E 7.3 Prohibited Materials. The use of nonmetallic materials, carbon steel, iron pipe, malleable iron, high-strength gray iron, or alloy steel shall be prohibited for breathing air pipe and tubing materials.

E 7.4 Pressure Monitoring Switch. An electric low-pressure monitoring switch shall be installed in the piping system to monitor the air pressure. The pressure switch shall transmit a supervisory signal to the central alarm monitoring station when the pressure of the breathing air system is less than 80 percent of the system operating pressure. Activation of the pressure switch shall also activate an audible alarm and visual strobe located at the building annunciator panel. A weather-resistant sign shall be provided in conjunction with the audible alarm, stating: "FIREFIGHTER AIR SYSTEM – LOW AIR PRESSURE ALARM." Where not part of a building annunciator panel, the lettering shall be in a contrasting color, and the letters shall be not less than 50mm (2 in.) high with a brush stroke equal to 10mm (3/8 in.).

E 7.5 Isolation Valve. A system isolation valve shall be installed downstream of each air fill station and shall be located in the panel or within 90cm (3 ft.) of the station. The isolation valve shall be marked with its function in letters that are not less than 5mm (3/16 in.) high with a brush stroke equal to 2mm (1/16 in.).

E 8.0 System Requirements.

E 8.1 Protection. All components of the Firefighter Breathing Air Replenishment System installed in a building or structure shall be protected by not less than a two hour fire-resistive construction. All components shall be protected from physical damage.

E 8.2 Markings. Components shall be clearly identified by means of stainless steel or plastic labels or tags indicating their function. This shall include, as a minimum, all fire department connection panels, air fill stations, air storage system, gauges, valves, air connections, air outlets, enclosures, and doors.

E 8.3 Tubing Markings. All tubing shall be clearly marked: "FIREFIGHTERS AIR SYSTEM" and "HIGH PRESSURE BREATHING AIR" by means of signs or self-adhesive labels. Signs shall be 25mm (1 in.) high and shall be secured to the tubing. Signs shall be made of brass, stainless steel, or plastic and nominally engraved with a height equal to 10mm (3/8 in.) and a brush stroke equal to 2mm (1/16 in.). Whether the tubing is concealed or in plain view, signs or labels shall be placed at intervals, not less than 6m (20 ft.) at each fitting. All tubing shall have a sign or label at any accessible point.

E 8.4 Support. Pipe and tubing shall be supported at the minimum intervals shown in UPC-AD, Table 3-3. Pipe and tubing shall be supported in accordance with UPC-AD, Section 314.0.

E 9.0 Design Criteria.

E 9.1 Fill Time. The system shall be designed to fill, at the most remote fill station or panel, a minimum of 1.9m^3 (66 $ft.^3$) compressed breathing air cylinder to a pressure not exceeding 310bar (4,500 psi) simultaneously in three minutes or less. Where greater capacity is required, the Authority Having Jurisdiction shall specify the required system capacity.

E 9.2 Fill Panels or Stations Location. Cylinder fill panels or stations shall be installed in the interior of buildings as follows:

E 9.2.1 High-Rise Buildings. An interior cylinder fill panel or station shall be installed commencing on the third floor and every third floor thereafter above grade. For underground floors in buildings exceeding five underground floors, an interior cylinder fill panel or station shall be installed commencing on the third floor below grade and every three floors below grade thereafter, except for the bottom-most floor.

E 9.2.2 Underground Structures. For underground floors in buildings exceeding five underground floors, an interior cylinder fill panel or station shall be installed commencing on the third floor below grade and every three floors below grade thereafter, except for the bottom-most floor.

E 9.2.3 Installation Locations. The specific location or locations on each floor shall be approved by the Authority Having Jurisdiction.

E 10.0 System Assembly Requirements.

The system shall be an all-welded system except where the tubing joints are readily accessible and at the individual air fill panels or stations. When mechanical high-pressure tube fittings are used, they shall be approved for the type of materials to be joined and rated for the maximum pressure of the system.

E 10.1 Welding Requirements. Welding procedures shall meet ASME B31.1, Part 4 and Chapter V or equivalent International Standard(s) approved by the Authority Having Jurisdiction. Prior to and during the welding of sections of tubing, a continuous, regulated dry nitrogen or argon purge at 20kPa (3 psi gauge) shall be maintained to eliminate contamination with products of the oxidation or welding flux. The purge shall commence not less than two minutes prior to welding operations and continue until the welded joint is at ambient temperature.