

KSC-STD-P-0002A
October 20, 1988

Supersedes
KSC-STD-P-0002
May 26, 1976

**PREPARATION OF COMPONENT
PROCUREMENT/PERFORMANCE SPECIFICATIONS
STANDARD FOR**

ENGINEERING DEVELOPMENT DIRECTORATE

National Aeronautics and
Space Administration

John F. Kennedy Space Center



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STANDARD FOR**

Approved By:

for Walter T. Munsch
James D. Phillips
Director of Engineering Development

JOHN F. KENNEDY SPACE CENTER, NASA

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PREPARATION OF COMPONENT
PROCUREMENT/PERFORMANCE SPECIFICATIONS
STANDARD FOR

This standard has been approved by the Engineering Development Directorate (DE) of the John F. Kennedy Space Center (KSC) and is mandatory for use by KSC and associated contractors.

1. SCOPE

This standard establishes the guidelines and procedures for the preparation of component procurement/performance specifications. This standard applies to the preparation of new component procurement/performance specifications for which KSC has responsibility. A component procurement/performance specification will be prepared when industry, Federal, Military, or NASA specifications for the item to be purchased do not exist or when existing industry, Military, Federal, or NASA specifications do not adequately define, control, or document the component.

2. APPLICABLE DOCUMENTS

Governmental.

Specifications.

John F. Kennedy Space Center, NASA

| | |
|-----------------|---|
| KSC-C-123 | Surface Cleanliness of Fluid Systems, Specification for |
| KSC-SPEC-Z-0019 | Age Control of Elastomeric Parts, Specification for |

Publications.

John F. Kennedy Space Center, NASA

| | |
|---------------|---|
| KSC-DE-512-SM | Guide for Design Engineering of Ground Support Equipment and Facilities for Use at Kennedy Space Center |
| KSC-DF-107 | DE Technical Publications Style Guide |
| GP-435 | Engineering Drafting Practices Manual |

3. REQUIREMENTS

3.1 General Requirements. - Component procurement/performance specifications shall contain all information required to adequately define the component for procurement. Minimum acceptance standards or characteristics that apply to the design requirements and performance required, such as operating pressure, flow factor, fluid compatibility, lubrication, critical dimensions, electrical characteristics, maintainability, safety, reliability, and quality assurance, shall be stated. Whenever practicable, requirements shall be stated in terms of functions to be performed or performance to be required. Market research shall be utilized to the extent practicable and specifications shall state requirements in such a manner as to promote full and open competition. Restrictive provisions or conditions shall be included only to the extent necessary to satisfy the minimum needs of KSC or as authorized by law. The applicable requirements of KSC-DE-512-SM shall be specified in the appropriate paragraphs of the specification.

Whenever available, industry specifications shall be used in defining a new component. When an appropriate industry specification does not exist, Federal specifications followed by Military and then NASA specifications shall be used.

There are two types of component procurement/performance specifications:

- a. **Multicomponent:** This type of specification will reflect a family of components, such as one type of pressure switch with various settings or one style of check valve with different port sizes.
- b. **Single Item:** Only a single component is identified in this type of specification.

The KSC B-size drawing formats, Form 21-4 and Form 21-4B, shall be used in the preparation of component procurement/performance specifications. A sample component procurement/performance specification is shown in Figure 1.

3.2 Writing Requirements. - Writing requirements such as writing mechanics and style, abbreviations, symbols, capitalization, punctuation, etc., shall be in accordance with KSC-DF-107, DE Technical Documentation Style Guide.

3.3 Detailed Requirements. - Detailed requirements appropriate to the type of component for which a component procurement/performance specification is being prepared shall be specified to ensure all technical requirements will be met.

3.3.1 Requirements for All Component Specifications. - The following requirements apply to all component procurement/performance specifications.

| PART NO. | | REVISE | | REVISIONS | |
|----------|-------------|--------|----|-------------|----------|
| QTY | DESCRIPTION | DATE | BY | DESCRIPTION | APPROVAL |
| | | | | | |
| | | | | | |
| | | | | | |

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|--|---|--|
| <p>1. SERVICE: AIR, OXYGEN</p> <p>2. SET PRESSURE: SEE SHT 3</p> <p>3. PROOF PRESSURE: 1-1/2 TIMES SET PRESSURE (INLET ONLY)</p> <p>4. BURST PRESSURE: 4 TIMES SET PRESSURE MIN (INLET ONLY)</p> <p>5. FLOW CHARACTERISTICS: SEE SHT 3.</p> <p>6. OPERATION: DIRECT ACTING; SPRING LOADED. VALVES ACTIVATE AT SET PRESSURES SPECIFIED ON SHT 3. OTHER OPERATING PRESSURE VALUES SHALL BE ACCORDING TO THE FOLLOWING DEFINITIONS & REQUIREMENTS: AT WHICH FIRST LEAKAGE OCCURS THRU CRACKING PRESSURE IS THAT INLET PRESSURE SET AT PRESSURES BELOW 50 PSIG THE VALVE ON INCREASING PRESSURE. AT WHICH PRESSURE VALVES SET AT SHALL NOT CRACK AT LESS THAN 95% OF SPECIFIED SET PRESSURE. VALVES SET AT 50 TO 99 PSIG SHALL NOT CRACK AT LESS THAN 95% OF SPECIFIED SET PRESSURE. VALVES SET AT 100 PSIG & HIGHER SHALL NOT CRACK AT LESS THAN 95% OF SPECIFIED SET PRESSURE.</p> <p>7. PNEUMATIC CONNECTIONS: INLET PORT - MS31849-9 OUTLET PORT - MS33649-16</p> | <p>8. CLEANING: CLEAN, PROTECT & INSPECT PER KSC-C-123</p> <p>A. PROCEDURE: AS APPLICABLE</p> <p>B. CLEANLINESS: LEVEL 300A</p> <p>C. TEST METHOD: AS REQUIRED</p> <p>D. CERTIFICATION: REQUIRED</p> <p>9. LEAKAGE: BUBBLE TIGHT EXTERNALLY. BUBBLE TIGHT INTERNALLY ON INCREASING PRESSURE UP TO CRACKING PRESSURE. INTERNAL LEAKAGE OCCURRING AFTER RESEAT SHALL BE ACCEPTABLE PROVIDED IT DOES NOT REOCCUR ON INCREASING PRESSURE AFTER THE INLET PRESSURE HAS BEEN REDUCED TO ZERO. TEST PRESSURES SHALL BE HELD FOR ONE MINUTE (MIN).</p> <p>10. OPERATING TEMPERATURE: -20°F TO 160°F</p> <p>11. LUBRICATION: USE KNITOX 240AC OR AN APPROVED EQUAL.</p> <p>NOTES:</p> <p>A. SEE QWG 79K0459 FOR MAINTENANCE REQUIREMENTS. VENDOR SHALL PROVIDE COMPONENTS & SOFT GOODS KITS CONSISTING OF THE PARTS DESCRIBED IN THE MAINTENANCE QWG.</p> <p>B. WEIGHTS OF VALVES</p> <p>79K0459-1 THRU -13, WT = 4.3 LBS</p> <p>79K0459-14, -15, WT = 13.3 LBS</p> | <p>ORIGINAL DATE OF DRAWING: 7-1-82</p> <p>DESIGNER: [Signature]</p> <p>CHECKER: [Signature]</p> <p>DATE: [Signature]</p> <p>SCALE: [Signature]</p> |
|--|---|--|

| | |
|---|---|
| <p>UNLESS OTHERWISE SPECIFIED</p> <p>TOLERANCES ARE IN INCHES</p> <p>FRACTIONS DECIMALS ANGLES</p> <p>±.012 ±.012</p> <p>FINISH: [Signature]</p> <p>HEAT TREATMENT: [Signature]</p> <p>MATERIAL SPECIFICATION: [Signature]</p> <p>APPLICATION: [Signature]</p> <p>SEE ENGINEERING RECORDS</p> <p>NEET ASST USED ON: [Signature]</p> | <p>COMPONENT SPECIFICATION</p> <p>VALVE, SAFETY-RELIEF</p> <p>1/2" X 1/87 ORIFICE</p> <p>AIR & OXYGEN SERVICE</p> <p>20-7400 PSIG PRESS RANGE</p> <p>WEIGHT DIRECTED: [Signature]</p> <p>DATE: [Signature]</p> <p>UNIT WEIGHT: [Signature]</p> <p>SEE NOTE B</p> |
|---|---|

| | |
|---|------------------------|
| <p>JOHN F. KENNEDY SPACE CENTER, FLORIDA</p> | <p>79K80459</p> |
| <p>REVISIONS</p> | <p>DATE</p> |
| <p>BY</p> | <p>OF</p> |

Figure 1. A Sample Component Procurement/Performance Specification (Sheet 1 of 4)

| COMPONENT SPECIFICATION SHEET | | | |
|-------------------------------|-------------|---------|-------------|
| SYN | DESCRIPTION | DATE | APPROVAL |
| A | NO CHG | 1-17-83 | [Signature] |
| B | NO CHG | 12-7-88 | [Signature] |

12. MATERIALS: BODY - 316 SST
 SPRING - 316 SST OR 17-7PH SST
 INTERNAL METAL PARTS - 300 SERIES SST
 SEAT - VITON-A
 BUSHING SEAL - VITON-A
 BUSHING SEAL - TEFLON

SEALS SHALL CONFORM TO MIL, AMS OR MAS SPECIFICATIONS/STANDARDS.
 ALL MATERIALS IN CONTACT WITH THE FLUID TO BE OXYGEN COMPATIBLE PER MS-B-806011. BATH TEST VITON-A REQUIRED PER Dwg 79K19556.

13. AGE CONTROL: PER KSC-SPEC-Z-0019. THE INSTALLATION DATE OF ELASTOMERIC PARTS SHALL BE MARKED UPON THE ASSEMBLY.

14. COMPONENT MARKINGS: THE VENDOR'S NAME, PART NO., SERIAL NO. (IF APPLICABLE), & KSC Dwg NO. SHALL APPEAR PERMANENTLY & LEGIBLY UPON THE ASSEMBLY. A SEPARATE 300 SERIES SST TAG APPROXIMATELY 1" X 3" X .002" SHALL BE SECURED BY THE SEAL WIRE TO THE RELIEF VALVE. THE VENDOR SHALL STAMP, ENGRAVE OR ETCH THE KSC PART NO. ON THE TAG IN CHARACTERS APPROXIMATELY 1/8" HIGH. SEE INT 4. KSC WILL ADD A SECOND DASH NO. WHICH WILL BE THE ACTUAL SET PRESSURE.

15. MOUNTING ATTITUDE: UPRIGHT VERTICAL POSITION.

16. DIMENSIONS: ENVELOPE IN ACCORDANCE WITH SHT 4.

17. TESTING: THE MANUFACTURER SHALL PROVIDE WRITTEN CERTIFICATION OF THE FOLLOWING: PROOF TEST PER ITEM 3; OPERATIONAL TEST PER ITEM 6; LEAKAGE TEST PER ITEM 9. PROOF TEST MUST BE PERFORMED PRIOR TO FUNCTIONAL & LEAK TEST. FUNCTIONAL TEST SHALL VERIFY AS A MINIMUM THAT VALVE IS LEAK TIGHT AS SPECIFIED.

18. PACKAGING: PER MANUFACTURER'S STANDARD COMMERCIAL PRACTICE, PROVIDED THAT PACKING SHALL BE SUFFICIENT TO PROTECT COMPONENT AGAINST DAMAGE DURING SHIPMENT. EXTERIOR SHIPPING CONTAINERS SHALL CONFORM TO FREIGHT CLASSIFICATION RULES & APPLICABLE CONTAINER SPECIFICATIONS.

19. MANUFACTURER: ANDERSON, GREENWOOD & CO.
 P.O. BOX 1097
 BELLAIRE, TEXAS 77401
 PSC# 01343

SUPPLIER IS: MARCO EQUIPMENT & INDUSTRIAL SALES INC.
 5-2865 TAYLOR ROAD
 OREGON PARK, NEW YORK 14127

OR KSC DESIGN ENGINEERING APPROVED EQUAL.

20. APPROVAL: ANY CHANGE TO THE COMPONENTS DESCRIBED BY THIS Dwg REQUIRES PRIOR KSC DESIGN ENGINEERING APPROVAL.

21. VENDOR DATA: WHEN SPECIFIED ON THE PURCHASE ORDER, THE VENDOR SHALL PROVIDE THREE (3) SETS OF NON-RESTRICTIVE ASSEMBLY DWGS, PARTS LISTS, TECHNICAL DATA, INSTRUCTIONS, ETC., SUITABLE FOR INSPECTION, TEST & MAINTENANCE. DRAWINGS SHALL BE IDENTIFIED ON THE PARTS LIST BY THE APPROPRIATE GOVERNMENT STANDARD PART NUMBER (MS, AM, MAS, ETC.) OR BY THE ASS68 DASH NUMBER, TYPE OF MATERIAL & HARDNESS (HARDNESS). ALL OTHER PARTS DESCRIBED BY A GOVERNMENT SPECIFICATION/STANDARD & USED WITHOUT FURTHER ALTERATION OR SELECTION SHALL BE IDENTIFIED ON THE PARTS LIST BY THE APPROPRIATE SPECIFICATION/STANDARD PART NUMBER. (EXAMPLES: BOLT, FULL THREADED, MAS568-33; RING, RETAINING, MS16624-4025).

COMPONENT SPECIFICATION

| | | | | |
|----------------|-------|----------|---|----------|
| CODE IDENT NO. | 22284 | Dwg SIZE | B | 79K80459 |
| | | | | SHEET 2 |

Figure 1. A Sample Component Procurement/Performance Specification
(Sheet 2 of 4)

| CONTINUATION SHEET | | | REVISION | | DATE | APPROVAL |
|--------------------|-------------|--|----------|---------|------|----------|
| SYM | DESCRIPTION | | | | | |
| A | NO CHG | | | 6-10-87 | | |
| B | NO CHG | | | 7-7-86 | | |

| KSC PART NUMBER | VENDOR PART NUMBER | SET PRESSURE RANGE - PSIG | FLOW CAPACITY CFM | SPRING VENDOR PART NUMBER | SOFT GOODS KIT-VENDOR PART NUMBER |
|-----------------|--------------------|---------------------------|-------------------|---------------------------|-----------------------------------|
| 79K8C459-1 | 83J548-3 | 20-31 | 17.7 | 03-CC43-002 | 04-4805-0148T |
| 79K8C459-2 | 83J548-3 | 32-46 | 23.6 | 03-CC42-002 | 04-4805-0158T |
| 79K8C459-3 | 83J548-3 | 47-69 | 32.1 | 03-CC43-002 | 04-4805-0168T |
| 79K8C459-4 | 83J548-3 | 70-124 | 45.2 | 03-CC44-002 | 04-4805-0188T |
| 79K8C459-5 | 83J548-3 | 105-156 | 65 | 03-CC45-002 | 04-4305-0143T |
| 79K8C459-6 | 83J548-3 | 157-235 | 94 | 03-CC46-002 | 04-4805-0198T |
| 79K8C459-7 | 83J548-3 | 236-350 | 138 | 03-CC47-002 | 04-4805-0198T |
| 79K8C459-8 | 83J548-3 | 351-526 | 205 | 03-CC48-002 | 04-4805-0198T |
| 79K8C459-9 | 83J548-3 | 527-750 | 305 | 03-CC49-002 | 04-4805-0198T |
| 79K8C459-10 | 83J548-3 | 791-1130 | 452 | 03-CC50-002 | 04-4805-0198T |
| 79K8C459-11 | 83J548-3 | 1131-1775 | 674 | 03-CC51-002 | 04-4805-0198T |
| 79K8C459-12 | 83J548-3 | 1776-2675 | 1013 | 03-CC52-002 | 04-4805-0198T |
| 79K8C459-13 | 83J548-3 | 2676-4000 | 1516 | 03-CC53-002 | 04-4805-0198T |
| 79K8C459-14 | 83J548-3 | 4001-6000 | 2268 | 03-CC54-002 | 04-4805-0198T |
| 79K8C459-15 | 83J548-3 | 6001-7400 | 3037 | 03-CC55-002 | 04-4805-0198T |
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NOTES:

- VENDOR SHALL SUPPLY THE VALVES SET AT MID-RANGE OF THE INDICATED SET PRESSURE RANGE.
- FLOW CAPACITIES SHOWN ARE FOR AIR. FLOWS ARE GIVEN AT MID-RANGE OF SET PRESSURE (10% ACCUMULATION) WITH AIR AT 50°F & 14.7 PSIA. FOR OXYGEN, THESE FLOWS ARE 410% IN 5%.
- SOFT GOODS KITS CONSIST OF BLOW-DOWN SEAL, BUSHING SEAL & SEAT.
- EACH SOFT GOODS KIT INCLUDES ALL SEAT SIZES, BUSHING SEALS & BLOW-DOWN SEALS, BUT EXCLUDES THE CAP SEAL.

| | | | |
|----------------|----------|----------|--|
| CODE IDENT NO. | DWG SIZE | 79K80459 | |
| 22264 | B | SHEET 3 | |

Figure 1. A Sample Component Procurement/Performance Specification (Sheet 3 of 4)

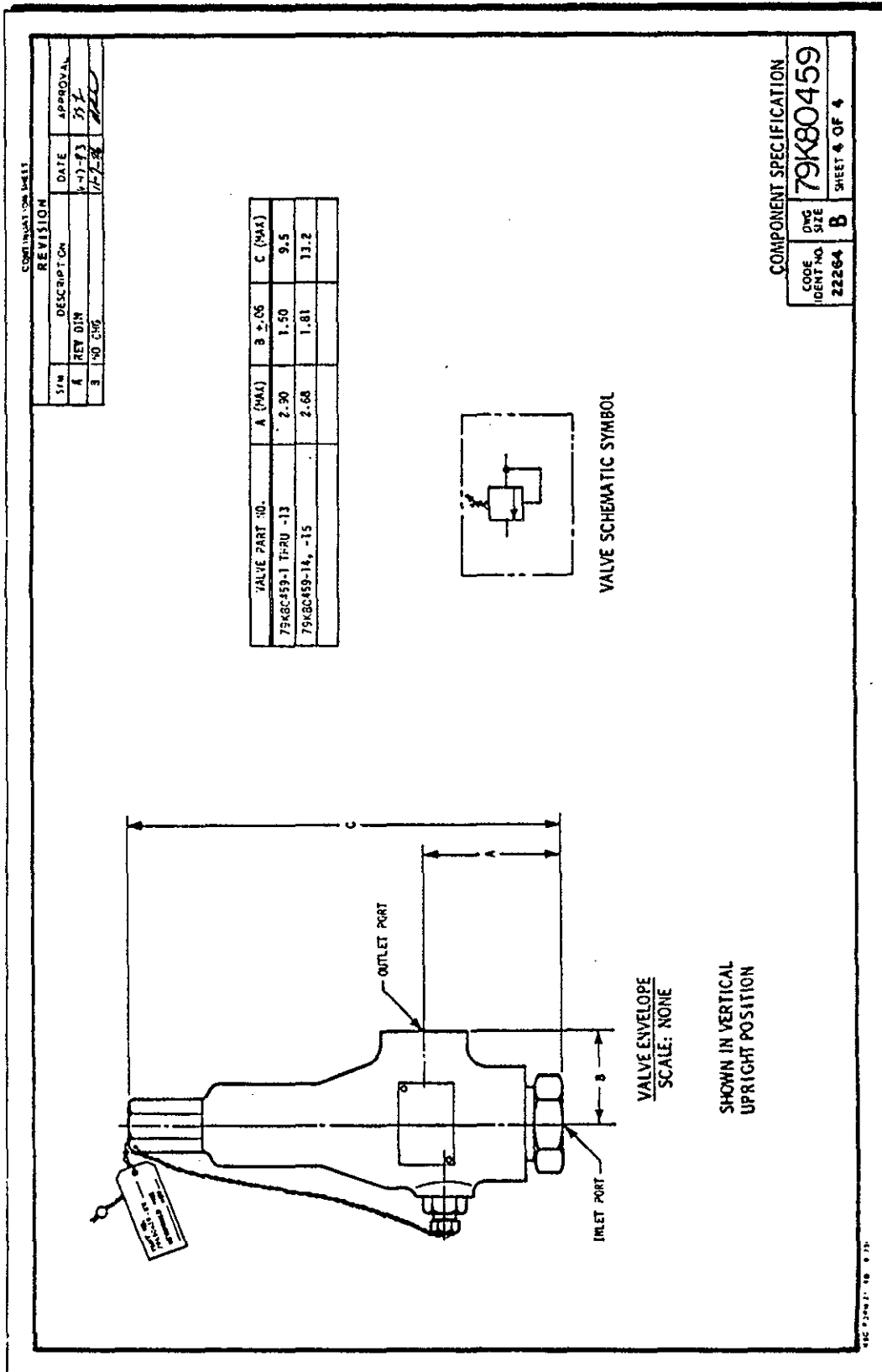


Figure 1. A Sample Component Procurement/Performance Specification
(Sheet 4 of 4)

3.3.1.1 Component Marking. - The vendor's name, part number, serial number (if applicable), KSC drawing number, and direction of flow or other component-specific characteristics (e.g., set pressure, filter delta P) shall appear permanently and legibly upon the assembly if space permits. Minimum markings shall include the KSC drawing number and direction of flow or labeling of inlet/outlet ports, if applicable.

3.3.1.2 Quality Assurance Tests and/or Inspections. - Quality assurance provisions, including tests, test data, inspections, and certification of compliance, shall be specified as required to ensure that the component meets the requirements of the specification.

3.3.1.3 Packaging. - Packaging shall be in accordance with the manufacturer's standard commercial practice, provided that packaging shall be sufficient to protect the component against damage during shipment. Exterior shipping containers shall conform to freight classification rules and applicable container specifications.

3.3.1.4 Vendor Data. - When specified on the purchase order, the vendor shall provide three sets of nondestructive assembly drawings, parts lists, technical data, instructions, etc., suitable for inspection, test, and maintenance. Parts lists for the component shall contain:

- a. Description: The name of the part and, when necessary, the size, dimensions, material, and tolerances.
- b. True manufacturer's name: Federal supply code for actual manufacturer.
- c. True manufacturer's part number: The Government standard part number should also be supplied, if applicable.
- d. Repair parts: When repair parts are provided in the form of kits or as quick-change units, each part shall be identified per (a), (b), and (c) of this item.
- e. Quantity: The quantity of each part required.
- f. Spare parts: Coded to reflect recommended spare parts.

3.3.2 Typical Mechanical Component Requirements. - Requirements for a typical mechanical component, such as a valve or regulator, are as follows:

- a. Service: Applicable media, for example air, nitrogen, helium, liquid oxygen, water, etc.
- b. Operating pressure: As applicable.
- c. Hydrostatic test pressure: 1-1/2 times maximum operating pressure.

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- d. Maximum allowable stress: In accordance with ANSI/ASME or other applicable codes.
- e. Flow: Specify whether monodirectional, bidirectional, flow factor, etc.
- f. Operation: As applicable, if manual, list maximum torques.
- g. Connections: As applicable, in accordance with MS 33649, Grayloc, Superpressure, etc.
- h. Leakage: List requirement and define allowable leakage.
- i. Operating temperature: As applicable, show range.
- j. Materials: List types of materials used as applicable (e.g., body: 300 series SST, seat: nylon, seals: O-rings per MIL, etc.). Material compatibility requirements shall be stated, and batch testing requirements, as applicable, shall be indicated.
- k. Cleaning: As applicable per KSC-C-123 (e.g., procedure, cleanliness level, test method, certification required, etc.).
- l. Lubrication: As applicable per Military or oxygen compatibility specification.
- m. Age control: In accordance with KSC-SPEC-Z-0019.
- n. Mounting attitudes: As applicable.
- o. Manufacturer: List the name and address of the previously supplied or qualified component manufacturer and the Federal supply code number of the manufacturer.
- p. Component marking. The vendor's name, part number, KSC drawing number, and direction of flow or other component-specific characteristics shall appear permanently and legibly upon the assembly.
- q. Tests and/or inspections: Tests and inspections shall be specified as required to ensure that the component meets the requirements of the specification.
- r. Packaging: Packaging shall be in accordance with the manufacturer's standard commercial practice, provided that packaging shall be sufficient to protect the component against damage during shipment. Exterior shipping containers shall conform to freight classification rules and applicable container specifications.

- s. Vendor data: When specified on the purchase order, the vendor shall provide three sets of nondestructive assembly drawings, parts lists, technical data, instructions, etc., suitable for inspection, test, and maintenance. Parts lists for the component shall contain:
- (1) Description: The name of the part and, when necessary, the size, dimensions, material, and tolerances.
 - (2) True Manufacturer's Name: Federal supply code for actual manufacturer.
 - (3) True Manufacturer's Part Number: The Government standard part number should also be applied, if applicable.
 - (4) Repair Parts: When repair parts are provided in the form of kits or as quick-change units, each part shall be identified per (1), (2), and (3) of this item.
 - (5) Quantity: Quantity of each part required.
 - (6) Spare parts: Coded to reflect recommended spare parts.

3.3.3 Component Maintenance. - When needed, requirements appropriate to component maintenance shall be included in the specification or shall be presented in a separate component maintenance drawing in accordance with GP-435, Volume 1. Maintenance criteria should include lubrication, torque values, cleaning, leakage, operational parameters to be verified, electrical tests (if applicable), calibration, and a cutaway drawing with complete piece parts breakdown.

3.3.4 Intended Use. - In the preparation of component procurement/performance specifications, applicable notes shall be used to supply information designed to help determine applicability of the specification and to help select the appropriate type, grade, or class of component. The use of the different types, grades, or classes in the specification will be explained.

3.4 Changes, Revisions, and Cancellations. - Component procurement/performance specifications, which carry a XXXXXXXX number, shall be revised or cancelled in accordance with requirements specified in GP-435, Engineering Drafting Practices Manual.

4. NOTES

4.1 Intended Use. - This standard is intended to be used as a guide in order to prepare uniform component procurement/performance specifications of a high quality.

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4.2 Definition

4.2.1 Component. - A component is defined as the smallest assembled item identifiable as a complete, functioning, hardware entity that performs a distinctive function in the operation of an item of equipment or a system.

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NASA - John F. Kennedy Space Center

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