SPECIFICATION
FOR PROCUREMENT OF
EIGHT INCH CRYOGENIC LIQUID HYDROGEN
VACUUM JACKETED FLEX HOSES FOR LH BARGE DOCKS
11CH0-GM11
MARCH 2013
Revision 1

ISSUED CEF

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Change/ Revision	Change Date	Originator/ Phone	Description
Basic	2/26/2013		
1	3/2013	Doug Dike/ ext. 8-2803	Added Code of Construction requirement in Paragraph 4.3.

ISSUED CEF MAR 2 9 2013

SPECIFICATION
FOR PROCUREMENT OF
EIGHT INCH CRYOGENIC LIQUID HYDROGEN
VACUUM JACKETED FLEX HOSES FOR LH BARGE DOCKS
11CH0-GM11
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SPECIFICATION FOR PROCUREMENT OF EIGHT INCH CRYOGENIC LIQUID HYDROGEN VACUUM JACKETED FLEX HOSES FOR LH BARGE DOCKS 11CH0-GM11

1.0 SCOPE

Procure three each eight inch liquid hydrogen vacuum jacketed cryogenic fully compressed flex hoses which will be used at LH Dock Position 1, 2 and 3 at NASA Stennis Space Center, Mississippi. The hoses are to be designed, fabricated and tested to the requirements of this specification and to SSC Drawing 54B00-GF01, unless noted otherwise.

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-GF01 -- Flex Hoses, Vacuum Jacketed, 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 hydrogen

4.1.1.2 *Size*
8 inch x 254" long

4.1.1.3 *Design pressure*
275 psi

4.1.1.4 *Temperature*
-423 deg F to 150 deg F

4.1.1.5 *End connections*
Eight inch 150# ANSI ring type joint flange x 8" ring type joint stub end with 8" 150# ANSI lap joint flange. Flange face finishes shall be concentric serrated.

4.1.1.6 *Material of construction (Body & trim)*
ASTM 304/304L/316/316L/321grade 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 flex hoses (both inner and outer) shall be fully compressed to increase the flexibility of the hoses.

4.1.1.8 *Motion Conditions*
Lateral – Seven (7) inches ± three (3) inches
Axial – None except when disconnecting hose from a mating flange.
Bend Radius – Three (3) feet

4.1.1.9 *Braiding*
Stainless steel, double layer braiding shall be provided.

4.1.1.10 *Insulation*
Multiple layer insulation (MLI) in the annulus of the jacket shall be a minimum of 16 layers of super insulation. Insulation shall be alternative layers of aluminized Mylar (aluminized both sides for 32 reflective layers) and glass fiber insulation. The insulation shall be wrapped around the inner hose and secured by stainless steel wiring. Acceptable alternate MLI are Reflex Technologies Crynsulate metalized super insulation and Lydall Ctyothern 243 films.

4.1.1.11 Jacket Support
The outer jacket shall be supported by Teflon or Micarta spacers to maintain a uniform spacing between the inner and outer convolutions of the hose.

4.1.1.12 Chemical Getter System
The hose assembly shall have a chemical getter system within the annulus of the inner and outer hoses. The system shall consist of a calcium zeolote desiccant, Linde type 5A molecular sieve and a hydrogen converter such as palladium oxide.

4.1.1.13 Evacuation Post Assembly
Each hose shall be provided with a vacuum seal-off and relief valve, PHPK Model VR-46 or equal and a bellows-sealed isolation valve and thermocouple vacuum gauge tubes in a stainless steel enclosure, PHPK Model VR-46-M (model number includes the seal off valve) or equal.

The evacuation post assembly shall be protected from damage during handling by a stainless steel metal shroud.

The Controls Component, Inc. device noted in Paragraph 5 of 54B00-GF01 is not applicable.

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-3A10-LH
FH-3A15-LH
FH-3A20-LH

4.4 Quality Assurance

*4.4.1 **Testing/Examination***
The flex hose assembly shall meet the testing/examination requirements of SSC Drawing 54B00-GF01 except as noted below. The contractor shall submit test/examination procedure(s) for approval prior to performing any testing or examinations.

Exceptions/Additions/Clarifications to SSC DWG 54B00-GF01 are as follows:

Paragraph 6: Not applicable.

Paragraph 8: The pressure in the vacuum jacket shall not exceed 50 microns and not 200 microns.

Paragraph 15: Welding procedures shall be per the requirements of ASME Section IX of the Boiler Code. All welding shall be 100% radiographic examined per ASME Section VIII, Paragraph UW-51 where practical. If radiographic examination is not practical then welds then welds are to be 100% dye penetrant root and final inspected. The seam weld of the inner pipe shall be 100% radiograph inspected prior to forming the convolutions. The radiographs are to be submitted to SSC for approval prior to forming the convolutions.

Paragraph 22: Not applicable.

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

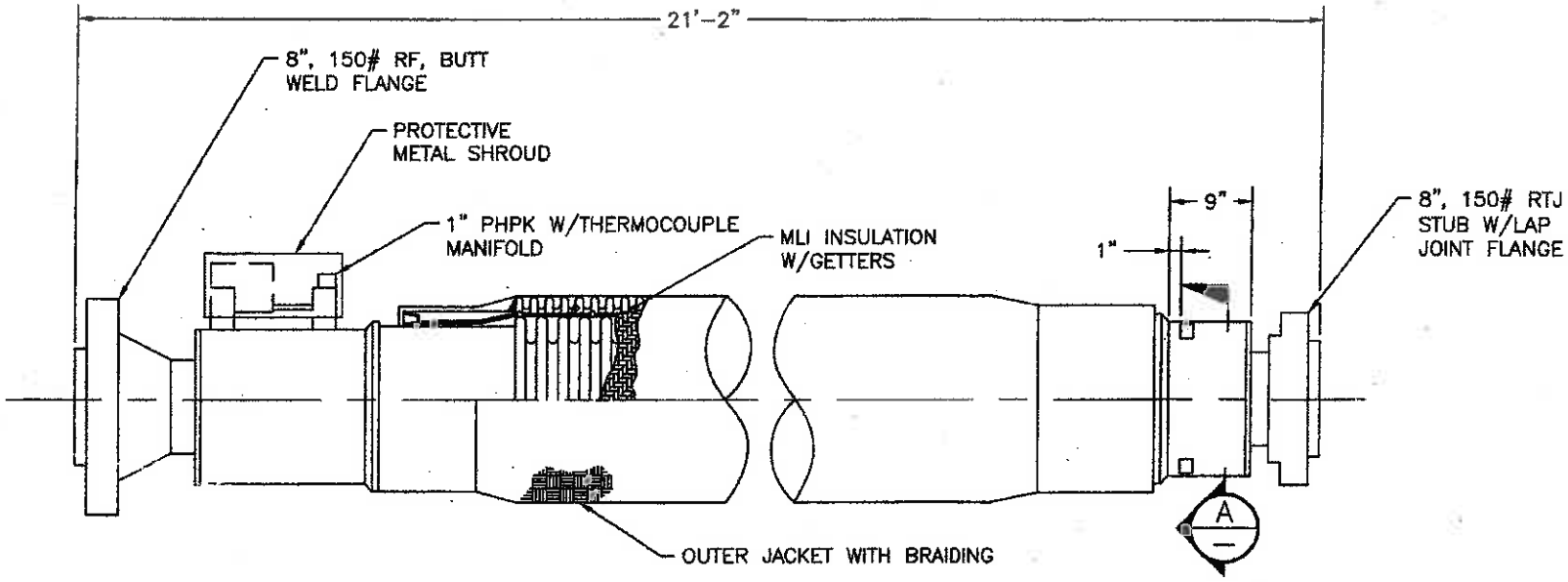
Source Inspection is required. All testing and examination shall be witnessed by a Government representative who has final approval on all testing and examination results.

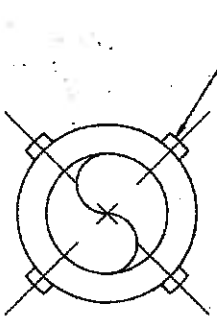
4.4.6 Welding

Welding procedures and welder certifications shall be per the requirements of ASME Section IX of the Boiler Code. All welding shall be examined per section 4.4.1 of this specification and SSC Drawing 54B00-GF01.

4.5 Preparation for delivery

The flex hoses shall be prepared for delivery per the requirements of SSC Drawing 54B00-GF01.





SECTION A
NTS

ATTACHMENT I

SYM	ZONE	DESCRIPTION	DATE	APPROVED
		REVISIONS		

SIGNATURE	DATE
DRAWN	
CHECKED	
ENGINEER	
ISSUED	
SUBMITTED	
NASA SAFETY	
APPROVED	
USED ON	

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

JOHN C. STENNIS SPACE CENTER
SSC, MS 39529-6000

LH FLEXIBLE LIQUID HOSE VACUUM JACKETED, 8"

CADD CONTROLLED DRAWING
CADD P/N:

SIZE B | DWG. NO. 11CH0-GM11 | REV.

AUTHORITY | SHEET

1. SCOPE:

This drawing covers the design, fabrication and testing of vacuum jacketed flexible hose assemblies.

DESIGN REQUIREMENTS

2. APPLICABLE PUBLICATIONS:

ASME, Boiler and Pressure Vessel Code

Section VIII	Rules for Unfired Pressure Vessels
Section IX	Welding

3. GENERAL:

The vacuum jacketed flexible hose assembly shall be designed, fabricated and tested 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 drawing shall govern and take preference where it may depart or conflict with provisions of referenced document.

Inner Hose. The inner hose shall be designed, fabricated, inspected and tested for a design internal pressure and temperature range as specified with full vacuum in the annular space.

Outer Jacket. Outer jacket shall be designed for an external atmospheric pressure and internal vacuum of 10 Microns of mercury absolute with the outer flex hose at ambient temperature.

4. MATERIALS:

All materials shall be free from all defects impairing strength, durability and appearance and of the best commercial quality for the purpose specified. All materials shall be new and shall have structural properties to sustain safety and stresses to which they are subjected at the design conditions.

5. VACUUM JACKET DESIGN:

Each vacuum jacketed hose assembly shall be provided with at least one combination device which shall contain a vacuum thermocouple probe and which also shall be used for annular space evacuation and as a protection against over pressurization of the outer hose. Rupture discs are prohibited. The combination protective device shall be a vacuum valve with a lift disc, thermocouple port, and welded connection. Protective device shall be similar and equal to Control Components, Inc., Valve No. VV216 and Actuator VV216A for each hose. A shield shall be fabricated and installed to prevent damage to the protective device.

6. HEAT GAIN:

Maximum allowable over-all heat gain for the hose when filled with liquid nitrogen and at an outside ambient temperature of 100 degrees F shall be as shown below:

Hose Size	Heat Gain
2 Inch	4 BTU/Linear Foot/Hr.
3 Inch	6 BTU/Linear Foot/Hr.
6 Inch	12 BTU/Linear Foot/Hr.

SYM	ZONE	DESCRIPTION	DATE	APPROVED
1		[illegible] CHANGED FROM "...HOSE SHALL HAVE STAMPED INTO ITS [illegible]" [illegible] SHALL BE IDENTIFIED WITH [illegible] CHANGED CLEANING REQUIREMENTS FROM LEVEL 1 TO COMMERCIAL CLEAN. [illegible]		
		THIS DWG SUPERSEDES MTF STD FH-VJ		

REVISIONS

SIGNATURES	DATE
DRAWN	
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ENGINEER	
ISSUED MAR 1 [illegible] 1969	
SUBMITTED	
APPROVED	
USED ON 54500-D001	

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BAY ST. LOUIS, MISSISSIPPI

MTSD GENERAL ELECTRIC

FLEX HOSES, VACUUM JACKETED GENERAL

SIZE E | DWG. NO. 54500-GF01 | REV. 1

AUTHORITY NASA Ag-410 Mod MSFC-1 | SHEET 1 of 1

Amend. 90

7. INSULATION:

Radiant shield insulation, as required, shall be provided in the annular space of the hose to meet heat leak requirements.

8. EVACUATION:

The jacket of each section shall be evacuated to an absolute pressure less than 10 Microns, in the manufacturer's shop. The pressure in the vacuum jacket shall not exceed 200 Microns absolute in the ambient condition throughout the first year after acceptance by the purchaser.

9. DRAWINGS & DATA:

Prior to start of fabrication, the manufacturer shall submit shop 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 inner hose and outer hose, suspension system, heat gain, stiffening rings, connections, design calculations, and other details of design and construction. Fabrication drawings shall indicate all dimensions of the hose assemblies, including the method of supporting inner flex hose. Installation, assembly, and sectional drawings shall be complete in all details. The manufacturer shall furnish two reproducible copies of approved drawings as part of the order. 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.

10. PROPRIETARY NOTICES:

Such notices on drawings or data submitted that would restrict the Government Representative from reproducing or using copies of these drawings and data as required for maintenance and operation of the subject components will be a basis for deeming the manufacturer's bid proposal non-responsive. The purchase of standard shelf-item soft goods will not necessarily be restricted to the manufacturer and therefore must not be covered by such proprietary restrictions.

11. APPROVAL OF DEPARTURES:

Any departures from these specifications deemed necessary by the manufacturer, shall be submitted for approval with the shop drawings. Approved departures shall be incorporated in the work at no additional cost.

12. RESPONSIBILITY:

Approval of shop drawings and data will not relieve the manufacturer from responsibility for deviations from these specifications and the codes referenced herein, or for any error or omission which may exist, and the manufacturer shall be responsible for adequate design, details, fabrication and construction of all work.

13. 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. All protrusions and weld spatter shall be chipped or ground smooth to a sufficient degree to permit radiographic inspection. Care shall be taken that no voids, scale, blowholes, and/or other defects are present that would be detrimental to the performance or appearance of the flexible hose. In no case shall defective or unsatisfactory conditions exceed limitations specified by ASME requirements. All welds shall have 100 percent penetration. All mating parts shall be gaged to insure proper mating and interchangeability of like standard parts. Care shall be taken during construction to insure a high standard of cleanliness of all parts.

14. WELDING:

Stainless steel welding shall be the 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 Unfired Pressure Vessels. Manufacturer shall certify that the welds are within required specifications.

REFER TO SHEET NO. 1

SYM	ZONE	DESCRIPTION	DATE	APPROVED

REVISIONS

SIGNATURES	DATE
DRAWN	
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ENGINEER	
ISSUED	ISSUED/CET MAR 15 1968
SUBMITTED	
APPROVED	
USED ON	54B00-D001

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MTSD GENERAL ELECTRIC

FLEX HOSES, VACUUM JACKETED, GENERAL

SIZE	DWG. NO.	REV.
B	54B00-GF01	

AUTHORITY: NASAw-410 Mod MSFC-1 SHEET 2 of 4

Amend. 90

15. RADIOGRAPHY:

Inner Hose: All inner hose welds shall be 100 percent radiographed.

Outer Jacket: Outer jacket welds shall be spot radiographed.

Radiographing shall be in accordance with ASME, Boiler and Pressure Vessel Code, Section VIII, paragraph UW 51, for Unfired, Pressure Vessels.

16. ANNEALING:

All stainless steel shall be in the fully annealed condition before starting fabrication. Parts that are severely cold worked during fabrication shall be annealed before any welding is performed. Annealing or other approved heat treatment shall be compatible with, and shall not detract from, the maximum corrosion resistance characteristics of the material.

17. TOLERANCE:

On lineal dimensions the tolerance shall be plus or minus one and one half (1-1/2) Inches.

18. 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 tests unless specifically waived in writing. The manufacturer shall notify the purchaser a minimum of 72 hours prior to a scheduled test sequence. Certified results of the tests shall be transmitted with the hoses.

19. PROOF TEST:

Inner Hose: Each hose shall be hydrostatically tested at 1.5 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 sources disconnected. Relief valves and other appurtenances shall be isolated and/or removed before testing and replaced following the test.

Outer Hose: The outer hose shall be pneumatically tested with dry air or nitrogen at 22 PSIG.

20. COLD SHOCK TEST:

Each cryogenic flexible hose shall be cold shock tested with liquid nitrogen. The test condition shall be maintained for a minimum of 10 minutes. There shall be no visible leakage.

21. VACUUM TEST:

The annular space shall be subject to a static vacuum test while the inner hose is pressurized with 10-90 helium-nitrogen mixture to the design pressure as indicated on the individual flexible hose drawings. The vacuum shutoff valve shall be closed for a period of at least 48 hours after the inner space has been evacuated to 10 Microns of mercury or less. The internal pressure shall be maintained on the inner pipe during this period of time. After 48 hours, the total pressure increase in the annular space shall be determined and evaluated. There shall be no indication of leakage into the annular space when checked with a mass spectrometer set to a sensitivity of 1 x 10 - 8 atmospheric CC's per second of helium.

22. HEAT GAIN:

A heat gain test shall be performed on one typical hose of each size, using liquid nitrogen. Ends shall be capped and insulated. The annular space shall be evacuated to 10 Microns of mercury absolute pressure of non-condensable gases at ambient temperature, and the inner line maintained full of liquid nitrogen by the use of a liquid nitrogen reservoir for a period of not less than 8 hours after temperature stabilization. During this 8 hour period, the vented gas shall be measured by an integrating type flowmeter and the results corrected for temperature, pressure, and the heat gain in the liquid reservoir used to maintain the liquid level in the pipe section. The average heat gain in the hose segment shall not exceed the value specified herein before. Manufacturer will certify the average heat gain through end connections and test equipment and the average heat gain of the hose assembly. The manufacturer shall submit, for approval, descriptions of the equipment to be used for the test, sketch of test loop, as well as test procedures.

SYM	ZONE	REFER TO SHEET NO. 1 DESCRIPTION	DATE	APPROVED

REVISIONS

SIGNATURES	DATE	NATIONAL AERONAUTICS SPACE ADMINISTRATION GEORGE C. MARSHALL SPACE FLIGHT CENTER MISSISSIPPI TEST FACILITY BAY ST. LOUIS, MISSISSIPPI
DRAWN		MTSD GENERAL ELECTRIC
CHECKED		
ENGINEER		FLEX HOSES, VACUUM JACKETED, GENERAL
ISSUED ISSUED/CEF MAR 15 1960		
SUBMITTED		
APPROVED		SIZE B DWG. NO. 54B00-GF01 REV. 1
USED ON		AUTHORITY 54B00-D001 NASA w-410 Mod. MSFC-1 SHEET 3 of 4

23. REJECTION:

Failure to meet any of the above specified tests' requirements shall result in rejection of the equipment under test.

24. CERTIFICATION & REPORTS:

The manufacturer shall furnish three (3) copies of all certification and test reports to the purchaser within one week after completion of the work.

25. CLEANING:

Commercial clean.

26. SHIPPING:

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 non-metallic material is permitted as long as the coil tightness does not exceed the natural lay of the hose materials. 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.

27. IDENTIFICATION:

Each hose shall be identified with the following information:

Hose Type
Design Temperature
Design Pressure
Proof Pressure
Service
Date of Proof Test
Serial No.

COMMERCIAL CLEANING PROCESS AT THE MANUFACTURER'S FACILITY

1. COMMERCIALLY CLEAN:

"Commercially Clean" is defined as visually free of loose slag, water, rust, gold or other foreign solid particles, and containing no visual sign of oil, grease or hydrocarbons.

2. CLEANLINESS LEVEL:

All surfaces contacted by the process fluid shall be in a "commercially clean" condition prior to assembly and leakage testing as required by the applicable specification. Valves specified for service in cryogenic service require that all external surfaces subject to cryogenic temperatures be in a "Commercially Clean" condition prior to performing external leakage tests.

3. CLEANING METHOD AND AGENTS:

Cleaning agents and methods shall be at the option of the manufacturer. Cleaning shall be accomplished by any method, or combination of methods, which assures the "commercially clean" level is attained.

4. INSPECTION

"Commercially Clean" valves as received from the manufacturer and upon visual inspection fail to meet the "Commercially Clean" requirements as defined in paragraph 1 and paragraph 2, shall be rejected by the purchaser and returned to the manufacturer.

REMOVED "EXCESSIVE" FROM ITEM 1.
ADDED "VISUALLY" AND "WATER" TO ITEM 1. REPLACED "LIQUID HYDROGEN" WITH "CRYOGENIC SERVICE" IN ITEM 2. (SEE HISTORY FILE FOR PREVIOUS REVISIONS)

SYM	ZONE	DESCRIPTION	DATE	APPROVED

REVISIONS

SIGNATURES	DATE
DRAWN R. SWANSON	9/6/68
CHECKED D. A. DiCerbo	9/6/68
ENGINEER D. A. DiCerbo	9/6/68
ISSUED ISSUED/CEF	9/11/68
SUBMITTED R. Ciccarelli	9/6/68
APPROVED R. G. Smith	9/11/68
USED ON 54000-D001	

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NATIONAL SPACE TECHNOLOGY LABORATORIES
NSTL STATION, MISSISSIPPI 39529

COMMERCIAL CLEANING PROCESS AT MANUFACTURER'S FACILITY

SIZE | DWG. NO. 54000-GC01 | REV.

AUTHORITY | SHEET 1 of 1

1. SCOPE:

Specified herein are the quality and inspection requirements for steel forgings for high pressure components, which are supplementary to the basic 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 & ultrasonic inspection techniques. The minimum acceptable quality requirements for these respective inspection methods are listed below. Where these methods may yield conflicting or contrary indications as to the severity of a defect, the most severe indication will govern the acceptance and/or disposition of the forging in question.

a. Liquid Penetrant Indications. Maximum permissible indications of a liquid penetrant examination made in accordance with ASTM E165-65 shall be as specified in paragraph N-627.7 of Section III of the ASME Boiler and Pressure Vessel Code except that weld repair shall be as specified under Section 4 of this document.

b. Ultrasonic Indications. Maximum defect severity for all discontinuity types shall be Class AA as indicated by MIL-I-8950B.

3. INSPECTION OF STEEL FORGINGS:

a. General.

(1) Vendor's Responsibility. The various inspections of steel forgings as stipulated herein shall be the responsibility of the vendor. However, it is not the intent of this specification to exclude 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 serviceability of any forging provided hereunder. All cost associated with the inspections 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 inspections and shall have a right to all data and results of such inspections. These data and results must be made available to the Purchaser immediately upon completion or termination of any inspection procedure. All pertinent data relating to their interpretation shall be transferred to and become the property of the Purchaser.

If the Purchaser or his authorized representative has reason to believe that the requirements of this specification are not being met, he the Purchaser or his authorized representative, can 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.

(3) Point of Inspection. The forgings are to be subjected to the inspections as outlined herein upon receipt from the forge shop or prior to any finished machining operations. Inspection of the forging at this point does not relieve the vendor of the responsibility of providing a component that satisfies the intent and requirements of the basic component specification.

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-627.7 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 A388-67 using the longitudinal beam technique. The types and degrees of defects shall be judged by MIL-I-8950B, Class AA.

4. REPAIR BY WELDING:

Repairs of defects by welding shall be in accordance with the requirements of paragraph UF-37 of Section VIII of the ASME Boiler and Pressure Vessel Code. The procedure qualification shall be performed on test specimens of forged material of the same specification and subjected to the heat-treatment before and after welding as will be applied to the work. All welders 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.

SYM	ZONE	PRELIMINARY RELEASE DESCRIPTION	DATE	APPROVED
		REVISIONS		

SIGNATURES	DATE
DRAWN	
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ENGINEER	
ISSUED	JUN 17 1970
SUBMITTED	
APPROVED	
USED ON 14000 D001 STA. GC1	

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MTSD GENERAL ELECTRIC

FORGING, STEEL
QUALITY AND INSPECTION REQUIREMENTS

SIZE | DWG. NO. 14000-GC11 | REV.
AUTHORITY WR G2/203 | SHEET 1 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	REFER TO SHEET NO. 1. DESCRIPTION	DATE	APPROVED

REVISIONS

SIGNATURES	DATE
DRAWN	
CHECKED	
ENGINEER	
ISSUED JUN 17 1970	
SUBMITTED	
APPROVED	
USED ON 54000-D001 Sht. GC-1	

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FORGING, STEEL
QUALITY AND INSPECTION REQUIREMENTS

SIZE | DWG. NO. 54000-GC11 | REV.

AUTHORITY WR 321233 | SHEET 2 of 2

SYM	ZONE	DESCRIPTION	DATE	APPROVED
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.'S a 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.'S a 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 JMFGSPW304. 6/14/93 MMM 8/3/93	ISSUED/CEF [illegible]	[illegible] 1993
5		COMPLETELY REWRITTEN PER NAS13-1 REQUIREMENTS. ISSUED/CEF 9-13-79	9-10-79	L.B. MIX

REVISIONS

	SIGNATURE	DATE
DRAWN	L. HOLDER	10-31-68
CHECKED	L. HOLDER	10-31-68
ENGINEER	D. DICERBO	10-31-68
ISSUED	CEF	11-18-68
SUBMITTED	L. TERRY	10-31-68
NASA SAFETY		
APPROVED	SMITH	10-31-68
USED ON	54000-D001 SH. G2	

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

JOHN C. STENNIS SPACE CENTER SSC, MS 39529-6000

DRAWINGS AND DOCUMENTATION, VALVES AND COMPONENTS

SIZE B | DWG. NO. 54000-GD01 | REV. 6

AUTHORITY NASA 410 MOD MSFC-1 | SHEET 1 OF 5

AMEND. 90

CADD CONTROLLED DRAWING
CADD P/N:
SCD/54000/GD01R6/SHT1

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 S75.02 CONTROL VALVE CAPACITY TEST PROCEDURE

ASME, BOILER AND PRESSURE VESSSEL CODE
SECTION VIII, DIVISION 1 RULES FOR UNFIRED 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 SHTLAL 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 IDUSTRY 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.

4. CERTIFIED CAPACITY RATING:

   a. VALVE COEFFICIENT, Cv, SHALL BE PER ANSI/ISA S75.02. 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 S75.02.

   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 PRODUT 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.

4. ACTUATION INFORMATION AS FOLLOWS:

   a. FOR HANDWHEEL OPERATED VALVE TYPES (CONVENTIONAL, BEVEL GEAR, ETC.): MAXIMUM TORQUE REQUIRED UNDER OPERATIONAL CONDITIONS.

   b. FOR CYLINDER OPERATED VALVES: MANUFACTURER, MODEL, DESIGN/MAXIMUM ALLOWABLE WORKING PRESSURE, MAXIMUM ACTUATION PRESSURE, BURST PRESSURE, STROKE, PISTON DIAMETER, AND CALCULATED THRUST.

   c. A CROSS-SECTIONAL ASSEMBLY VIEW OF ACTUATOR 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.

5. WHERE ALLOWABLE LEAKAGE RATE CRITERIA IS NOT SPECIFIED, THE CONTRACTOR WILL PROVIDE A STATEMENT OF GUARANTEE IN REGARD TO HIS OWN LEAKAGE RATE CRITERIA.

6. TOTAL WEIGHT OF VALVE AND ACTUATOR ASSEMBLY. WHERE AN ACTUATOR OTHER THAN A HAND OPERATED ACTUATOR IS USED, THE WEIGHT OF THE ACTUATING UNIT WILL BE SUPPLIED.

7. CERTIFIED CAPACITY RATING:

   a. VALVE COEFFICIENT, Cv, SHALL BE PER ANSI/ISA S75.02. 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 S75.02.

   b. RELIEF VALVE RELIEVING CAPACITY SHALL BE PER ASME SECTION VIII, DIVISION I.

8. PRESSURE RATINGS FOR DESIGN/MAXIMUM ALLOWABLE WORKING PRESSURE, PROOF PRESSURE, AND BURST PRESSURE.

9. CONTRACTOR'S PART/MODEL NUMBER.

10. RECOMMENDED SPARE PARTS.

11. ELECTRICAL REQUIREMENTS FOR SOLENOID VALVES AND ELECTRICAL ACTUATORS.

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

SYM	ZONE	DESCRIPTION	DATE	APPROVED

REVISIONS

SIGNATURE	DATE
DRAWN	
CHECKED	
ENGINEER	
ISSUED	
SUBMITTED	
NASA SAFETY	
APPROVED	
USED ON 54000-D001 SH. G2	

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

JOHN C. STENNIS SPACE CENTER SSC, MS 39529-6000

DRAWINGS AND DOCUMENTATION, VALVES AND COMPONENTS

SIZE B | DWG. NO. 54000-GD01 | REV. 6

AUTHORITY | SHEET 5 OF 5

CADD CONTROLLED DRAWING
CADD P/N: SCD/54000/GD01R6/SHT5

SYM	ZONE	DESCRIPTION	DATE	APPROVED
5		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/CEF SDM
4		RETYPED SHEET 1; ADDED FLAGNOTE 1; DELETED REQUIREMENT FOR CAPACITY/CV TO BE IDENTIFIED ON THE COMPONENT PER FSR 90HD56-03. ISSUED/CEF 06-27-85	6-18-85	R.C. BRUCE JR NASA NSTL FED

REVISIONS

SIGNATURE		DATE
DRAWN	KARL R. SWANSON	10-23-87
CHECKED	CARL CARRECA	10-24-87
ENGINEER	D.A. DECERBO	10-24-87
ISSUED	CEF	1-8-88
SUBMITTED	E. SWAIN	11-6-87
NASA SAFETY		
APPROVED	R.G. SMITH	1-5-88
USED ON	54000-D001	

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

JOHN C. STENNIS SPACE CENTER
SSC, MS 39529-6000

PACKAGING & IDENTIFICATION VALVES & COMPONENTS

SIZE B | DWG. NO. 54000-GP01 | REV. 5

AUTHORITY NASW-410 MOD MSFC-1 | SHEET 1 OF 4

AMEND. 90

CADD CONTROLLED DRAWING
CADD P/N:
SCD.54000-GP01REV5

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 1 SHT.4
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.

REFER TO SHEET NO. 1

SYM	ZONE	DESCRIPTION	DATE	APPROVED

REVISIONS

SIGNATURE	DATE
DRAWN	
CHECKED	
ENGINEER	
ISSUED	
SUBMITTED	
NASA SAFETY	
APPROVED	
USED ON 54000-D001	

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

JOHN C. STENNIS SPACE CENTER
SSC, MS 39529-6000

PACKAGING & IDENTIFICATION
VALVES & COMPONENTS

CADD CONTROLLED DRAWING
CICD P/N: SCD.54000-GP01REV5

SIZE B | DWG. NO. 54000-GP01 | REV. 5

AUTHORITY | 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.

NOTES

1. 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.

SYM	ZONE	DESCRIPTION	DATE	APPROVED
		REFER TO SHEET NO. 1		

REVISIONS

SIGNATURE	DATE
DRAWN	
CHECKED	
ENGINEER	
ISSUED	
SUBMITTED	
NASA SAEPT	
APPROVED	
USED ON 54000–D001	

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

JOHN C. STENNIS SPACE CENTER SSC, MS 39529–6000

PACKAGING & IDENTIFICATION VALVES & COMPONENTS

SIZE B | DWG. NO. 54000–GP01 | REV. 5

AUTHORITY | SHEET 4 OF 4

CADD CONTROLLED DRAWING
CADD P/N: SCD.54000–GP01REV5

National Aeronautics and Space Administration
John C. Stennis Space Center
Stennis Space Center, MS 39529-6000

CONTRACTOR TRANSMITTAL SHEET

DATE

SHEET OF

SECTION I - REQUEST FOR APPROVAL *(To be Initiated by the Contractor)*

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE
(See Instructions on Reverse)

CONTRACT NO.

☐ NEW SUBMITTAL
☐ RESUBMITTAL

TO	FROM	PREVIOUS TRANSMITTAL NO. *(If Any)*	TRANSMITTAL NO.

SPECIFICATION AND SECTION NO. *(Cover Only One Section With Each Transmittal)*	PROJECT TITLE AND LOCATION

ITEM NO. (a)	DESCRIPTION OF ITEM SUBMITTED (Type, Size, Model Number, ect.) (See Instruction No. 3) (b)	MANUFACTURER OF ITEM *(See Instruction No. 8)* (c)	NO. OF COPIES (d)	CONTRACT REFERENCE DOCUMENT		VARIATION (See Instruction No. 6) (g)	ACTION CODE *(See Instruction No. 9)* (h)
				SPECIFICATION PARAGRAPH NO. (e)	DRAWING SHEET NO. (f)		

REMARKS

I certify that the above submitted items have been reviewed in detail and are correct and in strict conformance with the contract drawings and specifications, except as stated.

NAME AND SIGNATURE OF CONTRACTOR

SECTION II - APPROVAL ACTION

ENCLOSURES RETURNED *(List by Item No.)*	NAME, TITLE, AND SIGNATURE OF APPROVING AUTHORITY	DATE

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.