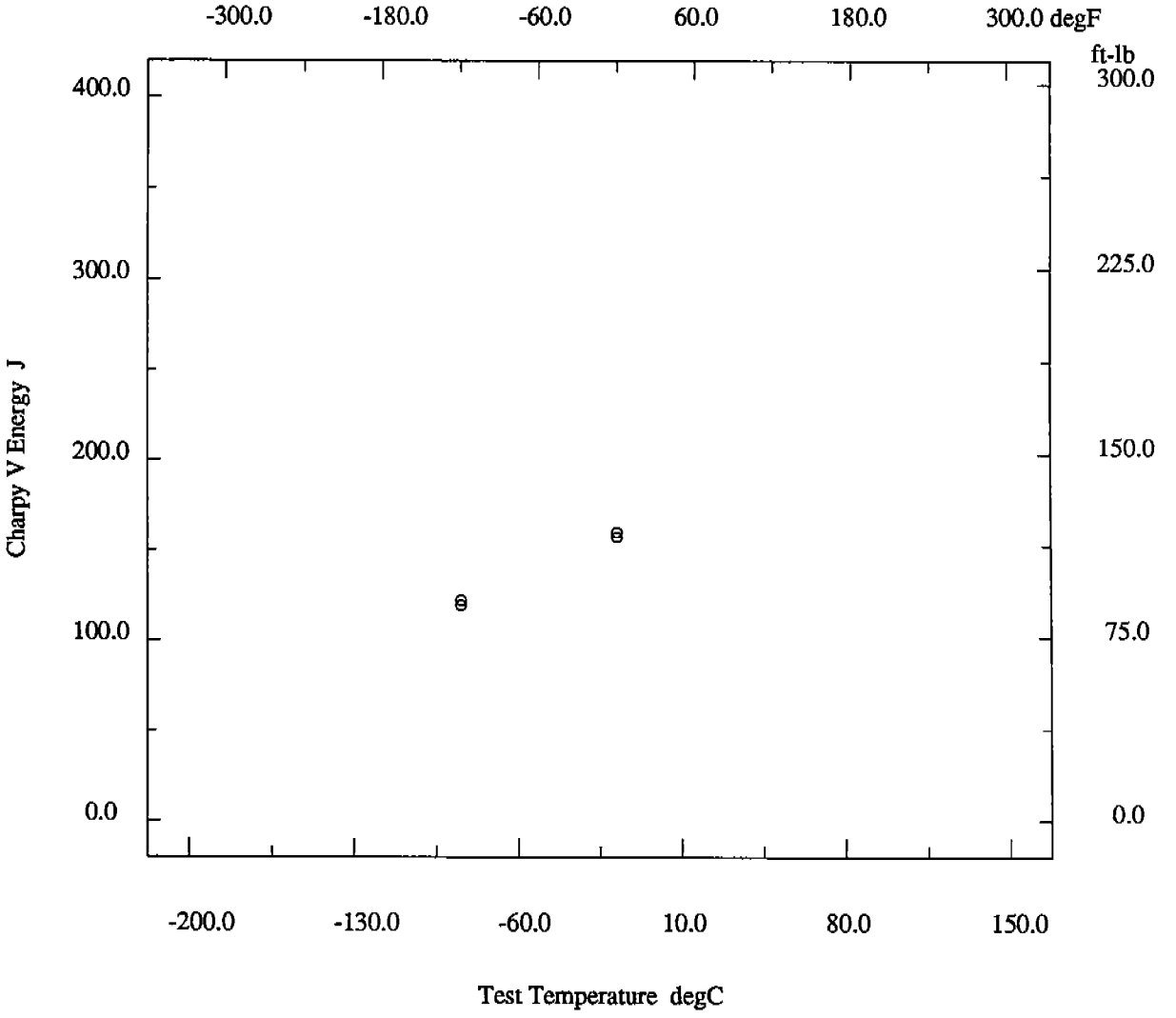
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	88
T-L °	-120	88
T-L °	-120	90
T-L °	0	116
T-L °	0	116
T-L °	0	118

* - not reported

Material HY80

Description

Material Code	001.019.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.019.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition

See Page 18300.1

Fabrication History

See Page 18300.1

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	*

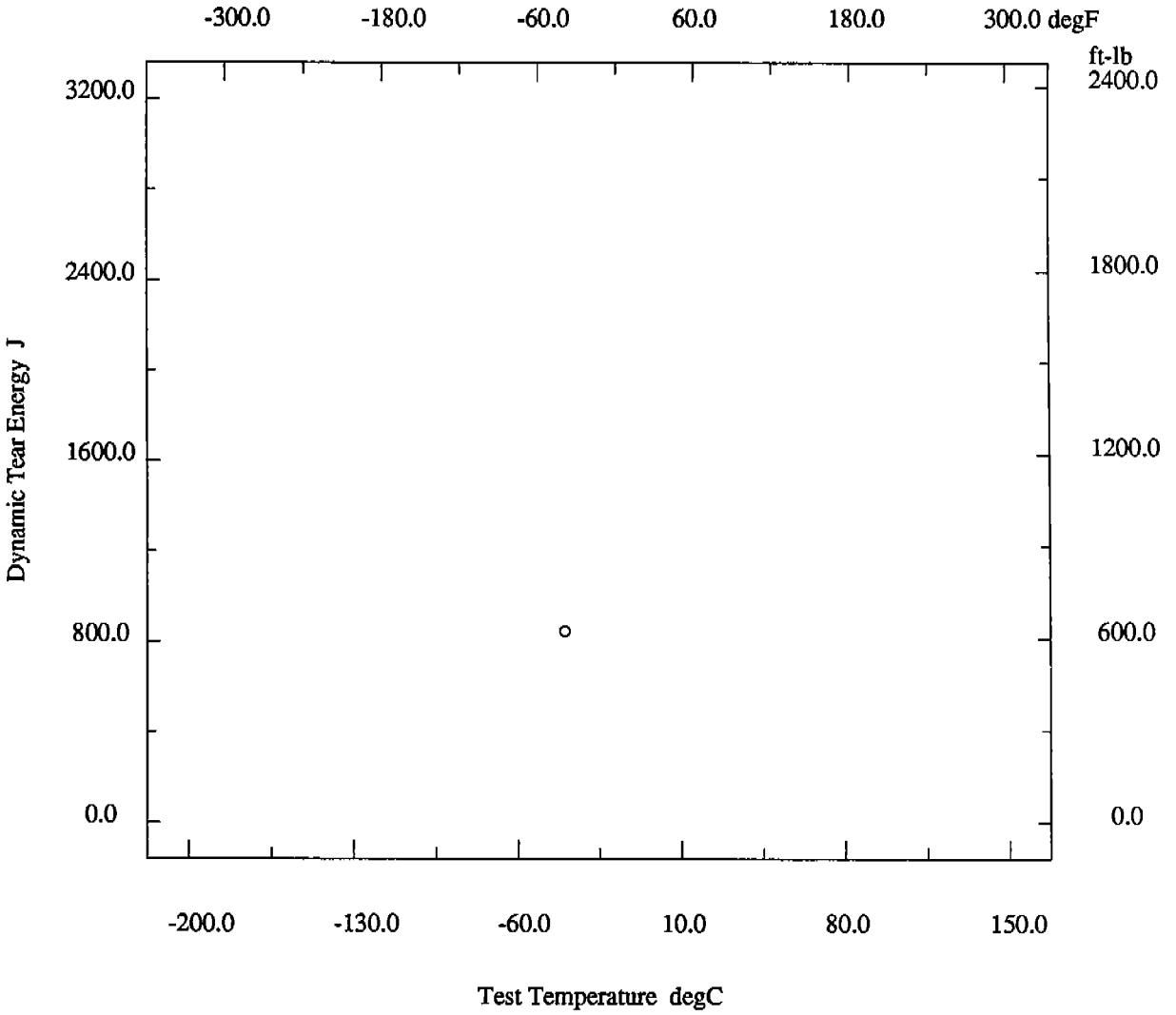
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L °	-40	625	*

* - not reported

Material HY80

Description

Material Code	001.019.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.019.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition

See Page 18300.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Mid	Killing Process	*
Process Temperature	1650 degF	Process Time	6 hr
Rolling Conditions	66 %	Final Processing	A,Q,T
Final Temperature	1160 degF	Final Time	5 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	116.0	102.9	*	21	69.0

* - not reported

Material HY80

Description

Material Code	001.019.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition

See Page 18300.1

Fabrication History

See Page 18300.17

Property Measurements

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

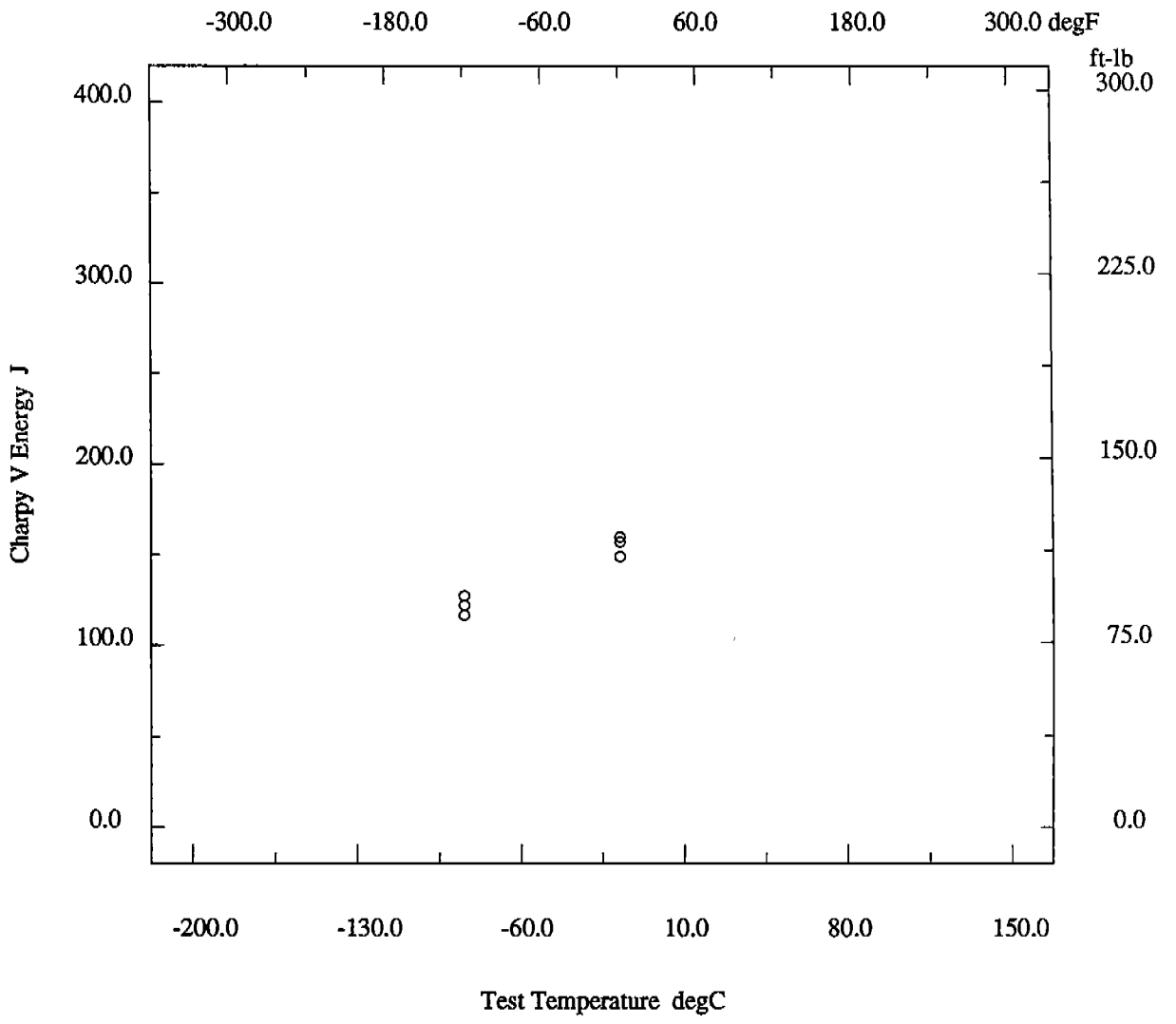
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	86
T-L °	-120	90
T-L °	-120	94
T-L °	0	110
T-L °	0	116
T-L °	0	118

* - not reported

Material HY80

Description

Material Code	001.019.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.019.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition See Page 18300.1

Fabrication History See Page 18300.17

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	*

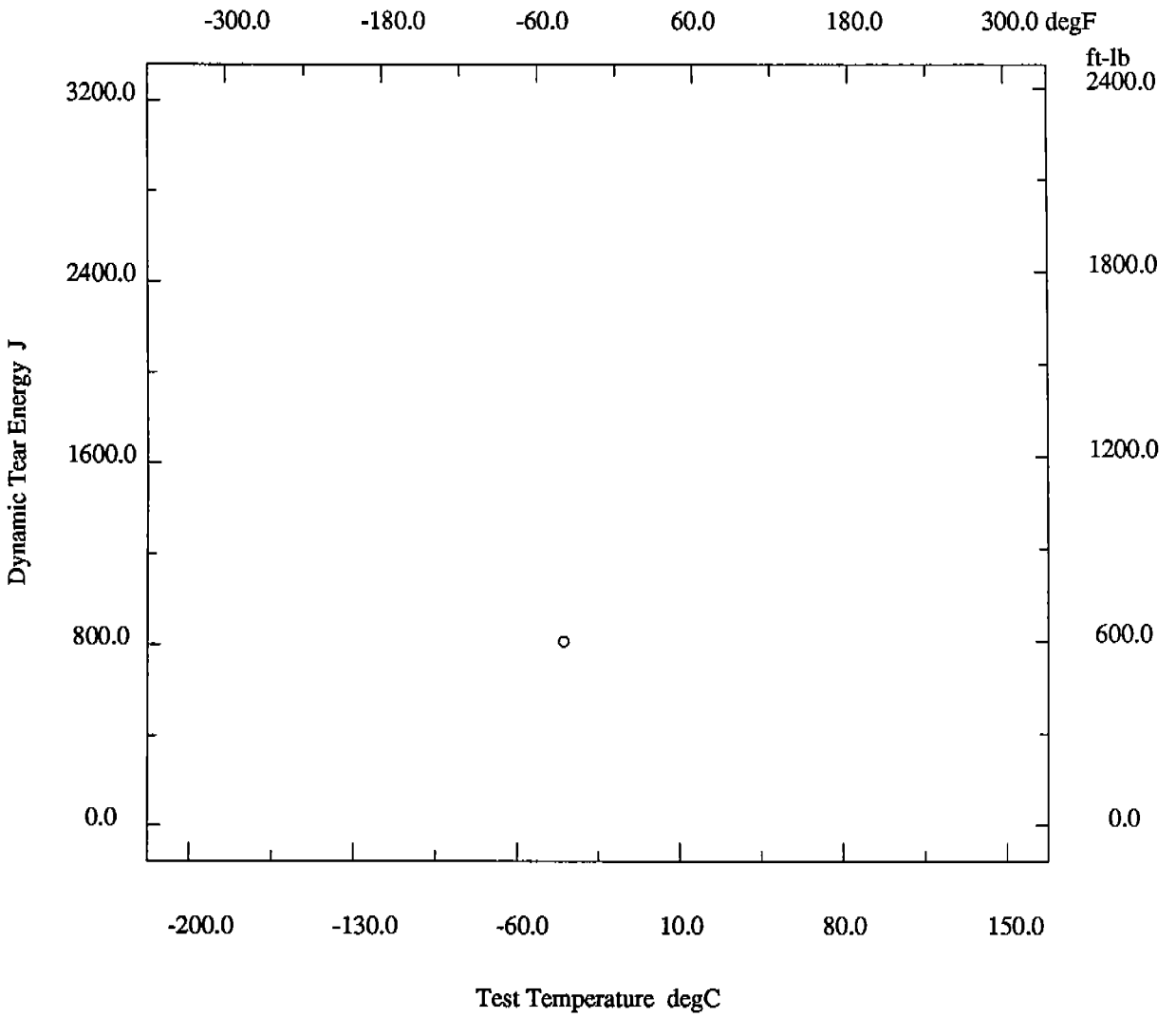
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L ○	-40	600	*

* - not reported

Material HY80

Description

Material Code	001.019.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.019.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition

See Page 18300.1

Fabrication History

See Page 18300.17

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	121.0	107.8	*	20	65.0

* - not reported

Material HY80

Description

Material Code	001.019.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition

See Page 18300.1

Fabrication History

See Page 18300.17

Property Measurements

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

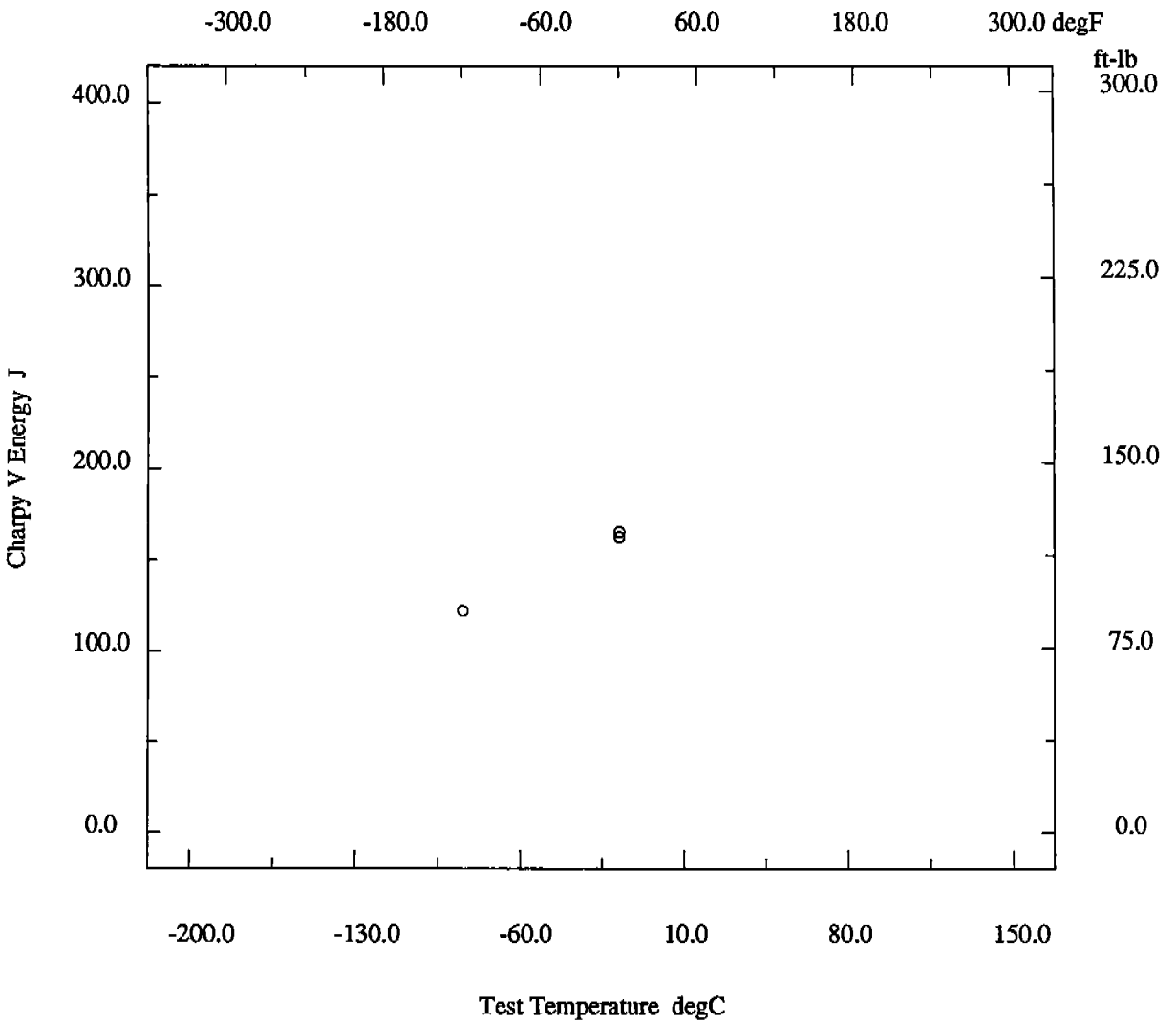
Orien	Test Temp degF	CVN Energy ft-lb
T-L ○	-120	90
T-L ○	-120	90
T-L ○	-120	90
T-L ○	0	120
T-L ○	0	120
T-L ○	0	122

* - not reported

Material HY80

Description

Material Code	001.019.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.019.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition

See Page 18300.1

Fabrication History

See Page 18300.17

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	*

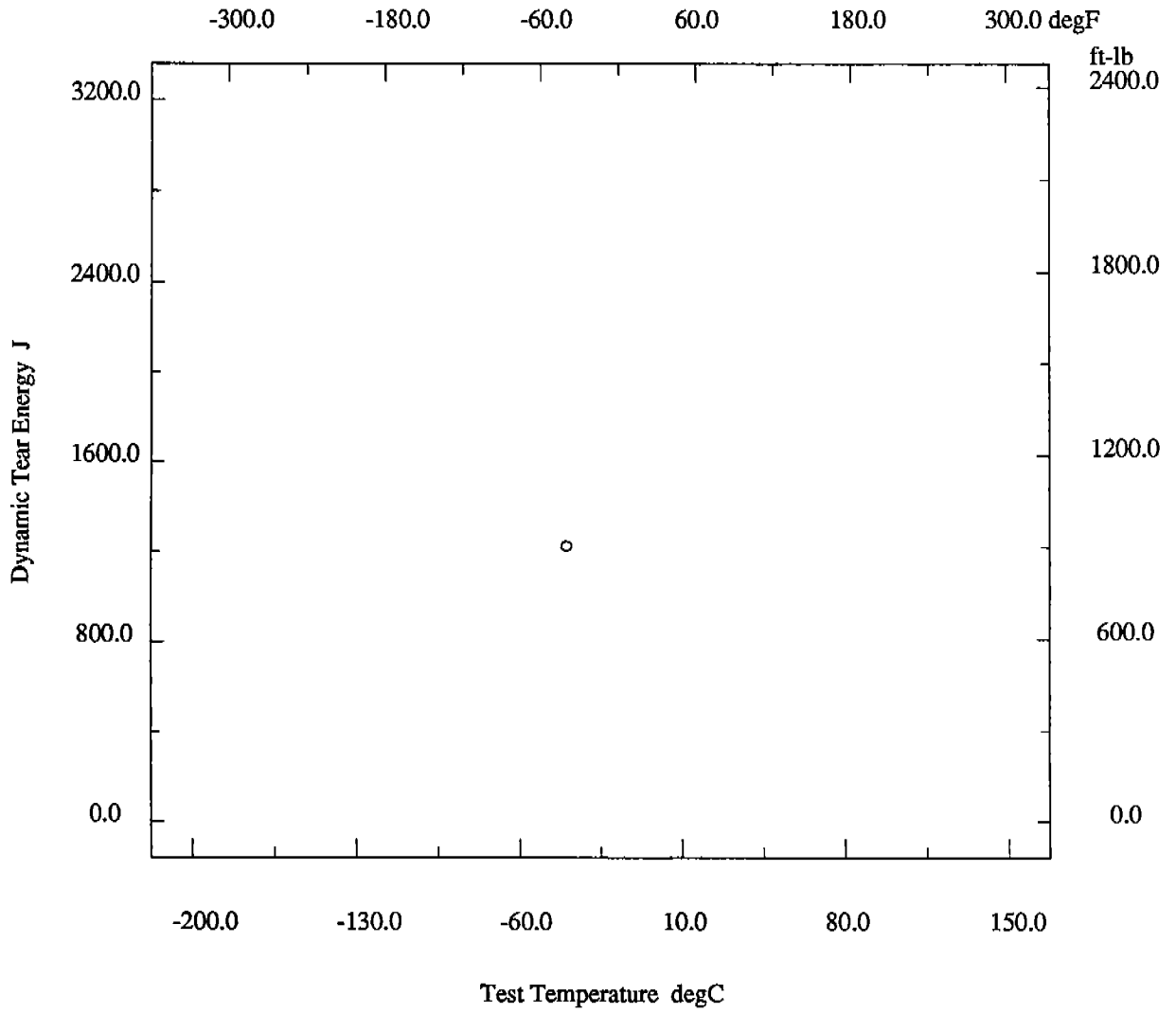
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L ○	-40	905	*

* - not reported

Material HY80

Description

Material Code	001.019.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.019.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition

See Page 18300.1

Fabrication History

See Page 18300.17

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	116.0	103.5	*	22	69.0

* - not reported

Material HY80

Description

Material Code	001.019.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition See Page 18300.1

Fabrication History See Page 18300.17

Property Measurements

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

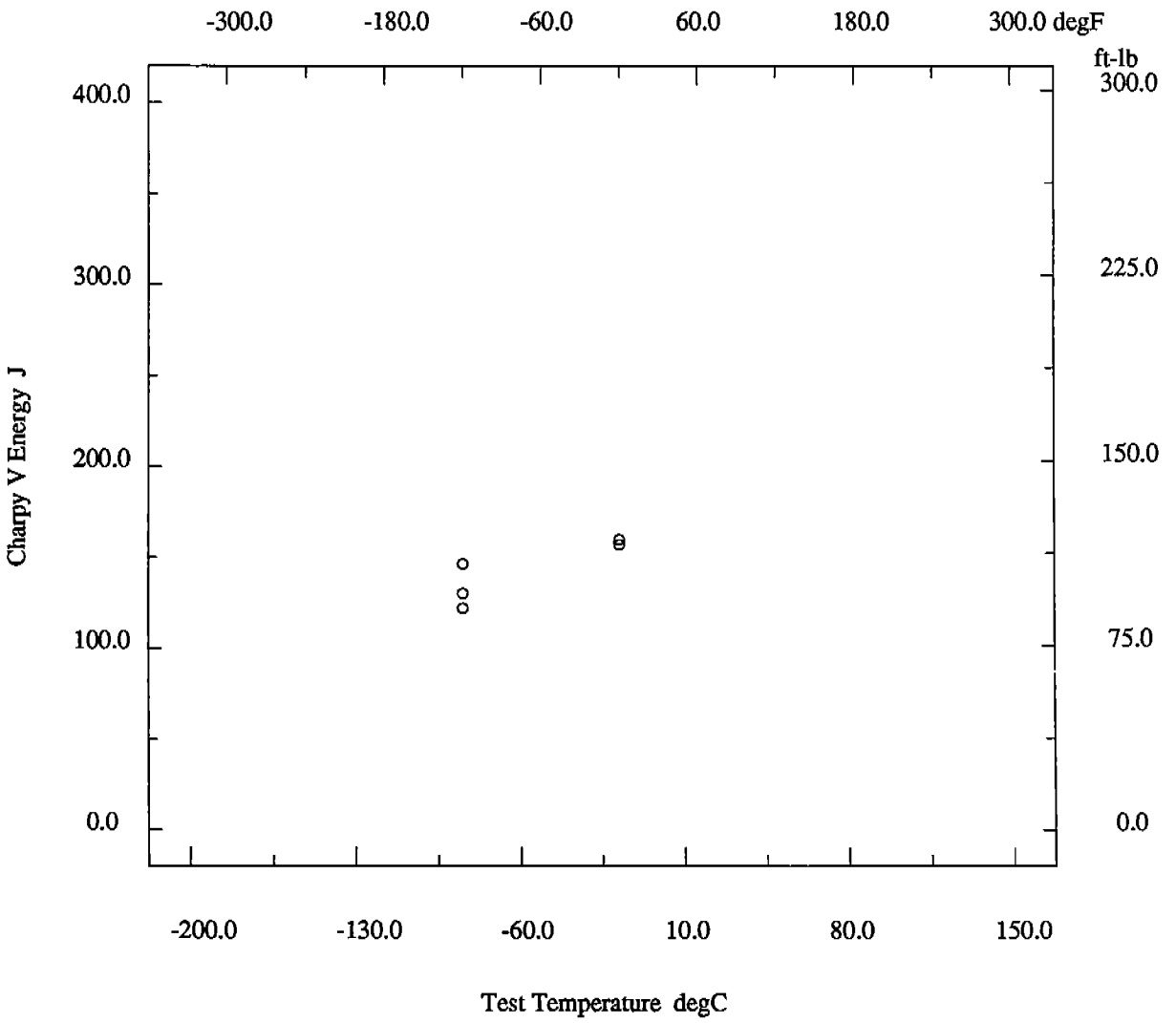
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	108
T-L °	-120	90
T-L °	-120	96
T-L °	0	116
T-L °	0	116
T-L °	0	118

* - not reported

Material HY80

Description

Material Code	001.019.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.019.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition

See Page 18300.1

Fabrication History

See Page 18300.17

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	*

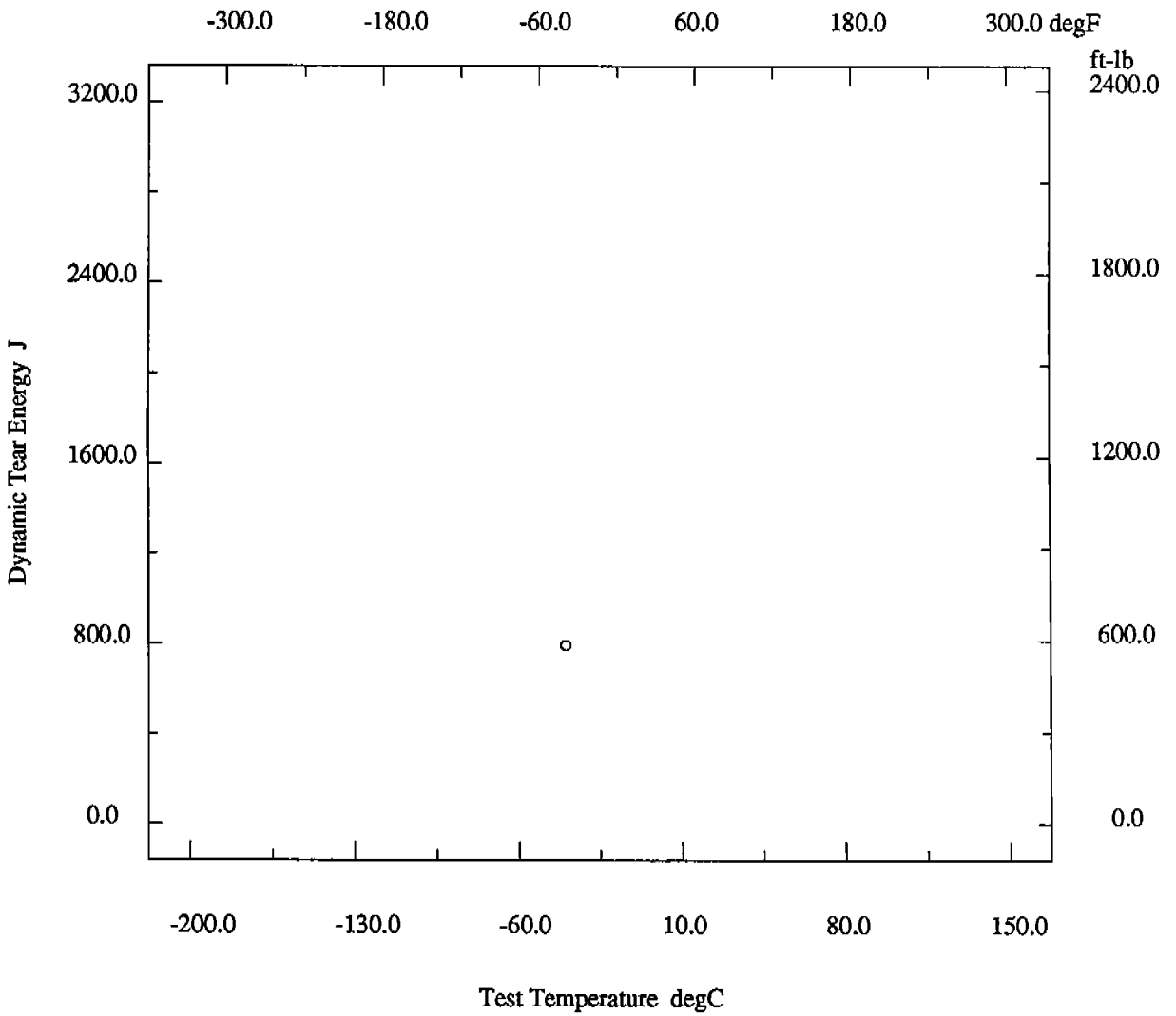
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L ○	-40	585	*

* - not reported

Material HY80

Description

Material Code	001.019.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.019.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition

See Page 18300.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Bottom	Killing Process	*
Process Temperature	1650 degF	Process Time	6 hr
Rolling Conditions	66 %	Final Processing	A,Q,T
Final Temperature	1160 degF	Final Time	5 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	113.0	101.1	*	22	71.5

* - not reported

Material HY80

Description

Material Code	001.019.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition

See Page 18300.1

Fabrication History

See Page 18300.32

Property Measurements

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

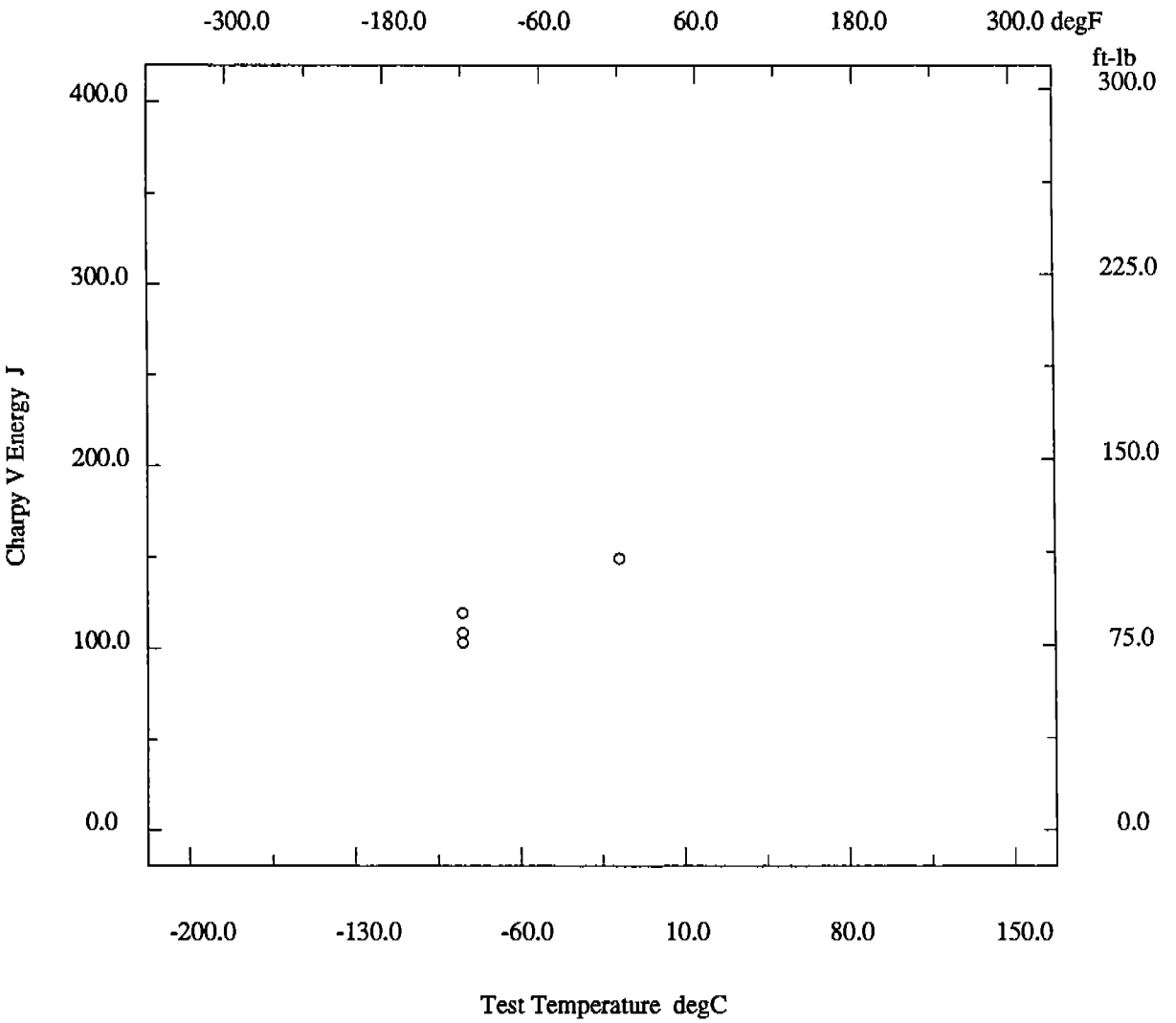
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	76
T-L °	-120	80
T-L °	-120	88
T-L °	0	110
T-L °	0	110
T-L °	0	110

* - not reported

Material HY80

Description

Material Code	001.019.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.019.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition

See Page 18300.1

Fabrication History

See Page 18300.32

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	*

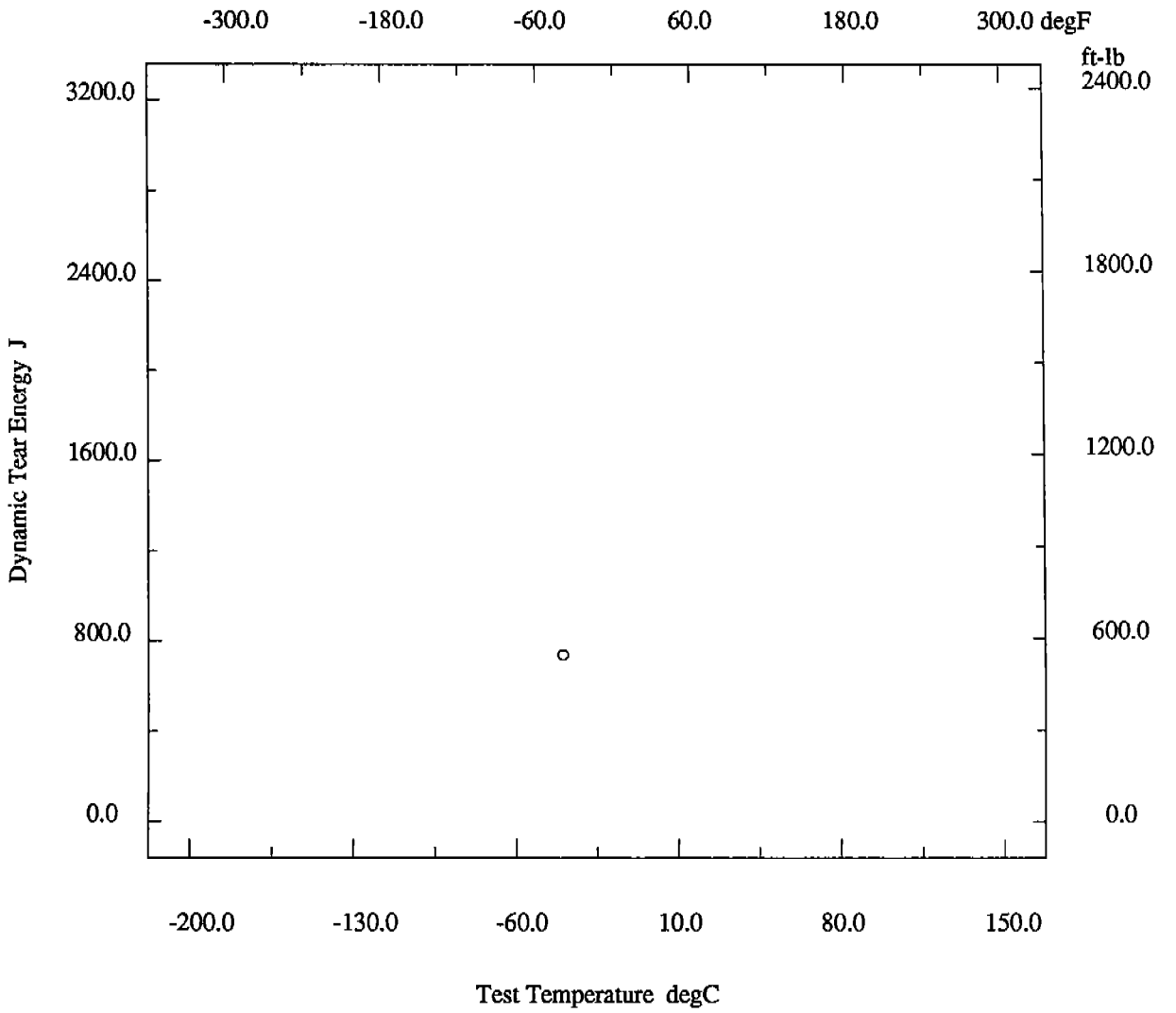
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L °	-40	545	*

* - not reported

Material HY80

Description

Material Code	001.019.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.019.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition See Page 18300.1

Fabrication History See Page 18300.32

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	121.2	108.6	*	19	64.1

* - not reported

Material HY80

Description

Material Code	001.019.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition See Page 18300.1

Fabrication History See Page 18300.32

Property Measurements

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

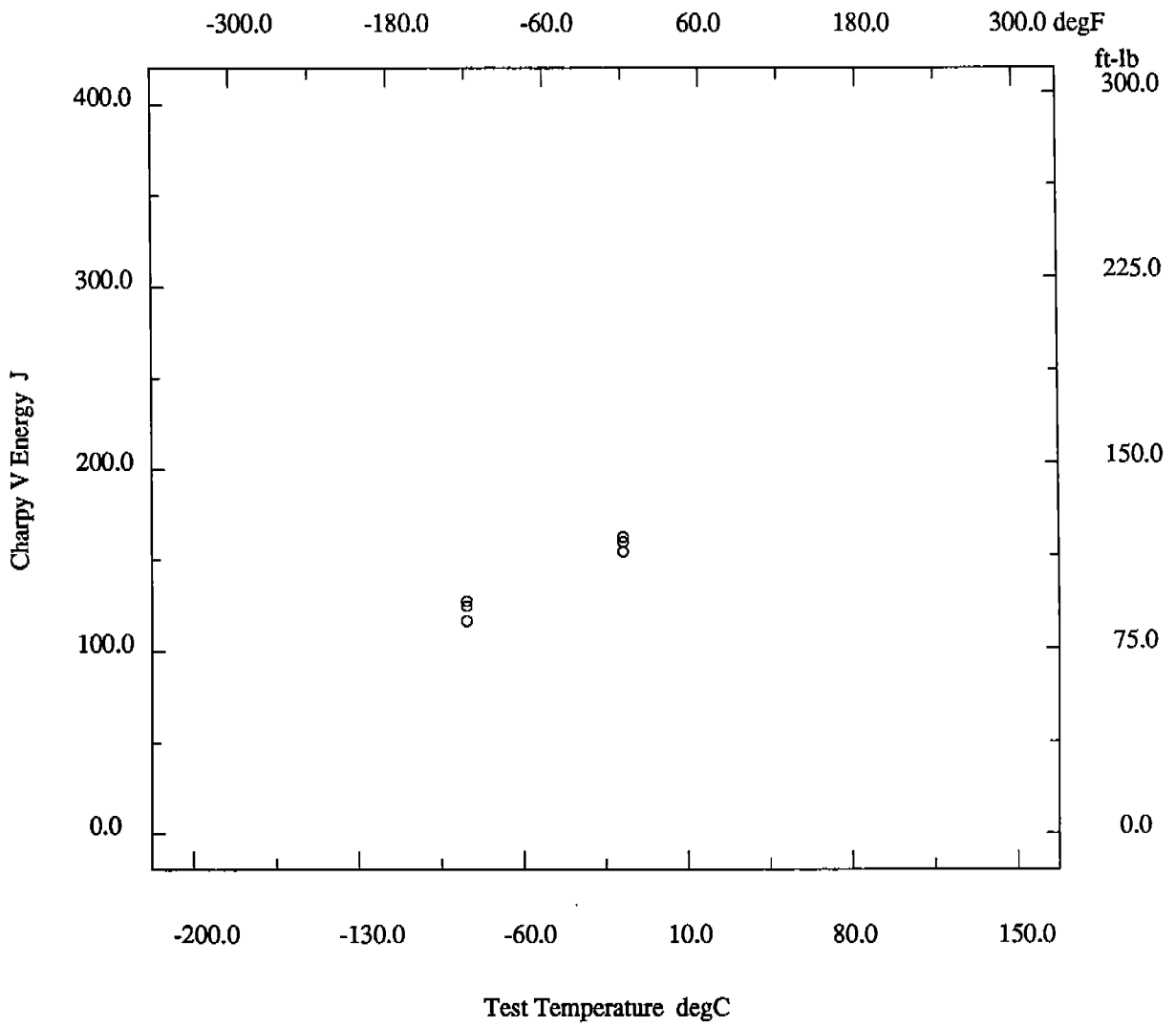
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	86
T-L °	-120	92
T-L °	-120	94
T-L °	0	114
T-L °	0	118
T-L °	0	120

* - not reported

Material HY80

Description

Material Code	001.019.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.019.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition

See Page 18300.1

Fabrication History

See Page 18300.32

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	*

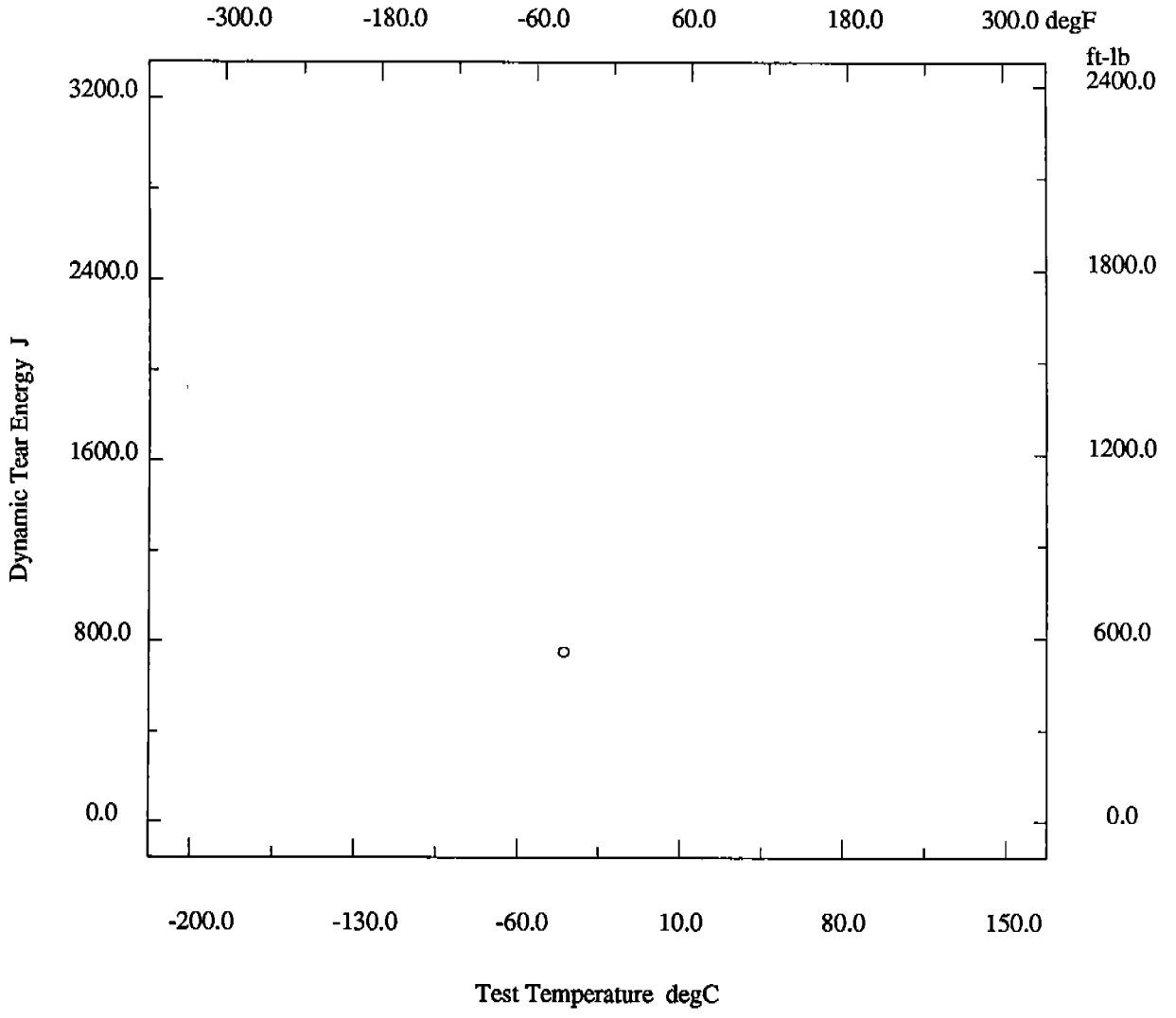
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L ○	-40	555	*

* - not reported

Material HY80

Description

Material Code	001.019.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.019.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition

See Page 18300.1

Fabrication History

See Page 18300.32

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	116.7	106.6	*	20	71.2

* - not reported

Material HY80

Description

Material Code	001.019.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition

See Page 18300.1

Fabrication History

See Page 18300.32

Property Measurements

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

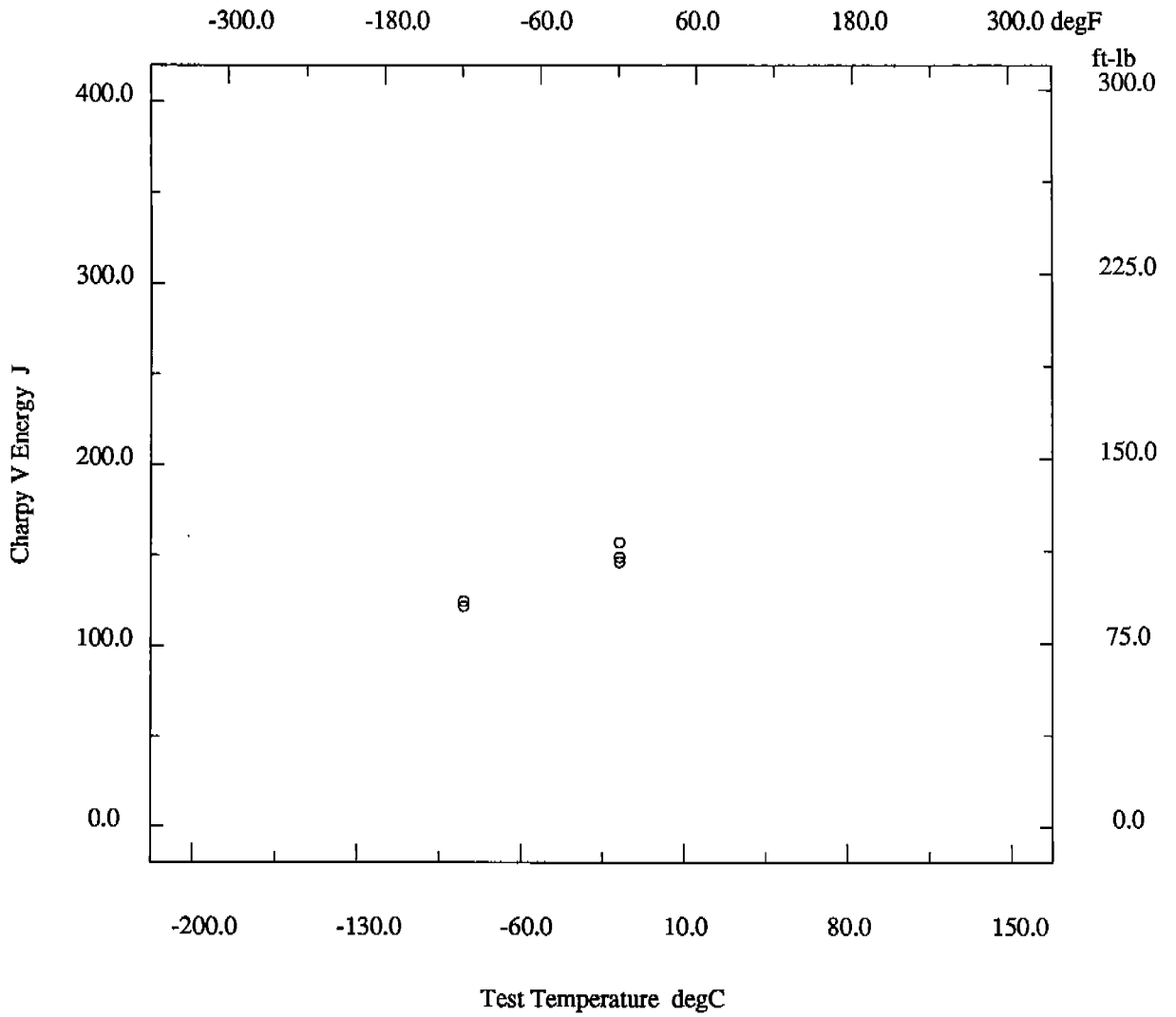
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	90
T-L °	-120	90
T-L °	-120	92
T-L °	0	108
T-L °	0	110
T-L °	0	116

* - not reported

Material HY80

Description

Material Code	001.019.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.019.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		

Composition

See Page 18300.1

Fabrication History

See Page 18300.32

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	*

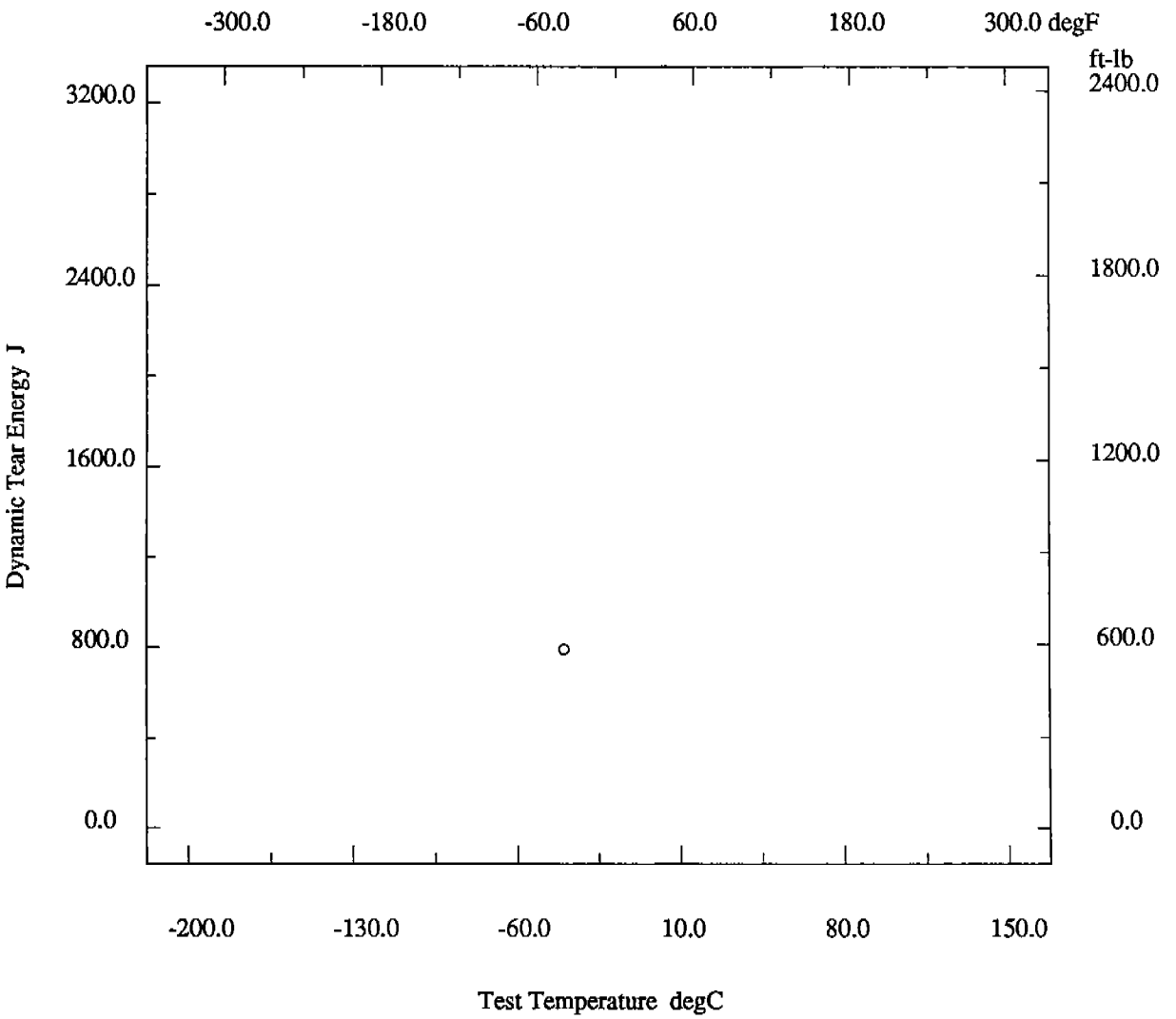
Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
T-L °	-40	585	*

* - not reported

Material HY80

Description

Material Code	001.019.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	4 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	D4030-4A
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.020.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		

Composition

C	0.16 %	Mn	0.28 %
P	0.01 %	S	0.004 %
Si	0.23 %	Cr	1.60 %
Ni	3.17 %	Mo	0.50 %
V	0.007 %	Cu	0.13 %
Cb	*	Ti	0.003 %
B	*	Al	0.026 %
N	*	Other Components	As=0.008;Sn=0.009;Sb=0.005 %

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Top	Killing Process	*
Process Temperature	1650 degF	Process Time	5.83 hr
Rolling Conditions	91 %	Final Processing	A,Q,T
Final Temperature	1140 degF	Final Time	4.83 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	124.5	111.4	*	22	71.0

* - not reported

Material HY80

Description

Material Code	001.020.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		

Composition

See Page 18400.1

Fabrication History

See Page 18400.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
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 ○	-120	78
L-T ○	-120	80
L-T ○	-120	80
L-T ○	-120	82
L-T ○	-120	86
L-T ○	-40	88
L-T ○	-40	92
L-T ○	-40	94
L-T ○	-40	96
L-T ○	-40	96
L-T ○	0	102
L-T ○	0	104
L-T ○	0	94
L-T ○	0	98
L-T ○	0	98
L-T ○	32	100
L-T ○	32	102
L-T ○	32	106
L-T ○	32	108
L-T ○	32	110
L-T ○	70	110
L-T ○	70	116
L-T ○	70	118
L-T ○	70	120
L-T ○	70	122
T-L △	-120	70
T-L △	-120	72
T-L △	-120	80
T-L △	-120	86
T-L △	-120	86
T-L △	-40	82
T-L △	-40	86
T-L △	-40	88

(continued)

* - not reported

Material HY80

(continued)

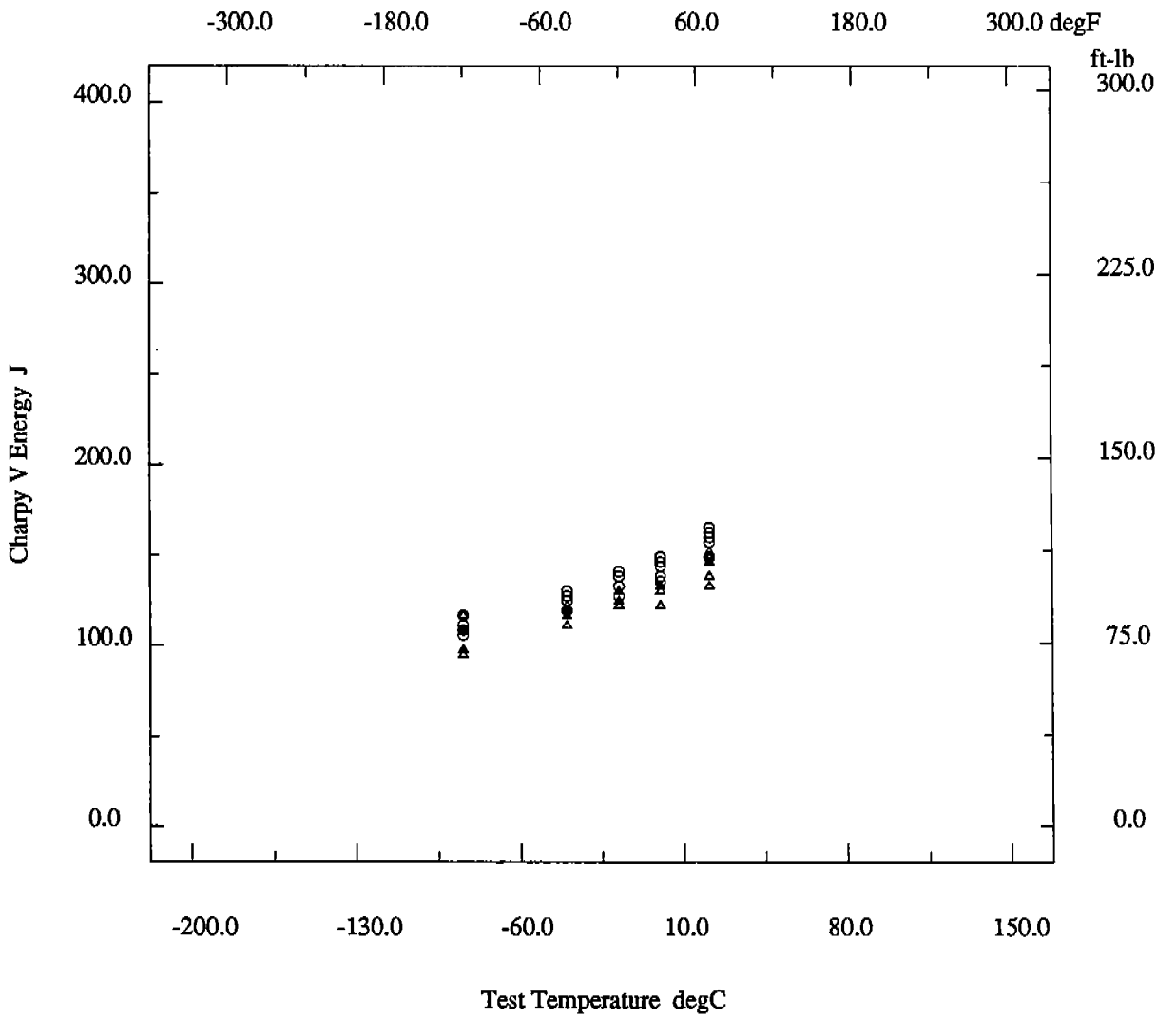
Orien	Test Temp degF	CVN Energy ft-lb
T-L △	-40	88
T-L △	-40	90
T-L △	0	90
T-L △	0	90
T-L △	0	92
T-L △	0	92
T-L △	0	96
T-L △	32	90
T-L △	32	96
T-L △	32	96
T-L △	32	98
T-L △	32	98
T-L △	70	102
T-L △	70	108
T-L △	70	110
T-L △	70	112
T-L △	70	98

* - not reported

Material HY80

Description

Material Code	001.020.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.020.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		

Composition See Page 18400.1

Fabrication History See Page 18400.1

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	125.9	111.9	*	22	69.2

* - not reported

Material HY80

Description

Material Code	001.020.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		

Composition See Page 18400.1

Fabrication History See Page 18400.1

Property Measurements

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

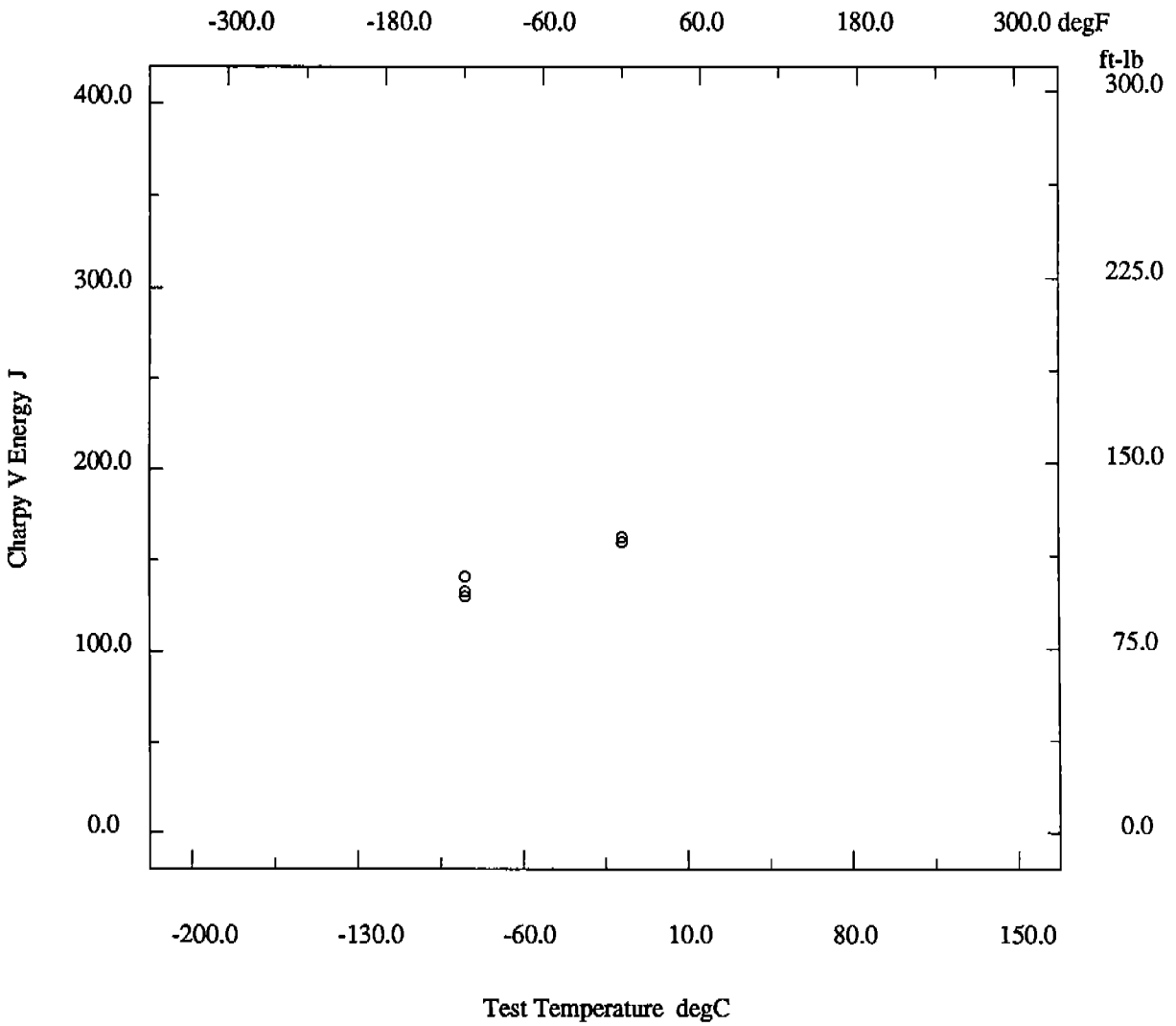
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	104
T-L °	-120	96
T-L °	-120	98
T-L °	0	118
T-L °	0	120
T-L °	0	120

* - not reported

Material HY80

Description

Material Code	001.020.01TM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.020.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		

Composition

See Page 18400.1

Fabrication History

See Page 18400.1

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	120.1	105.4	*	22	71.4

* - not reported

Material HY80

Description

Material Code	001.020.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		

Composition

See Page 18400.1

Fabrication History

See Page 18400.1

Property Measurements

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

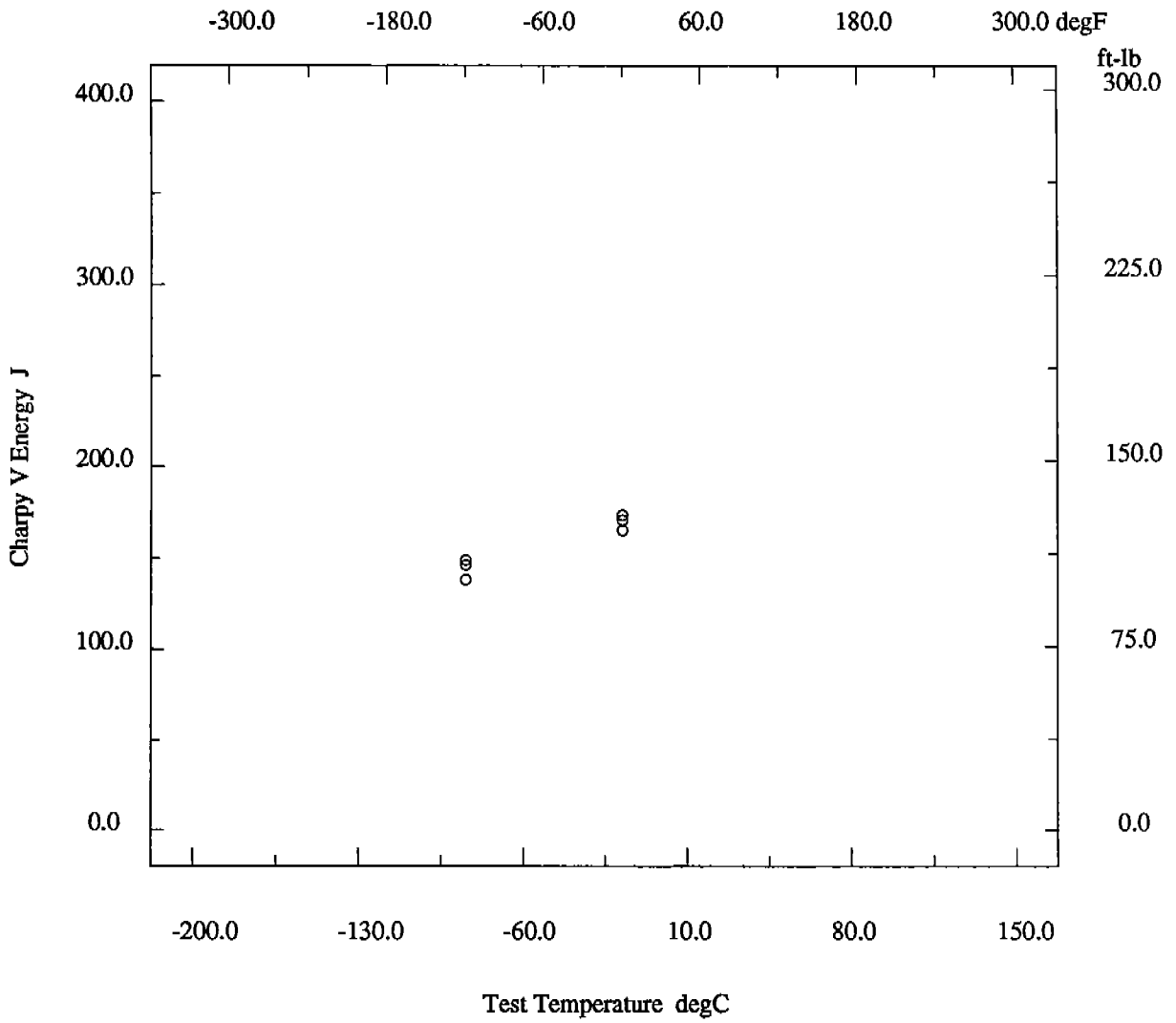
Orien	Test Temp degF	CVN Energy ft-lb
T-L ○	-120	102
T-L ○	-120	108
T-L ○	-120	110
T-L ○	0	122
T-L ○	0	126
T-L ○	0	128

* - not reported

Material HY80

Description

Material Code	001.020.01T2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.020.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		

Composition

See Page 18400.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Mid	Killing Process	*
Process Temperature	1650 degF	Process Time	5.83 hr
Rolling Conditions	91 %	Final Processing	A,Q,T
Final Temperature	1140 degF	Final Time	4.83 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	125.5	112.7	*	22	71.5

* - not reported

Material HY80

Description

Material Code	001.020.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		

Composition See Page 18400.1

Fabrication History See Page 18400.11

Property Measurements

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

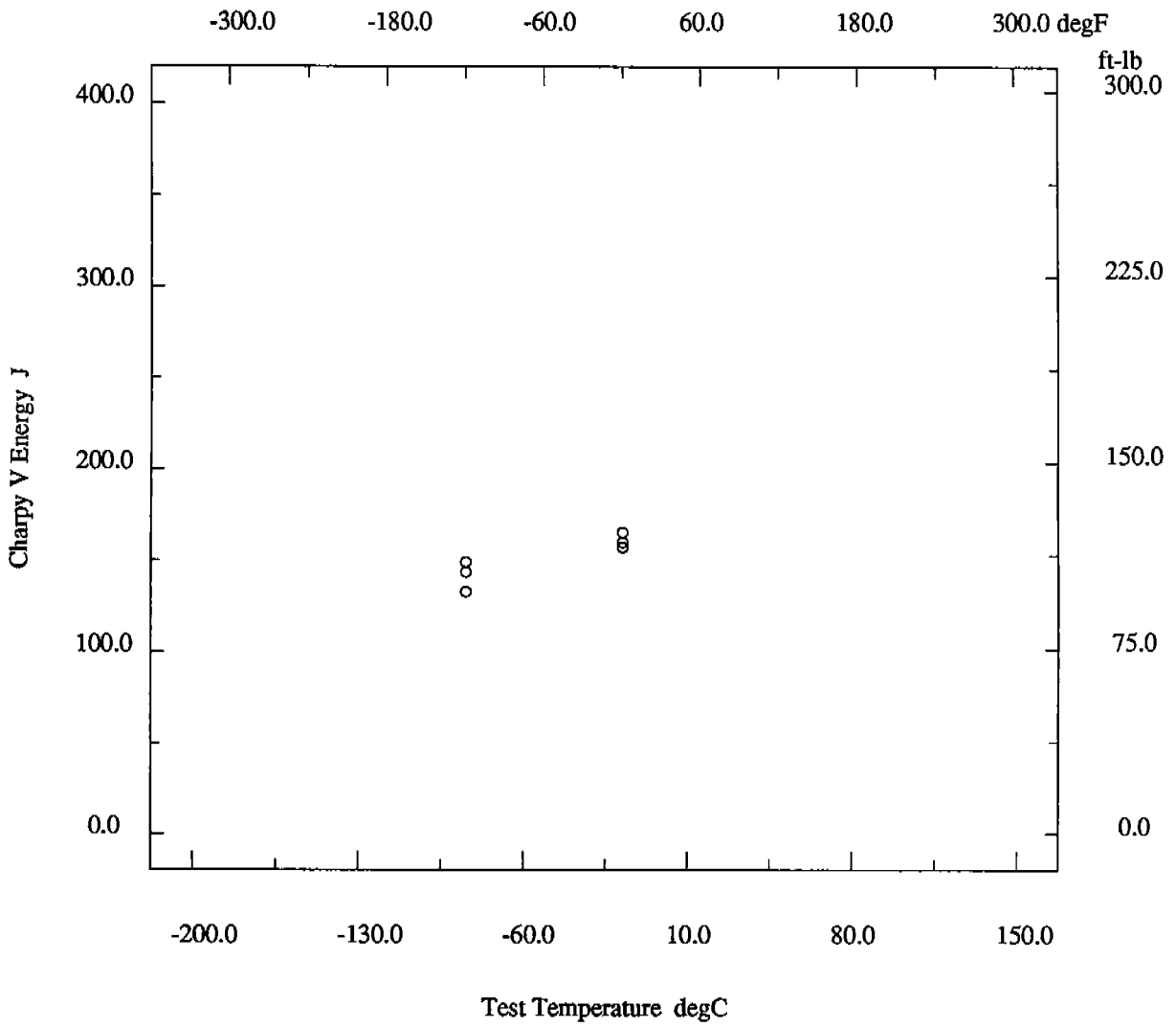
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	106
T-L °	-120	110
T-L °	-120	98
T-L °	0	116
T-L °	0	118
T-L °	0	122

* - not reported

Material HY80

Description

Material Code	001.020.01M1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.020.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		

Composition

See Page 18400.1

Fabrication History

See Page 18400.11

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	118.2	103.9	*	22	69.5

* - not reported

Material HY80

Description

Material Code	001.020.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		

Composition

See Page 18400.1

Fabrication History

See Page 18400.11

Property Measurements

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

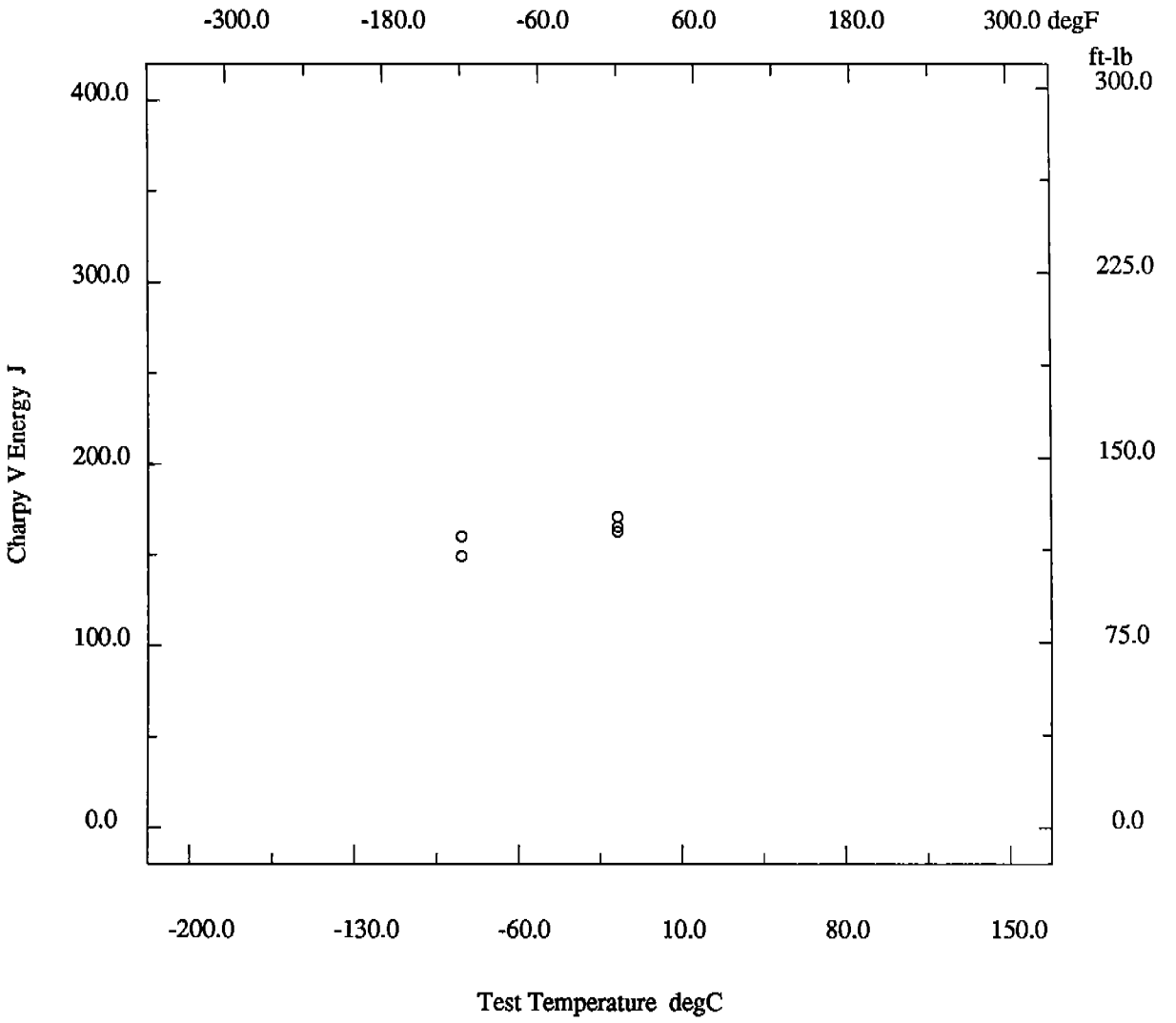
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	110
T-L °	-120	110
T-L °	-120	118
T-L °	0	120
T-L °	0	122
T-L °	0	126

* - not reported

Material HY80

Description

Material Code	001.020.01MM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.020.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		

Composition See Page 18400.1

Fabrication History See Page 18400.11

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	120.2	105.1	*	21	71.2

* - not reported

Material HY80

Description

Material Code	001.020.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		

Composition

See Page 18400.1

Fabrication History

See Page 18400.11

Property Measurements

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

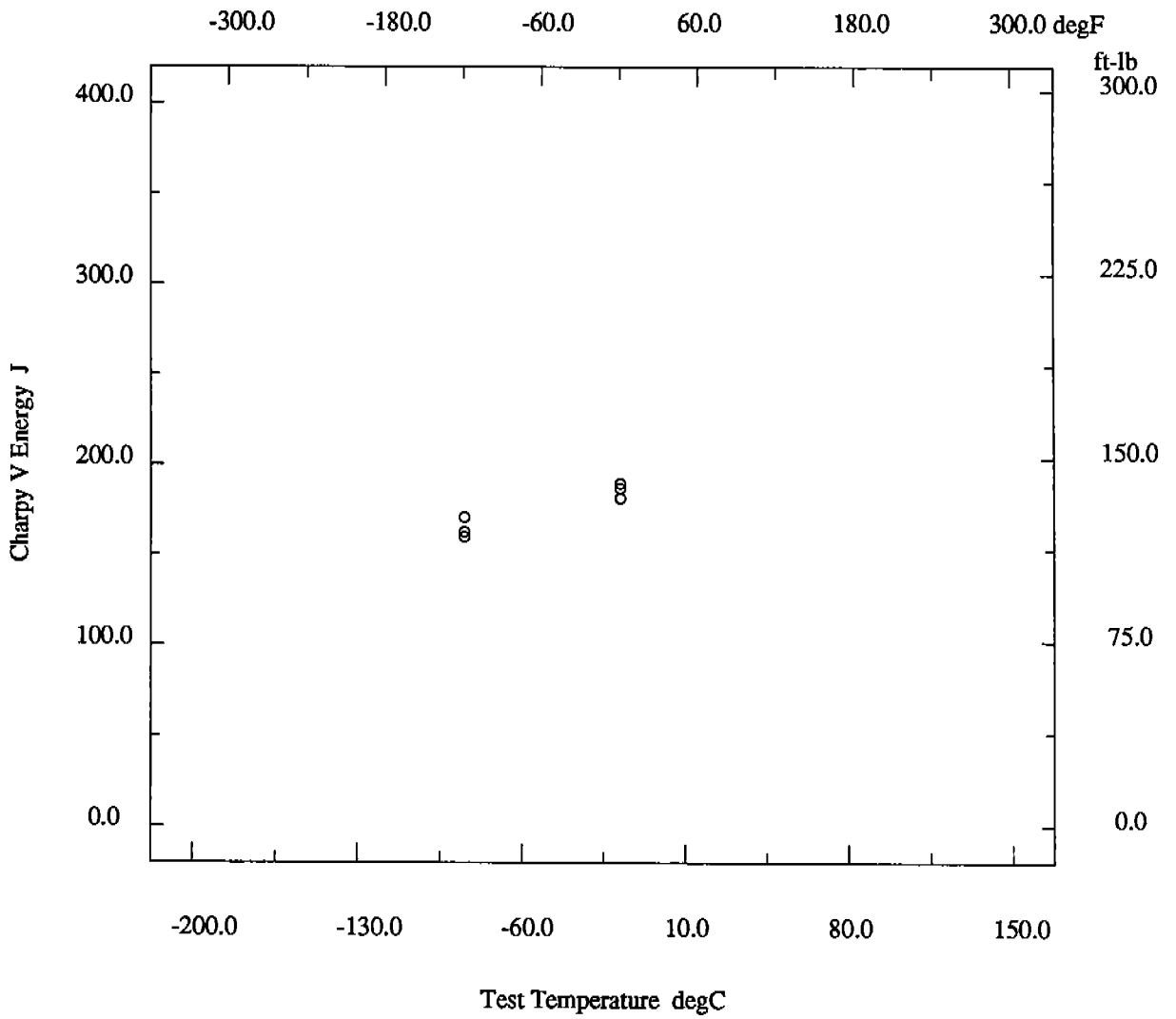
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	118
T-L °	-120	120
T-L °	-120	126
T-L °	0	134
T-L °	0	138
T-L °	0	140

* - not reported

Material HY80

Description

Material Code	001.020.01M2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.020.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		

Composition

See Page 18400.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Bottom	Killing Process	*
Process Temperature	1650 degF	Process Time	5.83 hr
Rolling Conditions	91 %	Final Processing	A,Q,T
Final Temperature	1140 degF	Final Time	4.83 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	116.7	101.2	*	20	68.5

* - not reported

Material HY80

Description

Material Code	001.020.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		

Composition

See Page 18400.1

Fabrication History

See Page 18400.20

Property Measurements

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

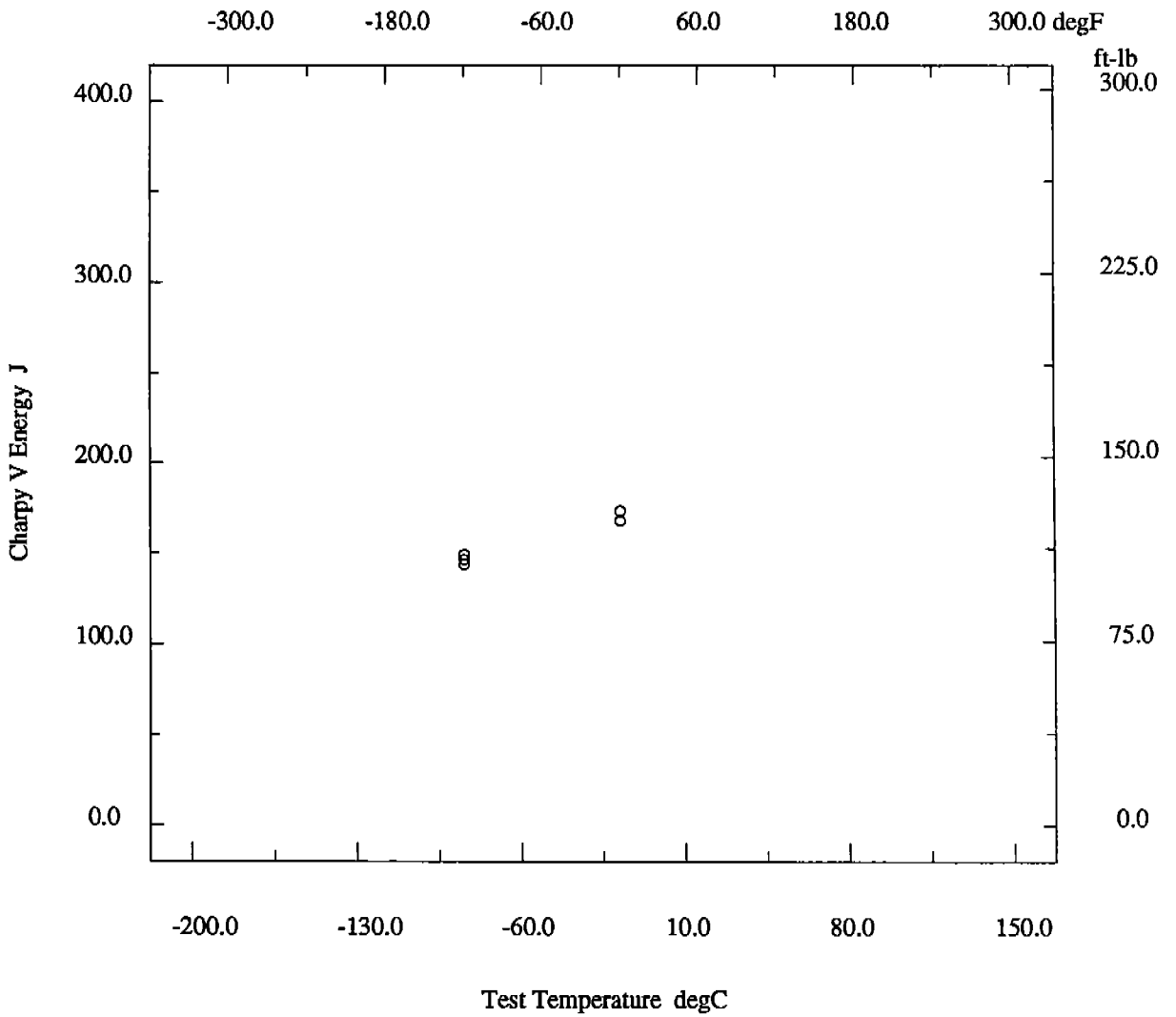
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	106
T-L °	-120	108
T-L °	-120	110
T-L °	0	124
T-L °	0	128
T-L °	0	128

* - not reported

Material HY80

Description

Material Code	001.020.01B1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.020.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		

Composition

See Page 18400.1

Fabrication History

See Page 18400.20

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	115.4	100.9	*	23	71.6

* - not reported

Material HY80

Description

Material Code	001.020.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		

Composition See Page 18400.1

Fabrication History See Page 18400.20

Property Measurements

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

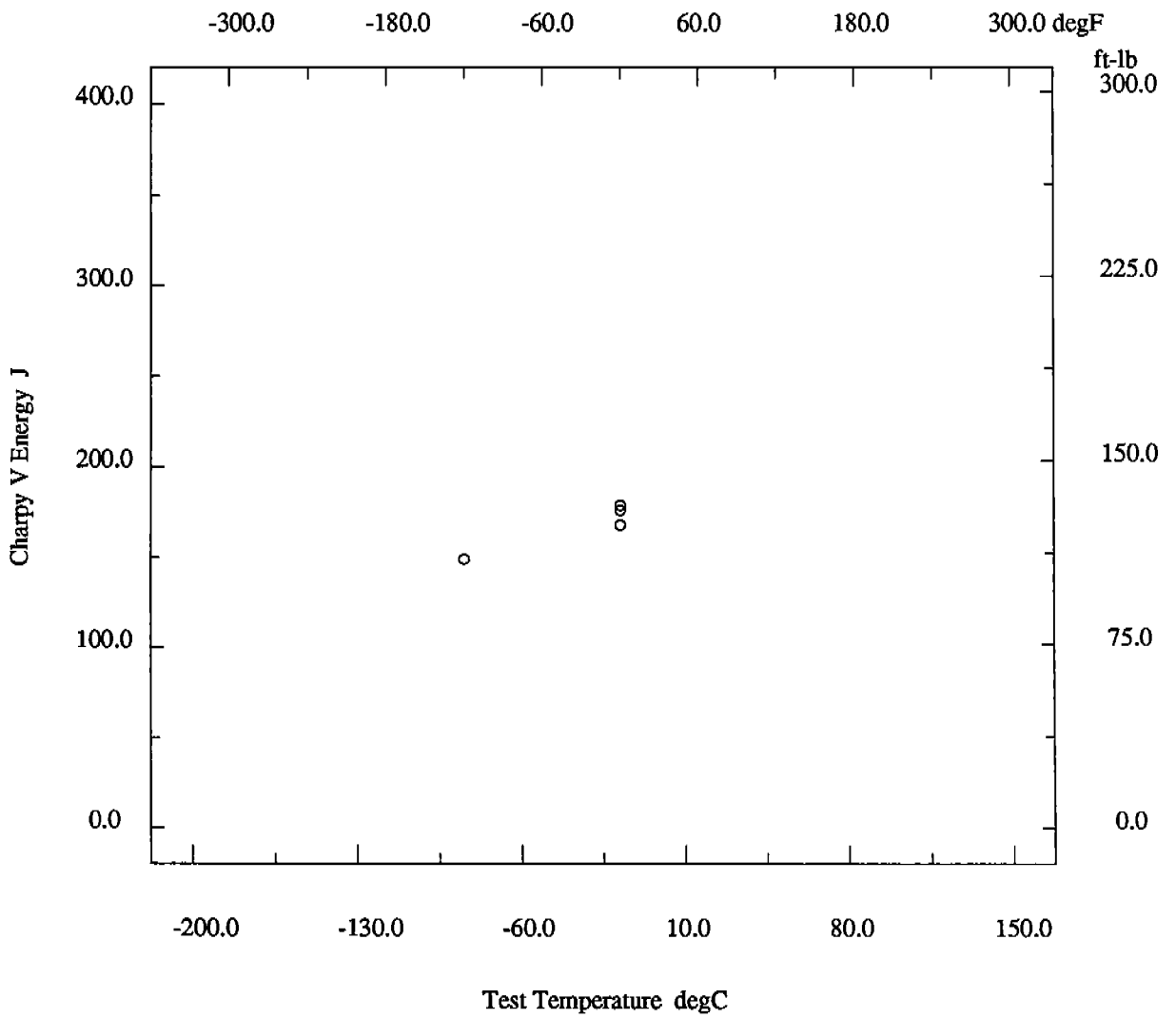
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	110
T-L °	-120	110
T-L °	-120	110
T-L °	0	124
T-L °	0	130
T-L °	0	132

* - not reported

Material HY80

Description

Material Code	001.020.01BM	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.020.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		

Composition See Page 18400.1

Fabrication History See Page 18400.20

Property Measurements

Test Type	Tensile	Position	1/4T
Specimen Type	*	Specimen Thickness	*
Gage Length	*	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	116.5	102.1	*	21	67.0

* - not reported

Material HY80

Description

Material Code	001.020.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		

Composition

See Page 18400.1

Fabrication History

See Page 18400.20

Property Measurements

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

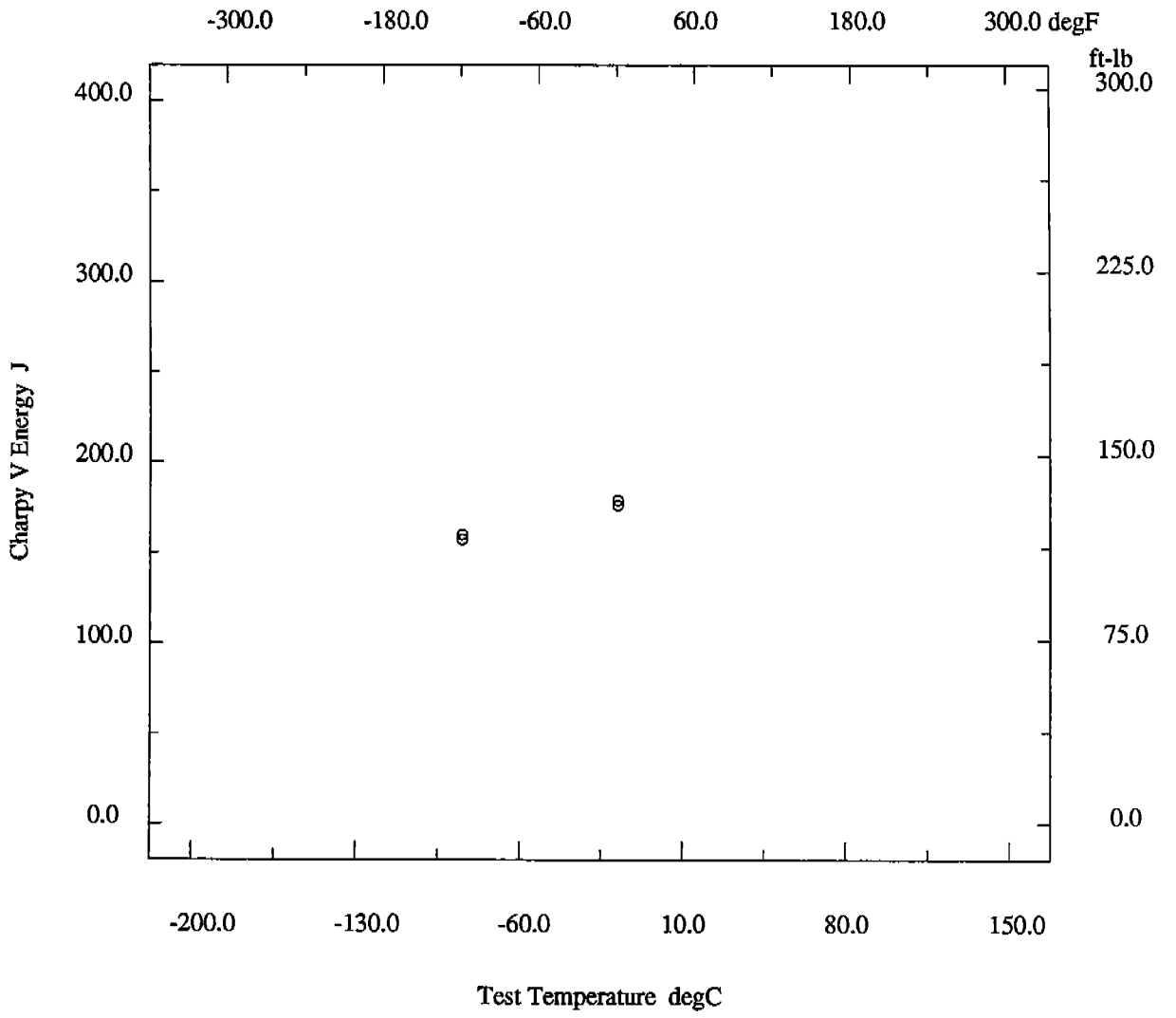
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	116
T-L °	-120	118
T-L °	-120	118
T-L °	0	130
T-L °	0	130
T-L °	0	132

* - not reported

Material HY80

Description

Material Code	001.020.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	3.75 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	B8817-1
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.021.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	C4771-39A
Reference	USN-1		

Composition

C	0.15 %	Mn	0.26 %
P	0.009 %	S	0.016 %
Si	0.22 %	Cr	1.31 %
Ni	2.43 %	Mo	0.24 %
V	0.006 %	Cu	0.14 %
Cb	*	Ti	0.002 %
B	*	Al	0.025 %
N	*	Other Components	As=0.006;Sn=0.013;Sb=0.008 %

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Top	Killing Process	*
Process Temperature	1660 degF	Process Time	0.75 hr
Rolling Conditions	89 %	Final Processing	A,Q,T
Final Temperature	1260 degF	Final Time	0.75 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	102.5	86.2	*	22	63.3

* - not reported

Material HY80

Description

Material Code	001.021.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	C4771-39A
Reference	USN-1		

Composition See Page 18500.1

Fabrication History See Page 18500.1

Property Measurements

Test Type	Charpy V Impact	Position	1/4T
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 ○	-120	125
L-T ○	-120	137
L-T ○	-120	139
L-T ○	-120	143
L-T ○	-120	159
L-T ○	-40	132
L-T ○	-40	141
L-T ○	-40	144
L-T ○	-40	145
L-T ○	-40	167
L-T ○	0	135
L-T ○	0	143
L-T ○	0	143
L-T ○	0	146
L-T ○	0	148
L-T ○	32	148
L-T ○	32	152
L-T ○	32	154
L-T ○	32	157
L-T ○	32	189
L-T ○	70	142
L-T ○	70	144
L-T ○	70	152
L-T ○	70	153
L-T ○	70	158
T-L △	-120	71
T-L △	-120	78
T-L △	-120	84
T-L △	-120	85
T-L △	-120	88
T-L △	-40	100
T-L △	-40	106
T-L △	-40	89

(continued)

* - not reported

Material HY80

(continued)

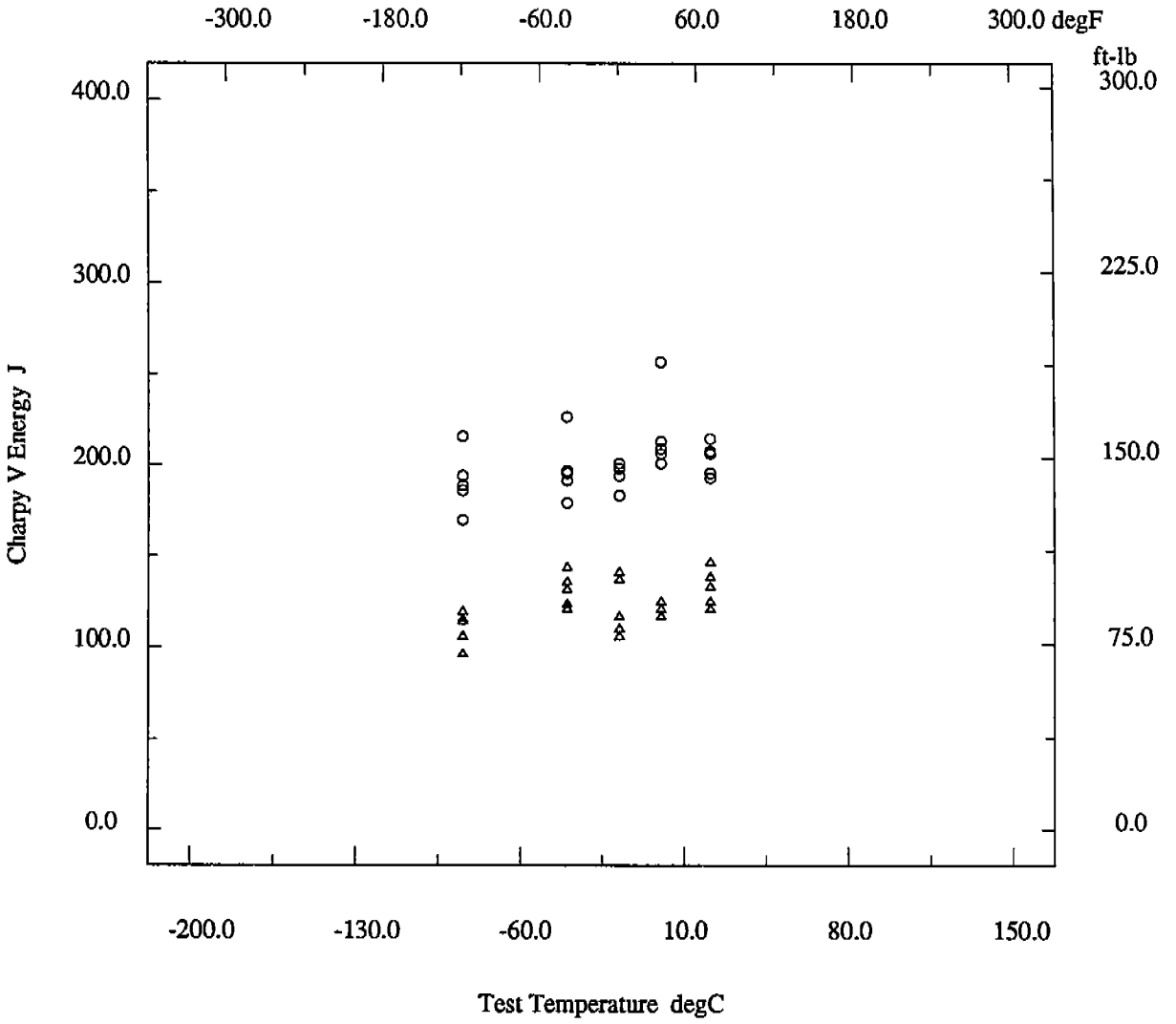
Orien	Test Temp degF	CVN Energy ft-lb
T-L △	-40	91
T-L △	-40	97
T-L △	0	101
T-L △	0	104
T-L △	0	78
T-L △	0	81
T-L △	0	86
T-L △	32	86
T-L △	32	89
T-L △	32	92
T-L △	32	92
T-L △	32	92
T-L △	70	102
T-L △	70	108
T-L △	70	89
T-L △	70	92
T-L △	70	98

* - not reported

Material HY80

Description

Material Code	001.021.01T1	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	C4771-39A
Reference	USN-1		



* - not reported

Material HY80

Description

Material Code	001.021.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	C4771-39A
Reference	USN-1		

Composition

See Page 18500.1

Fabrication History

Heat Treatment	A,Q,T	Producer	*
Year Produced	1982	Addl Info	No
Source	*	Melting Practice	*
Ingot Position	Bottom	Killing Process	*
Process Temperature	1660 degF	Process Time	0.75 hr
Rolling Conditions	89 %	Final Processing	A,Q,T
Final Temperature	1260 degF	Final Time	0.75 hr
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	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	103.5	87.8	*	22	62.7

* - not reported

Material HY80

Description

Material Code	001.021.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	C4771-39A
Reference	USN-1		

Composition

See Page 18500.1

Fabrication History

See Page 18500.5

Property Measurements

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

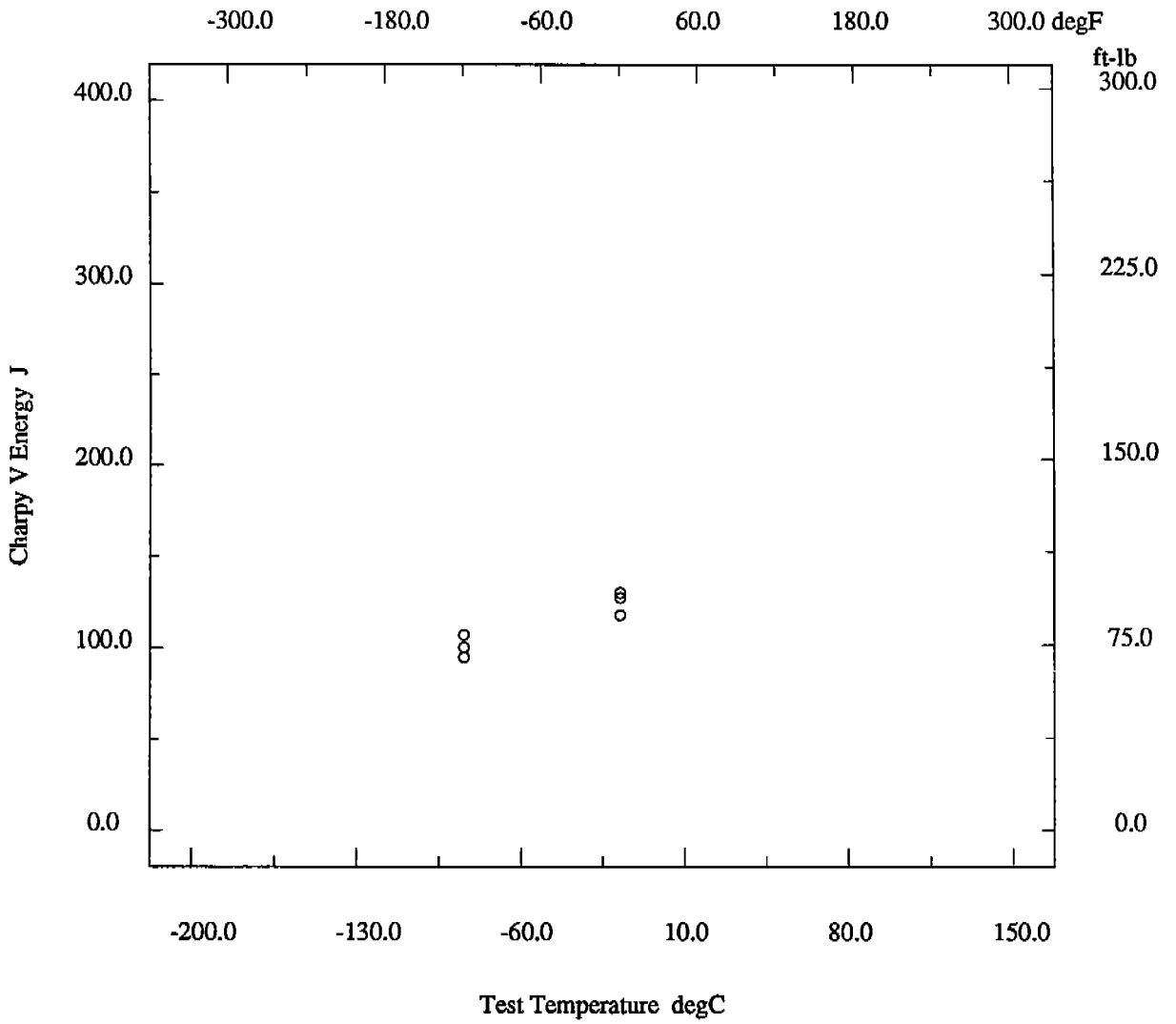
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	70
T-L °	-120	74
T-L °	-120	79
T-L °	0	87
T-L °	0	94
T-L °	0	96

* - not reported

Material HY80

Description

Material Code	001.021.01B2	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1 in	Composition Type	Actual
Composition Position	Ladle	Lot ID	C4771-39A
Reference	USN-1		



* - not reported

461
462X

Material HY80

Description

Material Code	001.023.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B1038-2B
Reference	USN 6/9		

Composition

C	0.17 %	Mn	0.33 %
P	0.006 %	S	0.006 %
Si	*	Cr	1.21 %
Ni	2.88 %	Mo	0.24 %
V	<0.001 %	Cu	0.11 %
Cb	*	Ti	<0.01 %
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,T	Producer	*
Year Produced	*	Addl Info	None
Source	USN	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	*
Specimen Type	Cylindrical	Specimen Thickness	0.505 in
Gage Length	2.0 in	Loading Rate	0.002 in/min
Tensile Strength Offset	0.2 %	Uniform Elongation	*
Tensile Modulus	29 ksi*10**3	Standard Method	E 8
Standard Year	1969		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	99.8	80.0	*	28	70

* - not reported

Material HY80

Description

Material Code	001.023.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B1038-2B
Reference	USN 6/9		

Composition

See Page 18600.1

Fabrication History

See Page 18600.1

Property Measurements

Test Type	Fracture Toughness	Position	*
Specimen Type	Compact Tension	Specimen Thickness	1.0 in
Crack Length	*	Loading Type	I
Loading Rate	*	KQ	*
KIc	*	Valid KIc?	*
Reason for Invalid	*	KJc	*
JIcpr	Modified Standard	Initial COD	*
Critical COD	*	Curve Shape	*
Initial JI, JI	*	Maximum J, Jmax	*
Standard Method	813	Standard Year	*

Orien	Test Temp degF	JIc in-lb/in2	Tear Mod in-lb/in**2
T-L	Room	1131	63
T-L	Room	1186	46
T-L	Room	633	65
T-L	Room	854	75

* - not reported

Material HY80

Description

Material Code	001.023.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B1038-2B
Reference	USN 6/9		

Composition

See Page 18600.1

Fabrication History

See Page 18600.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	E 23
Standard Year	1972		

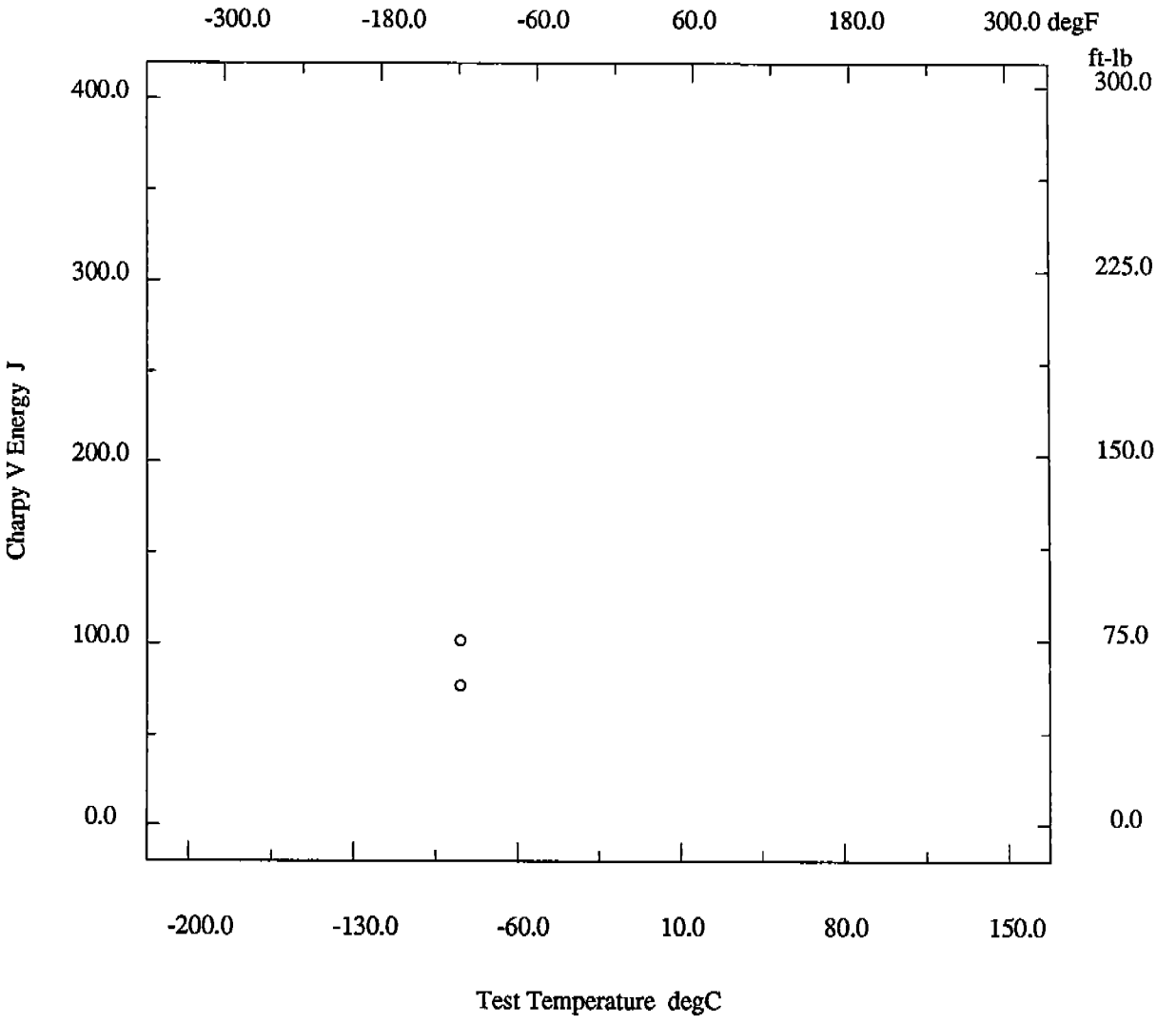
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	57
T-L °	-120	75

* - not reported

Material HY80

Description

Material Code	001.023.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B1038-2B
Reference	USN 6/9		



* - not reported

Material HY80

Description

Material Code	001.023.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B1038-2B
Reference	USN 6/9		

Composition

See Page 18600.1

Fabrication History

See Page 18600.1

Property Measurements

Test Type	Dynamic Tear	Position	*
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Appearance	*	Standard Method	E 604
Standard Year	1980		

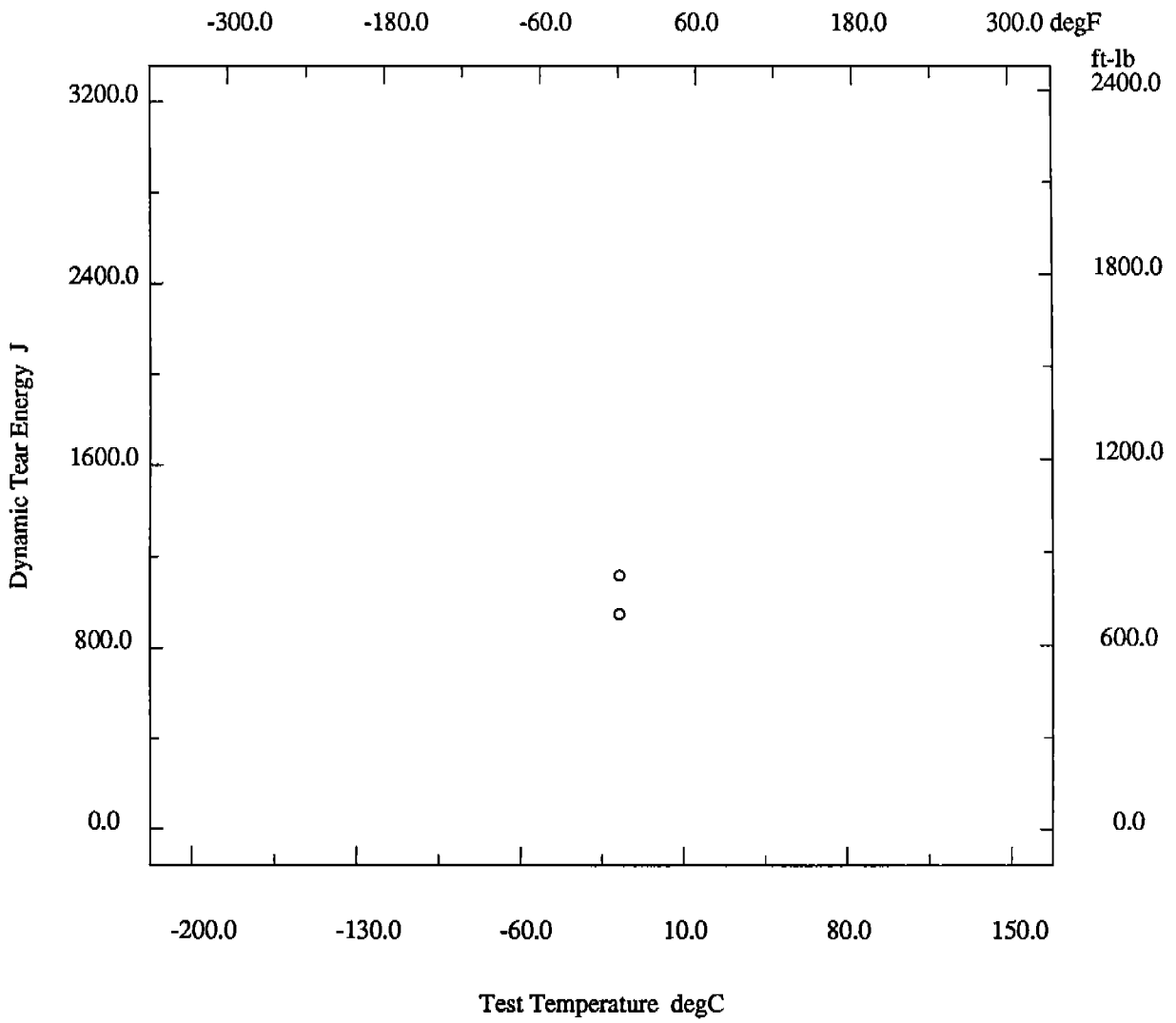
Orien	Test Temp degF	DT Energy ft-lb
T-L °	0	700
T-L °	0	825

* - not reported

Material HY80

Description

Material Code	001.023.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B1038-2B
Reference	USN 6/9		



* - not reported

Material HY80

Description

Material Code	001.024.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.0 in	Composition Type	Actual
Composition Position	*	Lot ID	C-9283-11
Reference	USN 6/9		

Composition

C	0.17 %	Mn	0.28 %
P	0.011 %	S	0.011 %
Si	*	Cr	1.19 %
Ni	1.96 %	Mo	0.25 %
V	<0.001 %	Cu	0.11 %
Cb	*	Ti	<0.01 %
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,T	Producer	*
Year Produced	*	Addl Info	None
Source	USN	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	Fracture Toughness	Position	*
Specimen Type	Compact Tension	Specimen Thickness	1.0 in
Crack Length	*	Loading Type	I
Loading Rate	*	KQ	*
KIc	*	Valid KIc?	*
Reason for Invalid	*	KJc	*
JIcpr	Modified Standard	Initial COD	*
Critical COD	*	Curve Shape	*
Initial JI, JI	*	Maximum J, Jmax	*
Standard Method	813	Standard Year	*

Orien	Test Temp degF	JIc in-lb/in2	Tear Mod in-lb/in**2
T-L	Room	627	56
T-L	Room	678	63
T-L	Room	890	57

* - not reported

Material HY80

Description

Material Code	001.024.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.0 in	Composition Type	Actual
Composition Position	*	Lot ID	C-9283-11
Reference	USN 6/9		

Composition

See Page 18700.1

Fabrication History

See Page 18700.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	E 23
Standard Year	1972		

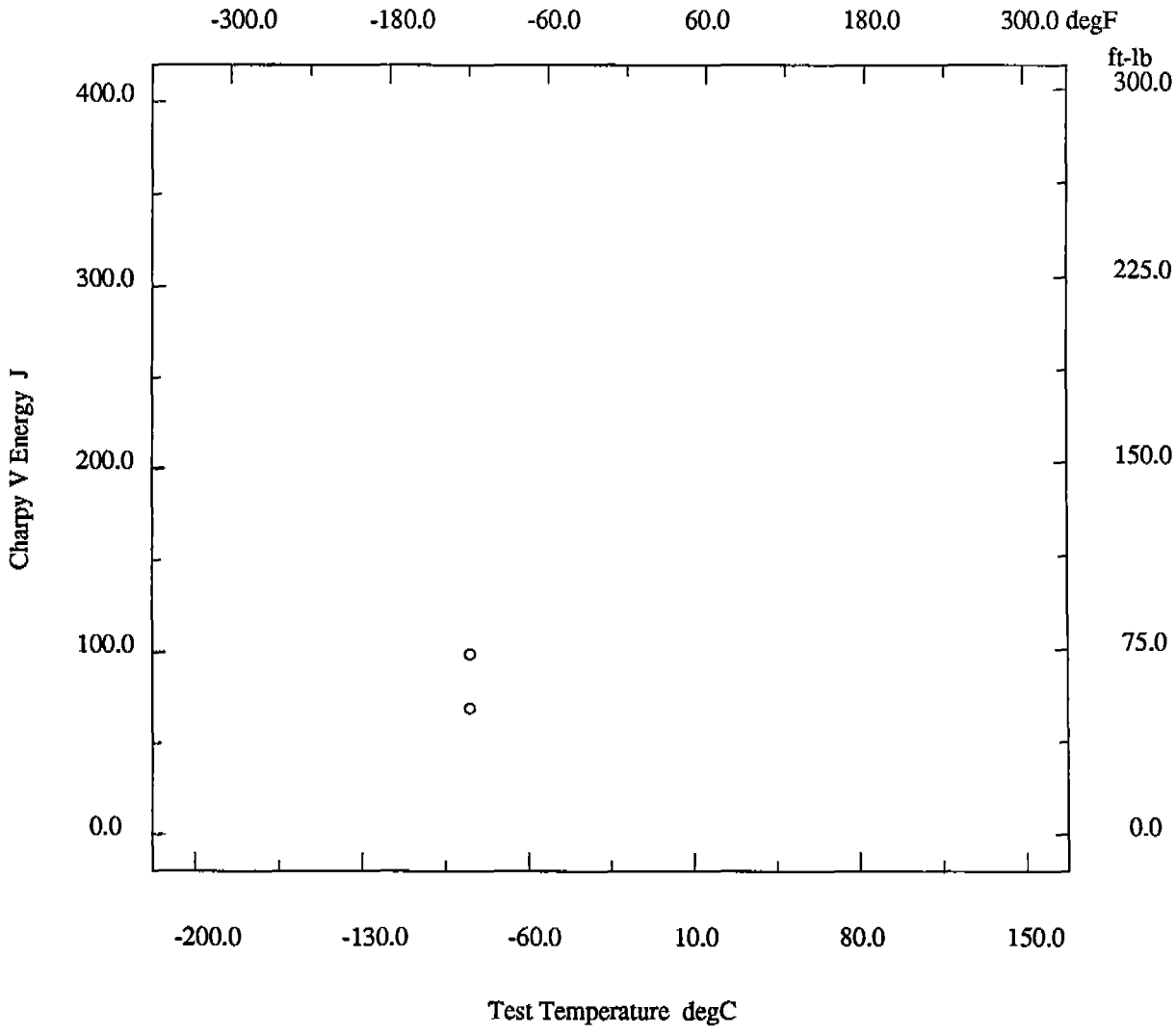
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	51
T-L °	-120	73

* - not reported

Material HY80

Description

Material Code	001.024.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.0 in	Composition Type	Actual
Composition Position	*	Lot ID	C-9283-11
Reference	USN 6/9		



* - not reported

Material HY80

Description

Material Code	001.024.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.0 in	Composition Type	Actual
Composition Position	*	Lot ID	C-9283-11
Reference	USN 6/9		

Composition

See Page 18700.1

Fabrication History

See Page 18700.1

Property Measurements

Test Type	Dynamic Tear	Position	*
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Appearance	*	Standard Method	E 604
Standard Year	1980		

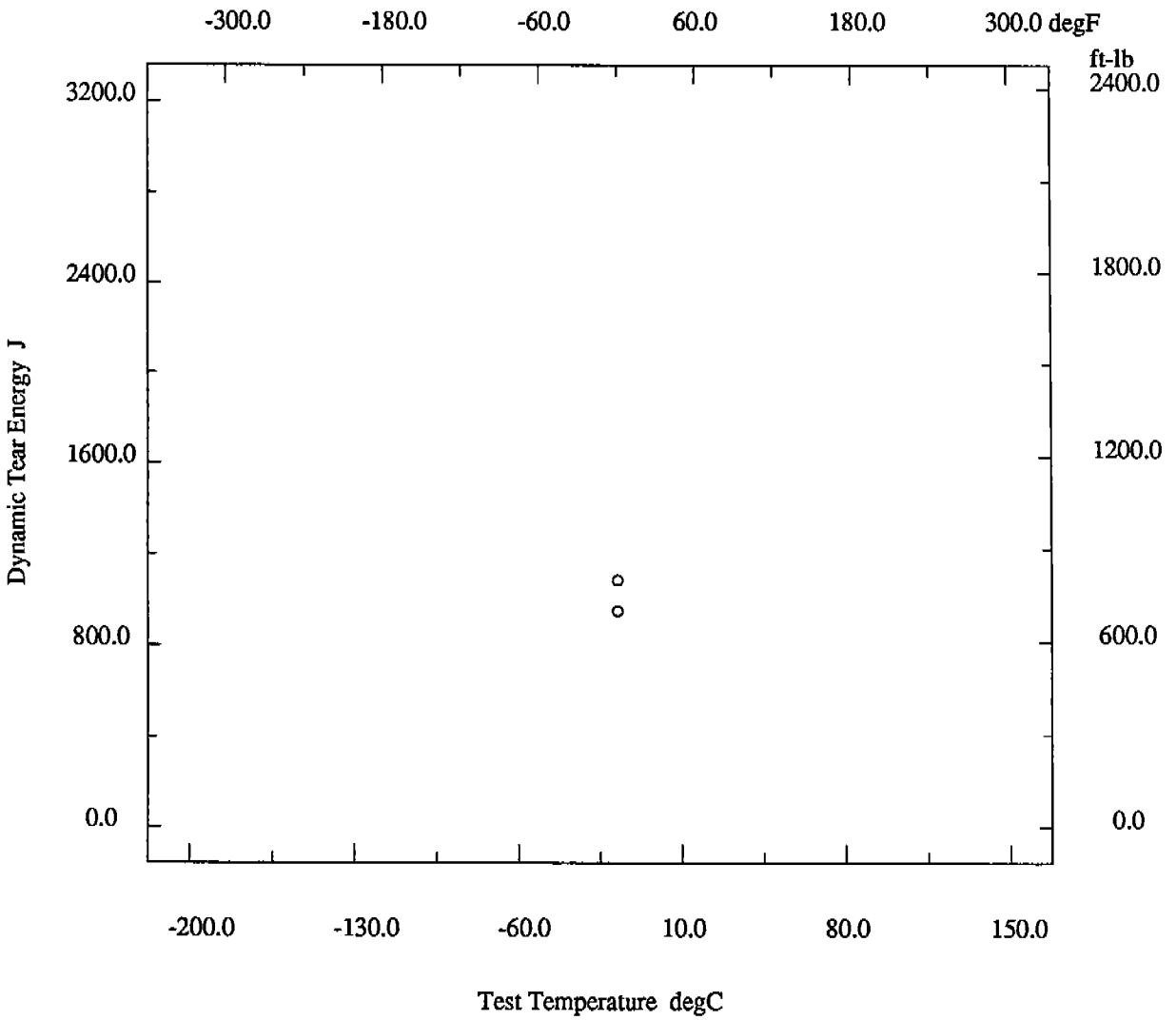
Orien	Test Temp degF	DT Energy ft-lb
T-L °	0	700
T-L °	0	800

* - not reported

Material HY80

Description

Material Code	001.024.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	1.0 in	Composition Type	Actual
Composition Position	*	Lot ID	C-9283-11
Reference	USN 6/9		



* - not reported

Material HY80

Description

Material Code	001.025.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B-1088-3
Reference	USN 6/9		

Composition

C	0.16 %	Mn	0.25 %
P	0.017 %	S	0.015 %
Si	*	Cr	1.42 %
Ni	2.40 %	Mo	0.30 %
V	<0.001 %	Cu	0.12 %
Cb	*	Ti	<0.01 %
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,T	Producer	*
Year Produced	*	Addl Info	None
Source	USN	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	*
Specimen Type	Cylindrical	Specimen Thickness	0.505 in
Gage Length	2.0 in	Loading Rate	0.002 in/min
Tensile Strength Offset	0.2 %	Uniform Elongation	*
Tensile Modulus	28 ksi*10**3	Standard Method	E 8
Standard Year	1969		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	99.8	78.4	*	27	72

* - not reported

Material HY80

Description

Material Code	001.025.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B-1088-3
Reference	USN 6/9		

Composition

See Page 18800.1

Fabrication History

See Page 18800.1

Property Measurements

Test Type	Fracture Toughness	Position	*
Specimen Type	Compact Tension	Specimen Thickness	1.0 in
Crack Length	*	Loading Type	I
Loading Rate	*	KQ	*
KIc	*	Valid KIc?	*
Reason for Invalid	*	KJc	*
JIcpr	Modified Standard	Initial COD	*
Critical COD	*	Curve Shape	*
Initial JI, JI	*	Maximum J, Jmax	*
Standard Method	813	Standard Year	*

Orien	Test Temp degF	JIc in-lb/in2	Tear Mod in-lb/in**2
T-L	Room	1143	91
T-L	Room	1195	92

* - not reported

Material HY80

Description

Material Code	001.025.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B-1088-3
Reference	USN 6/9		

Composition

See Page 18800.1

Fabrication History

See Page 18800.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	E 23
Standard Year	1972		

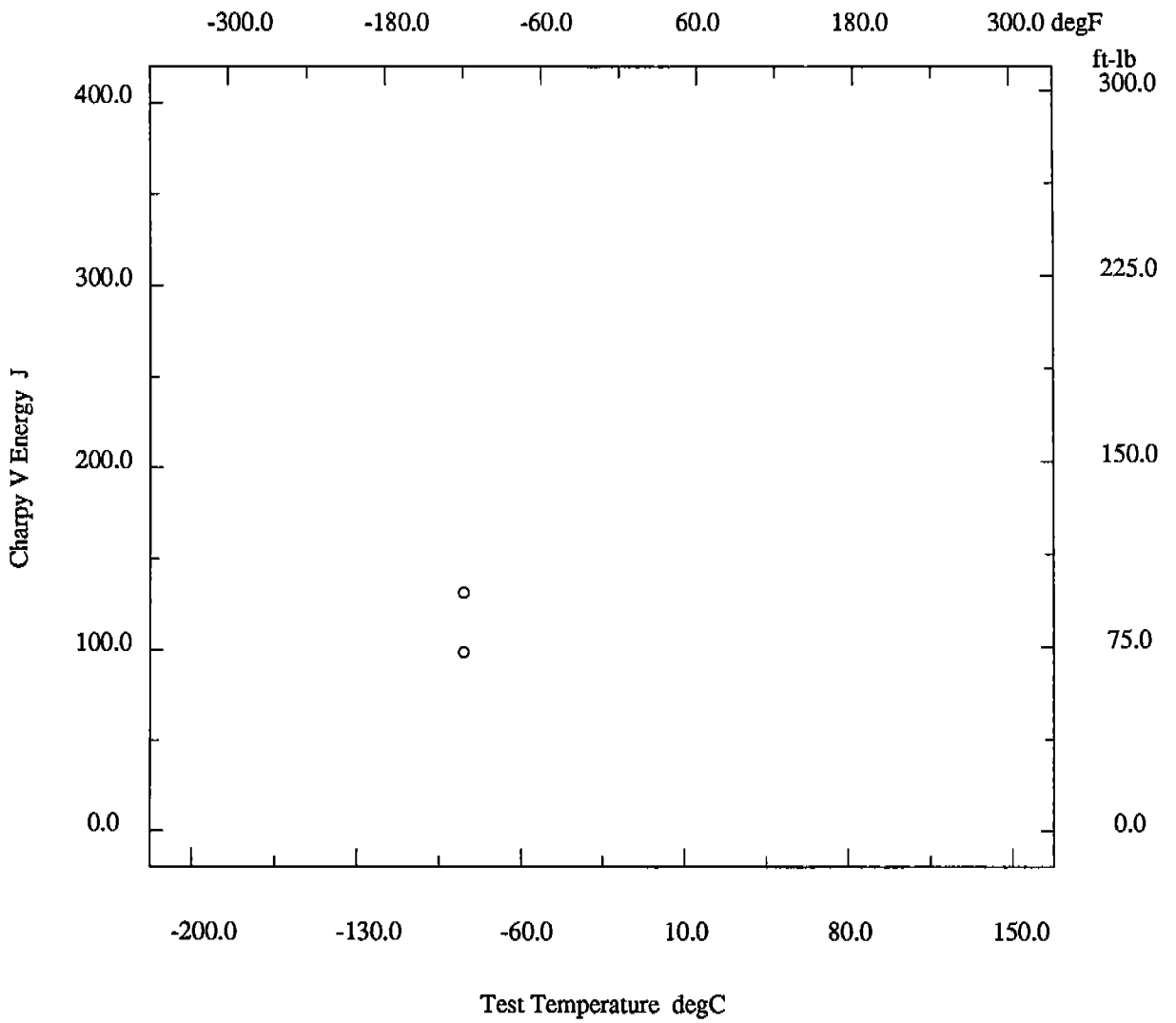
Orien	Test Temp degF	CVN Energy ft-lb
T-L ○	-120	73
T-L ○	-120	97

* - not reported

Material HY80

Description

Material Code	001.025.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B-1088-3
Reference	USN 6/9		



* - not reported

Material HY80

Description

Material Code	001.025.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B-1088-3
Reference	USN 6/9		

Composition

See Page 18800.1

Fabrication History

See Page 18800.1

Property Measurements

Test Type	Dynamic Tear	Position	*
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Appearance	*	Standard Method	E 604
Standard Year	1980		

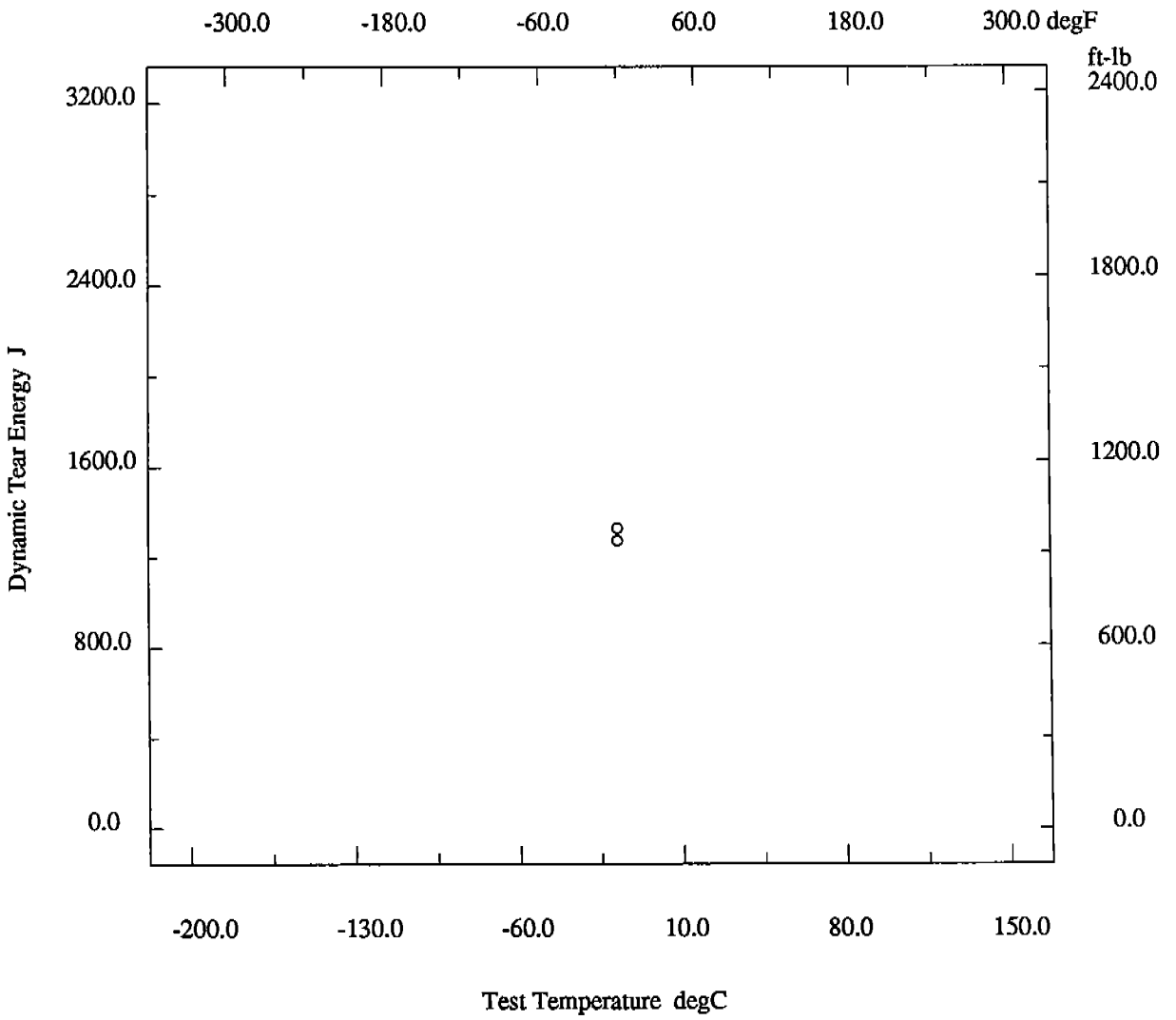
Orien	Test Temp degF	DT Energy ft-lb
T-L °	0	940
T-L °	0	980

* - not reported

Material HY80

Description

Material Code	001.025.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B-1088-3
Reference	USN 6/9		



* - not reported

Material HY80

Description

Material Code	001.026.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B-1088-5
Reference	USN 6/9		

Composition

C	0.16 %	Mn	0.28 %
P	0.003 %	S	0.012 %
Si	*	Cr	1.27 %
Ni	2.52 %	Mo	0.29 %
V	<0.001 %	Cu	0.11 %
Cb	*	Ti	<0.01 %
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,T	Producer	*
Year Produced	*	Addl Info	None
Source	USN	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	*
Specimen Type	Cylindrical	Specimen Thickness	0.505 in
Gage Length	2.0 in	Loading Rate	0.002 in/min
Tensile Strength Offset	0.2 %	Uniform Elongation	*
Tensile Modulus	27 ksi*10**3	Standard Method	E 8
Standard Year	1969		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	99.3	79.2	*	27	66

* - not reported

Material HY80

Description

Material Code	001.026.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B-1088-5
Reference	USN 6/9		

Composition

See Page 18900.1

Fabrication History

See Page 18900.1

Property Measurements

Test Type	Fracture Toughness	Position	*
Specimen Type	Compact Tension	Specimen Thickness	1.0 in
Crack Length	*	Loading Type	I
Loading Rate	*	KQ	*
KIc	*	Valid KIc?	*
Reason for Invalid	*	KJc	*
JIcpr	Modified Standard	Initial COD	*
Critical COD	*	Curve Shape	*
Initial JI, JI	*	Maximum J, Jmax	*
Standard Method	813	Standard Year	*

Orien	Test Temp degF	JIc in-lb/in2	Tear Mod in-lb/in**2
T-L	Room	1094	70
T-L	Room	1217	77
T-L	Room	1282	72

* - not reported

Material HY80

Description

Material Code	001.026.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B-1088-5
Reference	USN 6/9		

Composition

See Page 18900.1

Fabrication History

See Page 18900.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	E 23
Standard Year	1972		

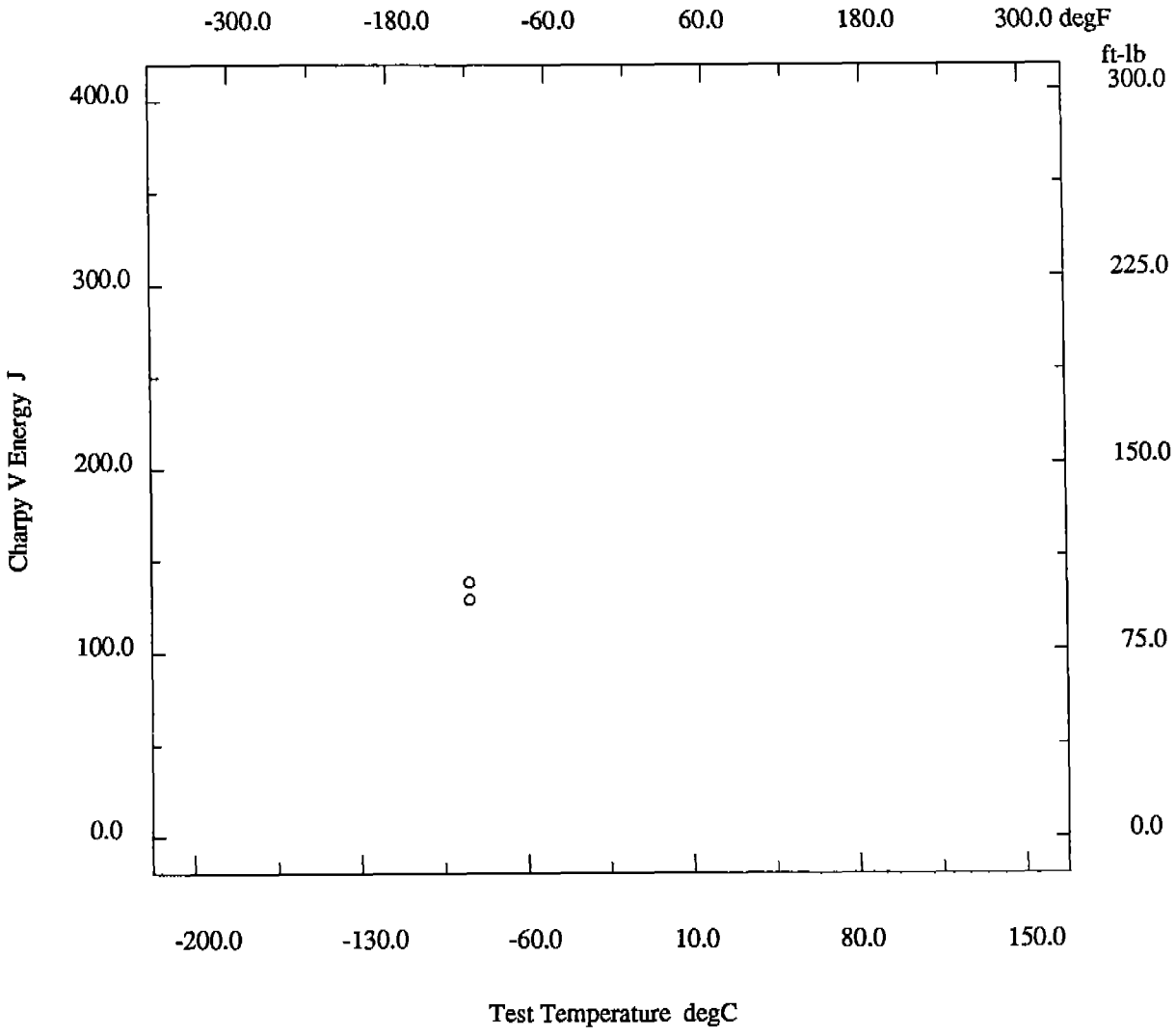
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	102
T-L °	-120	95

* - not reported

Material HY80

Description

Material Code	001.026.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B-1088-5
Reference	USN 6/9		



* - not reported

Material HY80

Description

Material Code	001.026.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B-1088-5
Reference	USN 6/9		

Composition

See Page 18900.1

Fabrication History

See Page 18900.1

Property Measurements

Test Type	Dynamic Tear	Position	*
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Appearance	*	Standard Method	E 604
Standard Year	1980		

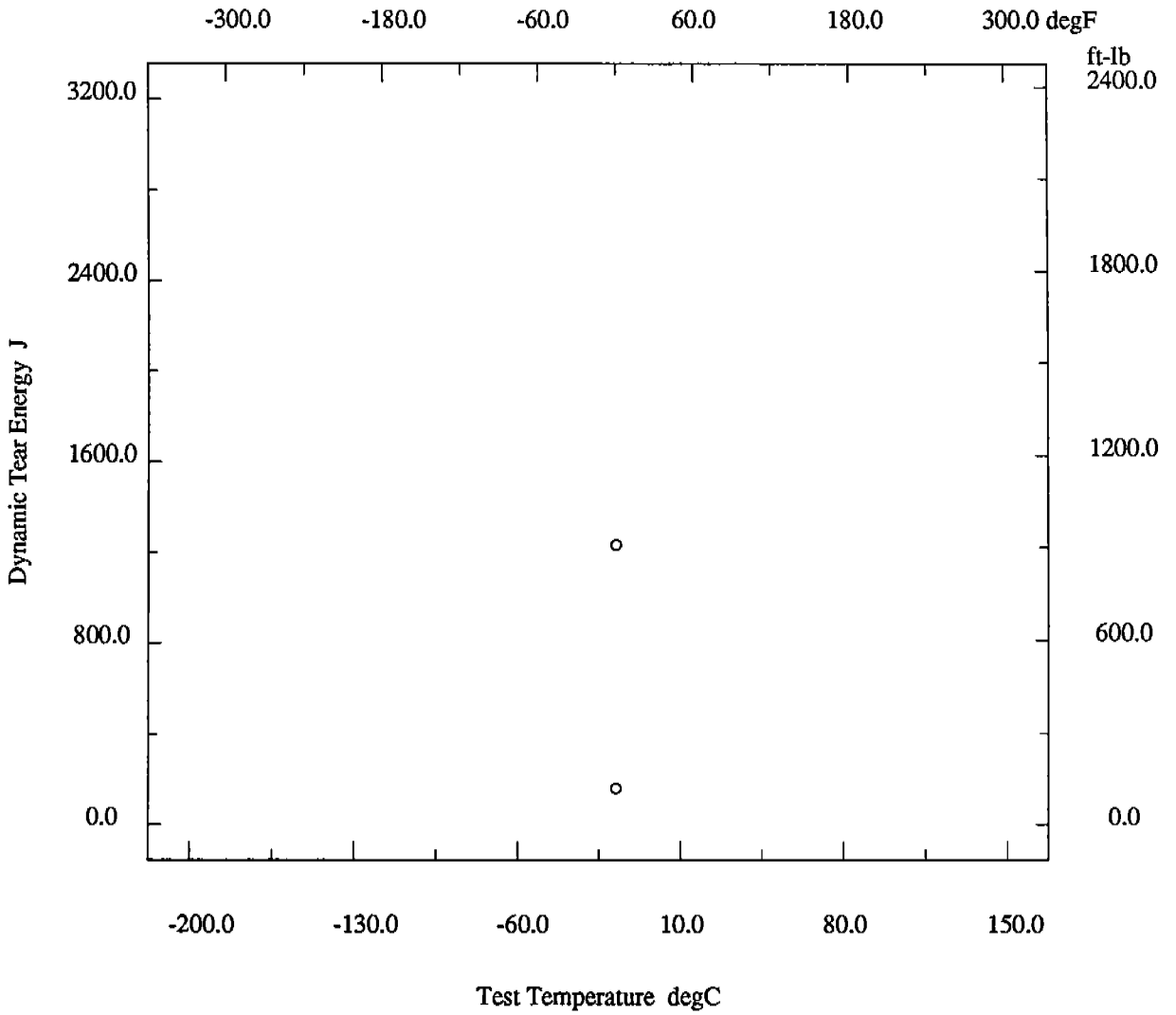
Orien	Test Temp degF	DT Energy ft-lb
T-L °	0	120
T-L °	0	910

* - not reported

Material HY80

Description

Material Code	001.026.01	Material Name	HY80
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	B-1088-5
Reference	USN 6/9		



* - not reported

Material HY80

Description

Material Code	001.027.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRM
Reference	USN 6/9		

Composition

C	0.07 %	Mn	1.77 %
P	0.016 %	S	0.005 %
Si	*	Cr	0.33 %
Ni	1.94 %	Mo	0.31 %
V	<0.001 %	Cu	0.03 %
Cb	*	Ti	<0.01 %
B	*	Al	*
N	*	Other Components	None %

Fabrication History

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

Weld

Weld Code	001.027.09	Weld Type	SMA
Base Metal Thickness	2.0 in	Welding Position	Downhand
Preheat Temperature	*	Metal Gap	*
Interpass Temperature	*	Passes	*
Filler Specification	M22000/1E	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	*
Joint Preparation	*	Number of Sides	*
Location wrt Weld	11mm in HAZ	Location wrt Surface	*
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	*
Weld Composition Reported?	Yes		

(continued)

* - not reported

Material HY80

(continued)

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	Cylindrical	Specimen Thickness	0.25 in
Gage Length	1.0 in	Loading Rate	0.002 in/min
Tensile Strength Offset	0.2 %	Uniform Elongation	*
Tensile Modulus	30.4 ksi*10**3	Standard Method	E 8
Standard Year	1969		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
L	Room	121	113.0	*	21	61

* - not reported

Material HY80

Description

Material Code	001.027.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRM
Reference	USN 6/9		

Composition

See Page 19000.1

Fabrication History

See Page 19000.1

Weld

See Page 19000.1

Property Measurements

Test Type	Fracture Toughness	Position	*
Specimen Type	Compact Tension	Specimen Thickness	1.0 in
Crack Length	*	Loading Type	I
Loading Rate	*	KQ	*
KIc	*	Valid KIc?	*
Reason for Invalid	*	KJc	*
JIcpr	Modified Standard	Initial COD	*
Critical COD	*	Curve Shape	*
Initial JI, JI	*	Maximum J, Jmax	*
Standard Method	E813	Standard Year	*

Orien	Test Temp degF	JIc in-lb/in2	Tear Mod in-lb/in**2
T-L	Room	459	21
T-L	Room	504	22
T-L	Room	515	18
T-L	Room	557	18
T-L	Room	582	20
T-L	Room	655	18
T-L	Room	663	22
T-L	Room	679	24
T-L	Room	689	14
T-L	Room	690	19

* - not reported

Material HY80

Description

Material Code	001.027.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRM
Reference	USN 6/9		

Composition

See Page 19000.1

Fabrication History

See Page 19000.1

Weld

See Page 19000.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	E 23
Standard Year	*		

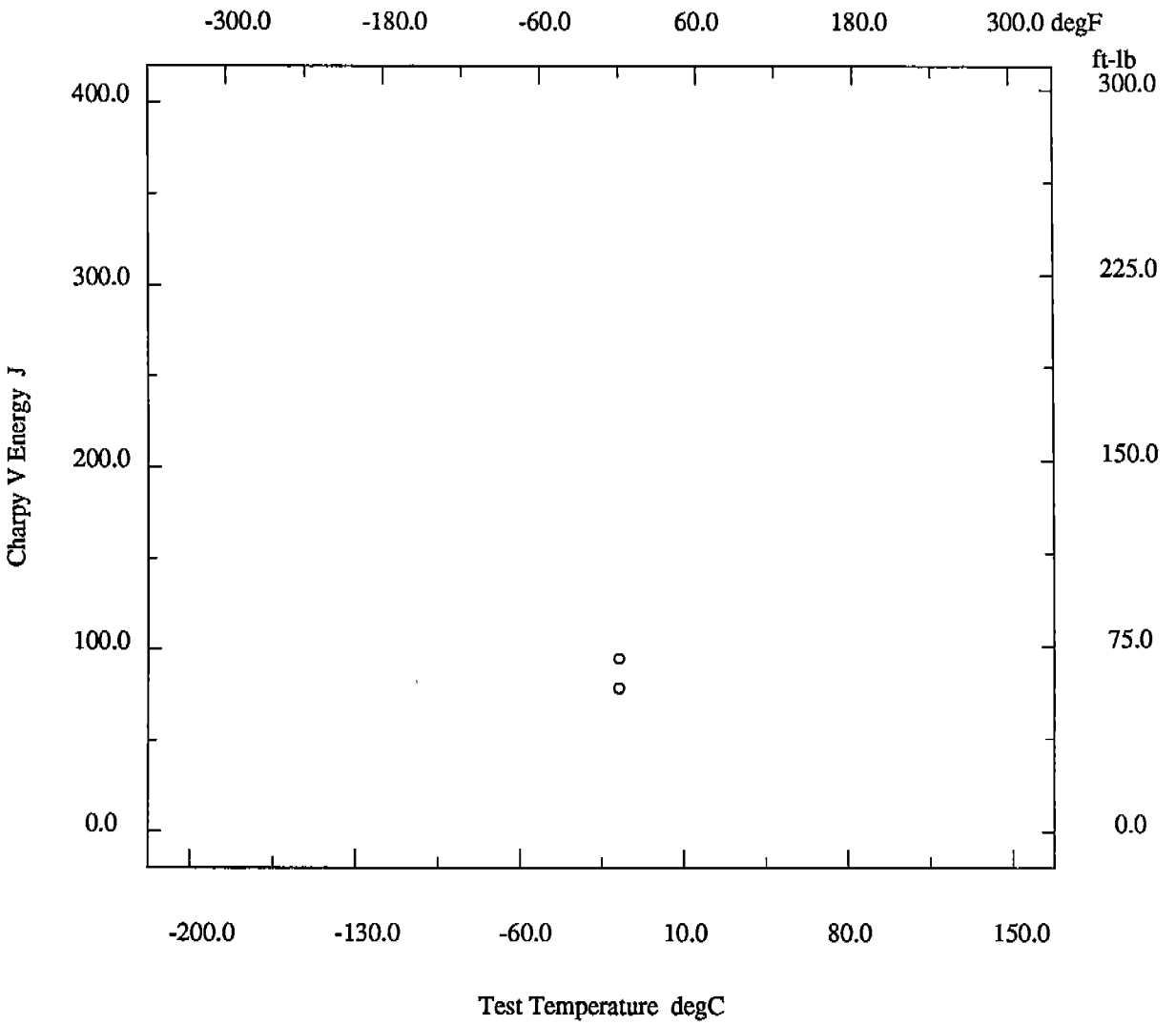
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	0	58
T-L °	0	70

* - not reported

Material HY80

Description

Material Code	001.027.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRM
Reference	USN 6/9		



* - not reported

Material HY80

Description

Material Code	001.027.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRM
Reference	USN 6/9		

Composition See Page 19000.1

Fabrication History See Page 19000.1

Weld See Page 19000.1

Property Measurements

Test Type	Dynamic Tear	Position	*
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Appearance	*	Standard Method	E 604
Standard Year	*		

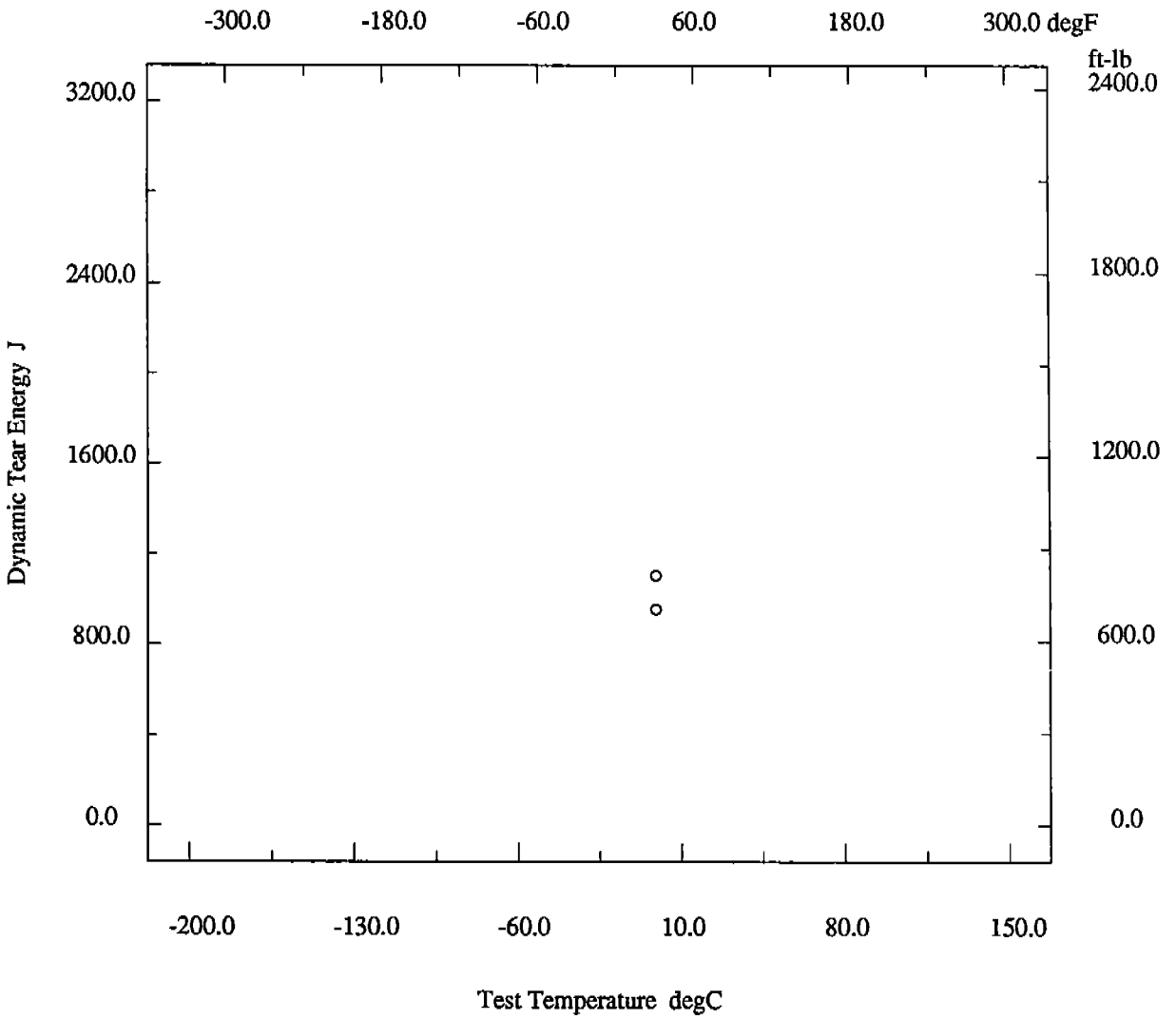
Orien	Test Temp degF	DT Energy ft-lb
T-L °	30	705
T-L °	30	815

* - not reported

Material HY80

Description

Material Code	001.027.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRM
Reference	USN 6/9		



* - not reported

493
494X

Material HY80

Description

Material Code	001.028.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRN
Reference	USN 6/9		

Composition

C	0.70 %	Mn	1.53 %
P	0.016 %	S	0.028 %
Si	*	Cr	0.31 %
Ni	2.25 %	Mo	0.41 %
V	0.006 %	Cu	0.01 %
Cb	*	Ti	<0.01 %
B	*	Al	*
N	*	Other Components	None %

Fabrication History

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

Weld

Weld Code	001.028.09	Weld Type	SMA
Base Metal Thickness	2.0 in	Welding Position	Downhand
Preheat Temperature	*	Metal Gap	*
Interpass Temperature	*	Passes	*
Filler Specification	*	Filler Name	E22000/1E
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	*
Joint Preparation	*	Number of Sides	*
Location wrt Weld	11mm in HAZ	Location wrt Surface	*
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	*
Weld Composition Reported?	Yes		

(continued)

* - not reported

Material HY80

(continued)

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	Cylindrical	Specimen Thickness	0.25 in
Gage Length	1.0 in	Loading Rate	0.002 in/min
Tensile Strength Offset	0.2 %	Uniform Elongation	*
Tensile Modulus	29.5 ksi*10**3	Standard Method	E 8
Standard Year	1969		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
L	Room	118.8	113.5	*	21	64

* - not reported

Material HY80

Description

Material Code	001.028.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRN
Reference	USN 6/9		

Composition

See Page 19100.1

Fabrication History

See Page 19100.1

Weld

See Page 19100.1

Property Measurements

Test Type	Fracture Toughness	Position	*
Specimen Type	Compact Tension	Specimen Thickness	1.0 in
Crack Length	*	Loading Type	I
Loading Rate	*	KQ	*
KIc	*	Valid KIc?	*
Reason for Invalid	*	KJc	*
JIcpr	Modified Standard	Initial COD	*
Critical COD	*	Curve Shape	*
Initial JI, JI	*	Maximum J, Jmax	*
Standard Method	E813	Standard Year	*

Orien	Test Temp degF	JIc in-lb/in2	Tear Mod in-lb/in**2
T-L	Room	266	30
T-L	Room	362	31
T-L	Room	367	20
T-L	Room	395	24
T-L	Room	401	25
T-L	Room	462	25
T-L	Room	561	17

* - not reported

Material HY80

Description

Material Code	001.028.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRN
Reference	USN 6/9		

Composition See Page 19100.1

Fabrication History See Page 19100.1

Weld See Page 19100.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	E 23
Standard Year	*		

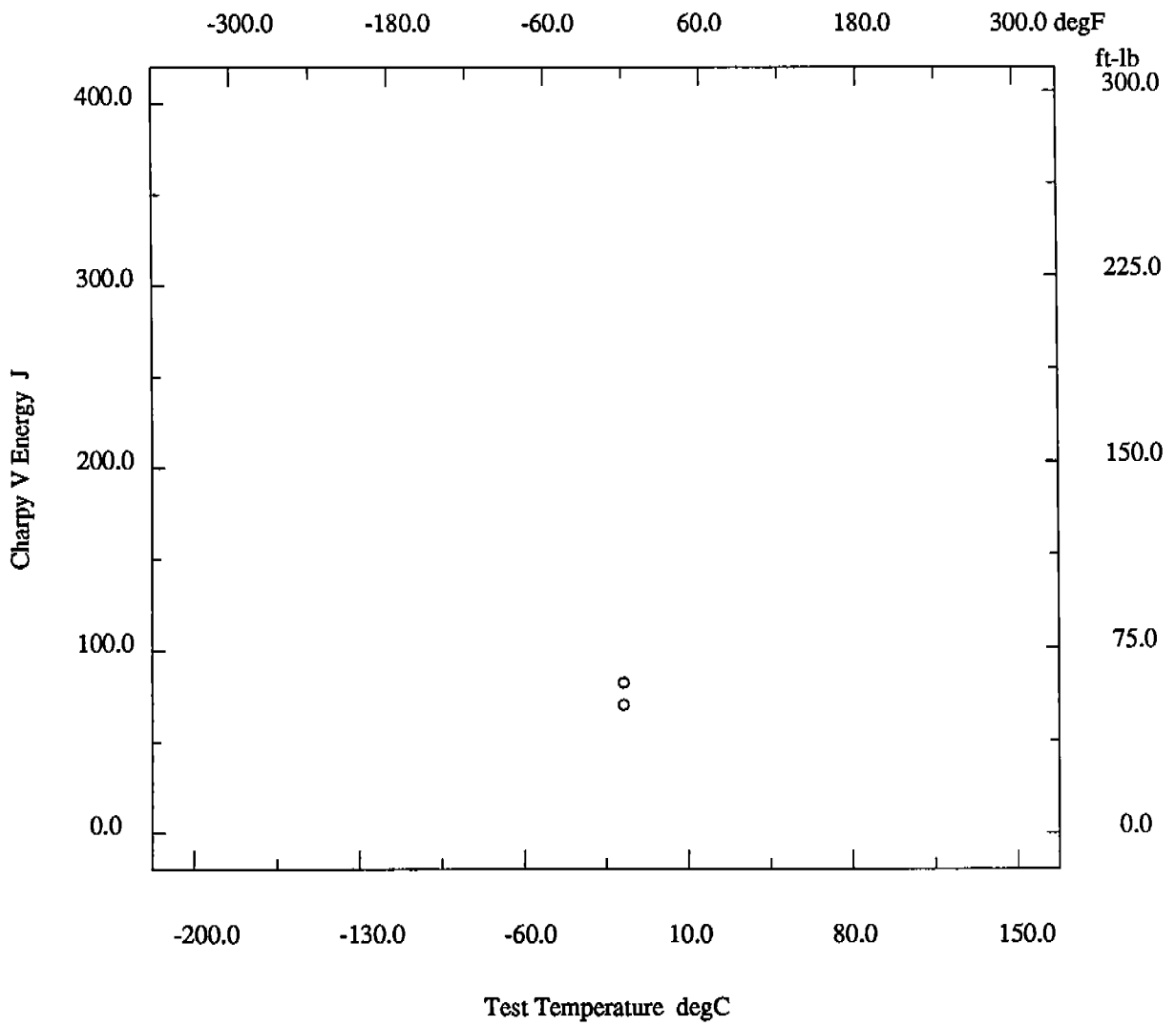
Orien	Test Temp degF	CVN Energy ft-lb
T-L ○	0	52
T-L ○	0	61

* - not reported

Material HY80

Description

Material Code	001.028.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRN
Reference	USN 6/9		



* - not reported

Material HY80

Description

Material Code	001.028.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRN
Reference	USN 6/9		

Composition See Page 19100.1

Fabrication History See Page 19100.1

Weld See Page 19100.1

Property Measurements

Test Type	Dynamic Tear	Position	*
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Appearance	*	Standard Method	E 604
Standard Year	*		

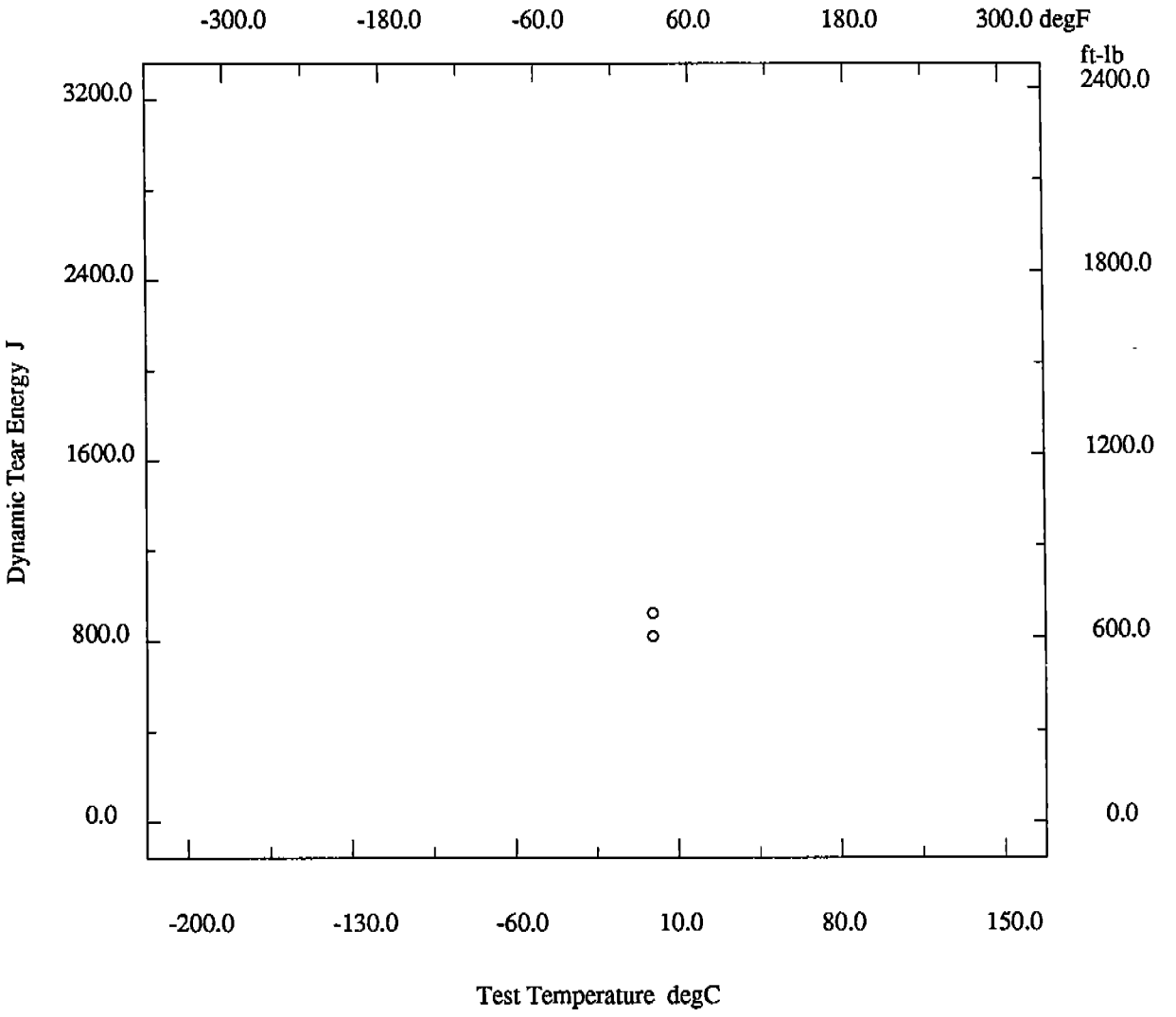
Orien	Test Temp degF	DT Energy ft-lb
T-L °	30	605
T-L °	30	680

* - not reported

Material HY80

Description

Material Code	001.028.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRN
Reference	USN 6/9		



* - not reported

501
502x

Material HY80

Description

Material Code	001.029.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FVD
Reference	USN 6/9		

Composition

C	0.06 %	Mn	1.60 %
P	0.018 %	S	0.01 %
Si	*	Cr	0.34 %
Ni	1.50 %	Mo	0.33 %
V	<0.001 %	Cu	0.04 %
Cb	*	Ti	<0.01 %
B	*	Al	*
N	*	Other Components	None %

Fabrication History

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

Weld

Weld Code	001.029.09	Weld Type	SMA
Base Metal Thickness	2.0 in	Welding Position	Downhand
Preheat Temperature	*	Metal Gap	*
Interpass Temperature	*	Passes	*
Filler Specification	*	Filler Name	E22000/1E
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	*
Joint Preparation	*	Number of Sides	*
Location wrt Weld	11mm in HAZ	Location wrt Surface	*
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	*
Weld Composition Reported?	Yes		

(continued)

* - not reported

Material HY80

(continued)

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	Cylindrical	Specimen Thickness	0.25 in
Gage Length	1.0 in	Loading Rate	0.002 in/min
Tensile Strength Offset	0.2 %	Uniform Elongation	*
Tensile Modulus	28.5 ksi*10**3	Standard Method	E 8
Standard Year	1969		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
L	Room	133.4	115	*	12	58

* - not reported

Material HY80

Description

Material Code	001.029.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FVD
Reference	USN 6/9		

Composition

See Page 19200.1

Fabrication History

See Page 19200.1

Weld

See Page 19200.1

Property Measurements

Test Type	Fracture Toughness	Position	*
Specimen Type	Compact Tension	Specimen Thickness	1.0 in
Crack Length	*	Loading Type	I
Loading Rate	*	KQ	*
KIc	*	Valid KIc?	*
Reason for Invalid	*	KJc	*
JIcpr	Modified Standard	Initial COD	*
Critical COD	*	Curve Shape	*
Initial JI, JI	*	Maximum J, Jmax	*
Standard Method	E813	Standard Year	*

Orien	Test Temp degF	JIc in-lb/in2	Tear Mod in-lb/in**2
T-L	Room	375	23
T-L	Room	477	19
T-L	Room	577	28
T-L	Room	590	18
T-L	Room	591	22
T-L	Room	696	15
T-L	Room	796	20

* - not reported

Material HY80

Description

Material Code	001.029.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FVD
Reference	USN 6/9		

Composition See Page 19200.1

Fabrication History See Page 19200.1

Weld See Page 19200.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	E 23
Standard Year	*		

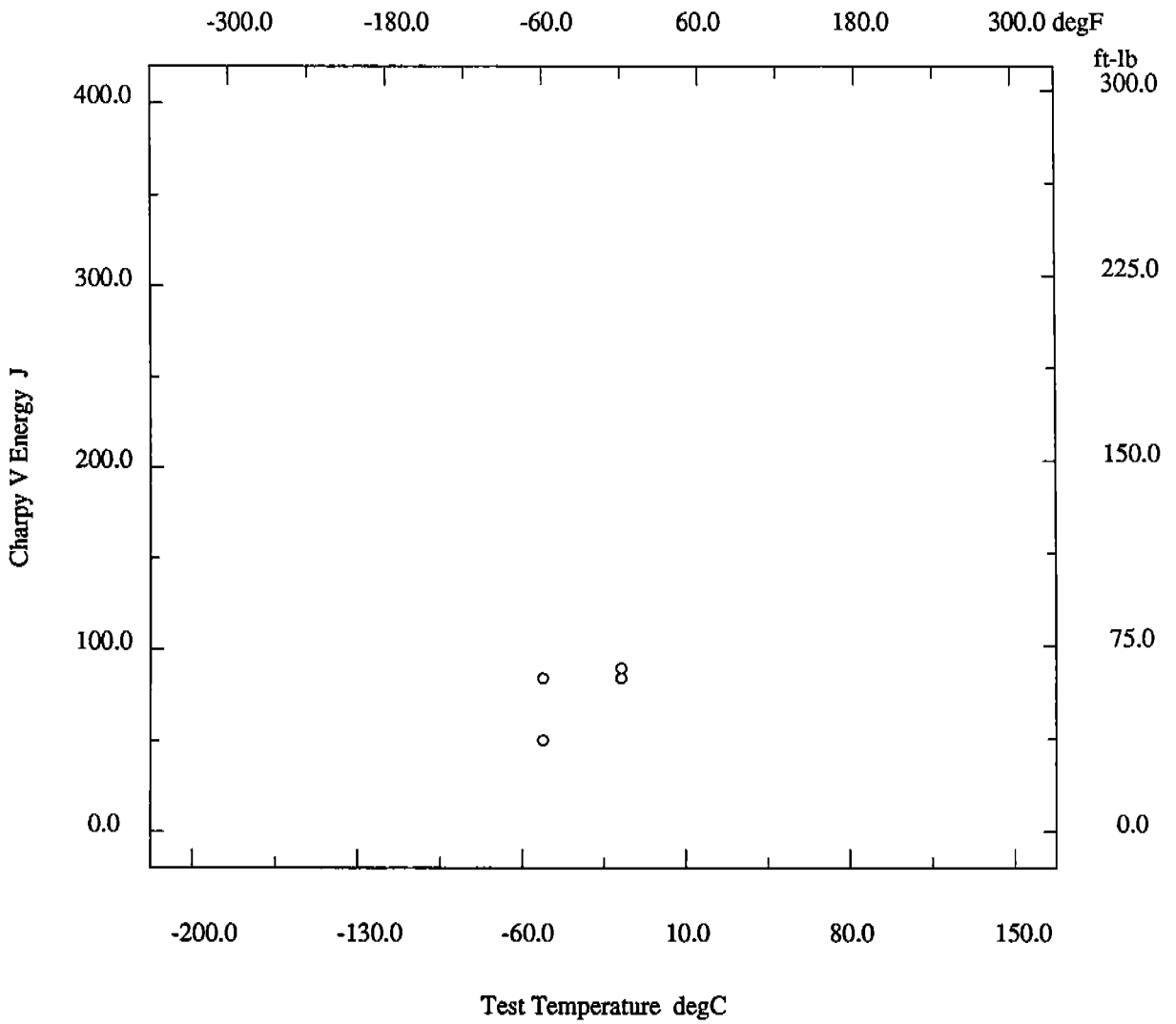
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-60	37
T-L °	-60	62
T-L °	0	62
T-L °	0	66

* - not reported

Material HY80

Description

Material Code	001.029.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FVD
Reference	USN 6/9		



* - not reported

Material HY80

Description

Material Code	001.029.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FVD
Reference	USN 6/9		

Composition See Page 19200.1

Fabrication History See Page 19200.1

Weld See Page 19200.1

Property Measurements

Test Type	Dynamic Tear	Position	*
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Appearance	*	Standard Method	E 604
Standard Year	*		

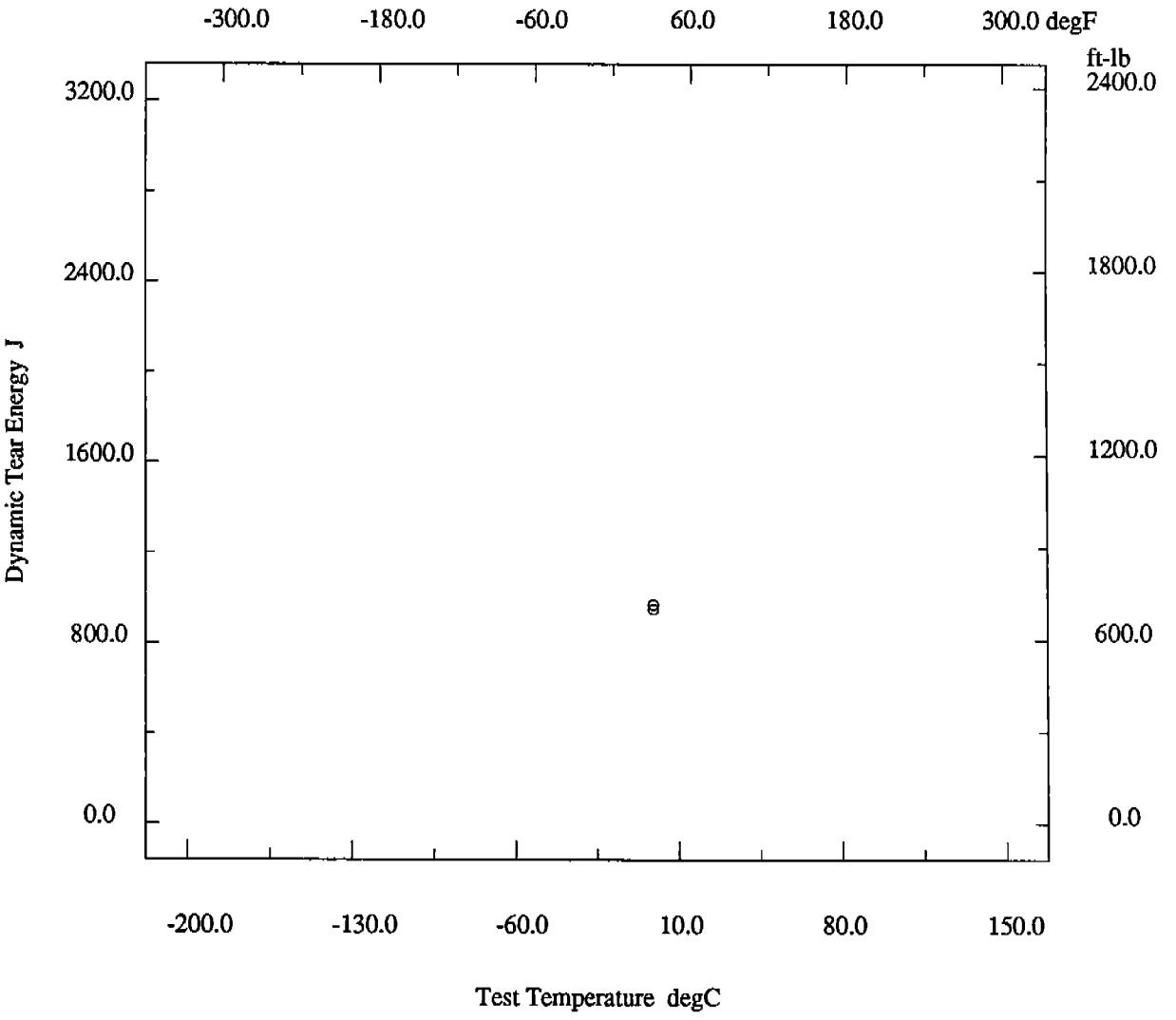
Orien	Test Temp degF	DT Energy ft-lb
T-L °	30	700
T-L °	30	715

* - not reported

Material HY80

Description

Material Code	001.029.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FVD
Reference	USN 6/9		



* - not reported

509
510x

Material HY80

Description

Material Code	001.030.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FXG
Reference	USN 6/9		

Composition

C	0.06 %	Mn	1.46 %
P	0.018 %	S	0.01 %
Si	*	Cr	0.34 %
Ni	1.88 %	Mo	0.33 %
V	0.006 %	Cu	0.03 %
Cb	*	Ti	<0.01 %
B	*	Al	*
N	*	Other Components	None %

Fabrication History

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

Weld

Weld Code	001.030.09	Weld Type	SMA
Base Metal Thickness	2.0 in	Welding Position	Downhand
Preheat Temperature	*	Metal Gap	*
Interpass Temperature	*	Passes	*
Filler Specification	*	Filler Name	E22000/1E
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	*
Joint Preparation	*	Number of Sides	*
Location wrt Weld	11mm in HAZ	Location wrt Surface	*
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	*
Weld Composition Reported?	Yes		

(continued)

* - not reported

Material HY80

(continued)

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	Cylindrical	Specimen Thickness	0.25 in
Gage Length	1.0 in	Loading Rate	0.002 in/min
Tensile Strength Offset	0.2 %	Uniform Elongation	*
Tensile Modulus	*	Standard Method	E 8
Standard Year	1969		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
L	Room	123.5	116.6	*	21	64

* - not reported

Material HY80

Description

Material Code	001.030.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FXG
Reference	USN 6/9		

Composition

See Page 19300.1

Fabrication History

See Page 19300.1

Weld

See Page 19300.1

Property Measurements

Test Type	Fracture Toughness	Position	*
Specimen Type	Compact Tension	Specimen Thickness	1.0 in
Crack Length	*	Loading Type	I
Loading Rate	*	KQ	*
KIc	*	Valid KIc?	*
Reason for Invalid	*	KJc	*
JIcpr	Modified Standard	Initial COD	*
Critical COD	*	Curve Shape	*
Initial JI, JI	*	Maximum J, Jmax	*
Standard Method	E813	Standard Year	*

Orien	Test Temp degF	JIc in-lb/in2	Tear Mod in-lb/in**2
T-L	Room	516	90
T-L	Room	540	95
T-L	Room	575	101
T-L	Room	636	111

* - not reported

Material HY80

Description

Material Code	001.030.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FXG
Reference	USN 6/9		

Composition

See Page 19300.1

Fabrication History

See Page 19300.1

Weld

See Page 19300.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	E 23
Standard Year	*		

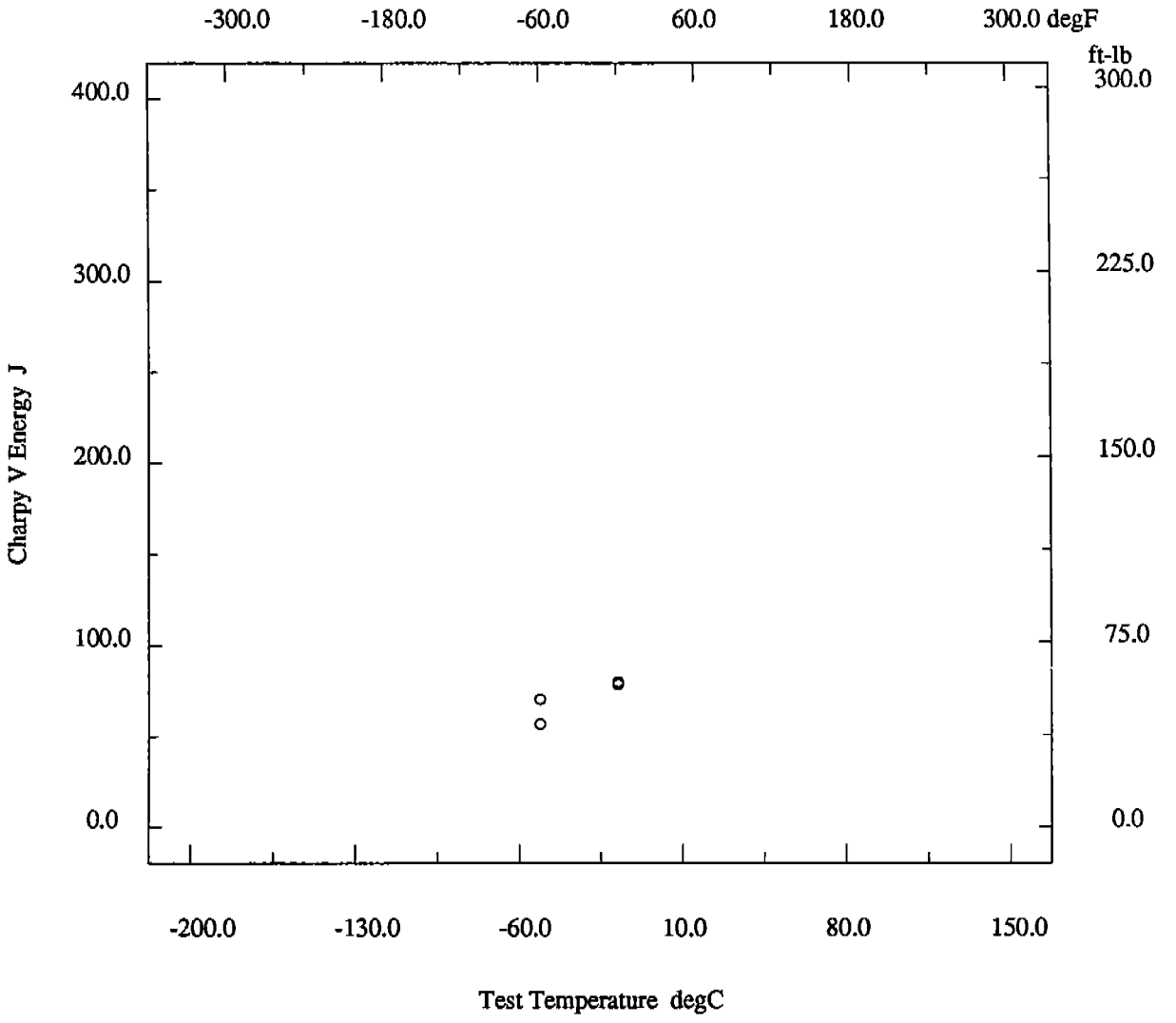
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-60	42
T-L °	-60	52
T-L °	0	58
T-L °	0	59

* - not reported

Material HY80

Description

Material Code	001.030.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FXG
Reference	USN 6/9		



* - not reported

Material HY80

Description

Material Code	001.030.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FXG
Reference	USN 6/9		

Composition

See Page 19300.1

Fabrication History

See Page 19300.1

Weld

See Page 19300.1

Property Measurements

Test Type	Dynamic Tear	Position	*
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Appearance	*	Standard Method	E 604
Standard Year	*		

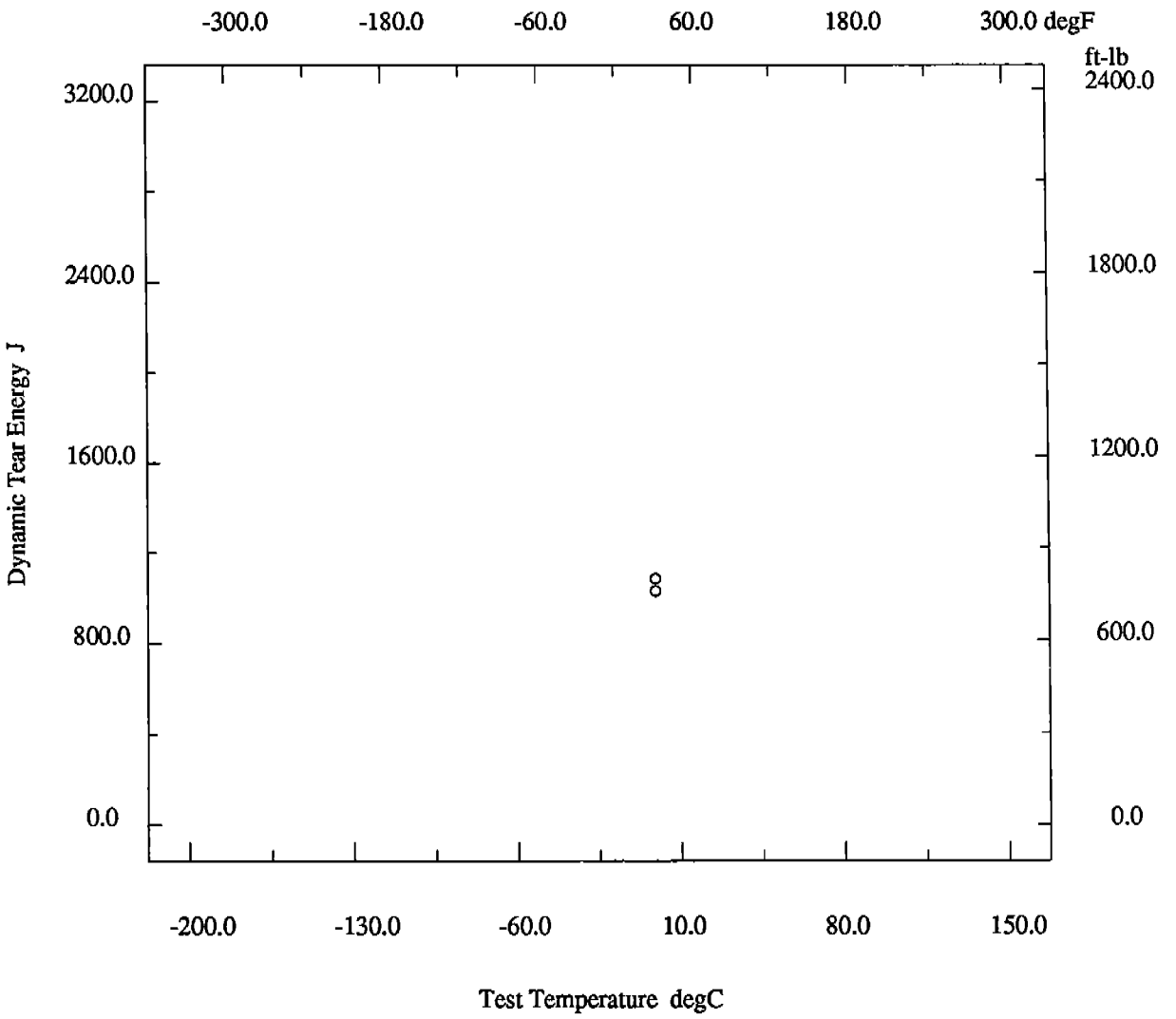
Orien	Test Temp degF	DT Energy ft-lb
T-L ○	30	760
T-L ○	30	800

* - not reported

Material HY80

Description

Material Code	001.030.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FXG
Reference	USN 6/9		



* - not reported

517 518

Material HY80

Description

Material Code	001.031.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FXF
Reference	USN 6/9		

Composition

C	0.07 %	Mn	1.13 %
P	0.015 %	S	0.015 %
Si	*	Cr	0.82 %
Ni	2.29 %	Mo	0.35 %
V	0.005 %	Cu	0.20 %
Cb	*	Ti	<0.01 %
B	*	Al	*
N	*	Other Components	None %

Fabrication History

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

Weld

Weld Code	001.031.09	Weld Type	SMA
Base Metal Thickness	2.0 in	Welding Position	Downhand
Preheat Temperature	*	Metal Gap	*
Interpass Temperature	*	Passes	*
Filler Specification	*	Filler Name	E22000/1E
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	*
Joint Preparation	*	Number of Sides	*
Location wrt Weld	11mm in HAZ	Location wrt Surface	*
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	*
Weld Composition Reported?	Yes		

(continued)

* - not reported

Material HY80

(continued)

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	Cylindrical	Specimen Thickness	0.25 in
Gage Length	1.0 in	Loading Rate	0.002 in/min
Tensile Strength Offset	0.2 %	Uniform Elongation	*
Tensile Modulus	*	Standard Method	E 8
Standard Year	1969		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
L	Room	117.7	108.8	*	30	63

* - not reported

Material HY80

Description

Material Code	001.031.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FXF
Reference	USN 6/9		

Composition

See Page 19400.1

Fabrication History

See Page 19400.1

Weld

See Page 19400.1

Property Measurements

Test Type	Fracture Toughness	Position	*
Specimen Type	Compact Tension	Specimen Thickness	1.0 in
Crack Length	*	Loading Type	I
Loading Rate	*	KQ	*
KIc	*	Valid KIc?	*
Reason for Invalid	*	KJc	*
JIcpr	Modified Standard	Initial COD	*
Critical COD	*	Curve Shape	*
Initial JI, JI	*	Maximum J, Jmax	*
Standard Method	E813	Standard Year	*

Orien	Test Temp degF	JIc in-lb/in2	Tear Mod in-lb/in**2
T-L	Room	263	30
T-L	Room	271	24
T-L	Room	280	31
T-L	Room	516	20
T-L	Room	528	22
T-L	Room	642	17

* - not reported

Material HY80

Description

Material Code	001.031.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FXF
Reference	USN 6/9		

Composition

See Page 19400.1

Fabrication History

See Page 19400.1

Weld

See Page 19400.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	E 23
Standard Year	*		

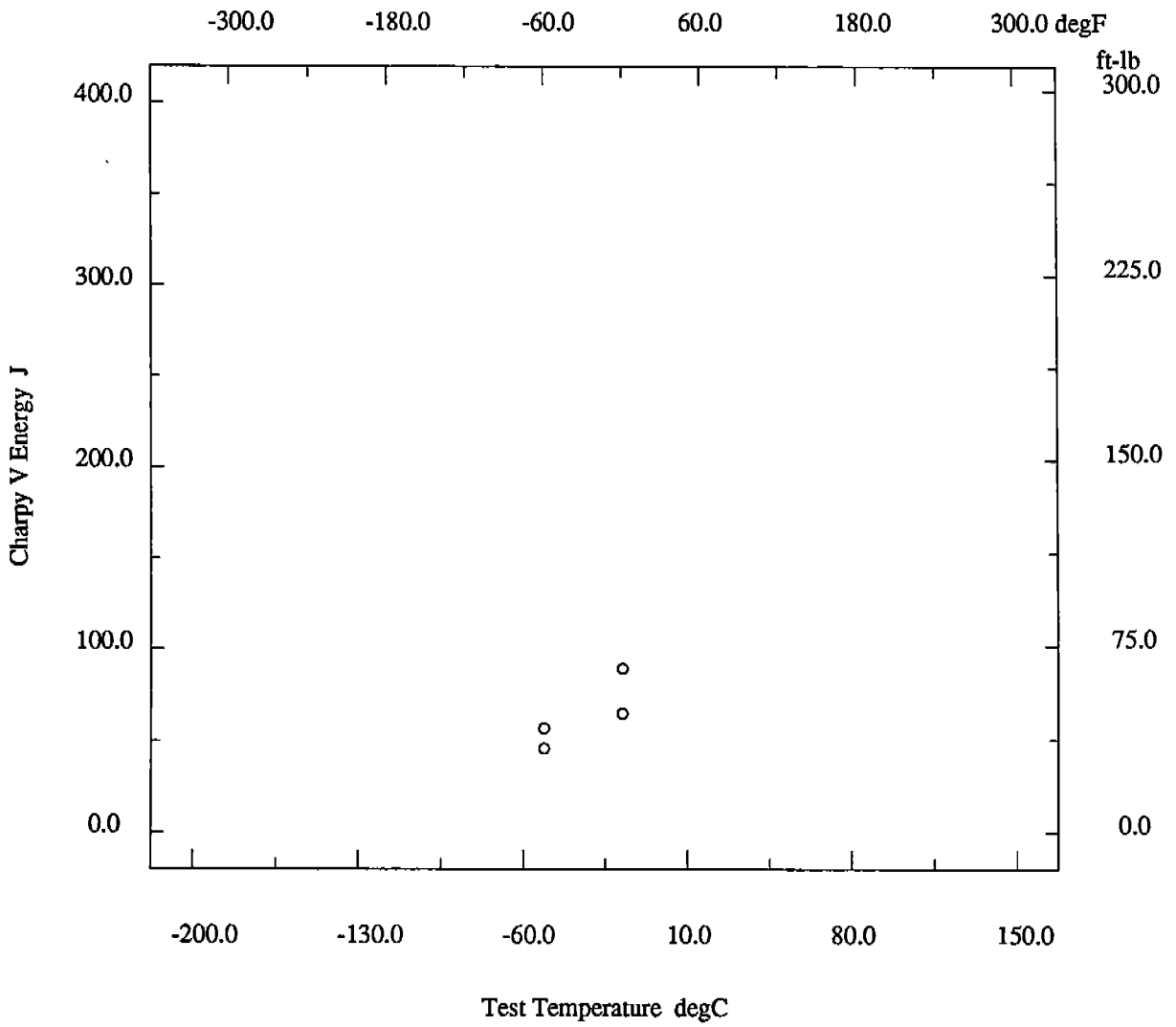
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-60	34
T-L °	-60	42
T-L °	0	48
T-L °	0	66

* - not reported

Material HY80

Description

Material Code	001.031.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FXF
Reference	USN 6/9		



* - not reported

Material HY80

Description

Material Code	001.031.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FXF
Reference	USN 6/9		

Composition See Page 19400.1

Fabrication History See Page 19400.1

Weld See Page 19400.1

Property Measurements

Test Type	Dynamic Tear	Position	*
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Appearance	*	Standard Method	E 604
Standard Year	*		

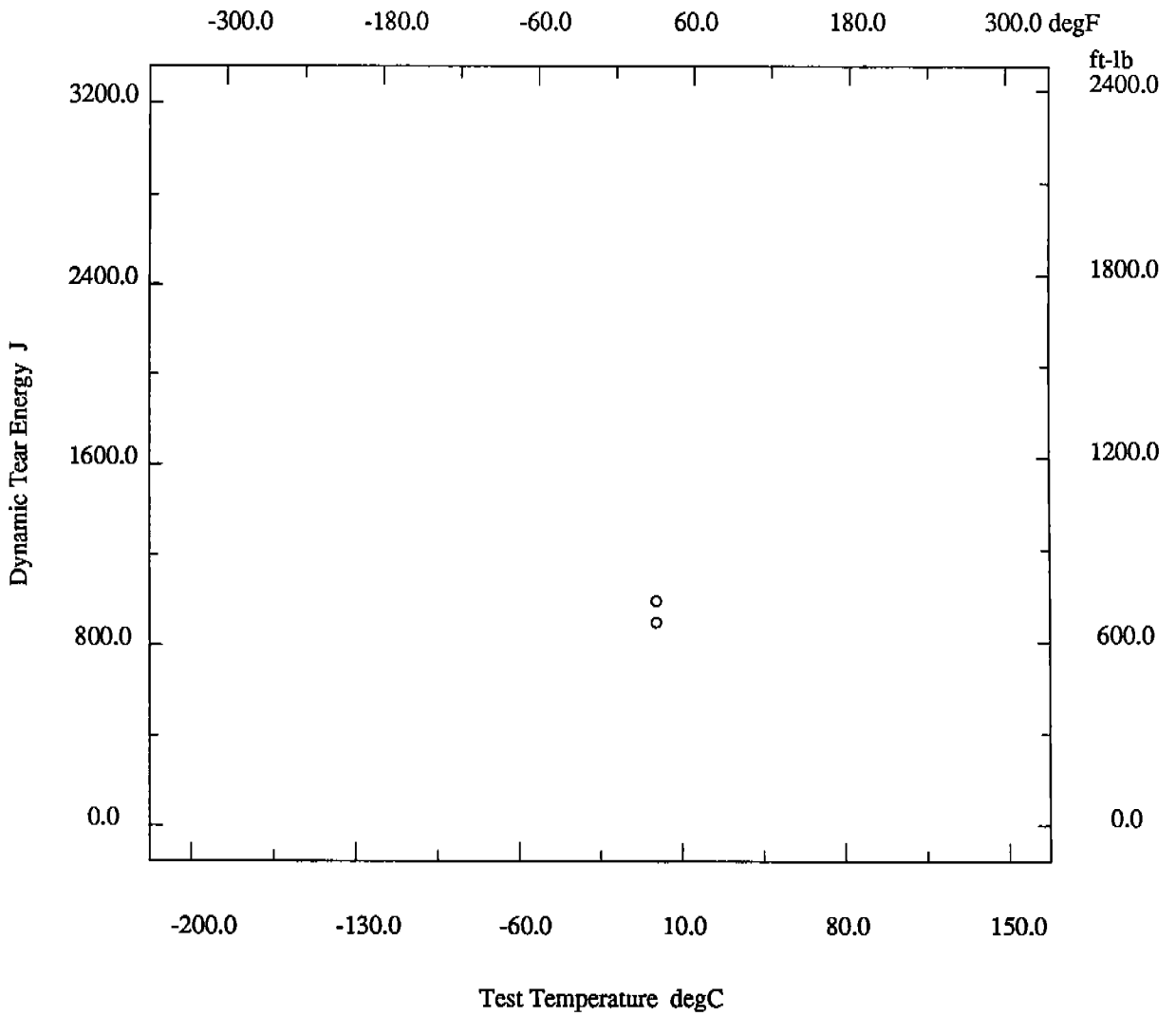
Orien	Test Temp degF	DT Energy ft-lb
T-L °	30	665
T-L °	30	735

* - not reported

Material HY80

Description

Material Code	001.031.09	Material Name	HY80
UNS	*	Other Designation	*
Type	Welded Joint	Form	*
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FXF
Reference	USN 6/9		



* - not reported

525
226

Material HY100

Description

Material Code	011.001.01	Material Name	HY100
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2 in	Composition Type	Actual
Composition Position	*	Lot ID	B5761-2R
Reference	3530		

Composition

C	0.17 %	Mn	0.40 %
P	0.007 %	S	0.019 %
Si	0.31 %	Cr	1.75 %
Ni	3.14 %	Mo	0.53 %
V	0.01 %	Cu	0.21 %
Cb	*	Ti	*
B	*	Al	0.05 %
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	1650 degF	Process Time	*
Rolling Conditions	*	Final Processing	Q,T
Final Temperature	1050 degF	Final Time	*
Cold Work Strain	*	Aging Temperature	*
Aging Time	*	Location	*

Property Measurements

Test Type	Tensile	Specimen Type	*
Specimen Thickness	*	Gage Length	*
Loading Rate	*	Tensile Strength Offset	*
Tensile Yield Point	*	Uniform Elongation	*
Tensile Modulus	*	Standard Method	*
Standard Year	*		

Position	Orient	Test Temp degF	UTS ksi	TYS ksi	Elongation %	RA %
0/4T	L	75	123.3	110.1	22	71.6
0/4T	L	75	123.3	110.2	22	71.6
0/4T	L	75	123.3	110.3	22	71.6
1/2T	L	75	122.6	109.3	21	71.0
1/2T	L	75	122.8	109.4	21	71.1
1/2T	L	75	123.1	109.5	21	71.3
0/4T	T	75	123.6	109.8	19	58.6
0/4T	T	75	123.7	110.3	19	58.7
0/4T	T	75	123.8	110.8	19	58.8
1/2T	T	75	122.8	109.6	20	59.8
1/2T	T	75	122.9	109.3	20	59.8
1/2T	T	75	123.1	109.1	20	59.8

* - not reported

Material HY100

Description

Material Code	011.001.01	Material Name	HY100
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2 in	Composition Type	Actual
Composition Position	*	Lot ID	B5761-2R
Reference	3530		

Composition

See Page 19500.1

Fabrication History

See Page 19500.1

Property Measurements

Test Type	Dynamic Tear	Specimen Type	Dynamic Tear
Notch Preparation	Pressed	Specimen Thickness	0.625 in
Loading Rate	*	Standard Method	*
Standard Year	*		

Position	Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
0/4T	L-T ○	-240	100	3
1/2T	L-T ○	-240	220	8
0/4T	L-T ○	-220	95	6
1/2T	L-T ○	-220	95	11
0/4T	L-T ○	-180	90	9
1/2T	L-T ○	-180	100	19
0/4T	L-T ○	-160	180	27
1/2T	L-T ○	-160	220	45
0/4T	L-T ○	-140	265	37
1/2T	L-T ○	-140	450	72
0/4T	L-T ○	-120	320	47
1/2T	L-T ○	-120	620	81
0/4T	L-T ○	-80	840	100
1/2T	L-T ○	-80	790	100
0/4T	L-T ○	-40	760	100
1/2T	L-T ○	-40	810	100
0/4T	L-T ○	0	815	100
1/2T	L-T ○	0	820	100
0/4T	L-T ○	30	875	100
1/2T	L-T ○	30	925	100
0/4T	T-L △	-240	45	3
1/2T	T-L △	-240	80	3
0/4T	T-L △	-220	75	6
1/2T	T-L △	-220	150	14
0/4T	T-L △	-180	90	17
1/2T	T-L △	-180	150	23
0/4T	T-L △	-160	95	16
1/2T	T-L △	-160	140	34
0/4T	T-L △	-140	125	30
1/2T	T-L △	-140	195	51
0/4T	T-L △	-120	200	50
1/2T	T-L △	-120	270	64
0/4T	T-L △	-80	325	100
1/2T	T-L △	-80	420	100

(continued)

* - not reported

Material HY100

(continued)

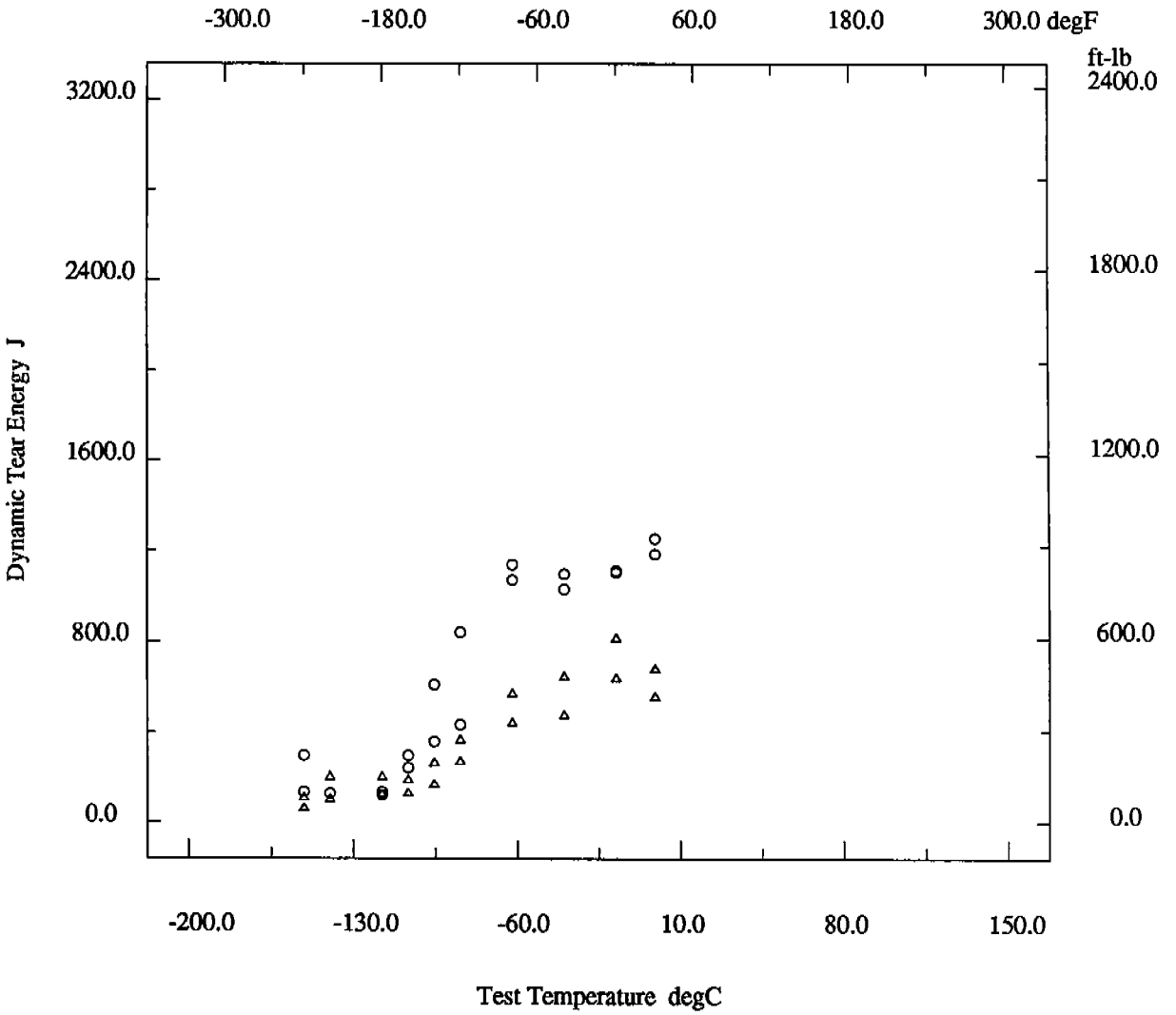
Position	Orien	Test Temp degF	DT Energy ft-lb	Frac Apear %
0/4T	T-L △	-40	350	100
1/2T	T-L △	-40	475	100
0/4T	T-L △	0	600	100
1/2T	T-L △	0	470	100
0/4T	T-L △	30	410	100
1/2T	T-L △	30	500	100

* - not reported

Material HY100

Description

Material Code	011.001.01	Material Name	HY100
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2 in	Composition Type	Actual
Composition Position	*	Lot ID	B5761-2R
Reference	3530		



* - not reported

Material HY100

Description

Material Code	011.001.01	Material Name	HY100
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2 in	Composition Type	Actual
Composition Position	*	Lot ID	B5761-2R
Reference	3530		

Composition See Page 19500.1

Fabrication History See Page 19500.1

Property Measurements

Test Type	Charpy V Impact	Specimen Type	Full
Did Specimen Fracture?	*	Standard Method	*
Standard Year	*		

Position	Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %	Split?
0/4T	L-T ○	-320	8	2	6	No
1/2T	L-T ○	-320	8	2	8	No
0/4T	L-T ○	-255	23	8	12	No
1/2T	L-T ○	-255	33	15	21	No
0/4T	L-T ○	-240	21	10	14	No
1/2T	L-T ○	-240	22	9	21	No
1/2T	L-T ○	-230	36	20	32	Yes
0/4T	L-T ○	-220	29	12	19	No
1/2T	L-T ○	-220	50	29	46	Yes
0/4T	L-T ○	-200	35	19	30	No
1/2T	L-T ○	-200	54	32	48	Yes
0/4T	L-T ○	-180	42	24	38	No
1/2T	L-T ○	-180	67	41	75	Yes
0/4T	L-T ○	-170	46	29	50	No
0/4T	L-T ○	-160	53	35	55	No
1/2T	L-T ○	-160	71	46	77	Yes
0/4T	L-T ○	-140	62	40	65	Yes
1/2T	L-T ○	-140	85	57	94	Yes
0/4T	L-T ○	-120	80	53	99	Yes
1/2T	L-T ○	-120	88	58	99	Yes
0/4T	L-T ○	-90	80	52	100	Yes
1/2T	L-T ○	-90	99	63	100	Yes
0/4T	L-T ○	-60	86	58	100	Yes
1/2T	L-T ○	-60	100	66	100	Yes
0/4T	L-T ○	0	85	56	100	Yes
1/2T	L-T ○	0	101	63	100	Yes
0/4T	L-T ○	30	87	65	100	Yes
1/2T	L-T ○	30	106	66	100	Yes
0/4T	L-T ○	74	85	64	100	Yes
1/2T	L-T ○	74	103	73	100	Yes
0/4T	T-L △	-320	10	2	8	No
1/2T	T-L △	-320	8	2	8	No
0/4T	T-L △	-255	19	6	11	No
1/2T	T-L △	-255	18	6	18	No
0/4T	T-L △	-240	9	6	11	No

(continued)

* - not reported

Material HY100

(continued)

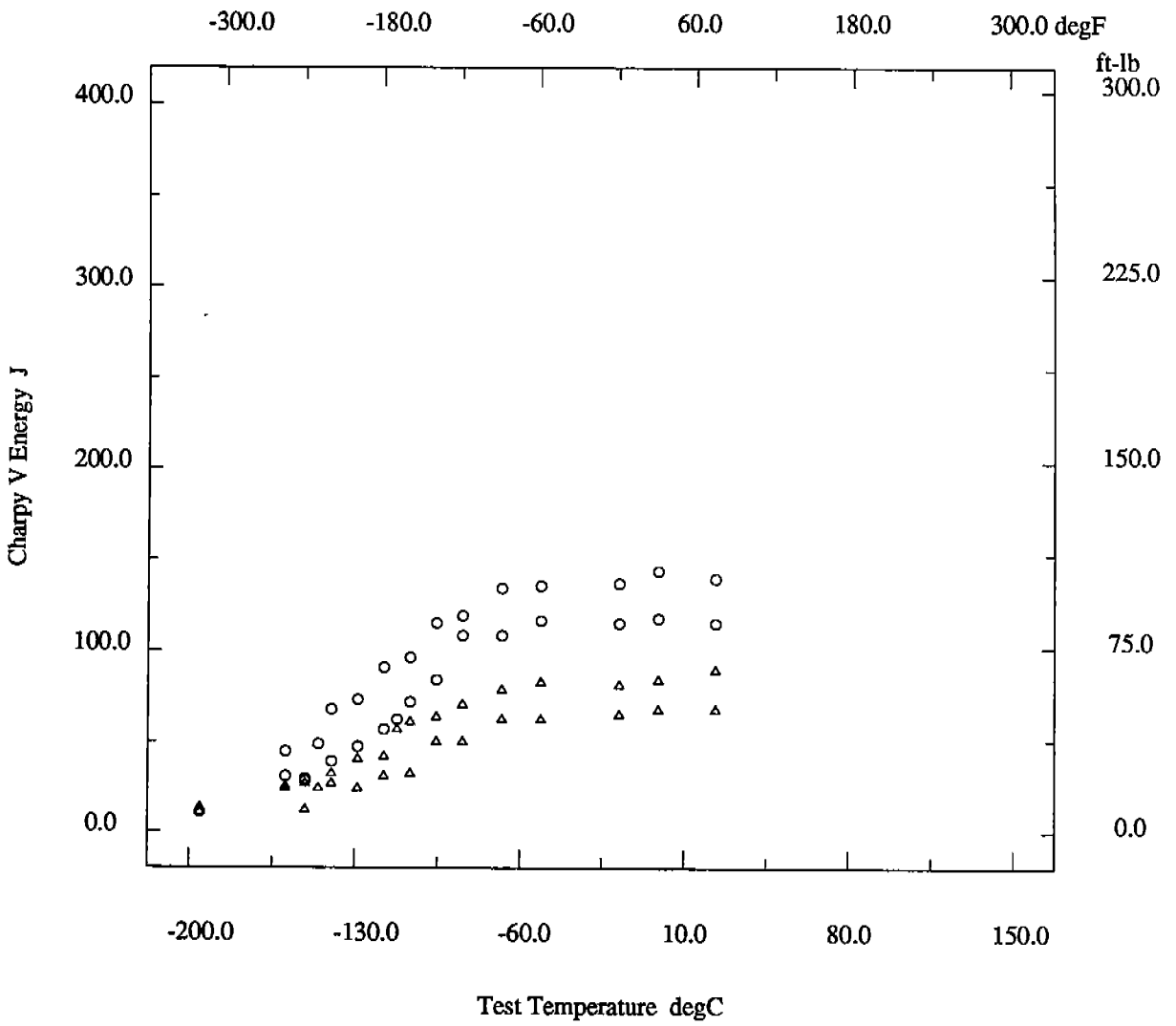
Position	Orien	Test Temp degF	CVN Energy ft-lb	Lat Expans mils	Shear %	Split?
1/2T	T-L ^	-240	20	9	21	No
0/4T	T-L ^	-230	18	5	14	No
0/4T	T-L ^	-220	20	8	19	No
1/2T	T-L ^	-220	24	12	26	No
0/4T	T-L ^	-200	18	8	22	No
1/2T	T-L ^	-200	30	18	40	No
0/4T	T-L ^	-180	23	14	33	No
1/2T	T-L ^	-180	31	21	49	No
1/2T	T-L ^	-170	42	27	56	No
0/4T	T-L ^	-160	24	16	40	No
1/2T	T-L ^	-160	45	30	68	No
0/4T	T-L ^	-140	37	27	72	No
1/2T	T-L ^	-140	47	32	78	No
0/4T	T-L ^	-120	37	28	72	No
1/2T	T-L ^	-120	52	39	92	No
0/4T	T-L ^	-90	46	34	98	No
1/2T	T-L ^	-90	58	40	100	No
0/4T	T-L ^	-60	46	35	100	No
1/2T	T-L ^	-60	61	45	100	No
0/4T	T-L ^	0	48	36	100	No
1/2T	T-L ^	0	60	45	100	No
0/4T	T-L ^	30	50	38	100	No
1/2T	T-L ^	30	62	45	100	No
0/4T	T-L ^	74	50	42	100	No
1/2T	T-L ^	74	66	52	100	No

* - not reported

Material HY100

Description

Material Code	011.001.01	Material Name	HY100
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2 in	Composition Type	Actual
Composition Position	*	Lot ID	B5761-2R
Reference	3530		



* - not reported

533
534x

Material HY100

Description

Material Code	011.003.01	Material Name	HY100
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	L467OV559
Reference	USN 6/9		

Composition

C	0.16 %	Mn	0.70 %
P	0.011 %	S	0.014 %
Si	*	Cr	2.93 %
Ni	7.02 %	Mo	0.79 %
V	<0.001 %	Cu	0.23 %
Cb	*	Ti	<0.01 %
B	*	Al	*
N	*	Other Components	None %

Fabrication History

Heat Treatment	Q,T	Producer	*
Year Produced	*	Addl Info	None
Source	USN	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	*
Specimen Type	Cylindrical	Specimen Thickness	0.505 in
Gage Length	2.0 in	Loading Rate	0.002 in/min
Tensile Strength Offset	0.2 %	Uniform Elongation	*
Tensile Modulus	29.0 ksi*10**3	Standard Method	E 8
Standard Year	1969		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
T	Room	113.4	99.0	*	25	72

* - not reported

Material HY100

Description

Material Code	011.003.01	Material Name	HY100
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	L467OV559
Reference	USN 6/9		

Composition

See Page 19600.1

Fabrication History

See Page 19600.1

Property Measurements

Test Type	Fracture Toughness	Position	*
Specimen Type	Compact Tension	Specimen Thickness	1.0 in
Crack Length	*	Loading Type	I
Loading Rate	*	KQ	*
KIc	*	Valid KIc?	*
Reason for Invalid	*	KJc	*
JIcpr	Modified Standard	Initial COD	*
Critical COD	*	Curve Shape	*
Initial JI, JI	*	Maximum J, Jmax	*
Standard Method	813	Standard Year	*

Orien	Test Temp degF	JIc in-lb/in2	Tear Mod in-lb/in**2
T-L	Room	773	67
T-L	Room	830	65
T-L	Room	912	64
T-L	Room	949	49

* - not reported

Material HY100

Description

Material Code	011.003.01	Material Name	HY100
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	L467OV559
Reference	USN 6/9		

Composition

See Page 19600.1

Fabrication History

See Page 19600.1

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	E 23
Standard Year	1972		

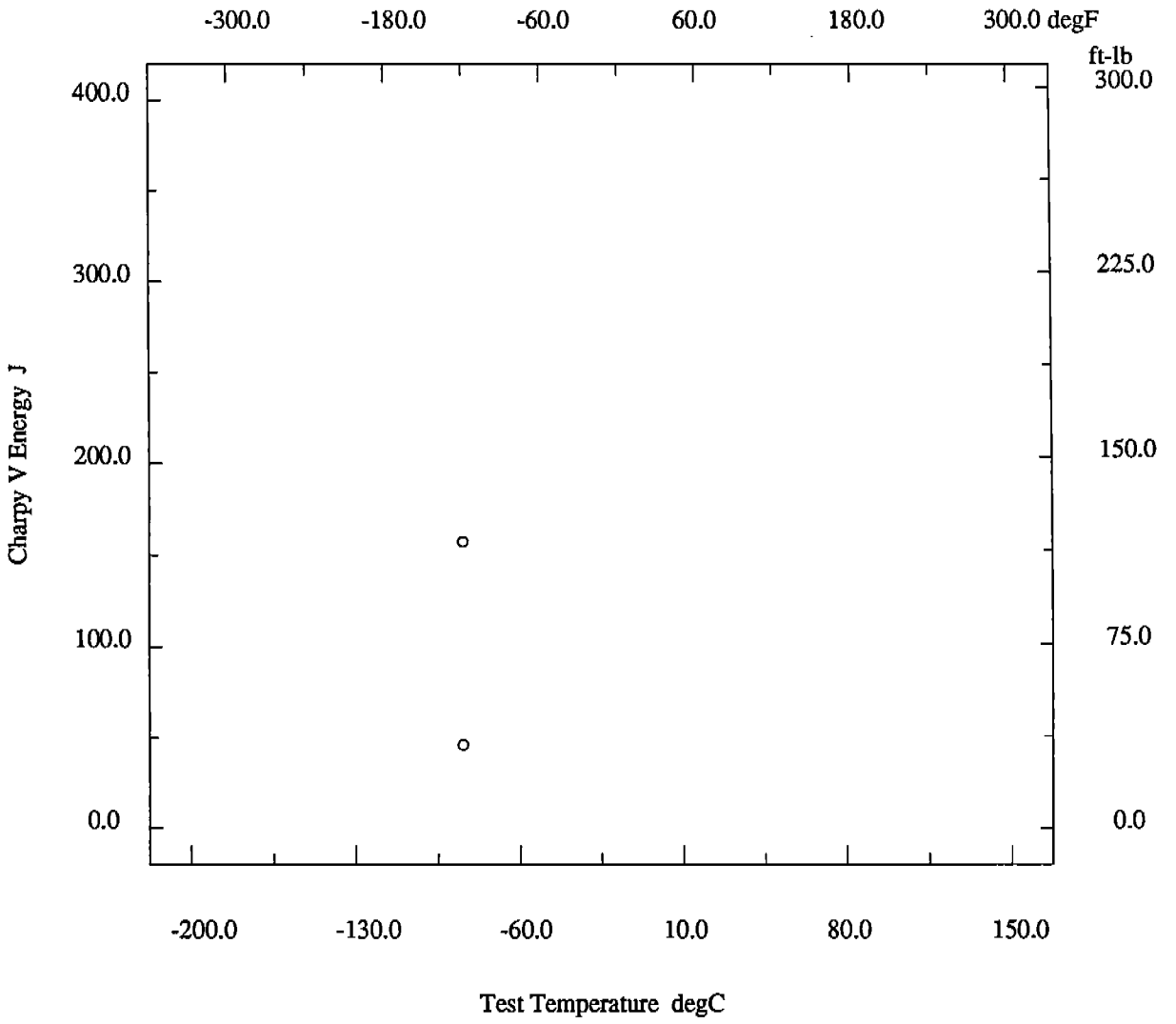
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-120	116
T-L °	-120	34

* - not reported

Material HY100

Description

Material Code	011.003.01	Material Name	HY100
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	L467OV559
Reference	USN 6/9		



* - not reported

Material HY100

Description

Material Code	011.003.01	Material Name	HY100
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	L467OV559
Reference	USN 6/9		

Composition

See Page 19600.1

Fabrication History

See Page 19600.1

Property Measurements

Test Type	Dynamic Tear	Position	*
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Appearance	*	Standard Method	E 604
Standard Year	1980		

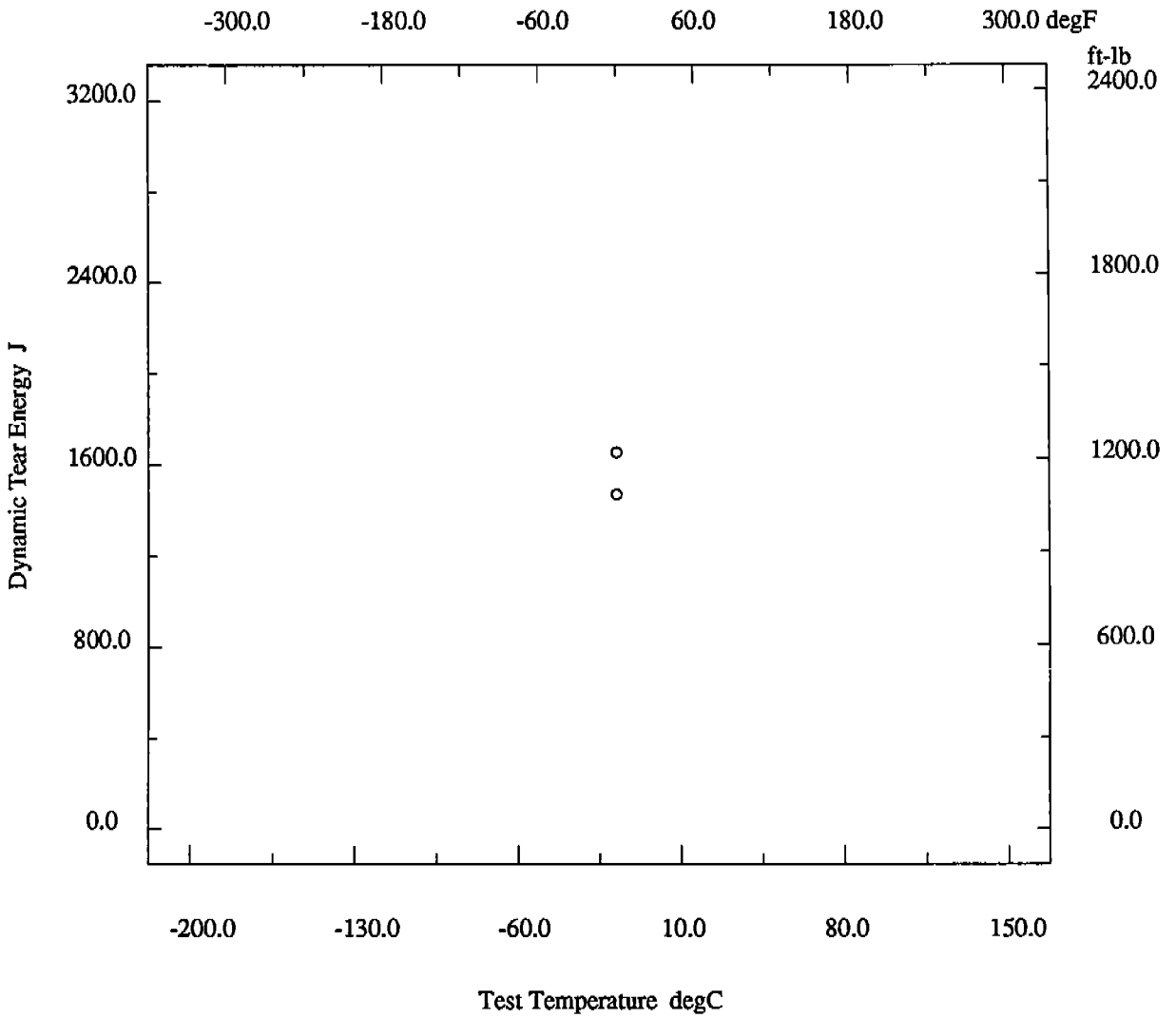
Orien	Test Temp degF	DT Energy ft-lb
T-L °	0	1085
T-L °	0	1220

* - not reported

Material HY100

Description

Material Code	011.003.01	Material Name	HY100
UNS	*	Other Designation	*
Type	Wrought Metal	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	L467OV559
Reference	USN 6/9		



* - not reported

Material HY100

Description

Material Code	011.003.09A	Material Name	HY100
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRO
Reference	USN 6/9		

Composition

C	0.07 %	Mn	1.13 %
P	0.013 %	S	0.014 %
Si	*	Cr	0.15 %
Ni	3.49 %	Mo	0.45 %
V	<0.001 %	Cu	0.03 %
Cb	*	Ti	<0.01 %
B	*	Al	*
N	*	Other Components	None %

Fabrication History

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

Weld

Weld Code	011.003.09A	Weld Type	SMA
Base Metal Thickness	2.0 in	Welding Position	Downhand
Preheat Temperature	*	Metal Gap	*
Interpass Temperature	*	Passes	*
Filler Specification	M22000/10	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	*
Joint Preparation	*	Number of Sides	*
Location wrt Weld	11mm in HAZ	Location wrt Surface	*
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	*
Weld Composition Reported?	Yes		

(continued)

* - not reported

Material HY100

(continued)

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	Cylindrical	Specimen Thickness	0.250 in
Gage Length	1.0 in	Loading Rate	0.002 in/min
Tensile Strength Offset	0.2 %	Uniform Elongation	*
Tensile Modulus	29.9 ksi*10**3	Standard Method	E 8
Standard Year	1969		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
L	Room	126.5	117.3	*	20	64

* - not reported

Material HY100

Description

Material Code	011.003.09A	Material Name	HY100
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRO
Reference	USN 6/9		

Composition

See Page 19600.7

Fabrication History

See Page 19600.7

Weld

See Page 19600.7

Property Measurements

Test Type	Fracture Toughness	Position	*
Specimen Type	Compact Tension	Specimen Thickness	1.0 in
Crack Length	*	Loading Type	I
Loading Rate	*	KQ	*
KIc	*	Valid KIc?	*
Reason for Invalid	*	KJc	*
JIcpr	Modified Standard	Initial COD	*
Critical COD	*	Curve Shape	*
Initial JI, JI	*	Maximum J, Jmax	*
Standard Method	813	Standard Year	*

Orien	Test Temp degF	JIc in-lb/in2	Tear Mod in-lb/in**2
T-L	Room	210	25
T-L	Room	246	14
T-L	Room	302	21
T-L	Room	313	24
T-L	Room	401	8
T-L	Room	424	13
T-L	Room	438	21
T-L	Room	445	19
T-L	Room	526	13

* - not reported

Material HY100

Description

Material Code	011.003.09A	Material Name	HY100
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRO
Reference	USN 6/9		

Composition See Page 19600.7

Fabrication History See Page 19600.7

Weld See Page 19600.7

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	E 23
Standard Year	1972		

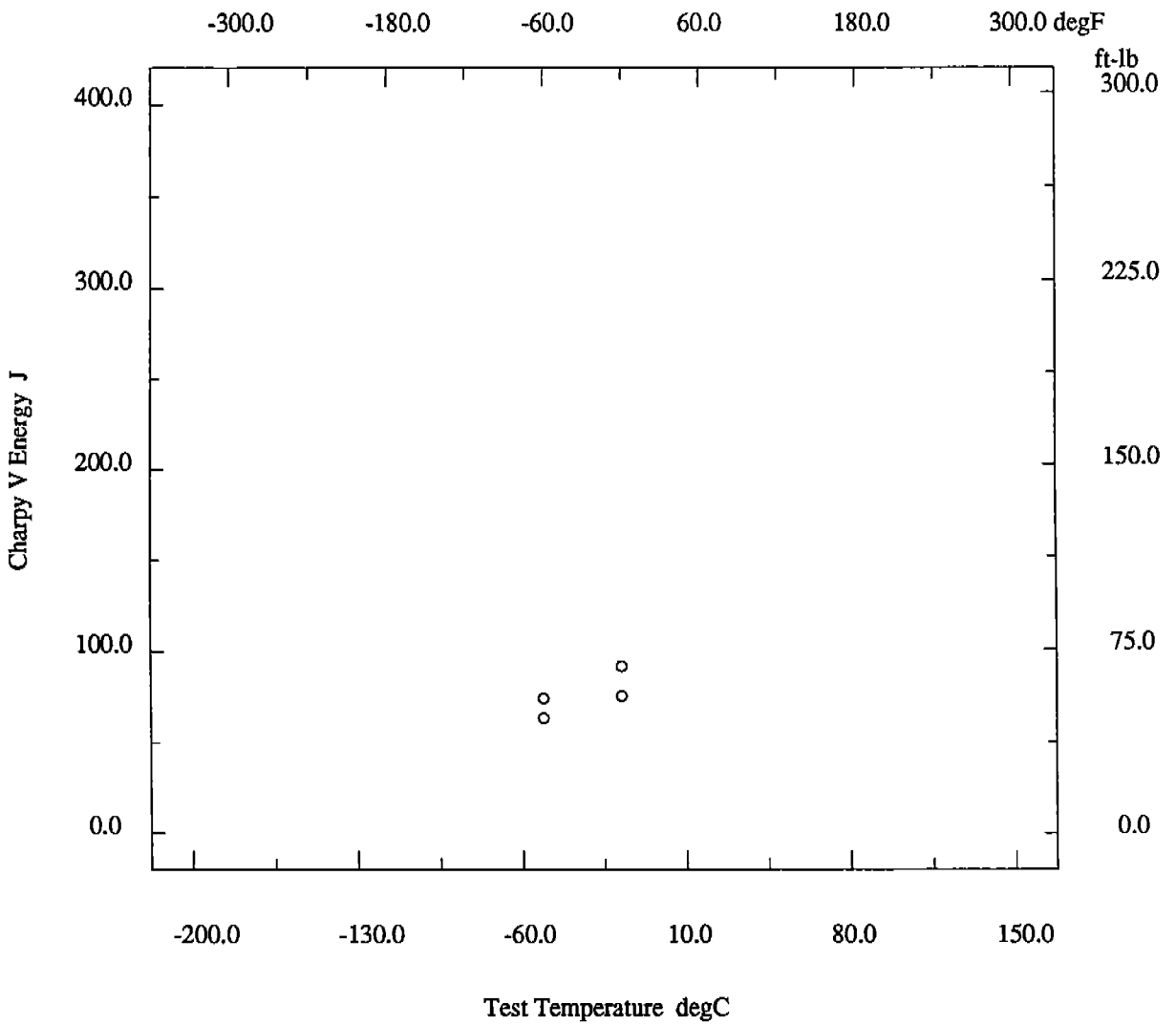
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-60	47
T-L °	-60	55
T-L °	0	56
T-L °	0	68

* - not reported

Material HY100

Description

Material Code	011.003.09A	Material Name	HY100
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRO
Reference	USN 6/9		



* - not reported

Material HY100

Description

Material Code	011.003.09A	Material Name	HY100
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRO
Reference	USN 6/9		

Composition See Page 19600.7

Fabrication History See Page 19600.7

Weld See Page 19600.7

Property Measurements

Test Type	Dynamic Tear	Position	*
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Appearance	*	Standard Method	E 604
Standard Year	1980		

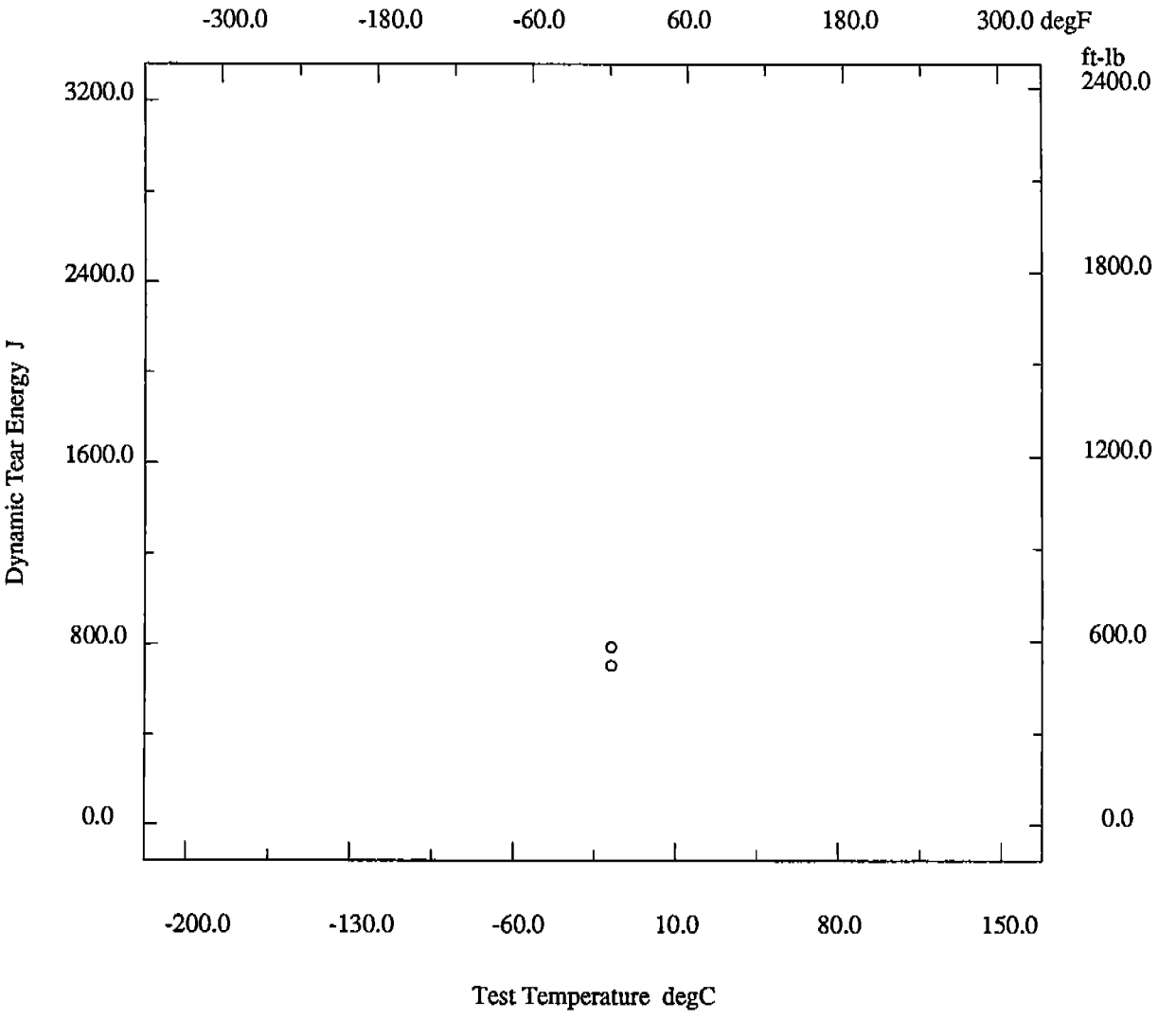
Orien	Test Temp degF	DT Energy ft-lb
T-L °	0	520
T-L °	0	580

* - not reported

Material HY100

Description

Material Code	011.003.09A	Material Name	HY100
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRO
Reference	USN 6/9		



* - not reported

Material HY100

Description

Material Code	011.003.09B	Material Name	HY100
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRP
Reference	USN 6/9		

Composition

C	0.07 %	Mn	1.26 %
P	0.018 %	S	0.006 %
Si	*	Cr	0.16 %
Ni	3.58 %	Mo	0.44 %
V	<0.001 %	Cu	0.04 %
Cb	*	Ti	<0.01 %
B	*	Al	*
N	*	Other Components	None %

Fabrication History

See Page 19600.7

Weld

Weld Code	011.003.09B	Weld Type	SMA
Base Metal Thickness	2.0 in	Welding Position	Downhand
Preheat Temperature	*	Metal Gap	*
Interpass Temperature	*	Passes	*
Filler Specification	M22000/10	Filler Name	*
Filler Carbon Content	*	Filler Metal Size	*
Shielding Gas	*	Voltage	*
Amperage	*	Polarity	*
Travel Speed	*	Heat Input/Pass	*
Joint Preparation	*	Number of Sides	*
Location wrt Weld	11mm in HAZ	Location wrt Surface	*
Post-Weld Heat Temp	*	Post-Weld Heat Time	*
Flux Type	*	Flux Name	*
Weld Composition Reported?	Yes		

Property Measurements

Test Type	Tensile	Position	*
Specimen Type	Cylindrical	Specimen Thickness	0.250 in
Gage Length	1.0 in	Loading Rate	0.002 in/min
Tensile Strength Offset	0.2 %	Uniform Elongation	*
Tensile Modulus	29.5 ksi*10**3	Standard Method	E 8
Standard Year	1969		

Orient	Test Temp degF	UTS ksi	TYS ksi	TYP ksi	Elongation %	RA %
L	Room	126.0	121.0	*	16	59

* - not reported

Material HY100

Description

Material Code	011.003.09B	Material Name	HY100
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRP
Reference	USN 6/9		

Composition

See Page 19600.14

Fabrication History

See Page 19600.7

Weld

See Page 19600.14

Property Measurements

Test Type	Fracture Toughness	Position	*
Specimen Type	Compact Tension	Specimen Thickness	1.0 in
Crack Length	*	Loading Type	I
Loading Rate	*	KQ	*
KIc	*	Valid KIc?	*
Reason for Invalid	*	KJc	*
JIcpr	Modified Standard	Initial COD	*
Critical COD	*	Curve Shape	*
Initial JI, JI	*	Maximum J, Jmax	*
Standard Method	813	Standard Year	*

Orien	Test Temp degF	JIc in-lb/in2	Tear Mod in-lb/in**2
T-L	Room	329	19
T-L	Room	338	27
T-L	Room	387	20
T-L	Room	416	13
T-L	Room	456	16
T-L	Room	457	16
T-L	Room	487	14
T-L	Room	494	16
T-L	Room	506	15
T-L	Room	523	15
T-L	Room	588	17

* - not reported

Material HY100

Description

Material Code	011.003.09A	Material Name	HY100
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRP
Reference	USN 6/9		

Composition

See Page 19600.14

Fabrication History

See Page 19600.7

Weld

See Page 19600.14

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	E 23
Standard Year	1972		

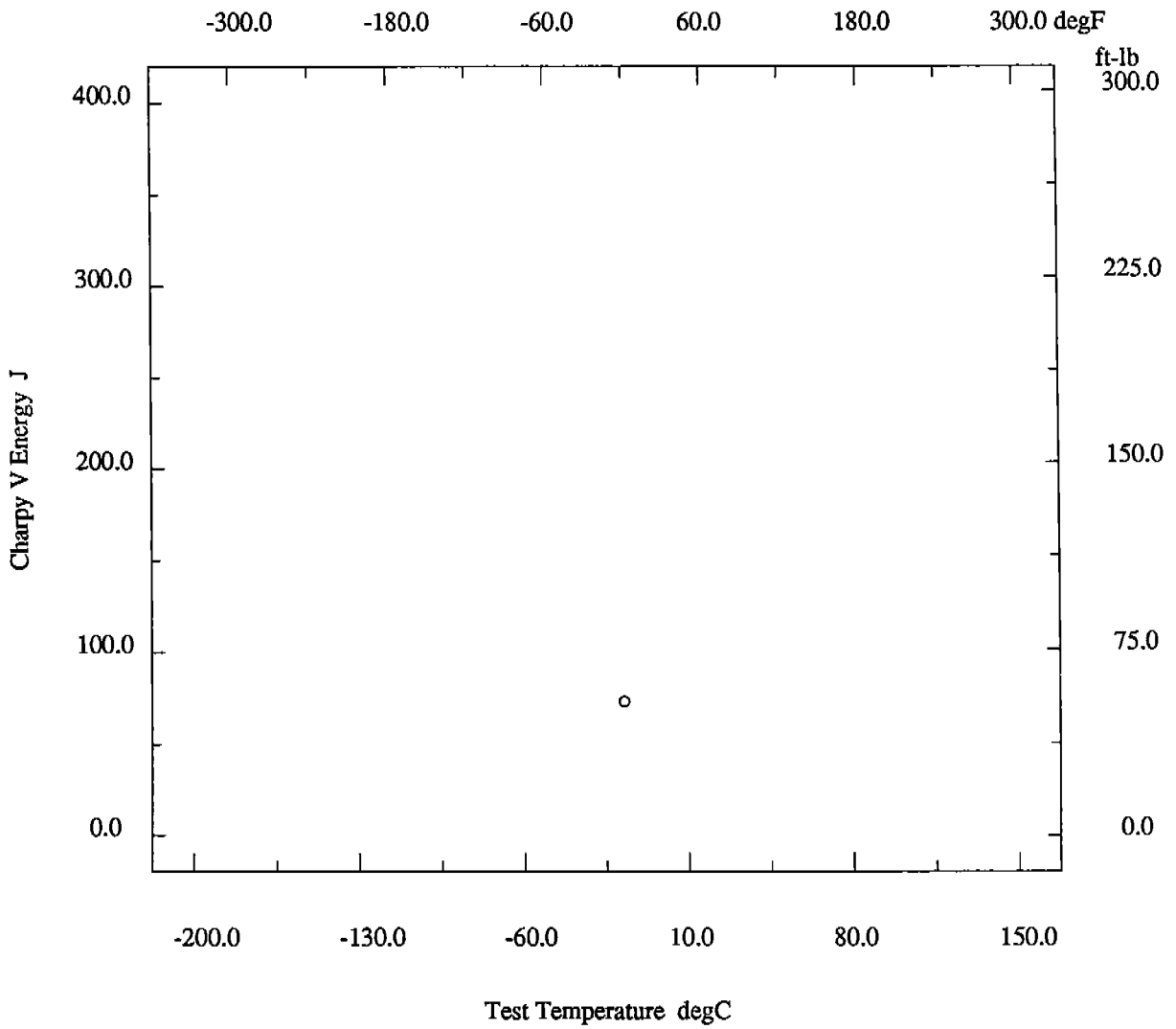
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	0	54

* - not reported

Material HY100

Description

Material Code	011.003.09A	Material Name	HY100
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRP
Reference	USN 6/9		



* - not reported

Material HY100

Description

Material Code	011.003.09B	Material Name	HY100
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRP
Reference	USN 6/9		

Composition

See Page 19600.14

Fabrication History

See Page 19600.7

Weld

See Page 19600.14

Property Measurements

Test Type	Charpy V Impact	Position	*
Specimen Type	Full	Lateral Expansion	*
Shear Fracture	*	Did Specimen Fracture?	Assumed
Did Specimen Split?	*	Standard Method	E 23
Standard Year	1972		

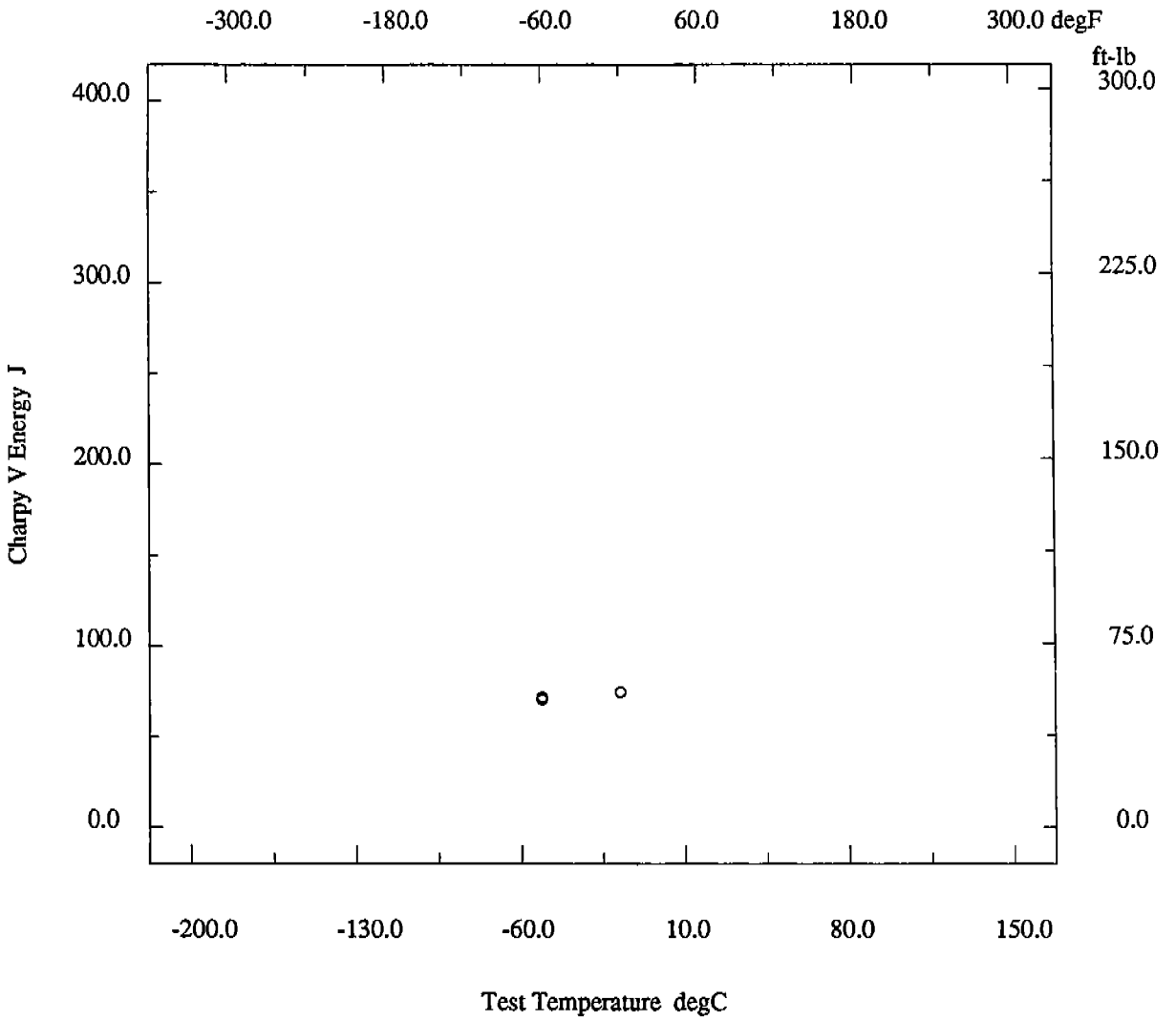
Orien	Test Temp degF	CVN Energy ft-lb
T-L °	-60	52
T-L °	-60	53
T-L °	0	55

* - not reported

Material HY100

Description

Material Code	011.003.09B	Material Name	HY100
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRP
Reference	USN 6/9		



* - not reported

Material HY100

Description

Material Code	011.003.09B	Material Name	HY100
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRP
Reference	USN 6/9		

Composition See Page 19600.14

Fabrication History See Page 19600.7

Weld See Page 19600.14

Property Measurements

Test Type	Dynamic Tear	Position	*
Specimen Type	Dynamic Tear	Notch Preparation	Pressed
Specimen Thickness	0.625 in	Loading Rate	*
Appearance	*	Standard Method	E 604
Standard Year	1980		

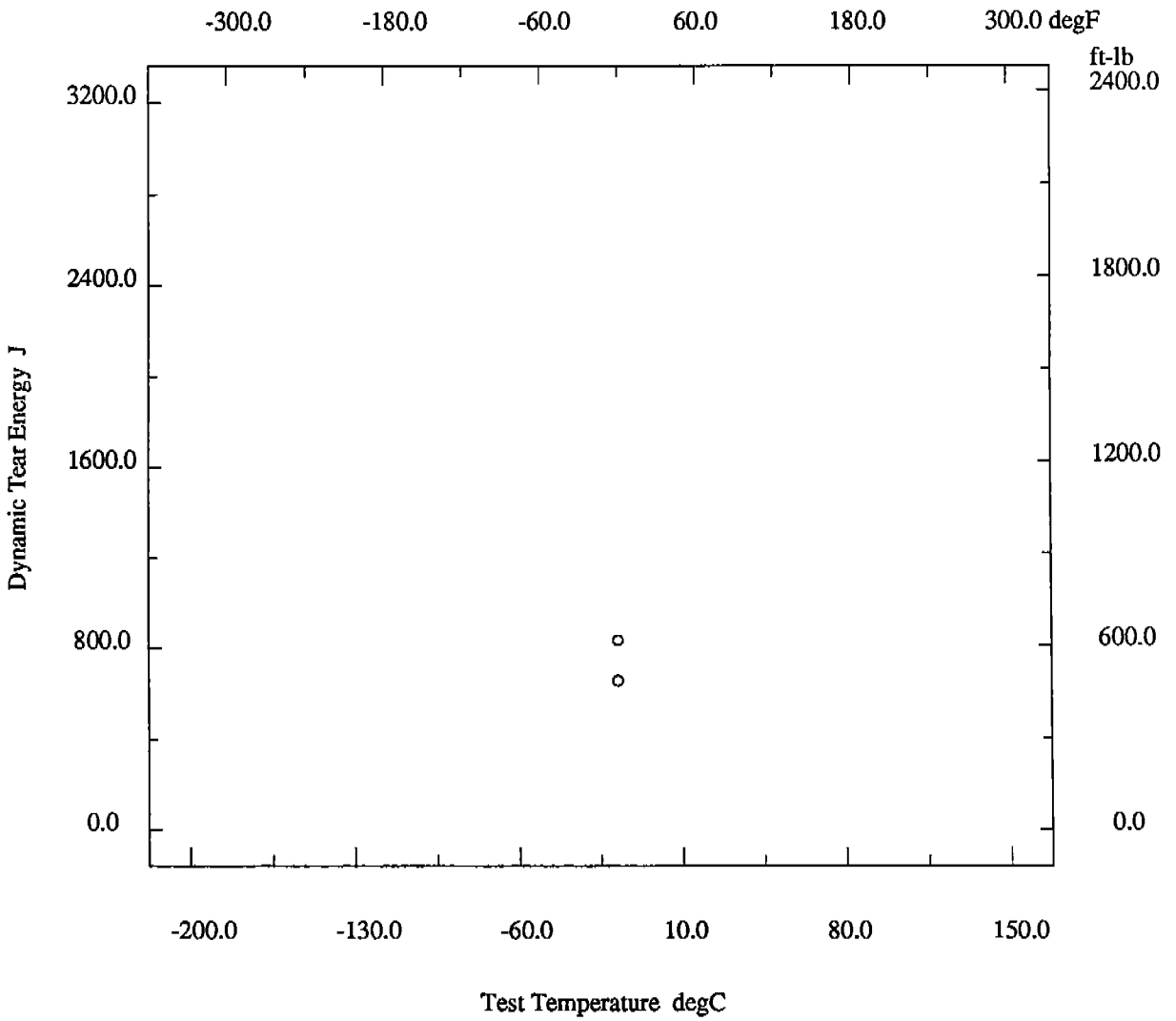
Orien	Test Temp degF	DT Energy ft-lb
T-L °	0	485
T-L °	0	616

* - not reported

Material HY100

Description

Material Code	011.003.09B	Material Name	HY100
UNS	*	Other Designation	*
Type	Welded Joint	Form	Plate
Thickness	2.0 in	Composition Type	Actual
Composition Position	*	Lot ID	FRP
Reference	USN 6/9		



* - not reported

555
556X

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,

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

Transverse 14500.46–14500.47, 14600.46–14600.47

Lot ID

0 3800.1–3800.4

1 3900.1–3900.3

11672 3400.1–3400.4

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

42252 10800.1–10800.7, 10900.1–10900.7, 11000.1–11000.7

43731 5400.1–5400.3

43752 3500.1–3500.4

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

50054 10300.1–10300.3, 10400.1–10400.3, 10500.1–10500.7

52100 12400.1–12400.3

52110 12300.1–12300.15

52765 5600.1–5600.3

52797 5500.1–5500.3

54614 11100.1–11100.4

55946 11800.1–11800.6, 11900.1–11900.6

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

641661 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 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

642697 1700.1–1700.2, 1700.5–1700.6

A 5200.1–5200.4
A0161 7800.1–7800.6
A1579-2AA 15900.1–15900.6
A6175-8 16100.1–16100.3, 16100.6–16100.8
A6670-3A 16400.1–16400.6
A6670-3B 16300.1–16300.6
B0469-2C 15400.1–15400.6, 16200.1–16200.6
B1038-2B 18600.1–18600.6
B-1088-3 18800.1–18800.6
B-1088-5 18900.1–18900.6
B1908-3 15500.1–15500.2, 15500.5–15500.7
B1908-5A 15600.1–15600.6
B1908-5B 15800.1–15800.3, 15800.6–15800.8
B5761-2R 19500.1–19500.7
B8478-3 17800.1–17800.7
B8490-2 17500.1–17500.19
B8563-4 17300.1–17300.19
B8601-5 17100.1–17100.19
B8687-1 17600.1–17600.7
B8740-2 17200.1–17200.46
B8740-3 16700.1–16700.28
B8817-1 18400.1–18400.28
B9353-3 16600.1–16600.7
B9671-1E 12600.1–12600.14
C 4000.1–4000.3
C4771-39A 18500.1–18500.7
C5830 16000.1–16000.6
C5830-5T 15300.1–15300.6
C-9283-11 18700.1–18700.5
D2580-4 17400.1–17400.28
D3007-3 15700.1–15700.3, 15700.6–15700.8
D3631-7L 16900.1–16900.7
D3667-3M 17000.1–17000.11
D3703-4B 16800.1–16800.7
D3710-42B 17900.1–17900.46
D3791-2B 7300.1–7300.6
D3974-1B 18200.1–18200.28
D3975-3E 17700.1–17700.28
D4030-4A 18300.1–18300.46
D4179-3B 7900.1–7900.6
D6274-4 9000.1–9000.2, 9000.5–9000.9, 9100.1–9100.3, 9100.6–9100.9
D6873-1A 12500.1–12500.6
D6873-1B 12700.1–12700.7
DO733-1D 18000.1–18000.11
E 5300.1–5300.4
FRM 19000.1–19000.7
FRN 19100.1–19100.7
FRO 19600.7–19600.13
FRP 19600.14–19600.21
FVD 19200.1–19200.7
FXF 19400.1–19400.7
FXG 19300.1–19300.7
G 4100.1–4100.3
G9011 2300.1–2300.8
G9837 2600.1–2600.20, 2700.1–2700.18
H 5000.1–5000.4
I 5100.1–5100.4
J131267 1000.1–1000.14
K1325 2400.1–2400.20, 2500.1–2500.18
k21-6425 3000.1–3000.8
K21-7102 2900.1–2900.8
K22-6296 2800.1–2800.8
KB6479 2100.1–2100.8, 2200.1–2200.8
L467OV559 19600.1–19600.6
N8686-5 18100.1–18100.11
P 4900.1–4900.3
S 4800.1–4800.3
T 4700.1–4700.3
LR3201 Reference 7300.1–7300.6
Lukens Producer 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
Lukens Source 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

M

M22000/10 Filler Specification 19600.7, 19600.14
M22000/1E Filler Specification 19000.1
Material Code
001.001.09B 16500.1–16500.4
001.001.09F 16500.5–16500.7
001.002.01 16600.1–16600.7
001.003.01B1 16700.20–16700.22
001.003.01B2 16700.26–16700.28
001.003.01BM 16700.23–16700.25
001.003.01M1 16700.11–16700.13
001.003.01M2 16700.17–16700.19
001.003.01MM 16700.14–16700.16
001.003.01T1 16700.1–16700.4
001.003.01T2 16700.8–16700.10
001.003.01TM 16700.5–16700.7
001.004.01B2 16800.5–16800.7
001.004.01T1 16800.1–16800.4
001.005.01B2 16900.5–16900.7
001.005.01T1 16900.1–16900.4
001.006.01B2 17000.7–17000.11
001.006.01T1 17000.1–17000.6
001.007.01B1 17100.11–17100.13
001.007.01B2 17100.17–17100.19
001.007.01BM 17100.14–17100.16
001.007.01T1 17100.1–17100.4
001.007.01T2 17100.8–17100.10

001.007.01TM 17100.5–17100.7
001.008.01B1 17200.32–17200.36
001.008.01B2 17200.42–17200.46
001.008.01BM 17200.37–17200.41
001.008.01M1 17200.17–17200.21
001.008.01M2 17200.27–17200.31
001.008.01MM 17200.22–17200.26
001.008.01T1 17200.1–17200.6
001.008.01T2 17200.12–17200.16
001.008.01TM 17200.7–17200.11
001.009.01B1 17300.11–17300.13
001.009.01B2 17300.17–17300.19
001.009.01BM 17300.14–17300.16
001.009.01T1 17300.1–17300.4
001.009.01T2 17300.8–17300.10
001.009.01TM 17300.5–17300.7
001.010.01B1 17400.20–17400.22
001.010.01B2 17400.26–17400.28
001.010.01BM 17400.23–17400.25
001.010.01M1 17400.11–17400.13
001.010.01M2 17400.17–17400.19
001.010.01MM 17400.14–17400.16
001.010.01T1 17400.1–17400.4
001.010.01T2 17400.8–17400.10
001.010.01TM 17400.5–17400.7
001.011.01B1 17500.11–17500.13
001.011.01B2 17500.17–17500.19
001.011.01BM 17500.14–17500.16
001.011.01T1 17500.1–17500.4
001.011.01T2 17500.8–17500.10
001.011.01TM 17500.5–17500.7
001.012.01B2 17600.5–17600.7
001.012.01T1 17600.1–17600.4
001.013.01B1 17700.20–17700.22
001.013.01B2 17700.26–17700.28
001.013.01BM 17700.23–17700.25
001.013.01M1 17700.11–17700.13
001.013.01M2 17700.17–17700.19
001.013.01MM 17700.14–17700.16
001.013.01T1 17700.1–17700.4
001.013.01T2 17700.8–17700.10
001.013.01TM 17700.5–17700.7
001.014.01B2 17800.5–17800.7
001.014.01T1 17800.1–17800.4
001.015.01B1 17900.32–17900.36
001.015.01B2 17900.42–17900.46
001.015.01BM 17900.37–17900.41
001.015.01M1 17900.17–17900.21
001.015.01M2 17900.27–17900.31
001.015.01MM 17900.22–17900.26
001.015.01T1 17900.1–17900.6
001.015.01T2 17900.12–17900.16
001.015.01TM 17900.7–17900.11
001.016.01B2 18000.7–18000.11
001.016.01T1 18000.1–18000.6
001.017.01B2 18100.7–18100.11
001.017.01T1 18100.1–18100.6
001.018.01B1 18200.20–18200.22
001.018.01B2 18200.26–18200.28
001.018.01BM 18200.23–18200.25
001.018.01M1 18200.11–18200.13
001.018.01M2 18200.17–18200.19
001.018.01MM 18200.14–18200.16
001.018.01T1 18200.1–18200.4
001.018.01T2 18200.8–18200.10
001.018.01TM 18200.5–18200.7
001.019.01B1 18300.32–18300.36
001.019.01B2 18300.42–18300.46
001.019.01BM 18300.37–18300.41
001.019.01M1 18300.17–18300.21
001.019.01M2 18300.27–18300.31
001.019.01MM 18300.22–18300.26
001.019.01T1 18300.1–18300.6
001.019.01T2 18300.12–18300.16
001.019.01TM 18300.7–18300.11
001.020.01B1 18400.20–18400.22
001.020.01B2 18400.26–18400.28
001.020.01BM 18400.23–18400.25
001.020.01M1 18400.11–18400.13
001.020.01M2 18400.17–18400.19
001.020.01MM 18400.14–18400.16
001.020.01T1 18400.1–18400.4
001.020.01T2 18400.8–18400.10
001.020.01TM 18400.5–18400.7
001.021.01B2 18500.5–18500.7
001.021.01T1 18500.1–18500.4
001.023.01 18600.1–18600.6
001.024.01 18700.1–18700.5
001.025.01 18800.1–18800.6
001.026.01 18900.1–18900.6
001.027.09 19000.1–19000.7
001.028.09 19100.1–19100.7
001.029.09 19200.1–19200.7
001.030.09 19300.1–19300.7
001.031.09 19400.1–19400.7
002.001.01A1 9400.1–9400.3
002.001.01B1 9500.1–9500.3
002.001.01B2 9500.4–9500.6
002.002.01A1 9600.1–9600.3
002.002.01A2 9600.4–9600.7
002.002.01B1 9700.1–9700.3
002.002.01B2 9700.4–9700.6
002.002.01C1 9800.1–9800.3
002.002.02B2 9700.9–9700.10
002.002.09B2 9700.7–9700.8
002.003.01A1 9900.1–9900.3

002.003.01A2 9900.4–9900.6
002.003.01B1 10000.1–10000.5
002.003.01C1 10100.1–10100.5
002.003.02A1 9900.9–9900.10
002.003.09A1 9900.7–9900.8
002.004.01A1 10200.1–10200.3
002.004.02AAA 10200.10–10200.11
002.004.02ABA 10200.6–10200.7
002.004.09AAA 10200.8–10200.9
002.004.09ABA 10200.4–10200.5
002.005.01A1 10300.1–10300.3
002.005.01B1 10400.1–10400.3
002.005.01C1 10500.1–10500.3
002.005.02C 10500.6–10500.7
002.005.09C 10500.4–10500.5
002.006.01A1 10300.4–10300.6
002.006.01B1 10600.1–10600.4
002.006.01C1 10700.1–10700.3
002.006.01C2 10700.4–10700.7
002.007.01A1 10800.1–10800.3
002.007.01B1 10900.1–10900.3
002.007.01C1 11000.1–11000.3
002.007.02AAA 10800.6–10800.7
002.007.02BAA 10900.6–10900.7
002.007.02CAA 11000.6–11000.7
002.007.09AAA 10800.4–10800.5
002.007.09BAA 10900.4–10900.5
002.007.09CAA 11000.4–11000.5
002.008.01C1 11100.1–11100.4
002.009.01B1 11200.1–11200.3
002.009.01B2 11200.4–11200.6
002.010.01B1 11300.1–11300.3
002.010.01C1 11400.1–11400.3
002.011.01B1 11500.1–11500.3
002.011.01C1 11600.1–11600.3
002.011.02B1 11500.6–11500.7
002.011.09B1 11500.4–11500.5
002.012.01B1 11700.1–11700.3
002.012.01B2 11700.4–11700.6
002.013.01B1 11800.1–11800.4
002.013.01B2 11800.5–11800.6
002.013.01C1 11900.1–11900.3
002.013.01C2 11900.4–11900.6
002.014.01B1 12000.1–12000.3
002.014.01C1 12100.1–12100.3
002.015.01C1 12200.1–12200.3
002.016.01C1 12300.1–12300.3
002.016.02CAA 12300.14–12300.15
002.016.02CAS 12300.10–12300.11
002.016.02CBA 12300.6–12300.7
002.016.09CAA 12300.12–12300.13
002.016.09CAS 12300.8–12300.9
002.016.09CBA 12300.4–12300.5
002.017.01C1 12400.1–12400.3
002.018.01 12500.1–12500.6
002.019.01 12600.1–12600.2, 12600.13–12600.14
002.019.01B 12600.6–12600.8, 12600.11–12600.12
002.019.01T 12600.3–12600.5, 12600.9–12600.10
002.020.01 12700.1–12700.7
002.021.01 12800.1–12800.5
002.022.01 12900.1–12900.5
002.023.01 13000.1–13000.5
002.024.01 13100.1–13100.5
002.025.01 13200.1–13200.3
002.026.01 13300.1–13300.5
002.027.01 13400.1–13400.5
002.028.01 13500.1–13500.5
002.029.01 13600.1–13600.5
002.030.01 13700.1–13700.3
003.001.01 7100.1–7100.6
003.002.01 7200.1–7200.6
003.002.03.1 7200.13–7200.16
003.002.09 7200.7
003.002.09.1 7200.8–7200.12
003.003.01 7300.1–7300.6
004.001.01B 1000.2, 1000.6–1000.8
004.001.01T 1000.1–1000.5, 1000.14
004.001.01TS1 1000.9–1000.11
004.001.01TS2 1000.12–1000.13
004.002.01.1 1100.1–1100.2, 1100.5–1100.6
004.002.01.2 1200.1–1200.2, 1200.5–1200.6
004.002.01.6 1300.1–1300.2, 1300.5–1300.6
004.003.01.1 1400.1–1400.2, 1400.5–1400.6
004.003.01.2 1500.1–1500.2, 1500.5–1500.6
004.003.01.7 1600.1–1600.2, 1600.5–1600.6
004.004.01.1 1700.1–1700.2, 1700.5–1700.6
004.005.01.1 1800.1–1800.2, 1800.5–1800.6
004.005.01.7 1900.1–1900.2, 1900.5–1900.6
007.001.01B 2100.2, 2100.6–2100.8
007.001.01T 2100.1–2100.5
007.002.01B 2200.2, 2200.6–2200.8
007.002.01T 2200.1–2200.5
007.003.01B 2300.2, 2300.6–2300.8
007.003.01T 2300.1–2300.5
007.004.01B 2400.2, 2400.6–2400.8, 2400.12–2400.14, 2400.18–2400.20
007.004.01T 2400.1–2400.5, 2400.9–2400.11, 2400.15–2400.17
007.004.02.1 2500.1–2500.3
007.004.03.1 2500.4–2500.6
007.004.04.1 2500.7–2500.9
007.004.05.1 2500.10–2500.12
007.004.06.1 2500.13–2500.15
007.004.09.1 2500.16–2500.18
007.005.01B 2600.2, 2600.6–2600.8, 2600.12–2600.14, 2600.18–2600.20

007.005.01T 2600.1–2600.5, 2600.9–2600.11, 2600.15–2600.17
007.005.02.1 2700.1–2700.3
007.005.03.1 2700.4–2700.6
007.005.04.1 2700.7–2700.9
007.005.05.1 2700.10–2700.12
007.005.06.1 2700.13–2700.15
007.005.09.1 2700.16–2700.18
007.007.01B 2800.2, 2800.6–2800.8
007.007.01T 2800.1–2800.5
007.008.01B 2900.2, 2900.6–2900.8
007.008.01T 2900.1–2900.5
007.009.01B 3000.2, 3000.6–3000.8
007.009.01T 3000.1–3000.5
009.002.010A 3100.1
009.002.02AA 3100.8–3100.9
009.002.02AS1 3100.2–3100.3
009.002.02AS2 3100.4–3100.5
009.002.02AS3 3100.6–3100.7
009.002.02AS4 3100.10–3100.11
009.002.02BS1 3200.6–3200.7
009.002.02BS2 3200.10–3200.11
009.002.02BS3 3200.14–3200.15
009.002.02BS4 3200.18–3200.19
009.002.02BW 3200.4–3200.5
009.002.09BS1 3200.20–3200.21
009.002.09BS2 3200.8–3200.9
009.002.09BS3 3200.12–3200.13
009.002.09BS4 3200.16–3200.17
009.002.09BW 3200.1–3200.3
009.010.01 3300.1–3300.4
009.011.01 3400.1–3400.4
009.012.01 3500.1–3500.4
009.013.01 3600.1–3600.4
009.014.01 3700.1–3700.4
009.015.01 3800.1–3800.4
009.016.01 3900.1–3900.3
009.017.01 4000.1–4000.3
009.018.01 4100.1–4100.3
009.019.01 4200.1–4200.3
009.020.01 4300.1–4300.3
009.021.01 4400.1–4400.4
009.022.01 4500.1–4500.4
009.023.01 4600.1–4600.3
009.024.01 4700.1–4700.3
009.025.01 4800.1–4800.3
009.026.01 4900.1–4900.3
009.027.01 5000.1–5000.4
009.028.01 5100.1–5100.4
009.029.01 5200.1–5200.4
009.030.01 5300.1–5300.4
009.031.01 5400.1–5400.3
009.032.01 5500.1–5500.3
009.033.01 5600.1–5600.3
009.034.01 5700.1–5700.3
009.035.01 5800.1–5800.3
009.036.01 5900.1–5900.3
009.037.01 6000.1–6000.3
009.038.01 6100.1–6100.3
009.039.01 6200.1–6200.3
009.040.01 6300.1–6300.3
009.041.01 6400.1–6400.3
009.041.03A 6400.7–6400.9
009.041.03B 6400.13–6400.15
009.041.03C 6400.19–6400.20
009.041.03D 6400.21–6400.23
009.041.09A 6400.4–6400.6
009.041.09B 6400.10–6400.12
009.041.09C 6400.16–6400.18
009.042.01 6900.1–6900.2
009.042.03A 6500.4–6500.5
009.042.03B 6600.4–6600.5
009.042.03C 6700.4–6700.5
009.042.03D 6800.4–6800.6
009.042.09A 6500.1–6500.3
009.042.09B 6600.1–6600.3
009.042.09C 6700.1–6700.3
009.042.09D 6800.1–6800.3
009.043.010A 7000.1–7000.2, 7000.5–7000.6
010.001.010A 13800.2, 13800.5–13800.7, 13800.37
010.001.010S 13800.1–13800.4
010.001.02ABA 13800.22–13800.23
010.001.02AFA 13800.10–13800.11
010.001.02AFS 13800.26–13800.27
010.001.02ANA 13800.36
010.001.02BFA 13900.4–13900.5
010.001.02BFS 13900.16–13900.17
010.001.02BNA 13900.26
010.001.02CFA 14000.6–14000.7
010.001.02CFS 14000.16–14000.17
010.001.02CNA 14000.3
010.001.03AFA 13800.12–13800.13
010.001.03AFS 13800.28–13800.29
010.001.03BFA 13900.6–13900.7
010.001.03BFS 13900.18–13900.19
010.001.03CFA 14000.8–14000.9
010.001.03CFS 14000.18–14000.19
010.001.04AFA 13800.14–13800.15
010.001.04AFS 13800.30–13800.31
010.001.04BFA 13900.8–13900.9
010.001.04BFS 13900.20–13900.21
010.001.04CFA 14000.10–14000.11
010.001.04CFS 14000.20–14000.21
010.001.05AFA 13800.16–13800.17
010.001.05AFS 13800.32–13800.33
010.001.05BFA 13900.10–13900.11

574

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

575

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

578

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,

580

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
USN 9/9 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-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

S

S Lot ID 4800.1–4800.3
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

Specimen Type
2/3 9400.2, 9600.2
3/4 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
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,

584

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

687 588X
Acc
587 588X