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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
NASA-15108 (June 2004)  
NASA  
Superseding NASA-15108  
(October 2003)  
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DIVISION 15 - MECHANICAL

SECTION 15108

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SECTION 15108

STAINLESS STEEL PIPE AND FITTINGS  
06/04

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NOTE: Delete, revise, or add to the text in this section to cover project requirements. Notes are for designer information and will not appear in the final project specification.  
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This section covers high-pressure compressed-air systems.  
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PART 1 GENERAL

1.1 REFERENCES

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NOTE: The following references should not be manually edited except to add new references. References not used in the text will automatically be deleted from this section of the project specification.  
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The publications listed below form a part of this section to the extent referenced:

ASME INTERNATIONAL (ASME)

- ASME B16.11 (2002) Forged Steel Fittings, Socket-Welding and Threaded
- ASME B16.5 (1996) Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24
- ASME B16.9 (2001) Factory-Made Wrought Steel Buttwelding Fittings
- ASME B36.10M (2000) Welded and Seamless Wrought Steel Pipe
- ASME B36.19M (1985; R 1994) Stainless Steel Pipe

ASTM INTERNATIONAL (ASTM)

- ASTM A 182/A 182M (2002) Standard Specification for Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves and Parts for

High-Temperature Service

ASTM A 193/A 193M	(2004) Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service
ASTM A 194/A 194M	(2003) Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service
ASTM A 307	(2003) Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
ASTM A 312/A 312M	(2003) Standard Specification for Seamless and Welded Austenitic Stainless Steel Pipes
ASTM A 403/A 403M	(2003a) Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings
ASTM F 568M	(2002) Standard Specification for Carbon and Alloy Steel Externally Threaded Metric Fasteners

1.2 SUBMITTALS

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**NOTE: Review submittal description (SD) definitions in Section 01330 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control. Include a columnar list of appropriate products and tests beneath each submittal description.**  
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The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES in sufficient detail to show full compliance with the specification:

SD-07 Certificates

Certificates shall be submitted for the following items showing conformance with the referenced standards contained in this section.

- Corrosion-Resistant Steel
- Fittings
- Flanges
- Gaskets
- Bolting

1.3 GENERAL REQUIREMENTS

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**NOTE: If Section 15003 GENERAL MECHANICAL PROVISIONS is not included in the project specification, applicable requirements therefrom**

should be inserted and the following paragraph deleted.

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Section 15003 GENERAL MECHANICAL PROVISIONS applies to work specified in this section.

PART 2 PRODUCTS

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**NOTE: Select required system materials and delete all others.**

The following system pressures are based on ASME B31.3, Zero corrosion factor, welded joints, and a stress of value 18,750 for ASTM A 312/A 312M, Grade TP316 or TP317. System pressures shall be reduced if the largest specified pipe size is increased, service temperatures are increased (over 100 degrees F) (over 38 degrees C), certain size piping is threaded, or alloy specifications are changed.

Materials for piping systems with pressures to 10,000 psi at 100 degrees F 68.9 Megapascal at 38 degrees C may be specified in accordance with MSS SP-75 and MSS SP-65. The same specification may be used for 6,000-psi 41369 kilopascal systems with pipe size larger than 3 inches DN80.

The following material specifications do not take into account material temperatures lower than minus 20 degrees F 29 degrees C.

For accessories and supporting elements, see Section 15050 BASIC MECHANICAL MATERIALS AND METHODS.

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2.1 TYPE SS-350 (350-PSI 2413 kPa SERVICE)

Pipe or tube (1/2 inch through 10 inches): (DN15 through DN250): Schedule 40, seamless Corrosion-Resistant Steel, conforming to ASTM A 312/A 312M, Grade TP 316, and ASME B36.19M

Fittings (1/2 through 1 inch): 2,000-pound per square inch (psi) (DN15 through DN25): 13790 kilopascal water, oil, or gas (wog), forged corrosion-resistant steel, socket weld, conforming to ASTM A 182/A 182M, Grade F 316 and ASME B16.11

Fittings (1 inch through 10 inches): (DN25 through DN250): Schedule 40, long radius, butt weld, corrosion-resistant steel, conforming to ASTM A 403/A 403M, WP 316, ASME B16.9, and ASME B36.19M

Flanges (1 inch through 12 inches): 300-pound, (DN25 through DN300): 2070 kilopascal forged corrosion-resistant steel, weld neck, with raised face and concentric serrated finish, conforming to ASTM A 182/A 182M Grade F 316, and ASME B16.5

Gaskets: Spiral wound, filled with chloride-ion-free non-asbestos materials, corrosion-resistant steel, with centering provisions, conforming

to ASME B16.5, Group 1

Bolting: Heavy-hex head carbon steel bolts or bolt studs and semifinished heavy hex-head nuts conforming to ASTM A 307, Grade B. ASTM F 568M, 4.8 or greater.

Square head bolts are not acceptable.

## 2.2 TYPE SS-2,000 (2,000-PSI 13790 kPa SERVICE)

Pipe or tube: Schedule 40S seamless Corrosion-Resistant Steel, conforming to ASTM A 312/A 312M, Grade TP 316 and ASME B36.19M

Fittings (1/2 inch through 1-1/2 inches): 2,000-psi (DN15 through DN40): 13790 kilopascal wog, forged corrosion-resistant steel, socket weld, conforming to ASTM A 182/A 182M, Grade F 316 and ASME B16.11

Fittings (2 through 3 inches): (DN50 through DN80): Schedule 40S, long radius, butt weld, corrosion-resistant steel, conforming to ASTM A 403/A 403M WP 316, ASME B16.9, and ASME B36.19M

Flanges (1 inch through 3 inches): 900-pound (DN25 through DN80): 6200 kilopascal, forged corrosion-resistant steel welding neck, with raised face and concentric serrated finish, conforming to ASTM A 182/A 182M Grade F 316 and ASME B16.5

Gaskets: Spiral wound, filled with chloride-ion-free non-asbestos materials, corrosion-resistant steel, with centering provisions, conforming to ASME B16.5, Group 1

Bolting: Alloy steel bolt studs conforming to ASTM A 193/A 193M, Grade B7, and semifinished heavy hex-nuts conforming to ASTM A 194/A 194M, Grade 2H

## 2.3 TYPE SS-6,000 (6,000-PSI 41369 kPa SERVICE)

Pipe or tube (1/2 inch through 3 inches): (DN15 through DN80): XXS, seamless Corrosion-Resistant Steel, conforming to ASTM A 312/A 312M, Grade TP 316 and ASME B36.10M

Fittings (1/2 inch through 1-1/2 inches): 6,000-psi (DN15 through DN40): 41369 kilopascal wog, forged corrosion-resistant steel, socket weld, conforming to ASTM A 182/A 182M, Grade F 316 and ASME B16.11

Fittings (2 through 3 inches): (DN50 through DN80): XXS, long radius, butt weld, corrosion-resistant steel, conforming to ASTM A 403/A 403M WP 316, ASME B16.9 and ASME B36.10M

Flanges (1 inch through 3 inches): 2,500-pound, (DN25 through DN80): 17.2 Megapascal (2500 pound) forged corrosion-resistant steel welding neck, with raised face and concentric serrated finish, conforming to ASTM A 182/A 182M Grade F 316 and ASME B16.5

Gaskets: Spiral wound, filled with chloride-ion-free non-asbestos materials, corrosion-resistant steel, with centering provisions, conforming to ASME B16.5, Group 1

Bolting: Alloy steel bolt studs conforming to ASTM A 193/A 193M, Grade B7 and semi-finished heavy hex-nuts conforming to ASTM A 194/A 194M, Grade 2H

PART 3 EXECUTION

3.1 INSTALLATION

Pipe shall be installed as shown on the drawings and as specified in Section 15050 BASIC MECHANICAL MATERIALS AND METHODS.

-- End of Section --