

SPECIFICATION
FOR PROCUREMENT OF
EIGHT INCH CRYOGENIC LIQUID OXYGEN
FLEX HOSES FOR LOX BARGE DOCKS

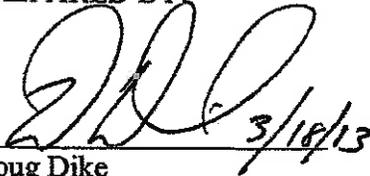
11BH0-GM02

March 2013

Revision 1

ISSUED CEF MAR 29 2013

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3/18/13

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Document History Log

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Basic	2/26/2013		
1	3/2013	Doug Dike/ ext. 8-2803	Changed 18'-6" to 19' on Page 3 and on attached drawing. Added Code of Construction requirement in Paragraph 4.3.

ISSUED CEF MAR 29 2013

SPECIFICATION
FOR PROCUREMENT OF
EIGHT INCH CRYOGENIC LIQUID OXYGEN
FLEX HOSES FOR LOX BARGE DOCKS
11BH0-GM02
SEPTEMBER, 2012

ISSUED CEF

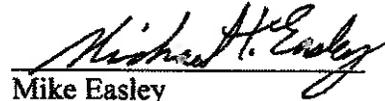
OCT 03 2012

PREPARED BY:



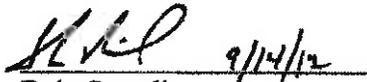
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**SPECIFICATION FOR PROCUREMENT OF
EIGHT INCH CRYOGENIC LOX FLEX HOSES
11BH0-GM02**

1.0 SCOPE

Procure three each eight inch liquid oxygen cryogenic fully compressed flex hoses which will be used at LOX Dock Position 1, 2 and 3 at NASA Stennis Space Center, Mississippi.

2.0 APPLICABLE DOCUMENTS

ASME B31.3 – ASME Process Piping
ASME Section VIII, Pressure Vessels, Paragraph UW-51
ASME Section IX – Welding
SSC Drawing 54000-GC01 – Commercial Cleaning Process at Manufacturer's Facility
SSC Drawing 54000-GC11 – Forging, Steel, Quality and Inspection Requirements
SSC Drawing 54000-GD01 – Drawings and Documentation Valves and Components
SSC Drawing 54000-GP01 -- Packaging and Identification Valves and Components
SSC Drawing 54B00-GF00 -- Flex Hose, Cryogenic Insulated, General
SSC Form 581 -- Contractor Transmittal Sheet

3.0 SUBMITTALS

A standard transmittal form provided by the Government, SSC Form 581, shall be used to transmit each submittal. Six (6) black line prints and one electronic copy created in PDF format will be submitted with SSC Form 581.

Submittal description including drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials to be furnished by the Contractor are explaining in detail specific portions (Section 4.0 Requirements) of the work required by the contract. The requirements to actually furnish the applicable items will be called out in each specification.

4.0 REQUIREMENTS

4.1 Design

4.1.1 Flex Hoses

4.1.1.1 *Service*
Liquid and gaseous oxygen

4.1.1.2 *Size*
8 inch X 19 feet

- 4.1.1.3 *Design pressure*
450 psi
- 4.1.1.4 *Temperature*
-320 deg F to 150 deg F
- 4.1.1.5 *End connections*
ANSI 300# Lap Joint flange on one end and a fixed ANSI 300#weld neck flange on the other end. Pipe to be Sch. 10S. Flange face finishes shall be concentric serrated.
- 4.1.1.6 *Material of construction (Body & trim)*
ASTM 304/304L/316/316L/321 grade stainless steel
- 4.1.1.7 *Fabrication*
The flex hoses shall be fabricated per the requirements in this specification and to the drawing in Attachment I of this specification. To facilitate installation and handling, one end of each hose shall have an extended pipe with stops as shown on the drawing in Attachment I. The hose shall be fully compressed to increase hose flexibility.
- 4.1.1.8 *Movement*
Lateral – Three (3) feet ± three (3) inches
Minimum number of lateral movement (cycles) before failure -- 1000
Bend Radius – Four (4) feet

4.2 Documentation

Documentation shall be per the requirements of SSC Drawing 54000-GD01. Approval drawings are to be submitted to SSC prior to start of fabrication.

4.3 Marking and Identification

Marking and identification shall be per the requirements of 54000-GP01. The hose's Code of Construction, if applicable, shall be included with the data required in 54000-GP01, Paragraph 1.0. Each hose shall be marked by one of the following locator numbers:

FH-51-LO
FH-52-LO
FH-53-LO

4.4 Quality Assurance

4.4.1 Testing

The flex hose assembly shall meet the testing requirements of SSC Drawing 54B00-GF00 except the proof test (paragraph 15) shall be conducted at 1½ times design pressure instead of two (2) times. Contractor shall submit a test procedure for approval that addresses testing and examinations. In addition to the requirements in 54B00-GF00, the seam weld of the tube to be used for the convolutions shall be 100% radiograph inspected prior to the convolution being formed. Radiographs are to be submitted to SSC for approval to proceed with forming the convolutions.

4.4.2 Casting

No castings are allowed.

4.4.3 Forging

Forging shall be per the requirements of SSC Drawing 54000-GC11.

4.4.4 Cleaning

Cleaning shall be per the requirements of SSC Drawing 54000-GC01.

4.4.5 Source Inspection

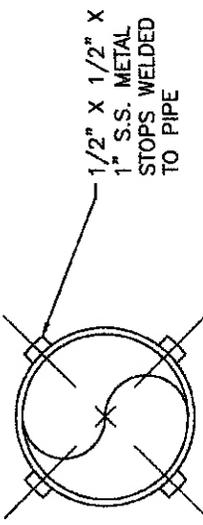
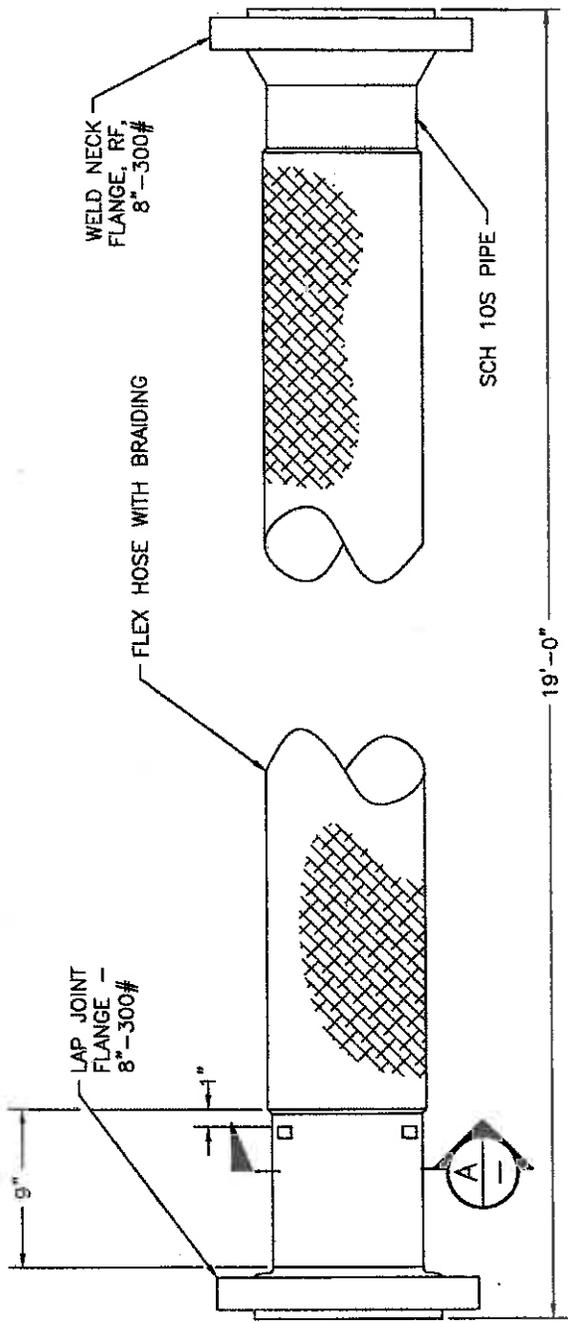
Source Inspection is required. All testing and examination shall be witnessed by a Government representative who has final approval on all testing and examination results. Flange face finishes shall be concentric serrated.

4.4.6 Welding

Welding procedures and welder certifications shall be per the requirements of ASME Section IX of the Boiler Code. All welding shall be 100% radiographic examined per ASME Section VIII, UW-51 where practical. If radiographic examination is not practical then welds are to be 100% dye penetrant root and final inspected.

4.5 Preparation for delivery

The flex hoses shall be prepared for delivery per the requirements of SSC Drawing 54B00-GF00.



SECTION A
NITS

ATTACHMENT

SYM	ZONE	DESCRIPTION	DATE	APPROVED
REVISIONS				
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JOHN G. STERNES
SPACE CENTER
BOSTON, MASS 02115-0000

FLEXIBLE HOSE
LOX
8"

REV. 1
REV. 2
REV. 3
REV. 4
REV. 5
REV. 6
REV. 7
REV. 8
REV. 9
REV. 10
REV. 11
REV. 12
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REV. 100

DATE CONTROLLED DRAWING
DATE P/N

		DELETED PARAGRAPH 6, "PROPRIETARY NOTICES"; REVISED PARAGRAPHS 10, 13, AND 18, ADDED PARAGRAPH 21 AND TABLE 1, DIRECT DRAWING CHANGE PER PTMEM81114.		5/20/00 ISSUED/CEF 5/23/00 SDM	
T.D.S. 5/2/00 MAM 5/4/00 (RES T1-2497)		(RES T1-2497)			
REVISIONS					
SIGNATURE I. C. DUNNION E. CARRERA D. DECEBRO L. LEWY	DATE 11/30/97 1/4/98 2/23/98 3/15/98 2/26/98	DESCRIPTION AERONAUTICAL SERVICE ADMINISTRATION		JOHN C. STEWART SERVICE CENTER SSC, MS 2822-0000	
FLEX HOSE CRYOGENIC INSULATED, GENERAL					
APPROVED R.H. SMITH	DATE 2/29/98	SIZE B	PART NO. 54B00-CF00	SHEET 1 OF 3	REV. 1
CAUD CONTROLLED DRAWING CDD P/N SCD\54B00\CF001R\SH11					

CAUD CONTROLLED DRAWING
 CDD P/N
 SCD\54B00\CF001R\SH11

APPROVED R.H. SMITH
 DATE 2/29/98
 SIZE B
 PART NO. 54B00-CF00
 SHEET 1 OF 3
 REV. 1

JOHN C. STEWART
 SERVICE CENTER
 SSC, MS 2822-0000

FLEX HOSE
 CRYOGENIC INSULATED,
 GENERAL

1. SCOPE
THIS DRAWING COVERS THE DESIGN, FABRICATION, CLEANING, AND TESTING OF CRYOGENIC FLEXIBLE HOSE ASSEMBLIES.
2. DESIGN REQUIREMENTS
APPLICABLE PUBLICATIONS
ASME, BOILER AND PRESSURE VESSEL CODE
SECTION VIII RULES FOR UNFIREED PRESSURE VESSEL
SECTION IX WELDING
GENERAL REQUIREMENTS
THE CRYOGENIC FLEXIBLE HOSE ASSEMBLY SHALL BE DESIGNED, FABRICATED, TESTED, AND CLEANED WITH THE REQUIREMENTS SPECIFIED HEREIN. THE MANUFACTURER SHALL PROVIDE ANY ADDITIONAL MEASURES NECESSARY TO PRODUCE EQUIPMENT WHICH WILL SATISFACTORILY PASS THE TESTS SPECIFIED HEREIN. THIS SSC DWG SHALL GOVERN AND TAKE PRECEDENCE WHERE IT MAY DEPART OR CONFLICT WITH PROVISIONS OF REFERENCED DOCUMENTS.
3. MATERIALS
ALL MATERIALS SHALL BE FREE FROM ALL DEFECTS IMPAIRING STRENGTH, DURABILITY, AND APPEARANCE AND BE OF THE BEST COMMERCIAL QUALITY FOR THE PURPOSE SPECIFIED. ALL MATERIALS SHALL BE NEW AND SHALL HAVE STRUCTURAL PROPERTIES TO SAFELY WITHSTAND STRESSES TO WHICH THEY ARE SUBJECTED AT THE DESIGN CONDITIONS.
4. DRAWINGS AND DATA
PRIOR TO START OF FABRICATION, THE MANUFACTURER SHALL SUBMIT DRAWINGS AND DATA TO THE PURCHASER FOR APPROVAL. APPROVAL OF DRAWINGS AND DATA IS REQUIRED PRIOR TO START OF FABRICATION. THE DRAWINGS AND DATA SHALL INCLUDE DESIGN OF ENTIRE HOSE, INCLUDING CONNECTIONS, DESIGN CALCULATIONS, AND ALL OTHER DETAILS OF DESIGN AND CONSTRUCTION. FABRICATION DRAWINGS SHALL INDICATE ALL DIMENSIONS OF THE HOSE ASSEMBLIES, INSTALLATION, ASSEMBLY, AND SECTIONAL DRAWINGS SHALL BE COMPLETE IN ALL DETAILS. THIS APPLIES ON INITIAL PROCUREMENT ONLY. THE MANUFACTURER THEREFORE WILL NOT BE REQUIRED TO COMPLY WITH THIS SPECIFICATION WHEN HE CAN SHOW THAT THE DRAWINGS AND DATA REQUIRED HEREIN HAS BEEN PREVIOUSLY FURNISHED TO THE PURCHASER.
6. APPROVAL OF DEPARTURES
ANY DEPARTURES FROM THESE SPECIFICATIONS SHALL BE SUBMITTED FOR APPROVAL. APPROVED DEPARTURES SHALL BE INCORPORATED IN THE WORK AT NO ADDITIONAL COST.

7. RESPONSIBILITY
APPROVAL OF DRAWINGS AND DATA SHALL NOT RELIEVE THE MANUFACTURER FROM ANY RESPONSIBILITY UNDER THE CODES REFERENCED HEREIN OR FOR ANY DEVIATION FROM SPECIFICATIONS, ERROR, OR OMISSION WHICH MAY EXIST. THE MANUFACTURER SHALL BE RESPONSIBLE FOR ADEQUATE DESIGN, DETAILS, FABRICATION, AND CONSTRUCTION OF ALL WORK.
8. FABRICATION
FLEXIBLE HOSE SHALL BE MADE SO THAT INSPECTION AND CLEANING CAN BE ACCOMPLISHED. APPROVED WELDING PROCEDURES SHALL BE FOLLOWED USING MATERIALS COMPATIBLE WITH AND RECOMMENDED FOR USE WITH THE BASE METAL. CARE SHALL BE TAKEN THAT NO VOIDS, SCALE, BLOWHOLES, AND/OR OTHER DEFECTS ARE PRESENT. ALL WELDS SHALL HAVE 100 PERCENT PENETRATION. ALL MATING PARTS SHALL BE GAUGED TO INSURE PROPER MATING AND INTER-CHANGEABILITY OF LIKE STANDARD PARTS. CARE SHALL BE TAKEN DURING CONSTRUCTION TO INSURE A HIGH STANDARD OF CLEANLINESS OF ALL PARTS.
9. WELDING
STAINLESS STEEL WELDING SHALL BE GAS TUNGSTEN ARC PROCESS. AN INERT GAS PURGE SHALL BE MAINTAINED DURING THE ROOT PASS AND ALL SUBSEQUENT PASSES. ALL WELDING SHALL BE PERFORMED AND INSPECTED IN ACCORDANCE WITH THE ASME, BOILER AND PRESSURE VESSEL CODE, SECTION VIII AND IX FOR UNFIREED PRESSURE VESSELS. MANUFACTURER SHALL CERTIFY THAT THE WELDS ARE WITHIN REQUIRED SPECIFICATIONS.
10. RADIOGRAPHY
ALL HOSE WELDS, INCLUDING SEAM WELDS, SHALL BE 100 PERCENT RADIOGRAPHED IN ACCORDANCE WITH ASME, BOILER AND PRESSURE VESSEL CODE, SECTION VIII, PARAGRAPH UW51 FOR UNFIREED PRESSURE VESSELS. RADIOGRAPHS SHALL BE SUBMITTED FOR APPROVAL PRIOR TO FORMING THE CONVOLUTIONS. WELDS THAT CANNOT BE RADIOGRAPHIC INSPECTED SHALL BE DYE PENETRANT INSPECTED USING A SOLVENT OR WATER REMOVAL TYPE PENETRANTS. INDICATIONS REQUIRING REWORK ARE AS NOTED IN TABLE I.

TABLE I. INDICATIONS FOUND DURING EVALUATION REQUIRING REWORK

TYPE OF INDICATION	DESCRIPTION
RELEVANT	THOSE INDICATIONS WITH MAJOR DIMENSION GREATER THAN 1/16"
LINEAR	THOSE INDICATIONS IN WHICH THEIR LENGTH IS EQUAL TO OR GREATER THAN THREE (3) TIMES THEIR WIDTH
ROUNDED	CIRCULAR OR ELLIPTICAL INDICATIONS WITH A LENGTH LESS THAN THREE (3) TIMES THEIR WIDTH

11. ANNEALING
ALL STAINLESS STEEL MATERIAL SHALL BE IN THE FULLY ANNEALED CONDITION PRIOR TO FABRICATION. PARTS SEVERELY COLD WORKED DURING FABRICATION SHALL BE ANNEALED BEFORE ANY WELDING IS PERFORMED. ANNEALING SHALL BE COMPATIBLE WITH, AND SHALL NOT DETRACT FROM, THE MAXIMUM CORROSION-RESISTANT CHARACTERISTICS OF THE MATERIAL.
- TESTING
12. WITNESS OF TEST
PRIOR TO PURCHASER'S ACCEPTANCE, THE FLEXIBLE HOSES SHALL BE SUBJECTED TO THE FOLLOWING TESTS IN THE SEQUENCE LISTED HEREIN. THE PURCHASER'S AUTHORIZED REPRESENTATIVE SHALL WITNESS ALL THE TESTS, IF SPECIFIED ON THE PURCHASE ORDER. THE MANUFACTURER SHALL NOTIFY THE PURCHASER A MINIMUM OF 72 HOURS PRIOR TO A SCHEDULED TEST SEQUENCE.
13. COLD SHOCK TEST
EACH CRYOGENIC FLEXIBLE HOSE SHALL BE COLD SHOCK TESTED WITH LIQUID NITROGEN AT ITS SPECIFIED DESIGN PRESSURE. THIS TEST CONDITION SHALL BE MAINTAINED FOR A MINIMUM OF 30 MINUTES. THERE SHALL BE NO VISIBLE LEAKAGE OR DEFORMATIONS.
14. PROOF TEST
EACH HOSE SHALL BE HYDROSTATICALLY TESTED AT TWO TIMES THE DESIGN PRESSURE WITH THE ENDS UNRESTRAINED AND FREE TO MOVE. THE HYDROSTATIC TEST SHALL BE PERFORMED USING WATER FILTERED TO REMOVE PARTICLES THAT WILL NOT PASS THROUGH A 400-MESH SCREEN. EACH SECTION SHALL BE PROVEN TIGHT BY SHOWING NO DECREASE IN TEST PRESSURE FOR 5 MINUTES, WITH THE PRESSURE SOURCE DISCONNECTED.
15. LEAK TEST
EACH CRYOGENIC FLEXIBLE HOSE SHALL BE SUBJECTED TO A PNEUMATIC LEAK TEST AT THE DESIGN PRESSURE USING A 10% HELIUM, 90% NITROGEN MIXTURE. THERE SHALL BE NO INDICATION OF LEAKAGE WHEN CHECKED WITH A MASS SPECTROMETER SET TO A SENSITIVITY OF 1 X 10⁻⁸ ATMOSPHERIC CC'S PER SECOND OF HELIUM.
16. REJECTION
FAILURE TO MEET ANY OF THE ABOVE SPECIFIED TESTS' REQUIREMENTS SHALL RESULT IN REJECTION OF THE EQUIPMENT UNDER TEST.
17. CERTIFICATION AND REPORTS
THE MANUFACTURER SHALL FURNISH THREE COPIES OF ALL CERTIFICATION AND TEST REPORTS TO THE PURCHASER WITHIN ONE WEEK AFTER COMPLETION OF THE WORK.
18. CLEANING
COMMERCIAL CLEAN PER SSC 54000-GC01 UNLESS OTHERWISE SPECIFIED BY THE PURCHASE ORDER.
19. SHIPPING
CRYOGENIC FLEXIBLE HOSE ASSEMBLIES SHALL HAVE END CONNECTION COVERS, PLUGS, OR CAPS SUITABLE TO PREVENT MOISTURE AND/OR CONTAMINATES ENTRANCE, WITH DOUBLE POLYETHYLENE BAGS PROPERLY SEALED PRIOR TO SHIPPING OR STORAGE. COILING AND RESTRAINING WITH A NONMETALLIC MATERIAL IS PERMITTED AS LONG AS THE COIL TIGHTNESS DOES NOT EXCEED THE NATURAL LAY OF THE HOSE MATERIAL. WHEN MORE THAN ONE ASSEMBLY IS SHIPPED IN ONE CONTAINER, ASSEMBLIES SHALL BE PACKED TO PREVENT CHAFING. CONTAINERS SHALL BE LEGIBLY MARKED WITH MINIMUM OF 1/2 INCH LETTERS AS TO CONTENTS BY NOMENCLATURE, SIZE, AND QUANTITY EACH.
20. IDENTIFICATION
EACH CRYOGENIC FLEXIBLE HOSE ASSEMBLY SHALL HAVE STAMPED INTO ITS METAL THE FOLLOWING INFORMATION:
HOSE TYPE
DESIGN TEMPERATURE
DESIGN PRESSURE
SERVICE
HOSE NUMBER
SERIAL NUMBER
21. REFERENCES
SSC DWG 54000-GC01 COMMERCIAL CLEANING PROCESS AT MANUFACTURER'S FACILITY

SIZE	DWG. NO.	SHEET	REV.
B	54B00-GF00	3 OF 3	1
AUTHORITY			

1. SCOPE:

Specified forgings are the quality and inspection requirements for steel forgings for high pressure components, which are supplementary to the user's component specification when so indicated by reference.

2. QUALITY REQUIREMENTS:

The quality of the steel forgings provided under this specification shall be determined by liquid penetrant examination or ultrasonic inspection techniques. The minimum acceptable quality requirements for these respective inspection methods are listed below. Where these methods may yield conflicting or contrary findings, those as to the severity of a defect, the most severe indication will govern the acceptance and/or disposition of the forging to question.

a. Liquid Penetrant Inspections: Maximum permissible indications of a liquid penetrant examination made in accordance with ASTM E165-55 shall be as specified in paragraph N-427.7 of Section III of the ASME Boiler and Pressure Vessel Code except that weld joints shall be as specified under Section 4 of this document.

b. Ultrasonic Inspections: Maximum defect severity for all discontinuity types shall be Class AA as indicated by MIL-T-89502.

3. INSPECTION OF STEEL FORGINGS:

a. General:

(1) Vendor's Responsibility: The vendor's inspections of steel forgings as stipulated herein shall be the responsibility of the vendor. However, it is not the intent of this specification to preclude the use or application of any other inspection procedures or techniques, not specified herein, that may be necessary or desirable in establishing the soundness and suitability of any forging provided hereunder. All costs stated with the inspector's shall be borne by the vendor and be included in the bid or contract price of the component.

(2) Purchaser Surveillance: The Purchaser, or Purchaser's authorized representative, shall have access to witness all phases of the inspection and shall have a right to all data and results of such inspections. These data and results shall be made available to the Purchaser immediately upon completion or examination of any inspection procedure. All pertinent data relating to such information shall be transmitted to and become the property of the Purchaser.

If the Purchaser or its authorized representative has reason to believe that the requirements of this specification are not being met, the Purchaser or his authorized representative may suspend the use of any questionable material, equipment, procedures, personnel, etc., on work covered by this specification until compliance with the requirements of this specification is judged satisfactory.

4. REPAIR BY WELDING:

Repairs of defects by welding shall be in accordance with the requirements of paragraph U of Section VII of the ASME Boiler and Pressure Vessel Code. The procedure qualifications shall be performed on test specimens of forged material of the same size, location and subjected to the heat treatment before and after welding as will be applied to the work. All welds and operators performing this welding shall also be qualified in accordance with Section IX. When repair welding is done after heat treatment of the forging, the forging shall be postweld heat treated.

3. Point of Inspection: The forgings are to be subjected to the purchaser's inspection level upon receipt from the forger shop or prior to any finished manufacturing operation. If the forger does not believe the vendor of the forging is providing a component that satisfies the intent and requirements of the purchaser's point inspection.

b. Liquid Penetrant Inspection: External and internal surfaces of each forging shall be subjected to liquid penetrant inspection. The forging shall be acceptable on the basis of the requirements of paragraph N-427.7 of Section III of the ASME Boiler and Pressure Vessel Code.

c. Ultrasonic Inspection: The forging shall be subjected to an ultrasonic examination in accordance with ASTM A386-57 of welding the longitudinal beam technique. The ultrasonic degrees of defects shall be judged by MIL-T-89502, Class AA.

SYMBOL	ZONE	DESCRIPTION	DATE	APPROVED
PRELIMINARY RELEASE				

SIGNATURES		DATE	REVISIONS	
DRAYN			NATIONAL AERONAUTICS	SPACE ADMINISTRATION
CHECKED			GEORGE C. MARSHALL	MISSISSIPPI TEST FACILITY
ENGINEER			SPACE FLIGHT CENTER	RAY ST. LOUIS, MISSISSIPPI
ISSUED	UN 17 1970		GENERAL ELECTRIC	FORGING, STEEL
SUBMITTED			QUALITY AND INSPECTION REQUIREMENTS	
APPROVED			SIZE	DRWG
USED ON			34000-0011	REV.
34000-0001 SW, GC1		UTILITY	WF 221283	SHEET 3 OF 2

5. FREQUENCY OF INSPECTION:

Where more than one forging of a particular design is produced, each of the first five forgings shall be inspected as outlined herein. Where more than five forgings are being produced, the examination shall be performed on the first five, plus one additional forging to represent each five additional forgings. If this additional forging proves to be unacceptable, each of the remaining four forgings in the group shall be inspected.

6. IDENTIFICATION AND MARKING:

Each forging shall be marked with the manufacturer's name and forging identification including material designation.

7. RECORDS:

The manufacturer shall maintain a quality control system adequate to assure the Purchaser or his authorized representative that all of the requirements of this specification have been and are continuously being met. The quality control system shall include preparing and maintaining written records of at least the following listed items as required by this specification for each forging produced:

- a. Chemical Analysis
- b. Tensile Properties and Impact Properties
- c. Heat Treatment
- d. Visual and Dimensional Inspection Results
- e. Inspection Results
- f. Repair Welding

SYM		ZONE		DATE		APPROVED
REFER TO SHEET NO. 1.						
DESCRIPTION						
REVISIONS						
SIGNATURES	DATE	NATIONAL AERONAUTICS		SPACE ADMINISTRATION		
DRAWN		GEORGE C. MARSHALL		MISSISSIPPI TEST FACILITY		
CHECKED		SPACE FLIGHT CENTER		MAY ST. LOUIS, MISSISSIPPI		
ENGINEER		MTSD		GENERAL ELECTRIC		
ISSUED	JUN 17 1970	FORGING, STEEL		QUALITY AND INSPECTION REQUIREMENTS		
SUBMITTED		SIZE		DWG. NO.		
APPROVED		54000-3011		REV.		
USED ON		AUTHORITY		SHEET		
		NR 021233		2 OF 2		

54000-D001 Sht GC-1

6		ADDED SECTION II AND RENUMBERED REMAINING SECTIONS. IN SECTION III, PART A, NUMBER 3 AND SECTION V, PART A, NUMBER 5. ADDED "DESIGN/MAXIMUM ALLOWABLE WORKING PRESSURE". IN SECTION III, PART A, NUMBER 4: DELETED FCI STD. 58-6 AND ADDED PARA. 5 AND b. IN SECTION V, PART A NUMBER 2; ADDED "MANUFACTURER'S PART NUMBER". REWROTE SECTION III, PART A, NUMBER 2 AND SECTION V, PART A, NUMBER 2 TO MAKE THEM IDENTICAL. IN SECTION V, PART A, NUMBER 4, PARA. b: ADDED "DESIGN/MAXIMUM ALLOWABLE WORKING PRESSURE, MAXIMUM ACTUATION PRESSURE, BURST PRESSURE". IN SECTION V, PART A, NUMBER 4; ADDED PARA. c. IN SECTION V, PART A, NUMBER 7: DELETED FCI STD. 58-2 AND ADDED PARA. 5 AND b. IN SECTION V, PART A; ADDED NUMBERS 10 AND 11. IN SECTION V, PART B, NUMBER 1: ADDED "MAINTENANCE INSTRUCTIONS... FOR ACTUATORS. UPDATED MAILING ADDRESS. CHANGED "MANUFACTURER" TO "CONTRACTOR" WHERE APPLICABLE. SCD WAS REVISED AND REDRAWN IN ITS ENTIRETY AND INC. ARN 5A PER FSR 444 JMFCSPW304. 01/4/93 JYM/113	9-10-79	LB. MAK										
5		COMPLETELY REWRITTEN PER NAS13-1 REQUIREMENTS.	9-13-79	LB. MAK										
<p style="text-align: center;">REVISIONS</p> <table border="1"> <thead> <tr> <th>SYMBOL</th> <th>ZONE</th> <th>DESCRIPTION</th> <th>DATE</th> <th>APPROVED</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>					SYMBOL	ZONE	DESCRIPTION	DATE	APPROVED					
SYMBOL	ZONE	DESCRIPTION	DATE	APPROVED										
<table border="1"> <tr> <td data-bbox="219 283 300 493"> DRAWN L. HOLDER 10-31-68 </td> <td data-bbox="219 493 300 703"> CHECKED L. HOLDER 10-31-68 </td> <td data-bbox="219 703 300 913"> ENGINEER D. DICERBO 10-31-68 </td> <td data-bbox="219 913 300 1123"> ISSUED CFE 11-18-68 </td> <td data-bbox="219 1123 300 1333"> SUBMITTED L. TERRY 10-31-68 </td> <td data-bbox="219 1333 300 1543"> APPROVED SMITH 10-31-68 </td> <td data-bbox="219 1543 300 1753"> USED ON 54000-D001 SH. G2 </td> <td data-bbox="219 1753 300 1963"> SIZE B 54000-GD01 </td> <td data-bbox="219 1963 300 2068"> SHEET 1 OF 5 </td> </tr> </table> <p style="text-align: center;">DRAWINGS AND DOCUMENTATION, VALVES AND COMPONENTS</p> <p style="text-align: right;">JOHN C. STUBBS SPEC. CENTER SEC. 10 2420-6900</p>					DRAWN L. HOLDER 10-31-68	CHECKED L. HOLDER 10-31-68	ENGINEER D. DICERBO 10-31-68	ISSUED CFE 11-18-68	SUBMITTED L. TERRY 10-31-68	APPROVED SMITH 10-31-68	USED ON 54000-D001 SH. G2	SIZE B 54000-GD01	SHEET 1 OF 5	
DRAWN L. HOLDER 10-31-68	CHECKED L. HOLDER 10-31-68	ENGINEER D. DICERBO 10-31-68	ISSUED CFE 11-18-68	SUBMITTED L. TERRY 10-31-68	APPROVED SMITH 10-31-68	USED ON 54000-D001 SH. G2	SIZE B 54000-GD01	SHEET 1 OF 5						

CAD CONTROLLED DRAWING
CDD 2/78
SCD/54000/GD01RF/SH1

AMERICAN 30

I GENERAL

A. THIS SPECIFICATION COVERS THE REQUIREMENTS FOR DRAWINGS AND DOCUMENTATION ON COMPONENTS FOR:

1. REQUESTS FOR QUOTATION ON A FIRST TIME PROCUREMENT.
2. REQUESTS FOR QUOTATION ON SPECIFICATION CONTROL DRAWINGS (SCD).
3. CONFIRMED FIRST TIME PURCHASE ORDERS.

B. THE TERMINOLOGY "PURCHASER" USED THROUGHOUT THIS SPECIFICATION IS INTENDED TO BE INTERPRETED AS THE AGENT AND/OR AGENCY WHOSE PURCHASE ORDER DESIGNATES EITHER DIRECTLY OR BY REFERRAL THIS SPECIFICATION, THE TERMINOLOGY "CONTRACTOR" IS THAT VENDOR OR MANUFACTURER WHO ENTERS INTO A PURCHASE ORDER CONTRACT TO SUPPLY THE GOODS DEFINED BY THIS SPECIFICATION.

II APPLICABLE PUBLICATIONS

INSTRUMENT SOCIETY OF AMERICA
ANSI/ISA 755.02 CONTROL VALVE CAPACITY TEST PROCEDURE
ASME, BOILER AND PRESSURE VESSEL CODE
SECTION VIII, DIVISION 1 RULES FOR UNFIREED PRESSURE VESSELS

III REQUEST FOR QUOTATION ON FIRST TIME PROCUREMENT

A. THE CONTRACTOR SHALL FURNISH TO THE PURCHASER THREE REPRODUCIBLE COPIES OF DRAWINGS DEPICTING THE ITEM(S) TO BE SUPPLIED. IN ADDITION, IF THE CONTRACTOR HAS CADD DRAWINGS DEPICTING THE SUBJECT ITEM(S), THE CONTRACTOR SHALL FURNISH TO THE PURCHASER ONE COMPUTER DISKETTE CONTAINING ALL CADD DRAWINGS THAT ARE COMPATIBLE WITH AUTOCAD, VERSION 11 OR 12. THESE DRAWINGS SHALL INCLUDE THE FOLLOWING:

1. PERTINENT EXTERNAL AND INTERNAL ENVELOPE DIMENSIONS SUCH AS FACE-TO-FACE DIMENSIONS, BORE, END CONNECTIONS, ETC.
2. CROSS-SECTIONAL ASSEMBLY VIEW WITH BUBBLE CALL OUT REFERENCED TO A COMPLETE PARTS LIST. THE PARTS LIST SHALL IDENTIFY EACH PIECE PART BY MANUFACTURER'S PART NUMBER AND INCLUDE MATERIAL, SPECIFICATION, STANDARD, ETC. FROM WHICH EACH PIECE PART IS MANUFACTURED. PARTS WHICH ARE PROCURABLE AS AN INDUSTRY WIDE WIDE STANDARD ITEM WILL BE SO IDENTIFIED IN THE PARTS LIST.
3. PRESSURE RATINGS FOR DESIGN/MAXIMUM ALLOWABLE WORKING PRESSURE, PROOF PRESSURE, AND BURST PRESSURE.

CADD CONTROLLED DRAWING
CADD FILE
SCD/54000/620186/59112

SIGNATURE		DATE	REFER TO SHEET NO. 1 DESCRIPTION REVISIONS National Approvals and Stamp Administration  JOHN C. STEIN State Capital SEC. NO. 3923-4000	DATE	APPROVED
SYN	ZONE				

DRAWINGS AND DOCUMENTATION, VALVES AND COMPONENTS	SEE 1 FOR NO. 54000-GD01	SHEET 2 OF 5	REV. 5
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4. CERTIFIED CAPACITY RATING:
 - a. VALVE COEFFICIENT, Cv, SHALL BE PER ANSI/ISA 575.02. WHERE VALVE COEFFICIENT IS DETERMINED BY ANOTHER PROCEDURE, THE CONTRACTOR WILL PROVIDE THE EXACT DETAILS OF THIS PROCEDURE AND THE METHOD OF CORRELATION WITH ANSI/ISA 575.02.
 - b. RELIEF VALVE RELIEVING CAPACITY SHALL BE PER ASME SECTION VIII, DIVISION 1.
 5. CONTRACTOR'S PART/MODEL NUMBER.
 6. MAXIMUM TORQUE REQUIRED TO OPERATE MANUAL VALVE UNDER OPERATING CONDITIONS.
- IV. REQUEST FOR QUOTATION ON SPECIFICATION CONTROL DRAWINGS
- A. SUBMITTALS IN RESPONSE TO REQUEST FOR QUOTATION ON A PRODUCT WHICH HAS BEEN INCORPORATED INTO THE SCD AS A STANDARD, NEED NOT BE ACCOMPANIED BY THE CONTRACTOR'S DRAWINGS, PROVIDED THE ASSEMBLY, PIECE PARTS AND MATERIALS IDENTIFIED TO BE SUPPLIED ARE IDENTICAL TO THE PRODUCT REPRESENTED BY THE SCD.
 - B. IF THE CONTRACTOR TAKES EXCEPTION TO THE SCD, SECTION III IS APPLICABLE.
- V. PURCHASE ORDER
- A. WITHIN ONE WEEK OF RECEIPT OF PURCHASE ORDER THE CONTRACTOR SHALL SUBMIT TO THE PURCHASING AGENT FOR ENGINEERING APPROVAL PRIOR TO THE START OF FABRICATION THREE REPRODUCIBLE COPIES OF DRAWINGS DEPICTING THE ITEM(S) TO BE SUPPLIED. IN ADDITION, IF THE CONTRACTOR HAS CADD DRAWINGS DEPICTING THE SUBJECT ITEM(S), THE CONTRACTOR SHALL FURNISH TO THE PURCHASER ONE COMPUTER DISKETTE CONTAINING ALL CADD DRAWINGS THAT ARE COMPATIBLE WITH AUTOCAD, VERSION 11 OR 12.
- RETURN UNAPPROVED DOCUMENTATION WILL BE CORRECTED BY THE CONTRACTOR AND RESUBMITTED WITHIN TEN DAYS. DOCUMENTATION SHOWING THE ACCEPTABLE CONFIGURATION WILL BE RETURNED TO THE CONTRACTOR PRIOR TO START OF FABRICATING. NO CHANGES WILL BE MADE WITHOUT APPROVAL OF THE PURCHASER'S ENGINEERING DEPARTMENTS. DOCUMENTATION SHALL INCLUDE THE FOLLOWING:
1. PERTINENT EXTERNAL AND INTERNAL ENVELOPE DIMENSIONS SUCH AS FACE-TO-FACE DIMENSIONS, BORE, END CONNECTIONS, ETC.
 2. CROSS-SECTIONAL ASSEMBLY VIEW WITH BUBBLE CALL OUT REFERENCED TO A COMPLETE PARTS LIST. THE PARTS LIST SHALL IDENTIFY EACH PIECE PART BY MANUFACTURER'S PART NUMBER AND INCLUDE MATERIAL, SPECIFICATION, STANDARD, ETC. FROM WHICH EACH PIECE PART IS MANUFACTURED. PARTS WHICH ARE PROCURABLE AS AN INDUSTRY WIDE STANDARD ITEM WILL BE SO IDENTIFIED IN THE PARTS LIST.
 3. DRAWING DETAILS WHICH CANNOT BE PRESENTED CLEARLY IN THE CROSS-SECTION ASSEMBLY DRAWING WILL BE PROVIDED IN BLOWUP FOR CLARITY.

CADD CONTROLLED DRAWING
 CADD P/LK
 SCD/54000/GD01R6/SH13

SYL	ZONE	REFER TO SHEET NO. 1	DATE	APPROVED
SIGNATURE		DATE	REVISIONS	
TOUCH			Name: JOHN C. STEWART	
ORDER			Address: SPACE CENTER	
ORDER			City: HOUSTON, TEXAS	
ORDER			State: TX 77060-4000	
ORDER			Phone: 281-283-4000	
ORDER			Fax: 281-283-4000	
ORDER			E-Mail: jstewart@spc.com	
ORDER			Web: www.spcc.com	
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B. WITHIN TWO WEEKS AFTER RECEIPT OF PURCHASE ORDER, THE CONTRACTOR SHALL FURNISH THE FOLLOWING:

1. MAINTENANCE INSTRUCTIONS SHOWING DISASSEMBLY, ASSEMBLY, AND PREVENTATIVE MAINTENANCE PROCEDURES, MAINTENANCE INSTRUCTIONS SHALL ALSO BE FURNISHED FOR ACTUATORS.
2. SPECIAL TOOLS REQUIRED WITH PART/TOOL NUMBER AND COST INCLUDING LEAD TIME REQUIRED FOR PROCUREMENT.

C. THE CONTRACTOR SHALL FURNISH THREE COPIES OF ALL REQUIRED CERTIFICATION AND ALL TEST REPORTS, ONE SET OF THESE DOCUMENTS WILL BE INCLUDED IN THE SHIPMENT, REMAINING TWO COPIES OF ALL REQUIRED DOCUMENTS MUST BE MAILED AS INDICATED IN SECTION VI AT TIME OF SHIPMENT.

VI. MAILING INSTRUCTIONS

JOHN C. STENNIS SPACE CENTER
 FOSS CONTRACTOR
 PURCHASING DEPT.
 STENNIS SPACE CENTER, MS 39529-6000.
 ATTENTION: (NAME OF PURCHASING AGENT)

REFER TO SHEET NO. 1		DATE	APPROVED
SYM	ZONE	DESCRIPTION	
REVISIONS			
SIGNATURE	DATE	MANUAL APPROVALS AND REVISIONS  JOHN C. STENNIS SPACE CENTER SEC. MS 39529-6000	DRAWINGS AND DOCUMENTATION, VALVES AND COMPONENTS
ISSUED			
CHECKED			
DESIGNED			
FORWARDED			
SCALE	NO. OF SHEETS	CAD/D CONTROLLED DRAWING Dwg No. 54000-GD01 Rev. 6 SCD/54000/GD01R6/SH15 USED ON 54000-DD01 SH. G2 SHEET 5 OF 5	

4	UNDER ITEM 1, IDENTIFICATION, ADDED D, H, I, J AND K. MOVED FLAGNOTE 1 TO SHT 3. CHANGED NSTL TO SSC WHERE APPLICABLE. SCD REVISE AND REDRAWN IN ITS ENTIRETY AND INC ARN 4A PER FSR J1DOGPW204. MAM 9/17/92. RM 8/13/92	10/20/92 10/15/92	ISSUED/CF SM
5	RETYPED SHEET 1; ADDED FLAGNOTE 1; DELETED REQUIREMENT FOR CAPACITY/CV TO BE IDENTIFIED ON THE COMPONENT PER FSR 90HDS6-03. ISSD/CF 10-27-92	10-16-92	RL RICE & MKA MFL FD
REVISIONS DESCRIPTION DATE APPROVED			
SIGNATURE DATE DRAWN KARL R. SWANSON 10-23-92 CHECKED CARL CARRECA 10-24-92 ENGINEER D.A. DECERBO 10-24-92 DESIGNED CEF 1-9-93 SUBMITTED E. SWAN 11-9-92 DRAWN SWEET APPROVED R.G. SMITH 1-5-93 DESIGNED ON 54000-D001			
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  JOHN C. STUBBS SPACE CENTER SEC. 15 3608-0000		PACKAGING & IDENTIFICATION VALVES & COMPONENTS SIZE: B PART NO.: 54000-GP01 AMOUNT: NASW-410 MOD MFC-1 SHEET 1 OF 4 REV. 5 AMEND. 90	

CAUD CONTROLLED DRAWING
 CDD P/N
 SCD 54000-GP01REVS

1. IDENTIFICATION:

EACH VALVE OR COMPONENT SHALL BE FURNISHED WITH THE FOLLOWING DATA PERMANENTLY AFFIXED THERETO:

- A. MANUFACTURER
- B. DESIGN MODEL OR TYPE NUMBER
- C. DESIGN PRESSURE (EXCEPT RELIEF VALVES)
- D. PROOF TEST PRESSURE
- E. SET PRESSURE (FOR RELIEF VALVES ONLY)
- F. SSC SPEC. NO. (IF APPLICABLE)
- G. SERIAL NUMBER
- H. RATING CLASS
- I. SIZE
- J. DESIGN TEMPERATURE
- K. MATERIAL
- L. ASME CODE STAMP (FOR RELIEF VALVES ONLY)

2. PACKAGING:

- A. EACH VALVE OR COMPONENT SHALL BE ADEQUATELY PACKAGED TO PREVENT DAMAGE TO ANY COMPONENT DURING SHIPMENT, HANDLING AND STORAGE.
- B. ALL OPENINGS SHALL BE PLUGGED OR SEALED TO PREVENT THE ENTRANCE OF FOREIGN MATERIAL AND/OR MOISTURE.
- C. EACH SHIPPING CONTAINER SHALL BE PERMANENTLY MARKED ON TWO EXTERIOR SIDES TO SHOW MANUFACTURER, PURCHASE ORDER NUMBER AND VALVE OR COMPONENT SIZE AND TYPE.

3. SPECIAL PACKAGING REQUIREMENTS FOR BUTTWELD END VALVES

- A. DISASSEMBLY. VALVES MAY BE SHIPPED IN A PARTIALLY DISASSEMBLED CONDITION WITH THE TOPWORKS SEPARATED FROM THE BODY. ALL DISASSEMBLED PARTS SHALL BE MATCH MARKED FOR EASE OF FIELD ASSEMBLY.
- B. CONTAINER. THE BODY AND TOPWORKS MAY BE PACKED IN EITHER A SINGLE CONTAINER OR IN TWO SEPARATE CONTAINERS AT THE MANUFACTURER'S OPTION. HOWEVER, IF PACKED IN A SINGLE CONTAINER, SUCH CONTAINER SHALL BE COMPARTMENTED SO THAT REMOVAL OF THE BODY SHALL NOT DISTURB THE INTEGRITY OF THE PACKING OF THE OTHER COMPONENTS.
- C. BODY BONNET BLANK. A TEMPORARY TOP BODY CLOSURE SHALL BE SUPPLIED BY THE MANUFACTURER. THIS BONNET BLANK SHALL BE OF THE SAME MATERIAL AS THE BONNET, WITH VALVE MODEL NUMBER FOR IDENTIFICATION, AND SHALL SEAL THE VALVE WITHOUT LEAKAGE DURING FIELD CLEANING AND PRESSURE TESTING OF THE INSTALLED BODY AT FULL RATED HYDROSTATIC AND PNEUMATIC TESTING PRESSURES. THE BONNET BLANK SHALL HAVE A 1/2 INCH FNPT PLUGGED CONNECTION AT THE OUTER EDGE FOR HIGH POINT VENTING.

CAD CONTROLLED DRAWING
 DATE P/LK
 SCH. 54000-GP01 REV. 5

SIGNATURE		DATE	REFER TO SHEET NO. 1
SYML ZONE		DESCRIPTION	DATE
REVISIONS		APPROVED	
NATIONAL ASSOCIATES AND SERVICE ADMINISTRATION		JOHN C. STUBBS SERVICE CENTER SSC, MS 3628-0000	
PACKAGING & IDENTIFICATION VALVES & COMPONENTS			
SIZE	DATE	54000-GP01	
REV. 5	APPROVED	SHEET	2 OF 4

D. WELDING PROCEDURE WITH EACH VALVE BODY PACKAGE TWO COPIES OF WELDING PROCEDURES FOR SATISFACTORY INSTALLATION OF THE VALVE WITHOUT DISTORTION SHALL BE INCLUDED.

4. IDENTIFICATION PLATE:

THE REQUIRED DATA SHALL BE AFFIXED IN SUCH A WAY THAT THE IDENTIFICATION WILL NOT BE OBLITERATED DURING CHEMICAL CLEANING AND WHILE IN SERVICE. THE MARKING OR IDENTIFICATION MAY BE PLACED ON A PLATE AND PERMANENTLY ATTACHED TO THE COMPONENT. ADHESIVE - TYPE PLATES SHALL NOT BE USED. WIRE AFFIXED METAL TAGS ARE ACCEPTABLE.

CADD CONTROLLED DRAWING
 CADD P/L#
 SCD 54000-GP01REVS

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PACKAGING & IDENTIFICATION VALVES & COMPONENTS

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
 JOHN C. STUBBS SERVICE CENTER
 SSC, MS 20529-0000



SIZE: B
 DATE: 54000-GP01
 SHEET: 3 OF 4

NOTES

IF THE MANUFACTURER DOES NOT RECOGNIZE ITS COMPONENTS BY SERIAL NO., A SERIAL NO. WILL BE ASSIGNED AND AFFIXED AT SSC AT SUCH TIME IT IS PROCESSED FOR USE.

CADD CONTROLLED DRAWING
 CDD P/N
 SCD 54000-GP01REV5

SYN	ZONE	REFER TO SHEET NO. 1	DATE	APPROVED
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 JOHN C. STORRS SPACE CENTER SSC, MS 38229-0000				
PACKAGING & IDENTIFICATION VALVES & COMPONENTS				
SIZE	DATE	NO.	REV.	REV.
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INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required number of copies.
2. Each transmittal shall be numbered consecutively in the space provided for "Transmittal No. " This number, in addition to the contract number, will form a serial number for identifying each submittal. For new submittals or resubmittals mark the appropriate box; on resubmittals, insert transmittal number of last submission as well as the new submittal number.
3. Only one item should be described on each line.
4. Submittals requiring expeditious handling will be submitted on a separate form.
5. Separate transmittal form will be used for Shop Drawings submitted under separate sections of the specifications.
6. A check shall be placed in the "Variation" column when a submittal is not in accordance with the plans and specifications - also, a written statement to that effect shall be included in the space provided for "Remarks."
7. Form is self-transmittal; letter of transmittal is not required.
8. Provide manufacturer's name and when a sample of material of Manufacturer's Certificate of Compliance is transmitted, indicate "Sample" or "Certificate" in Column (b), Section I, along with description.
9. The National Aeronautics and Space Administration Project Manager will assign action codes as indicated below in space provided in Section I, Column (h), to each item submitted. In addition, the Project Manager will ensure that enclosures are indicated and attached to the form prior to return to the contractor.

THE FOLLOWING ACTION CODES ARE GIVEN TO ITEMS SUBMITTED

- A—Approved as submitted.
 - B—Approved, except as noted on drawings. Resubmission not required.
 - C—Approved, except as noted on drawings. Refer to attached sheet, resubmission required.
 - D—Will be returned by separate correspondence.
 - E—Disapproved (see attached).
 - F—Receipt acknowledged.
 - G—Other (specify).
10. Approval of items does not relieve the contractor from complying with all the requirements of the contract plans and specifications.