PART 1 - GENERAL

1.1 SUMMARY
A. Section includes process tubing for pneumatic control air.
B. Related Sections:
   1. 25 05 53 Identification

1.2 REFERENCES
A. Refer to 25 00 00 Integrated Automation

1.3 DEFINITIONS
A. Refer to 25 06 11 Integrated Automation Definitions

1.4 DESCRIPTION
A. All piping and tubing for instruments associated with the installation and operation of pneumatically operated or monitored devices.

1.5 SUBMITTALS
A. Refer to 25 00 00 Integrated Automation

1.6 QUALITY ASSURANCE
A. Refer to 25 05 53 for identification requirements.
B. Run Raceway, Piping, Tubing, and similar components in horizontal and vertical alignment with building structure or in horizontal and vertical alignment with associated principal equipment.
C. Run tubing in such manner as to give maximum protection against mechanical damage. No pipe or tube shall be left with mechanical stress or strain on it.
D. Support plastic tubing, and tubing bundles in continuous track, channel, or conduit.
E. Conduit fill limits shall not exceed 40 percent.
F. Edges, ends, and protrusions in Conduit, Tubing Track, Tubing Channel, or supports for Tubing, shall be free of burrs, sharp edges, and sharp corners to prevent injury to personnel and damage to jackets.
G. Pull tubing into raceway in such manner as to prevent damage.
H. Make tubing unions in raceways, sheets, or groupings in joint (junction) boxes.
I. Prevent foreign material from entering tubing lines during installation.
J. Blow lines clean with instrument quality air or dry nitrogen prior to connection.
K. Use only tool made bends on copper or stainless tubing.

Note: Section specific quality requirements should be defined here but not repeated from other sections.
PART 2 - PRODUCTS

2.1 PNEUMATIC TUBING

A. Steel Pipe: Schedule 40 Galvanized with threaded ends.

B. Copper Tubing: Type “L” hard drawn copper tubing shall be 1/2 inch, 3/8 inch, or 1/4 inch as appropriate for the given service.

C. Stainless Steel Tubing shall be 1/2 inch, 3/8 inch, or 1/4 inch as appropriate for the given service.

D. Tube Fittings: All tube fittings other than sweated fittings shall be Swagelok or Parker A-Lok compression fittings. Brass fittings shall be used with copper tubing. Stainless steel fittings shall be used with stainless steel tubing.

E. Nonmetallic: Polyethylene flame retardant, high density type FR tubing. Multi-tube bundles shall have numbered tubes and enclosed in flame retardant polyethylene jacket.

PART 3 - EXECUTION

3.1 PNEUMATIC TUBING

A. Adequately size all tubing runs so that all subsystems have ample capacity to handle the controls connected. Provide sectioning valves in air distribution system that divides the building into several areas of control that may be conveniently isolated for future maintenance and/or repair.

B. Instrument air piping installed in accessible areas shall be copper or polyethylene tubing when permitted by local codes.

C. Instrument air piping installed exposed in mechanical equipment rooms and shafts, or in concealed inaccessible areas shall be copper tubing or installed in conduit.

D. Polyethylene tubing is not be permitted in smoke control systems, buried locations, outdoor air intakes, outdoor locations, ducts, for service in excess of 30 psig, or in any location in which the temperature may exceed 125°F.

E. Use number coded tubing throughout with coding rapidly identifiable at points of control and equipment. No piping shall be concealed under or within duct insulation or acoustic lining. Air piping shall be run horizontally level and vertically plumb and parallel to building lines. Tubing shall be fastened and adequately supported to prevent sagging. Only tool-made bends in copper or stainless tubing are acceptable.

F. Install piping so it does not interfere with the maintenance of process equipment such as the removal of tube bundles, pump casings, coils, etc. Instrument piping and tubing shall be installed so that there is sufficient space around the instrument for servicing and adjustment. Connections to instruments shall be made so that disconnect and removal of each individual instrument can be made without distortion of tubing.

G. Whenever copper tubing crosses from a vibration isolated piece of equipment to a stationary structure, or crosses a flexible connection, a short piece of plastic tubing (maximum length 12 inches) will be installed in between to absorb vibration. The final connection to moving control equipment, such as damper actuators, shall be made via a short section of plastic tube.

END OF SECTION