KSC-SPEC-Z-0009A
January 15, 1991
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LUBRICATION, THREAD, CORROSION-RESISTANT STEEL AND ALUMINUM ALLOY TUBE FITTINGS, SPECIFICATION FOR

ENGINEERING DEVELOPMENT DIRECTORATE

National Aeronautics and
Space Administration

John F. Kennedy Space Center

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Approved:

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Director of Engineering Development

JOHN F. KENNEDY SPACE CENTER, NASA

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1. SCOPE

This specification defines the requirements for lubrication of stainless steel and aluminum 37-degree flared-tube fittings to prevent galling and to provide more accurate assembly torque values.

1.1 Application. - This specification shall not be used on systems requiring a cleanliness level more stringent than level 300 for particulate and level A for nonvolatile residue in accordance with KSC-C-123, unless authorized by Engineering Development (DE).

1.1.1 Working Fluids. - This specification may be used for the following fluids:

a. All hydrocarbons, such as RP-1, hydraulic fluid, etc.

b. All inert fluids, such as helium and argon (both gaseous and liquid)

c. Air, nitrogen, and carbon dioxide (both gaseous and liquid)

d. Water

e. Gaseous and liquid oxygen

f. Gaseous and liquid hydrogen

g. Hypergolic propellants, such as nitrogen, tetroxide, monomethylhydrazine, hydrazine, unsymmetrical dimethylhydrazine, etc.

1.1.2 Material Compatibility. - This specification shall be used for stainless steel to stainless steel and aluminum to aluminum joints only. Only lubricants that are oxygen compatible shall be used, except as specified in 3.1.1 and 3.1.2.

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.

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KSC-C-123	Surface Cleanliness of Fluid Systems, Specification for
KSC-SPEC-Z-0008	Fabrication and Installation of Flared Tube Assemblies and Installation of Fittings and Fitting Assemblies, Specification for

Military

MIL-G-27617	Grease, Aircraft and Instrument, Fuel and Oxidizer Resistant

2.1.2 NASA Handbook.

NHB 8060.1	Flammability, Odor, and Offgassing Requirements and Test Procedures for Materials in Environments That Support Combustion

(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.)

3. REQUIREMENTS

3.1 Approved Compounds. - KRYTOX 240AC, TRIBOLUBE 10 TYPE III, TRIBOLUBE 16 TYPES II and III, or Christo-Lube MCG-111, or equal, in accordance with MIL-G-27617 and approved for liquid oxygen service in accordance with NHB 8060.1 shall be used.

3.1.1 Hydraulic Systems. - Fittings in hydraulic systems may be lubricated with either the approved compounds listed in 3.1 or the system fluid, provided the fluid meets the particulate contamination standards for the system. Dipping the fitting in the hydraulic fluid is an acceptable method of lubrication.

3.1.2 Refrigerant Chlorofluorcarbon (CFC) Systems. - Fittings in refrigerant (CFC) systems shall be lubricated with BRAYCO 8152 oil or equal. Due to binder compatibility, care shall be used when choosing compounds for refrigerant (CFC) systems.

3.2 Approved Dispenser. - The lubricant compound shall be dispensed from a nozzle-equipped tube or a syringe. The maximum tip opening shall be 1/16-inch diameter.

3.3 Application of Lubricant. - The lubricant compound shall be applied only to external threads in longitudinal streaks. The two streaks shall be applied approximately 180 degrees apart to 1/2-inch and smaller fittings. One streak per 1/4 inch of fitting size, approximately equally spaced, shall be applied to fittings larger than 1/2 inch.

CAUTION

The lubricant shall be applied sparingly and shall not be allowed to enter the flow passages. Contaminated assemblies shall be recleaned.

3.3.1 Tubing Coupling Nuts and KC136 Fitting Ends. - The first thread of the fitting end shall be engaged into the mating female thread and the lubricant compound applied to the remaining exposed threads. [See figures 1(a), 1(b), and 1(d)].

3.3.2 KC138 Fitting End With AN924 Locknut and KC140 Washer. - The captive AN924 nut shall be turned until the washer bottoms against the outer external threads. The lubricant compound shall be applied to the exposed inner set of external threads. The AN924 nut shall be turned over the lubricated threads until the washer can be bottomed against the inner external threads. The outer set of external threads shall not be lubricated [see figure 1(c)].

3.3.3 Locknuts on KC104 Bulkhead Fitting Ends. - The fitting through the bulkhead shall be installed with the required washers and the locknut started on the outer set of external threads. The lubricant compound shall be applied to the inner set of external threads and the locknut advanced to secure the fitting to the bulkhead [see figure 1(a)].

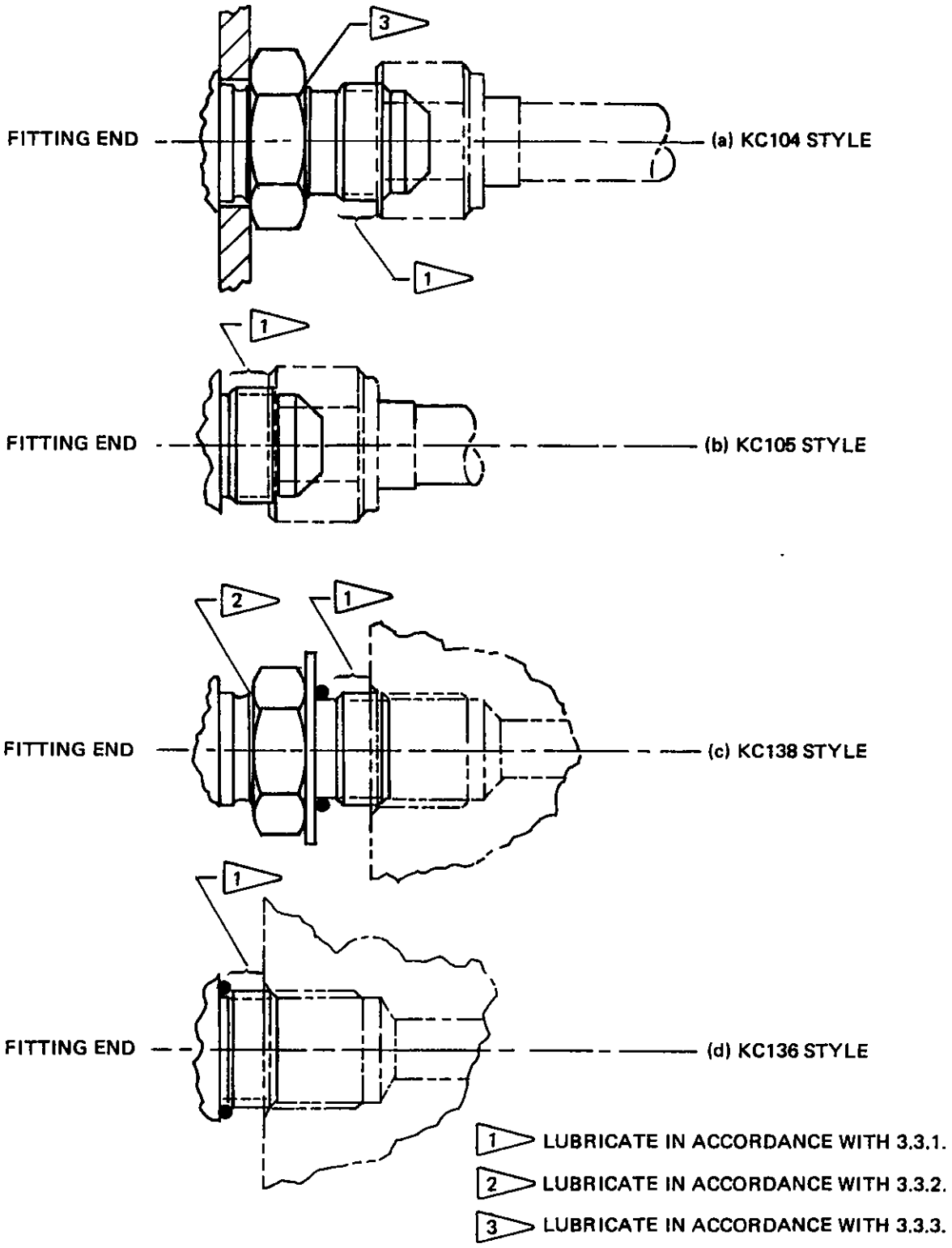

Figure 1. Lubricant Application Details

CAUTION

Special care is required to prevent contamination of the flow passage when installing a locknut on bulkhead fittings.

3.3.4 Swivel Fittings. - The threads shall first be lubricated in accordance with 3.3. Next, the lubricant container nozzle shall be placed against the swivel nut retaining wire hole, and the lubricant squeezed into the hole to help prevent galvanic corrosion of the aluminum fitting when in contact with the corrosion-resistant steel retaining wire. The lubricant helps to prevent water or other potential electrolytic solutions from entering the hole. The lubricant will help prevent galling in stainless steel fittings.

3.4 Assembly of Joint. - After lubrication, the joint shall be assembled in accordance with the provisions of KSC-SPEC-Z-0008.

3.5 Torque of Joint. - Lubricated joints shall be torqued in accordance with the provisions of KSC-SPEC-Z-0008.

4. QUALITY ASSURANCE PROVISIONS

Quality Assurance shall perform in-process surveillance of all assembly operations to verify all processes and procedures implementing the requirements of this document are current, approved, and adequate and are being accurately utilized.

5. WORKMANSHIP

Workmanship shall be a level of quality to ensure the processed products meet the performance requirements of the engineering documentation and criteria delineated herein.

6. PREPARATION FOR DELIVERY

There are no applicable requirements.

7. NOTES

7.1 Intended Use. - Lubrication in accordance with this specification is intended to minimize galling of mating surfaces. Strict adherence to this specification is required to prevent fluid system contamination.

NOTICE. When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and 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 in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

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