AQUApipe: Stainless-Steel Pipe System

PART 1 – GENERAL

1.1 SUMMARY

A. AQUApipe is a complete stainless steel pipe and fitting system designed to convey fluids and gases used in a variety of applications:

- Chilled/Cooling Water
- Hot Water
- Process Water
- Compressed Air and Inert Gases
- Chemicals
- Acid Solutions
- Caustic Solutions
- Low-Pressure Steam (15 psi max)
- Potable Water (Pending)
- Vacuum
- Hydraulic Oils
- Waste waters

B. Permanent press technology is used on pipe diameters 1/2” to 4”.

C. Modular and reusable clamshell technology is used on pipe diameters 5” to 10”.

1.2 PERFORMANCE PARAMETERS

A. This specification encompasses piping and fittings for compressed gas and fluid systems operating at an industrial vacuum of .0.03 in. Hg to 200 psig (in diameters ½” to 4”) and 188 psig (in diameters 5” to 10”). Operating temperature levels are dependent on the seal material:
(EPDM, -4°F to 250°F)
(NBR, -4°F to 212°F)
(FKM, -4°F to 392°F)

1.3 ENGINEERING STANDARDS:

A. ASME Compliance: ASME B31.1 (power piping), ASME B31.3 (process piping), and ASME B31.9 (low pressure building services piping).

B. GB/T 12771-2008 Pipe manufacturing standard

C. GB/T 19228.1-2011 Fitting manufacturing standard

D. NPT (ANSI B 1.20.1) Thread Type

E. ANSI Class 150 Flange Type

F. NSF/ANSI 61 (Certified EPDM seals only)

G. ISO 8573-1 Class 1.1.1

H. UL94HB

I. FDA CFR 21, GRAS, U.S. Food and Drugs Regulation

J. NSF 61, NSF 372 (In process)

PART 2 – PRODUCTS

2.1 STAINLESS STEEL PIPE

A. AQUApipe stainless steel pipe is offered in 304 or 316 stainless steel to compliment the AQUApipe fittings and offer a complete solution.

B. Pipe Dimensions

Nominal and Outer Diameter	Wall Thickness	Length
DN15 (1/2") (ODφ16 mm)	0.8 mm	20’
DN20 (3/4") (ODφ20 mm)	1.0 mm	20’
DN25 (1") (ODφ25 mm)	1.0 mm	20’
DN32 (1 1/4") (ODφ32 mm)	1.2 mm	20’
DN40 (1 1/2") (ODφ40 mm)	1.2 mm	20’
DN50 (2") (ODφ50.8 mm)	1.2 mm	20’

C. Pipe Dimensions (continued)

Nominal and Outer Diameter	Wall Thickness	Length
DN60 (2 1/2") (ODφ63.5 mm)	1.2 mm	20’
DN65 (3") (ODφ76.1 mm)	1.5 mm	20’
DN100 (4") (ODφ101.6 mm)	1.5 mm	20’
DN125 (5") (ODφ133 mm)	2.0 mm	20’
DN150 (6") (ODφ159 mm)	2.0 mm	20’
DN200 (8") (ODφ219 mm)	2.5 mm	20’
DN250 (10") (ODφ273 mm)	3.0 mm	20’

2.2 STAINLESS STEEL FITTINGS

A. AQUApipe fittings 1/2” (15 mm) – 4” (100 mm) shall be 304 or 316 permanent press joints with interchangeable captivated seals. Configurations include elbows, tees, couplings, ball valves, reducing tees, threaded adapters, reducing couplings, flanges, butterfly valves, caps, and clips/hangers. AQUApipe fittings are designed only to be used with AQUApipe stainless steel pipe.

B. AQUApipe fittings 5” (125 mm) – 10” (250 mm) shall be 304 or 316 groove and clamshell joints with interchangeable seals. Configurations include elbows, tees, couplings, ball valves, reducing tees, threaded adapters, reducing couplings, flanges, butterfly valves, caps, and clips/hangers. AQUApipe fittings are designed only to be used with AQUApipe stainless steel pipe. Union connectors are provided with each fitting.

C. Consult the AQUApipe catalog of products for the complete configuration offering, part numbers, and dimensions.

2.3 TOOLING

A. AQUApipe fittings 1/2” (15 mm) – 4” (100 mm) will utilize a portable battery powered press tool and die sets to permanently press AQUApipe fittings onto AQUApipe pipe. Only AQUApipe tooling and die sets can be used to permanently press fittings.

B. AQUApipe fittings 5” (125 mm) – 10” (250 mm) will utilize either an electric, or portable hand-operated, lugging machine to apply convex grooves to cut ends of pipe.

2.4 CAPTIVE SEAL OPTIONS

A. EPDM – Operating temperature -4°F to 250°F. EPDM, or ethylene-propylenediene rubber, is a synthetically manufactured and peroxidically cured all-purpose elastomer. EPDM sealing elements possess excellent resistance to aging, sunlight, weathering, ozone, environmental influences, alkalis, and most alkaline solutions along with chemicals used in a broad range of applications including ketones.

B. EPDM for drinking water applications. Seals have same operating parameters of EPDM material, but with NSF/ANSI 61 certification (pending approval).

B. Viton – Operating temperature -4°F to 392°F. Viton, also known as FKM, is a fluoroelastomer, or synthetic fluorinated rubber specialty purpose elastomer. Viton sealing elements possess excellent resistance to chemicals, higher temperatures, sunlight, weathering, ozone, environmental influences, oils, and petroleum-based additives. Viton’s resistance to higher temperatures and aggressive chemicals make it ideal for extreme industrial applications.

C. Nitrile – Operating temperature -4°F to 212°F. Nitrile, or acrylonitrile butadiene, is a specialty purpose compound used where resistance to petroleum-based additives are required. Nitrile possess excellent physical strength and retention properties after long term exposure to heat, oil, chemicals, and compressed air. Nitrile is used for applications of compressed air, mixed, and manufactured gases. Nitrile’s versatility has resulted in wide use in automotive, industrial, and assorted high-performance applications.

PART 3 – PREPARATION

3.1 Examination

A. The installer shall examine the stainless steel pipe and fittings for defects and cracks. There shall be no defects of the pipe or fittings. Any damaged pipe or fittings shall be rejected.

3.2 Preparation

A. Stainless steel pipe shall be cut with a wheeled pipe cutter or approved stainless steel pipe cutting tool. The pipe shall be cut square to permit proper joining with the fittings.

B. Remove scale, dirt, and debris from inside and outside of pipe and fittings before assembly. The pipe end shall be wiped clean and dry. The burrs of the pipe shall be reamed with a deburring or reaming tool.

PART 4 – INSTALLATION

4.1 PIPE INSTALLATION

A. All stainless piping to be installed in strict accordance with AQUApipe installation instructions and specifications.

B. Pressure rating of non-AQUApipe components: Components installed to AQUApipe shall have a pressure rating equal to or greater than the system operating pressure.

C. Press Connections: The pipe shall be fully inserted into fitting body and the pipe marked at the edge of the fitting. The fitting alignment shall be checked against the mark on the pipe to assure the pipe is fully inserted into the fitting. The joints shall be pressed by the tool provided by the manufacturer.

D. Threaded joints shall have joint compound or Teflon tape applied to the male threads only. Tighten joint with wrench as required.

E. Drawing plans, schematics, and diagrams indicate general location and arrangement of stainless steel piping. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved.

4.1 PIPE INSTALLATION (continued)

F. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls.

G. Install piping adjacent to equipment and machines to allow service and maintenance.

H. Install piping to permit valve servicing.

I. Install piping free of sags and bends.

J. Install sleeves for piping penetrations of walls, ceilings, and floors.

K. Install escutcheons for piping penetrations of walls, ceilings, and floors.

L. Provide fire caulk around all penetrations thru fire separations in accordance with the building code. Do not penetrate fire walls without specific instructions from the engineer. Submit UL listing for all fire-proofing materials.

M. Backfill material shall not include any ashes, refuse, cinders, stones, boulders, or other materials which could damage or break the pipe or cause corrosive action in any trench or excavation in which pipe is installed.

4.2 HANGER AND SUPPORT INSTALLATION

A. Horizontal and vertical AQUApipe piping shall be supported every 8’ by AQUApipe fixing clips or equals. Hangers shall be either stainless steel, nylon, or vinyl coated to prevent galvanic corrosion between the pipe and supporting member. Hanger rods to be solid with only enough thread for the connection ends. Install hangers in accordance with MSS-SP-99 or per local codes and requirements.

B. Vertical stainless steel pipe shall be supported at each floor or at 10 foot intervals.

C. Stainless steel pipe systems shall have pipe markers in accordance with the requirements of ASME A13.1.

D. Expansion and contraction of the system shall be calculated prior to installation. The system designer and installer should calculate the elongation or retraction of each line.

4.3 Field Quality Control

A. The stainless steel system shall be water tested for joint tightness. The piping system shall be filled with water. The system shall be pressurized to the maximum pressure and length of time required by code or standard. The system shall have no leaks at the pressure tested.

B. In lieu of a water test, the stainless steel system shall be air tested for joint tightness. The piping system shall be pressurized with air to the maximum pressure and length of time required by code or standard.

4.4 Cleaning for potable water systems

A. The stainless steel hot and cold water distribution system shall be disinfected prior to being placed in service. The system shall be disinfected in accordance with AWWA C651 standards.

PART 5 – MANUFACTURER CONTACT INFORMATION

5.1 North American Headquarters

A. AIRpipe USA
6855 S. Kyrene Rd, Suite #101
Tempe, AZ 85283

B. (602) 362-7474 (PIPE)

C. www.airpipeusa.com