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SPECIFICATION FOR FITTINGS, FLARED TUBE

ENGINEERING DEVELOPMENT DIRECTORATE

National Aeronautics and
Space Administration

John F. Kennedy Space Center

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Approved By:

Walter T. Murphy
Director of Engineering Development

JOHN F. KENNEDY SPACE CENTER, NASA

TABLE OF CONTENTS

Section	Title	Page
1.	SCOPE	1
2.	APPLICABLE DOCUMENTS	1
2.1	Governmental	1
2.1.1	Specifications	1
2.1.2	Standards	2
2.1.3	NASA Directives	2
2.1.4	Publications	2
2.2	Non-Governmental	2
3.	REQUIREMENTS	3
3 1	Materials	3
3.1.1	Corrosion-Resistant Steel	3
3.1.2	Aluminum Alloy	3
3.1.3	Wire	3
3.2	Design	3
3.2.1	Fluid Passage and Wall Thickness	3
3.2.2	Threads	3
3.3	Finish	3
3.3.1	Corrosion-Resistant Steel	3
3.3.2	Aluminum Alloy	4
3.4	Product Marking	4
3.4.1	Location	4
3.4.2	KC Symbols and Trademarks	4
3.5	Cleaning	4
4.	QUALITY ASSURANCE PROVISIONS	4
4.1	Special Process Control	4
4.2	Records of Inspections and Tests	5
4.3	Workmanship	5
4.4	Prototype Samples	5
4.5	Testing	5
4.6	Acceptance Test	5
4.6.1	Dimensions	5

TABLE OF CONTENTS

Section	Title	Page
4.6.2	Fluid Passage	5
4.6.3	Cleaning	5
5.	PREPARATION FOR DELIVERY	5
5.1	Protection of Fittings	5
5.2	Packing	6
5.3	Marking	6
6.	NOTES	6

SPECIFICATION FOR FITTINGS, FLARED TUBE

1. SCOPE

This specification establishes the requirements for flared tube fittings and fitting accessories and fluid connections, including adjustable and swivel elbows, reducers, and tees (hereinafter referred to as fittings) suitable for use in accordance with KSC-SPEC-Z-0008 in ground support equipment.

2. APPLICABLE DOCUMENTS

The following documents form a part of this document to the extent specified herein. When this document is used for procurement, including solicitations, or is added to an existing contract, the specific revision levels, amendments, and approval dates of said documents shall be specified in an attachment to the Solicitation/Statement of Work/Contract.

2.1 Governmental.

2.1.1 Specifications.

John F. Kennedy Space Center (KSC), NASA

KSC-SPEC-Z-0008	Fabrication and Installation of Flared Tube Assemblies and Installation of Fittings and Fitting Assemblies, Specification for

Federal

QQ-A-225/6	Aluminum Alloy 2024, Bar, Rod, and Wire; Rolled, Drawn, or Cold Finished
QQ-A-367	Aluminum Alloy Forgings
QQ-S-763	Steel Bars, Wire, Shapes, and Forgings, Corrosion Resisting

Military

MIL-A-8625	Anodic Coatings for Aluminum and Aluminum Alloys

MIL-S-8879	Screw Threads, Controlled Radius Root With Increased Minor Diameter, General Specification for

2.1.2 Standards.

Federal

FED-STD-H28	Screw-Thread Standards for Federal Services

Military

MIL-STD-129	Marking for Shipment and Storage
MIL-STD-171	Finishing of Metal and Wood Surfaces
MS 33677	Fitting End, Taper Pipe Thread, Standard Dimensions for

2.1.3 NASA Directives.

National Aeronautics and Space Administration (NASA)

NHB 5300.4(1C)	Inspection System Provisions for Aeronautical and Space System Materials, Parts, Components and Services

2.1.4 Publications.

John F. Kennedy Space Center (KSC), NASA

KSC-GP-425	Engineering Standards

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specified procurement functions should be obtained from the procuring activity or as directed by the Contracting Officer.)

2.2 Non-Governmental.

American Society for Testing and Materials (ASTM)

ASTM A580	Wire, Steel, Stainless and Heat-Resisting

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

3. REQUIREMENTS

3.1 Materials. - Unless otherwise specified by the procuring activity, the materials shall meet all the requirements specified herein.

3.1.1 Corrosion-Resistant Steel. - Corrosion-resistant steel shall conform to class 316, condition A, in accordance with QQ-S-763.

As defined by KSC-GP-425, the material designation for class 316 corrosion-resistant steel has been changed to "K" in lieu of "C." The "C" designation shall continue to be used interchangeably until the present inventory is exhausted.

3.1.2 Aluminum Alloy. - Aluminum alloy shall conform to type 2024 temper T6 in accordance with QQ-A-225/6 for straight fittings and type 2014 temper T6 in accordance with QQ-A-367 for forgings and shapes.

3.1.3 Wire. - Corrosion-resistant steel wire shall conform to class 302, 304, or 305 in accordance with ASTM A580. This wire shall be used for swivel fittings of both corrosion-resistant steel and aluminum material.

3.2 Design. - Fitting design and dimensions shall be as specified on the applicable detailed KC standard drawing of KSC-GP-425. Working pressure and testing requirements are specified in KSC-SPEC-Z-0008.

3.2.1 Fluid Passage and Wall Thickness. - The fluid passage diameter shall be as specified on the applicable detailed KC standard drawing of KSC-GP-425.

Unless otherwise specified, the wall thickness at any point on the fitting shall not be less than the thickness established by the dimensions and tolerances for the inside and outside diameters and eccentricities specified on the applicable detailed KC standard drawing of KSC-GP-425.

3.2.2 Threads. - Straight threads shall be unified thread series and conform to MIL-S-8879 for inch-pound and FED-STD-H28 section 21B for metric. Pipe threads shall conform to MS 33677 and FED-STD-H28, section 7.

3.3 Finish.

3.3.1 Corrosion-Resistant Steel. - Corrosion-resistant steel shall be passivated in accordance with MIL-STD-171.

3.3.2 Aluminum Alloy. - Aluminum alloy shall be anodized in accordance with MIL-A-8625, type II, class 2, and be duplex sealed. Aluminum alloy fittings, sleeves, and nuts shall be blue in color after all surface treatments have been completed.

3.4 Product Marking.

3.4.1 Location. - Unless otherwise specified, the markings shall be applied in a location not detrimental to the fitting and shall not be detrimental to the corrosion protection of the fitting.

3.4.2 KC Symbols and Trademarks. - Unless otherwise specified, all fittings shall be marked with the letters KC and the part numbers as shown by the applicable detailed KC standard drawing of KSC-GP-425. The marking shall be permanent, preferably electro-etched or embossed lettering. For part numbers of -6 (-10M) and smaller, the minimum required marking is "KC" plus the first three digits of the basic part number.

3.5 Cleaning. - Unless otherwise specified by the procuring activity, all fittings and fitting accessories, such as sleeves, nuts, washers, and other similar items, shall be cleaned of contamination (such as metal chips, grease, grime, or grit) in accordance with the best commercial practice.

4. QUALITY ASSURANCE PROVISIONS

The supplier shall establish and maintain an inspection system that satisfies the requirements of NHB 5300.4(1C). The contractor shall be responsible for the performance of inspections and tests to ensure compliance with the requirements of the contract, drawings, specifications, standards, and any other contractual documents.

4.1 Special Process Control. - To ensure compliance with quality requirements, the Contractor shall establish inspections and controls over processes that are not readily detectable or measurable by inspection and test of the finished articles. When approval or certification of special processes, operating personnel, special equipment, or procedures is required by the contract, drawing, or specification, the Contractor shall obtain necessary approvals or certification prior to processing the articles intended for delivery to the Government. These special processes may include, but not be limited to, radiography and liquid penetrant inspection.

4.2 Records of Inspections and Tests. - The Contractor shall maintain records of inspections and tests performed on the items of this specification. These records shall be made available to the Government, upon request, during the contract performance period and for 180 days after delivery and acceptance of the items.

4.3 Workmanship. - Uniformity of shapes and dimensions shall permit interchangeability of units. There shall be no cracks, dents, bends, chips, burrs, sharp edges, loose attaching parts, misalignment, or other defects that could render the unit unsuitable for its intended purpose.

4.4 Prototype Samples. - Two prototype samples shall be submitted when required and specified by the purchasing agency. The prototype sample shall be capable of meeting the requirements specified herein and shall be identical to the proposed end product.

4.5 Testing. - Testing and inspection at Government facilities may be performed at the discretion of the Contracting Officer to ensure compliance with these specifications (independent of any other inspections and tests) and may be used as criteria for acceptance or rejection. Final acceptance will be at KSC.

4.6 Acceptance Test.

4.6.1 Dimensions. - Conformance of the fittings with the dimensional requirements of the applicable KC standard of KSC-GP-425 shall be determined by methods consistent with the requirements of section 4 of this specification.

4.6.2 Fluid Passage. - When the fluid passage is drilled from each end, the offset between the drilled holes at the meeting point shall not exceed 0.38 millimeter (mm) (0.015 inch) as evidenced by the passage of a steel ball [minimum diameter 0.50 mm (0.020 inch) less than the passage mean diameter] completely through the fluid channel.

4.6.3 Cleaning - Fittings shall be inspected for cleanliness as specified in 3.5.

5. PREPARATION FOR DELIVERY

5.1 Protection of Fittings. - After cleaning, the fittings with external threads shall be capped. Fittings, such as bulkhead types, with extended external threaded ends shall have a plastic covering for the entire thread length. Fittings with internal threads shall be plugged, including KC139 and KC239 nuts (in accordance with KSC-GP-425) assembled on fittings. Fitting accessories, such as nuts, sleeves, cap assemblies, and washers, need not be capped or plugged. Plastic caps and plugs are to protect the 37-degree seal surface and threads.

5.2 Packing. - Unless otherwise specified, packing shall be equivalent to the Contractor's best commercial practice, provided this practice will protect the fittings against damage and contamination during shipment.

5.3 Marking. - Unless otherwise specified by the procuring activity, marking of packages and exterior containers shall be in accordance with MIL-STD-129.

6. NOTES

The KC103 and KC203 seal rings, in accordance with KSC-GP-425, are not to be included with the fittings and, therefore, are specifically excluded from this specification.

NOTICE. The Government drawings, specifications, and/or data are prepared for the official use by, or on the behalf of, the United States Government. The Government neither warrants these Government drawings, specifications, or other data, nor assumes any responsibility or obligation, for their use for purposes other than the Government project for which they were prepared and/or provided by the Government, or an activity directly related thereto. The fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded, by implication or otherwise, as licensing in any manner the holder or any other person or corporation, nor conveying the right or permission, to manufacture, use, or sell any patented invention that may relate thereto.

Custodian:	Preparing Activity:
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