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John C. Stennis Space Center
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SSTD-8070-0060-PIPE Rev. Basic
February 2009

John C. Stennis Space Center
LOW PRESSURE PIPE SYSTEM FOR LIQUID
OXYGEN "AA"

Original signed by

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| Responsible Office: NASA SSC Center Operations Directorate Design & Construction Project Management Division | | |
| SUBJECT: Low Pressure Pipe System for Liquid Oxygen "AA" | | |

Document History Log

| Revision | Date | Originator/ Phone | Description |
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| Basic | 02/04/09 | Larry de Quay, x-8-1956 | Initial release. Supersedes SSC-47-034 with the following changes. New document control number and format in accordance with SPR 1400.1. Updated referenced documents. Section 5.0: Added operating conditions for liquid nitrogen; changed temperature range for liquid oxygen. Section 6.0: Updated requirements for Flange Details, Bolting, Gaskets, and Pressure Test, and added Note 3. |
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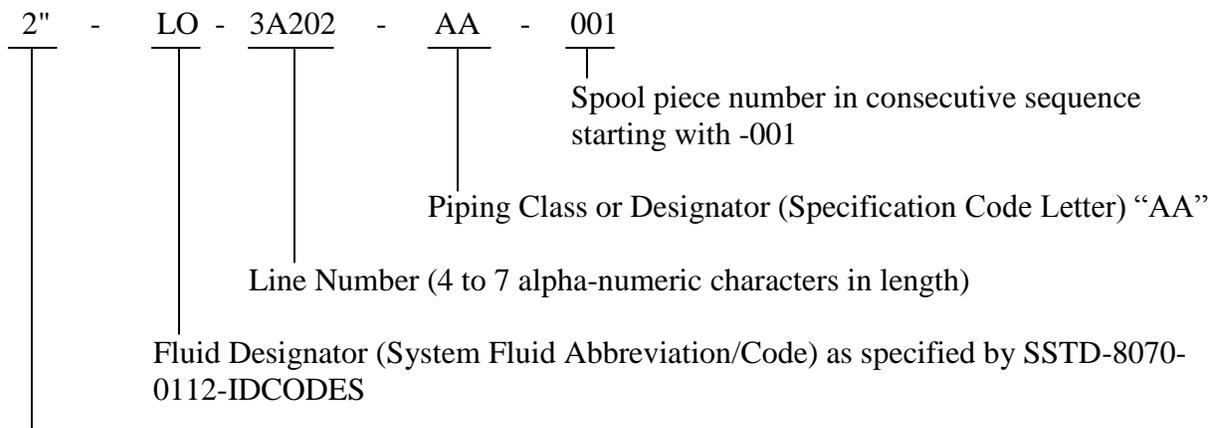
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1.0 PURPOSE

This John C. Stennis Space Center (SSC) Standard specifies materials and procedures for the construction of low pressure facility piping systems for liquid oxygen.

2.0 APPLICABILITY

- a. This Standard shall be used for specifying materials and components to be incorporated into piping system “AA” as designated on the Site-wide Operational and Repair Documentation (SORD) Drawing System. These piping system drawings are drawn in schematic form and are identified by system and specification code numbers. An example of this identification system is given below.



Nominal Size of Pipe (Line Size as specified by SSTD-8070-0112-IDCODES) in inches

- b. The Line Number shown above shall include the “Area Number” and “Distinctive Number” called out in SSTD-8070-0112-IDCODES where:
1. The second or third character is a letter and all remaining characters are numeric.
 2. The one or two digits before the letter define the “Area Number” per SSTD-8070-0112-IDCODES.
 3. The remaining digits following the letter (alpha character) is a unique sequence number for the pipeline or pipeline section.

3.0 REFERENCES

All references are assumed to be the latest version unless otherwise indicated.

ASME B31.3, Process Piping

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SPR 1440.1, Records Management Program Requirements

SSC-34-004, Classes of Welding Inspection

SSC-34-010, Joining Stainless Steel by GTAW Wire and SMAW Rod

SSC Drawing 54000-GM00, Flange Gasket

SSC Drawing 54000-GM30, Specification for Materials LOX/GOX Service

SSTD-8070-0005-CONFIG, Preparation, Review, Approval and Release of SSC Standards

SSTD-8070-0089-FLUIDS, John C. Stennis Space Center Surface Cleanliness Requirements for SSC Fluid Systems

SSTD-8070-0112-IDCODES, John C. Stennis Space Center Line Designator Numbers

4.0 RESPONSIBILITIES

- a. Users of this Standard shall comply with its requirements, ensure use of the correct version of this Standard and the documents it references, and inform the appropriate organization of needed changes in accordance with SSC Standard SSTD-8070-0005-CONFIG.
- b. Responsibilities for the use and control of this Standard and for the review and approval of revisions or cancellation of this Standard shall be as specified in SSTD-8070-0005-CONFIG and the applicable documents referenced therein.

5.0 OPERATING CONDITIONS

| Service | Max. Operating Pressure | Temp. Range |
|-----------------|-------------------------|-----------------|
| Liquid Oxygen | 400 psig | -297°F to 100°F |
| Liquid Nitrogen | 400 psig | -320°F to 100°F |

6.0 REQUIREMENTS

| | | |
|------------------|--|--|
| Size | ½" through 12" | 14" |
| Pipe Material | ASTM A312 Gr. TP 304L (Stainless Steel) | ASTM A358 Gr. TP 304L (Stainless Steel) |
| Pipe Details | Sch. 10S; Welded; Beveled Ends ☉ ☉ | 0.250" Minimum Wall; Welded; Beveled Ends ☉ |
| Fitting Material | ASTM A403 Gr. WP 304L | |

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|--|---|---------------------|
| Fitting Details | ASME B16.9 (Butt Weld Ends) Sch. 10S | 0.250” Minimum Wall |
| Flange Material | ASTM A182 Gr. F304L | |
| Flange Details | ASME B16.5 300# weld neck, raised face, concentric serrated finish on face, bore to match I.D. of connected pipe or fitting. | |
| Bolting | Studs: ASTM A320 Gr. B8 Full Thread (Strain Hardened) | |
| | Nuts: ASTM A194 Gr. 8 Heavy Hex | |
| Gaskets | 304L or 316L Stainless Steel, Class 300 to match flanges, Flexitallic Style CGI spiral wound with stainless steel and pure virgin PTFE filler 0.175” thick with 0.125” thick stainless steel inner and outer gauge rings. (Gaskets shall compress to 1/8” thickness.) The PTFE used in gaskets shall be certified and batch/lot traceable in accordance with NASA SSC Drawing 54000-GM30. © | |
| Welding | Weld per SSC-34-010; Inspect per SSC-34-004 Class I for longitudinal seam welds; Inspect per SSC-34-004 Class II for circumferential butt and fillet welds. | |
| Pressure Test | For hydrostatic test, pressurize to 1.5 times maximum operating pressure. No external leakage or permanent deformation shall result. If pneumatic test is used, pressurize to 1.25 times maximum operating system pressure. No external leakage (determined by soap test) or permanent deformation shall result. Test pressure tolerance +/- 10 psig. | |
| System Cleanliness Level | Pipe systems shall be precision cleaned and certified to Cleanliness Level 1 under SSTD-8070-0089-FLUIDS except where indicated otherwise on system drawings. All pipe systems rated for oxygen service shall be precision cleaned and certified to Cleanliness Level 1, 1X, 1XX, or 1XXX under SSTD-8070-0089-FLUIDS. | |
| Code Compliance | ASME B31.3 | |
| Notes: | | |
| <p>① ½” through 1”, Sch. 40S, threaded pipe may be used only for instrument connections, pressure gages, and screwed relief valves. Teflon tape shall be used on all threaded joints. ½” through 1” unions shall be ASTM A182 Gr. F304L, Sch. 40S, with fully confined Teflon seals and butt weld ends.</p> <p>② Seamless pipe may be used with this Standard. The most economical of the listed specifications should be purchased.</p> <p>③ Specified Flexitallic gaskets are required for all piping systems and spools designed, modified, fabricated, or tested after the issue date of this Standard. Gaskets conforming to SSC Specification Control Drawing 54000-GM00 are permitted for existing piping systems fabricated and tested prior to the issue date of this Standard.</p> | | |

7.0 RECORDS AND FORMS

Records and forms required by the procedures of this standard shall be maintained in accordance with SPR 1440.1. All records and forms are assumed to be the latest edition unless otherwise indicated. Forms may be obtained from the SSC Electronic Forms repository or from the NASA SSC Forms Management Officer. Quality Records are identified in the SSC Master Records Index.

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APPENDIX A – ACRONYMS AND ABBREVIATIONS

| | |
|------|--|
| ASME | American Society of Mechanical Engineers |
| ASTM | American Society for Testing and Materials |
| psig | pounds per square inch gauge |
| SORD | Site-wide Operational and Repair Documentation |
| SPR | John C. Stennis Space Center Procedural Requirements |
| SSC | John C. Stennis Space Center |