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PREPARATION OF COMPONENT PROCUREMENT/PERFORMANCE SPECIFICATIONS STANDARD FOR

ENGINEERING DEVELOPMENT DIRECTORATE

National Aeronautics and
Space Administration

John F. Kennedy Space Center

NASA

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PREPARATION OF COMPONENT PROCUREMENT/PERFORMANCE SPECIFICATIONS STANDARD FOR

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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 Publicatons 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 compatibiity, 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.		REVISIONS				
		ZONE	SYM	DESCRIPTION	DATE	APPROVAL
			A	REV ITEM 11 & SH 4	6-17-85	[illegible]
			B	C-G TITLE BLK	11-7-86	[illegible]

1. SERVICE: AIR, OXYGEN
2. SET PRESSURE: SEE SHT 3
3. PROOF PRESSURE: 1-1/2 TIMES SET PRESSURE (INLET ONLY)
4. BURST PRESSURE: 4 TIMES SET PRESSURE MIN (INLET ONLY)
5. FLOW CHARACTERISTICS: SEE SHT 3.
6. OPERATION: DIRECT ACTING; SPRING LOADED. VALVES ACTUATE AT SET PRESSURES SPECIFIED ON SHT 3. OTHER OPERATING PRESSURE VALUES SHALL BE ACCORDING TO THE FOLLOWING DEFINITIONS & REQUIREMENTS:
   CRACKING PRESSURE IS THAT INLET PRESSURE AT WHICH FIRST LEAKAGE OCCURS THRU THE VALVE ON INCREASING PRESSURE. VALVES SET AT PRESSURES BELOW 50 PSIG SHALL NOT CRACK AT LESS THAN 85% OF SPECIFIED SET PRESSURE. VALVES SET AT 50 TO 99 PSIG SHALL NOT CRACK AT LESS THAN 90% OF SPECIFIED SET PRESSURE. VALVES SET AT 100 PSIG & HIGHER SHALL NOT CRACK AT LESS THAN 95% OF SPECIFIED SET PRESSURE.
   SET (ACTUATION) PRESSURE IS THAT INLET PRESSURE AT WHICH SUDDEN, HIGH VOLUME FLOW OCCURS THRU THE VALVE ON INCREASING PRESSURE. SET PRESSURE TOLERANCE SHALL NOT EXCEED ±2 PSIG FOR PRESSURES UP TO & INCLUDING 70 PSIG & ±3% FOR PRESSURES ABOVE 70 PSIG.
   RESEAT PRESSURE IS THAT INLET PRESSURE AT WHICH HIGH VOLUME FLOW CEASES THRU THE VALVE ON DECREASING PRESSURE. VALVES SET BELOW 50 PSIG SHALL RESEAT AT NOT LESS THAN 80% OF SPECIFIED SET PRESSURE. VALVES SET AT 50 TO 99 PSIG SHALL RESEAT AT NOT LESS THAN 90% OF SPECIFIED SET PRESSURE. VALVES SET AT PRESSURES OF 100 PSIG & HIGHER SHALL RESEAT AT NOT LESS THAN 92% OF SPECIFIED SET PRESSURE.
7. PNEUMATIC CONNECTIONS: INLET PORT - MS33649-8
   OUTLET PORT - MS33649-16
8. CLEANING: CLEAN, PROTECT & INSPECT PER KSC-C-123
   A. PROCEDURE: AS APPLICABLE
   B. CLEANLINESS: LEVEL 300A
   C. TEST METHOD: A
   D. CERTIFICATION REQUIRED
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).
10. OPERATING TEMPERATURE: -20°F TO 160°F
11. LUBRICATION: USE KRYTOX 240AC OR AN APPROVED EQUAL.

NOTES: A. SEE DWG 79K90459 FOR MAINTENANCE REQUIREMENTS. VENDOR SHALL PROVIDE COMPONENTS & SOFT GOODS KITS CONSISTING OF THE PARTS DESCRIBED IN THE MAINTENANCE DWG.

B. WEIGHTS OF VALVES
79K80459-1 THRU -13, WT = 4.3 LBS
79K80459-14, -15, WT = 13.3 LBS

COMPONENT SPECIFICATION

SEE ENGINEERING RECORDS	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ___ DECIMALS ±0.12 ANGLES ___ MATERIAL HEAT TREATMENT FINAL PROTECTIVE FINISH	ORIGINAL DATE OF DRAWING 7-1-82 DRAFTSMAN / CHECKED / ENGINEER / STRESS / DESIGNER J. Rock / SUBMITTED H. L. Cope / APPROVED F. E. Lundy / [illegible]	VALVE, SAFETY-RELIEF 1/2"X1",.187 ORIFICE AIR & OXYGEN SERVICE 20-7400 PSIG PRESS RANGE	JOHN F. KENNEDY SPACE CENTER, NASA KENNEDY SPACE CENTER, FLORIDA
KSC GSE			WEIGHT CHECKED / DATE / CODE 22264	DWG SIZE B 79K80459
NEXT ASSY / USED ON			SCALE / UNIT WEIGHT SEE NOTE B	SHEET 1 OF 4
APPLICATION				

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

CONTINUATION SHEET

REVISION			
SYM	DESCRIPTION	DATE	APPROVAL
A	NO CHG	6-13-83	[illegible]
B	NO CHG	11-7-88	[illegible]

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
BLOWDOWN SEAL - TEFLON

SEALS SHALL CONFORM TO MIL, AMS OR NAS SPECIFICATIONS/STANDARDS.

ALL MATERIALS IN CONTACT WITH THE FLUID TO BE OXYGEN COMPATIBLE PER NHB 8060.1. BATCH TEST VITON-A REQUIRED PER DWG 79K19956.

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

14. COMPONENT MARKING: 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 .062" 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 SHT 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
FSCM 01343

SUPPLIER IS: NIABCO EQUIPMENT & INDUSTRIAL SALES INC.
S-3865 TAYLOR ROAD
ORCHARD 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. O-RINGS SHALL BE IDENTIFIED ON THE PARTS LIST BY THE APPROPRIATE GOVERNMENT STANDARD PART NUMBER (MS, AN, NAS, ETC.) OR BY THE AS568 DASH NUMBER, TYPE OF MATERIAL & HARDNESS (DUROMETER). 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, NAS568-33; RING, RETAINING, MS16624-4025).

COMPONENT SPECIFICATION

CODE IDENT NO.	DWG SIZE	79K80459
22284	B	SHEET 2

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

CONTINUATION SHEET

REVISION			
SYM	DESCRIPTION	DATE	APPROVAL
A	NO CHG	6-17-83	[illegible]
B	NO CHG	11-7-86	[illegible]

KSC PART NUMBER	VENDOR PART NUMBER	SET PRESSURE RANGE - PSIG	FLOW CAPACITY CFM	SPRING VENDOR PART NUMBER	SOFT GOODS KIT-VENDOR PART NUMBER
79K80459-1	83JS48-3	20-31	17.7	03-0041-002	04-4805-0158T
79K80459-2	83JS48-3	32-46	23.6	03-0042-002	04-4805-0158T
79K80459-3	83JS48-3	47-69	32.1	03-0043-002	04-4805-0158T
79K80459-4	83JS48-3	70-104	45.2	03-0044-002	04-4805-0158T
79K80459-5	83JS48-3	105-156	65	03-0045-002	04-4805-0158T
79K80459-6	83JS48-3	157-235	94	03-0046-002	04-4805-0158T
79K80459-7	83JS48-3	236-350	138	03-0047-002	04-4805-0158T
79K80459-8	83JS48-3	351-526	205	03-0048-002	04-4805-0158T
79K80459-9	83JS48-3	527-790	305	03-0049-002	04-4805-0158T
79K80459-10	83JS48-3	791-1130	452	03-0050-002	04-4805-0158T
79K80459-11	83JS48-3	1131-1775	674	03-0051-002	04-4805-0158T
79K80459-12	83JS48-3	1776-2675	1013	03-0052-002	04-4805-0158T
79K80459-13	83JS48-3	2676-4000	1516	03-0053-002	04-4805-0158T
79K80459-14	83JS48-3	4001-6000	2268	03-0054-002	04-4805-0158T
79K80459-15	83JS48-3	6001-7400	3037	03-0055-002	04-4805-0158T

NOTES:

1. VENDOR SHALL SUPPLY THE VALVES SET AT MID-RANGE OF THE INDICATED SET PRESSURE RANGE.
2. FLOW CAPACITIES SHOWN ARE FOR AIR. FLOWS ARE GIVEN AT MID-RANGE OF SET PRESSURE (10% ACCUMULATION) WITH AIR AT 60°F & 14.7 PSIA. FOR OXYGEN, THESE FLOWS ARE WITHIN 5%.
3. SOFT GOODS KITS CONSIST OF BLOW-DOWN SEAL, BUSHING SEAL & SEAT.
4. EACH SOFT GOODS KIT INCLUDES ALL SEAT SIZES, BUSHING SEALS & BLOWDOWN SEALS, BUT EXCLUDES THE CAP SEAL.

COMPONENT SPECIFICATION

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

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

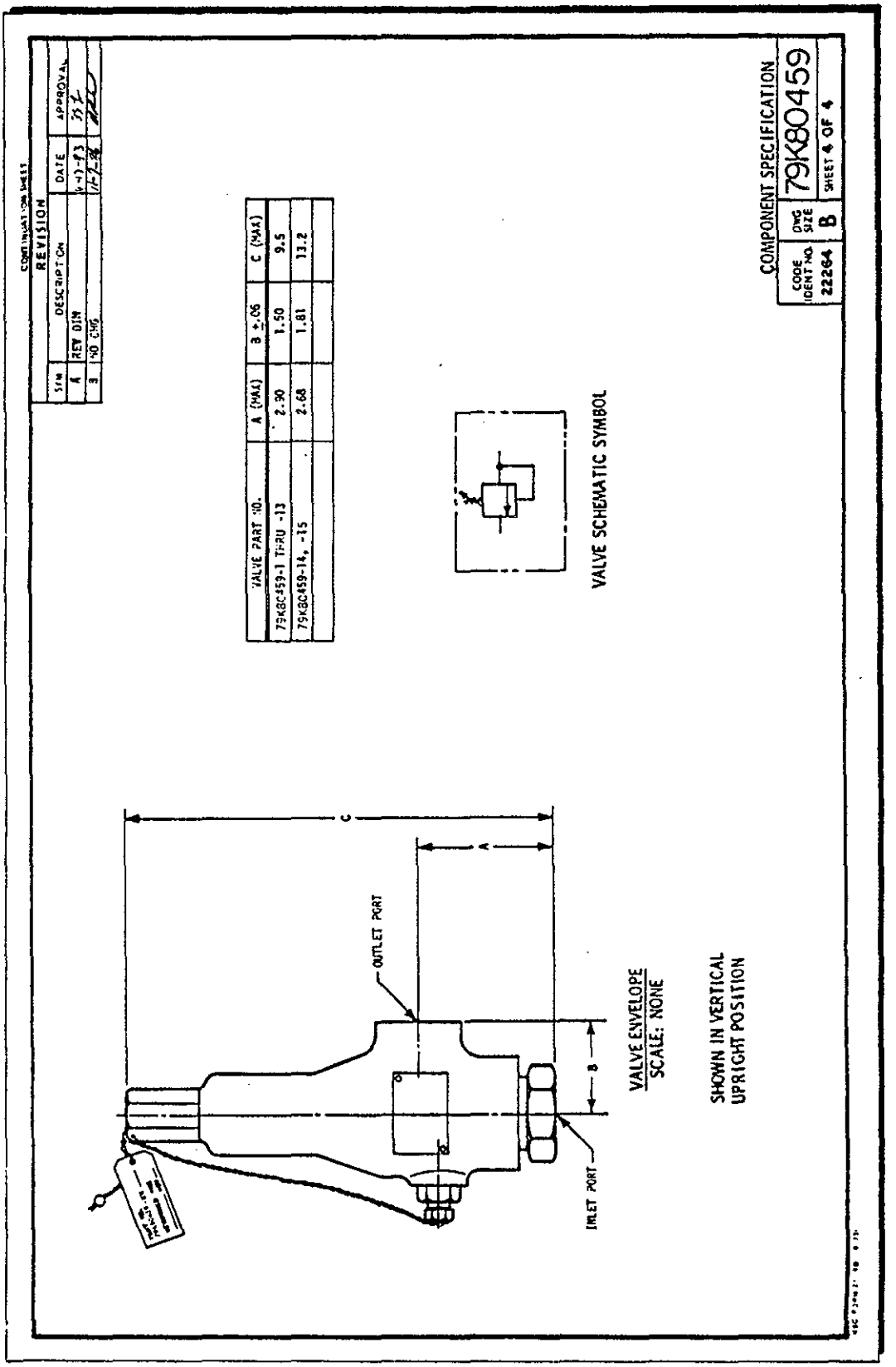

Figure 1. A Sample Component Procurement/Performance Specification
(Sheet 4 of 4)

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.

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 temperatuare: 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 inspectons: 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 rcommended 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 applicablility 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 XXKXXXXX 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.

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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