SECTION 22 15 13

GENERAL SERVICE COMPRESSED-AIR PIPING

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\*\* NOTE TO SPECIFIER \*\* IPEX USA LLC; compressed air systems.  
This section is based on the products of IPEX USA LLC which is located at:  
10100 Rodney Street  
Pineville, NC 28134  
Tel: 289-881-0120  
Fax: 905-884-0826  
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Website: [www.ipexna.com](http://www.ipexna.com) .  
Click Herefor additional information  
Leader in Thermoplastic Piping Systems.  
IPEX USA LLC supplies one of the world's most diverse lines of integrated thermoplastic piping systems, pipe, valves, fittings, auxiliary components and tools all engineered from the ground up to handle the full range of today's municipal, industrial and electrical applications. More than 50 years' experience in plastics combined with efficient distribution centers and coast-to-coast customer support has made the IPEX name synonymous with quality, innovation and performance.  
When you choose IPEX, you can be confident that all your piping materials are designed, built and backed by one company. One supplier to stand behind you and your complete system.

1. GENERAL
   1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. General-service compressed-air piping:
       1. Acrylonitrile Butadiene Styrene (ABS) piping.
       2. Polyethylene/Aluminum/Polyethylene (PE-AL-PE) Composite Pressure Pipe.
  1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 22 11 13 - Facility Water Distribution Piping.
    2. Section 22 11 13 - Facility Water Distribution Piping.
    3. Section 22 10 00 - Plumbing Piping.
    4. Section 22 67 00 - Process Water Systems for Laboratory and Healthcare.
    5. Section 22 66 00 - Chemical-Waste Systems for Laboratory and Healthcare Facilities.
  1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. American Society of Mechanical Engineers (ASME):
       1. ASME B16.5 - Pipe Flanges and Flanged Fittings.
          1. ASME B31.1 - Power Piping.
          2. ASME B31.9 - Building Services Piping.
    2. ASTM International (ASTM):
       1. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
       2. ASTM D2235 - Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
       3. ASTM D 2282 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe.
       4. ASTM D3965 - Standard Classification System and Basis for Specifications for Rigid Acrylonitrile-Butadiene-Styrene (ABS) Materials for Pipe and Fittings.
       5. ASTM F1282 - Standard Specification for Polyethylene/Aluminum/Polyethylene (PE-AL-PE) Composite Pressure Pipe.
       6. ASTM F1974 - Standard Specification for Metal Insert Fittings for Polyethylene/Aluminum/Polyethylene and Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene Composite Pressure Pipe.
    3. National Standards of Canada (CSA):
       1. CSA B137.9 - Polyethylene/aluminum/polyethylene (PE-AL-PE) composite pressure-pipe systems.
    4. German Institute of Standards (DIN):
       1. DIN 4102 B2 - Reaction to fire tests - Ignitability of building products subjected to direct impingement of flame.
       2. DIN 8062 - Unplasticized polyvinyl chloride (PVC-U) pipes - Dimensions.
    5. Food and Drug Administration (FDA):
       1. FDA 21; CFR 177.1520 - Indirect Food Additives; Olefin Polymers.
  1. DEFINITIONS

\*\* NOTE TO SPECIFIER \*\* Delete any abbreviations that are no longer relevant after the sections has been edited.

* + 1. CFR: Code of Federal Regulations.
    2. EPDM: Ethylene propylene diene monomer elastomer.
    3. PP: Polypropylene piping.
    4. PTFE: Polytetrafluoroethylene plastic (Teflon).
    5. FKM: Fluorocarbon.
  1. SUBMITTALS
     1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
     2. Product Data: For each product type specified.
     3. Shop Drawings:
        1. Piping, supports, spacing.
        2. Joint details.
     4. Coordination Drawings: Piping, specialties in relation to surrounding equipment and services.
        1. To scale: Show piping, equipment locations, and elevations.
        2. Field test reports.
        3. Operation and Maintenance data.
  2. QUALITY ASSURANCE
     1. Piping: Labeled and marked as determined by agency approved by authorities having jurisdiction.
     2. Standards compliance:
        1. ASME B31.1.
        2. ASME B31.9.
     3. Source Limitations: Obtain piping, fittings, valves and accessory equipment from a single manufacturer.
  3. DELIVERY, STORAGE, AND HANDLING
     1. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
        1. Protect plastic piping from direct sunlight.
           1. Support to prevent sagging and bending.
        2. Protect internal parts, valve ends, and specialties against corrosion, dirt, and damage.
        3. Store valves set in open position.
        4. Storage:
           1. Indoors: Higher than ambient dew point temperature.
           2. Outdoors: Watertight enclosures off ground.
     2. Handling: Comply with manufacturer's recommendations. Avoid damaging components.
        1. Large Valves: Operating handles or stems are not rigging points for slings.
  4. PROJECT CONDITIONS

\*\* NOTE TO SPECIFIER \*\* Delete this article if interruption of service is not required.

* + 1. Do not interrupt compressed air service without arranging temporary compressed air service.
       1. Owner or Owner's representative is to be notified a minimum of two days prior to service interruption.
       2. Do not proceed without written permission.
       3. Only compatible compressor lubricants are to be used with Duraplus ABS Airline. Consult IPEX for list of approved compressor lubricants.

1. PRODUCTS
   1. MANUFACTURER
      1. Acceptable Manufacturer: IPEX USA LLC, which is located at: 10100 Rodney St.; Pineville, NC 28134; Toll Free Tel: 800-463-9572; Email: [request info (specifications@ipexna.com)](http://admin.arcat.com/users.pl?action=UserEmail&company=IPEX+USA+LLC&coid=41230&rep=&fax=&message=RE:%20Spec%20Question%20(15211ipx):%20%20&mf=); Web: [www.ipexna.com](http://www.ipexna.com)

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
    2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. ABS AIRLINE PIPING, FITTINGS, AND VALVES
     1. Basis of Design: IPEX USA LLC; Duraplus ABS Airline Piping System.
        1. Standards:
           1. ANSI 150.
           2. ANSI B16.5.
           3. ASTM D256.
           4. ASTM D 2282.
           5. ASTM D3965.
           6. DIN 4102 B2.
           7. DIN 8062.
        2. Material Requirements Piping and fittings:
           1. Acrylonitrile Butadiene Styrene blend:

Piping: Co-extruded high performance copolymeric inner liner.

Fittings: Alloy blend of ABS and pipe liner material.

* + - * 1. ASTM D256, method A:

Izod Impact resistance rating.

8.5 ft/lb at 73 degrees F.

\*\* NOTE TO SPECIFIER \*\* An increase in temperature will require a decrease in pressure rating. Consult manufacturer's product information for more information.

* + - 1. Pressure Rating: At 73 degrees F (23 degrees C): 185 psi (1275 kPa) per ASTM D2282.
      2. Fire Rating: DIN 4102 B2.
      3. Pipe sizes: Metric complying with DIN 8062 and ISO 161/1.
      4. Fittings: Socket type end connections for solvent welding.
         1. Taper of 0.50 degrees decreasing diameter from mouth to root of socket.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Ball Valves: Full port.
         1. Material Requirements: ABS complying with ASTM D3965.

Cell classification: 43234.

* + - * 1. Seats: PTFE.
        2. Seals: EPDM.
        3. End Connections: Union, socket type.
        4. Pressure rating at 73 degrees F (23 degrees C): 185 psi (1275 kPa).
        5. Markings: Size, material, name of manufacturer or trademark.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Butterfly Valves:
         1. Material Requirements:

Valve Body: Glass reinforced polypropylene (GRPP).

Valve Disc: ABS complying with ASTM D3965. Cell classification: 43234.

* + - * 1. Disc Liner: EPDM completely isolating valve body from process flow.
        2. Seals: EPDM.
        3. End Connections: Flanged per ANSI 150 and ANSI B16.5.
        4. Pressure Rating at 73 degrees F (23 degrees C): 150 psi (1034 kPa).
        5. Markings: Size, material, name of manufacturer or trademark.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. PERT-AL-PERT AIRLINE PIPING, FITTINGS, AND VALVES
     1. Basis of Design: IPEX USA LLC; Duratec PERT-AL-PERT Composite Pressure Pipe Airline System.
        1. Standards:
           1. ASME B31.3.
           2. ASME B31.9.
           3. ASTM F1282.
           4. ASTM F1974.
           5. CSA B137.9.
           6. FDA 21; CFR 177.1520.
           7. ULC S102.2.
        2. Piping: Aluminum core encased in raised temperature polyethylene (PERT) per ASTM F1282 and CSA B137.9.
           1. Meet requirements of ASME 31.3 and ASME 31.9.
           2. Meet requirements of FDA 21; CFR 177.1520 for use in contact with food.
           3. Outer casing: UV stabilizers imparting a resistance equivalent to 2 years in Florida sunlight exposure.

Color: Blue.

* + - * 1. Inner casing: Chemically resistant to common synthetic and natural compressor oils.
        2. CAL OSHA: Meet or exceed all health and safety requirements as third party tested by NSF.
        3. Pressure rating:

At 73 degrees F (23 degrees C): 200 psi (1378 kPa).

At 140 degrees F (60 degrees C): 160 psi (1103 kPa).

* + - * 1. Markings: per ASTM F1282 and CSA B137.9; NPS, pressure ratings at 73 and 140 degrees F (23 and 60 C) and date coding.
      1. Fittings: per ASTM F1974 and CSA B137.9.
         1. Material:

Nickel plated brass.

Stainless steel, UNS S316000.

* + - * 1. Markings: "Duratec" and the applicable ASTM and CSA standard.

\*\* NOTE TO SPECIFIER \*\* Some fittings do not have a CRN number. Contact IPEX for further details.

National pressure vessel CRN: 0A02020.2C.

1. EXECUTION
   1. EXAMINATION
      1. Verification of Conditions: Examine areas and conditions under which Work is to be performed and identify conditions that may be detrimental to proper or timely completion.
         1. Rough-in for water-supply, sanitary drainage and vent piping systems: Verify locations; pipe and connection.
         2. Walls and partitions: Suitable thickness.
      2. Fixture and Valve Interiors: Clean and free of foreign matter, and corrosion. Remove packing used to prevent disc movement.
         1. Operate valves from fully open to fully closed positions.
         2. Verify guides and seats are clean and free of foreign matter, and corrosion.
      3. Threads on Valves Fittings and Fixtures: Inspect valve and mating pipe for form and cleanliness.
      4. Mating Flange Faces: Inspect for conditions that may cause leaking.
         1. Bolting: Proper size, length, and material.
         2. Gaskets: Proper size and material composition suitable for application; defect and damage free.
      5. Replace defective fixtures and valves with new.
      6. Do not proceed until unsatisfactory conditions have been corrected.
   2. PIPING INSTALLATION
      1. If specific installation details are not indicated, install per piping manufacturer's written instructions.
      2. All Fixtures: level and plumb.
         1. Install pipes at indicated slopes, pitched in direction of flow.
      3. Attach all support framing to building substrate per manufacturer's written instructions.
         1. Vinyl coated hangers are required for ABS piping.
      4. Wall-mounted fixtures: Pressure-reducing valves to be downstream of shutoffs.

\*\* NOTE TO SPECIFIER \*\* Omit paragraph below if not in an active seismic zone.

* + 1. Seismic restraints to be installed on piping.
    2. Conceal piping whenever possible except in equipment rooms and service areas.
       1. Diagonal pipe runs are prohibited.
       2. No sagging or bending.
       3. All valves need to be accessible for actuation and maintenance.
    3. Escutcheons and wall flanges: Wall piping penetrations finished locations.
    4. Joints between fixtures and walls: Seal with silicone sealant:
       1. Sanitary, one-part, mildew-resistant. Match colors.
    5. See appropriate sections in Division 33 for common requirements for utility piping.
    6. Pipe joints: Per manufacturer's written instructions.
       1. ABS piping: per ASME B31.9 and ASTM D2235.
       2. Join dissimilar pipe materials with adapters compatible with pipe materials being joined.

\*\* NOTE TO SPECIFIER \*\* Retain and edit first paragraph below for piping with gasketed joints; delete if not required.

* + 1. Underground piping: Restrained joints at directional changes both horizontal and vertical.
       1. Restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.
    2. Anchorages:

\*\* NOTE TO SPECIFIER \*\* Remove or add to subparagraphs below as required. Anchorages are used for tees, plugs and caps, bends, crosses, valves, and hydrant branches.

* + - 1. Thrust blocks.
      2. Pipe clamps and tie rods.
      3. \_\_\_\_\_\_.
    1. Restrained joints:

\*\* NOTE TO SPECIFIER \*\* Remove or add to subparagraphs below as required.

* + - 1. Mechanical.
      2. Set-screw retainers.
      3. Flanged.
      4. Heat-fused.
      5. \_\_\_\_\_\_.
  1. VALVE INSTALLATION
     1. At Air Compressors and Pressure Regulating Equipment: Shutoff valves and unions.
        1. Check valves to maintain proper air flow direction.
  2. FIELD QUALITY CONTROL

\*\* NOTE TO SPECIFIER \*\* Revise this article to suit requirements of authorities having jurisdiction.

* + 1. Perform field tests and inspections.
    2. Testing, Rigid Solvent-Weld ABS Pipe:
       1. Test per authorities having jurisdiction to a maximum pressure of the lowest pressure-rated appurtenance.
       2. Test using dry air or nitrogen gas.
       3. Inspect installed piping for evidence of mechanical abuse and suspect joints.
       4. Split system into test sections not exceeding 1,000 ft (305 m).
       5. Slowly pressurize each section to 15psi (104 kPa). Allow section to equalize for 30 minutes.
       6. Check joints for leaks with an IPEX approved foaming/ leak detection agent.
          1. If leaks are detected or section loses pressure, stop test immediately and relieve pressure.

Remake leaking threaded joints using Teflon (PTFE) tape wrapped around the thread.

Cut out and replace defective solvent weld joints.

Suspend further testing until joints have cured for 24 hours.

* + - 1. After successfully pressurizing the system to 15psi (103kPa) for 30 minutes, gradually increase pressure to 50psi (345kPa) and apply for 30 minutes.
         1. If leaks are detected or section loses pressure, stop test immediately and relieve pressure.

Remake leaking threaded joints using Teflon (PTFE) tape wrapped around the thread.

Cut out and replace defective solvent weld joints.

Suspend further testing until joints have cured for 24 hours.

* + - * 1. Re-pressurize to 15psi (103kPa) and test each joint with a soap solution.
        2. Continue the test procedure as indicated above.
      1. After successfully pressurizing to 50psi (103kPa) for 30 minutes gradually increase the pressure to full working pressure and apply for 1 hour.
         1. If leaks are detected or section loses pressure, stop test immediately and relieve pressure.

Re-pressurize to a maximum 15psi (103kPa) and test each joint with soap solution.

* + - * 1. Continue testing and repair procedures as indicated above.
    1. Testing, Composite PERT-Al-PERT Pipe:
       1. Test per authorities having jurisdiction to a maximum pressure of the lowest pressure-rated appurtenance.
       2. Test using dry air or nitrogen gas.
       3. Inspect installed piping for evidence of mechanical abuse and suspect joints.
       4. Split the system into test sections not exceeding 1,000 feet (305 m).
       5. Test sections to a maximum 1.25 times the design operating pressure.
          1. Duration of testing:

Comply with local regulatory measures.

Comply with the engineer designing and/or inspecting the system.

Not to exceed 2 hours.

* + - 1. Check joints for leaks and section for pressure loss.
         1. If leaks are detected or if there is a significant drop in pressure, or extended times are required to achieve the desired pressure, a joint leakage has likely occurred.

Inspect for joint leaks.

Tighten the nut on leaking joints 1/8 to 1/4 turn.

Replace defective joints.

* + - * 1. Continue the test procedure as indicated above.
    1. Piping Tests: Prior to covering and after curing and setting of concrete thrust blocks. Fill and pressurize pipeline to test pressure a minimum of 24 hours before testing.
    2. Inspect compressed air equipment to confirm it is operating within acceptable parameters.
    3. Prepare test and inspection reports.
  1. IDENTIFICATION
     1. Comply with requirements for identification specified in Section 22 05 53 - Identification for Plumbing Piping and Equipment.
  2. STARTUP
     1. Complete installation and startup checks per manufacturer's written instructions.
        1. Installed per Contract Documents.
           1. Electrical wiring:

Energize circuits.

* + - * 1. Run all systems through full operation sequences.

Adjust controls.

* 1. ADJUSTING
     1. Replace damaged fixtures, fittings, and controls.
  2. CLEANING
     1. As prescribed by:

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs.

* + - 1. Authorities having jurisdiction.
      2. Owner.
    1. Purge all piping including existing altered piping.
       1. Flush piping system with appropriate compatible reagent.
    2. Remove paint spots, dirt, and debris. Damaged finish to match original finish.
    3. Clean fixtures, according to manufacturer's written instructions.
    4. Provide protective covering for installed fixtures.
    5. Not to be uses for temporary facilities without written approval by Owner.
    6. Prepare reports.
    7. Prepare reports flushing efforts.

END OF SECTION