ISLAND-TYPE VEHICLE FUELING SYSTEM FOR GARAGES AND SERVICE OPERATIONS CENTERS EQUIPMENT DESIGN REQUIREMENTS

CONTENTS PAGE

1. GENERAL

1.01 This section furnishes engineering information covering the equipment design requirements of an Island-Type Vehicle Fueling System for Garages and Service Operations Centers.

1.02 Whenever this section is reissued, the reason(s) for reissue will be given in this paragraph.

2. DESCRIPTION OF SYSTEM

2.01 The system functions in the following manner. Gasoline is stored in an underground storage tank and withdrawn and dispensed by means of a fuel dispensing pump. This pump may be located within the tank or within a dispensing device located on an elevated concrete island.

2.02 Federal, state, or local codes or regulations may require the installation of a hydrocarbon vapor recovery system. The requirement may be for a Phase I vapor recovery system or both a Phase I and Phase II system.

3. DESCRIPTION OF EQUIPMENT

3.01 A Phase I vapor recovery system shall have the following fittings manufactured by OPW Division of Dover Corporation installed on the underground gasoline storage tank:

(a) Vapor check valve with cap

(b) Extractor vent valve

(c) Float vent valve (ball type)

(d) Pressure/vacuum vent cap

(e) A 4-inch aluminum drop tube.

3.02 Phase II vapor recovery system (future automobile fuel tank vapor recovery) shall be provided for at time of tank installation. In addition to fittings called for in paragraph 3.01, each dispenser location on pump islands shall have a 2-inch vent line installed from storage tank to pump island. This line shall be terminated and capped either above island slab level or within a box cast into the island slab. Cap shall be identified as "Phase II vent."

3.03 Fuel dispensing pump shall be Tokheim Model 785-MC-E-PR, rated up to 22 gallons per minute with 3/4 hp, 115-volt/single phase explosion proof motor. Unit shall have suction pump and built-in provisions for external ticket printer, and be equipped with the following accessories:

(a) Noncollapsible strainer

(b) Visible register to indicate delivery up to 1,000 gallons with electric power reset mechanism

(c) Automatic totalizer, indicating up to 1,000,000 gallons

(d) A 15 foot length of 1-inch diameter gasoline and oil resistant hose with hose restracting device

(e) Safety-fill type nozzle designed to automatically cut off flow when tank is filled

(f) Pump shall be designed to permit locking of nozzle to pump when nozzle is in hanger and pump is off.

3.04 Piping may be black steel, schedule 40, standard weight, or RTRP (Reinforced Thermosetting Resin Pipe) fiberglass. Metallic pipe shall have swing joints at all 90 degree turns. The RTRP fiberglass shall have flexible connections to relieve any strain on buried pipes.

3.05 Nipple may be a black steel, schedule 40, standard weight, or RTRP fiberglass. Metal nipples shall have not less than 1/2 inch of unthreaded material between threaded ends.

3.06 Fittings shall be malleable iron or RTRP fiberglass.

3.07 All underground metallic pipes shall be coated by one of the following methods:

(a) Factory applied extruded plastic coating. Joints shall be wrapped with fungus-resisting pressure-sensitive tape and coated with compatible primer. Primer and tape shall be as recommended by plastic coated piping fabricator.

(b) A coal tar coating shall be mechanically applied in factory or field plant. Pipe covering shall consist of a coal tar priming coat, a coat of coal tar enamel, a wrapper of bonded asbestos felt, and a wrapper of kraft paper or a coat of water-resistant whitewash applied in the order named conforming to the requirements of American Waterworks Association (AWWA) Specification C203 as to materials, methods of application, tests and field procedures, except that interior lining will not be required. Fittings, couplings, and joints, shall be cleaned, primed, and coated in conformance with AWWA Specification C203, Field Procedure.

3.08 Each suction line from the storage tank to dispenser pump shall have a union (for metallic piping) or mating flanges (for RTRP fiberglass piping) located near the suction stub fitting on the tank. In addition, each suction line shall have either an angle check valve or foot valve to prevent flow back into the tank from the dispenser pump. A suction line screen shall be installed on the suction stub not less than 3 inches from bottom of tank.

3.09 An additional 3/4-inch conduit should be installed between the pump and a mechanical or mechanized fuel dispensing system if such a device is anticipated at a particular location in the near future.

4. INSTALLATION

4.01 All buried piping shall have a nominal earth covering of 3 feet, 0 inches.

4.02 All vent piping, including future Phase II vapor recovery piping, shall be installed as to drain to the storage tank without sags or traps in which liquid can collect. Minimum slope shall be 1 inch in every 8 foot, 0 inch.

4.03 Fill and dispenser pump suction pipes shall enter storage tank at the top and slope towards the tank at not less than 2 1/2 inch in every 10 foot, 0 inch.

4.04 Metallic pipe threads shall have a sealing compound of litharge and glycerine cement or other product not soluble in gasoline. No teflon type is to be used.

5. ELECTRICAL WIRING

5.01 Electrical material, equipment, and work in hazardous areas shall comply strictly with requirements of National Electrical Code (NEC), paragraphs 500, 501, and 514, and applicable standards and recommended safeguards of the National Fire Protection Association (NFPA).

5.02 ***Requirements for conduit seals are explained below:***

(a) Seals in conduit running between the nonhazardous area and the hazardous area shall be located immediately next to the separation wall between the two areas on the nonhazardous side. Seals shall be located each conduit run entering an enclosure for switches, fuses, relays, or other apparatus which may produce arcs, sparks, or high temperatures. Seals shall be placed as close as practical and in no case more than 18 inches from such enclosure. There shall be no junction box or similar enclosure in the conduit run between the sealing fitting and the apparatus enclosure.

(b) There shall be no union, coupling, box, or fitting in the conduit between the sealing fitting and the point at which the conduit leaves the Division 1 hazardous area.

(c) Sealing compound shall be approved for class 1, Group D, Divisions 1 and 2 and not be af-

fected by the surrounding atmospheres or liquids, and shall not have a melting point of less than 93° C. Seals shall be Crouse-Hinds-type EYS. Seals and sealing compound shall be installed in accordance with the manufacturer's recommended procedure. The minimum thickness of the sealing compound shall not be less than the trade size of the conduit and in no case less than 5/8 inches.

(d) Splices and taps shall not be made in fittings intended only for sealing with compound, nor shall other fittings in which splices or taps are made be filled with compound.

5.03 A drainage system shall be provided to prevent accumulation of liquid or other condensed vapor that may be trapped within enclosures for control equipment and at various points in the raceway system.

5.04 Equipment approved for installation in hazardous areas shall be marked to show the class, group and operating temperature or temperature range based on operation in a 40°C ambient for which it is approved. Identification numbers marked on equipment nameplates shall be in accordance with NEC, Table 500-2 (b).

5.05 In hazardous areas, conduit fittings shall be ferrous alloy, cadmiumplated with threaded hubs, and cast alloy covers with oil-resistant synthetic rubber gaskets.

5.06 ***Raceway Installation*** shall be as follows:

(a) Rigid conduit in hazardous areas shall have threaded joints made wrenchtight to minimize sparking when fault current flows through the conduit system. The conduit shall be threaded with a standard conduit cutting die which provides 3/4-inch taper per foot.

(b) Boxes, fittings, and joints shall be threaded for connection to conduit or cable terminations and shall be explosion proof. Threaded joints shall be made with at least five threads fully engaged.

5.07 In hazardous areas, connections to motors shall be made with flexible connectors suitable for class 1, Division 1, Group D application as manufactured by Crouse-Hinds, Appleton, or Pyle-National. Connections to control devices shall be with rigid steel conduit. Flexible connectors shall not be longer than 2 feet, 6 inches.

5.08 Electrical installation for dispensing pump shall be as follows:

(a) ***Wiring and equipment above class 1 locations:*** Wiring and equipment above the class 1 locations defined in NEC, Section 514-2 shall comply with Sections 511-5 and 511-6.

(b) ***Circuit disconnects:*** Each circuit leading to or through a dispensing pump shall be provided with a switch or other acceptable means of disconnect simultaneously from the source of supply all conductors of the circuit, including the grounded neutral, if any.

(c) ***Sealing at dispenser and at boundary is defined below:***

(1) ***At dispenser:*** An approved seal shall be provided in each conduit run entering or leaving a dispenser or any cavities or enclosures in direct communication therewith. The sealing fitting shall be the first fitting after the conduit emerges from the earth or concrete.

(2) ***At boundary:*** Additional seals shall be provided in accordance with NEC, Section 501-5, Section 501-5(a)(4), and Section 501-5(b)(2) and shall apply to horizontal as well as to vertical boundaries of the defined class 1 locations.

(d) ***Grounding:*** Metal portions of dispensing pumps, metal raceways, and all noncurrent-carrying metal parts of electric equipment, regardless of voltage, shall be grounded as provided in NEC, Article 250.