# Engineering Specification

# Reliable DDX-LP DryPaK Assembled Unit

**Recommended CSI MasterFormat Specification Location: 21 13 16, Dry-Pipe Sprinkler Systems (formerly 13935)**

A self-contained, fully integrated low-pressure dry-pipe sprinkler system shall be provided. The system must be **[**cULus Listed**] [**FM Approved**]** components within a cabinet specifically designed for the intended use as an assembled unit, containing all of the factory installed hydraulic and electrical components, fittings, gauges, mechanical couplings and supervisory air supply necessary for the operation of an approved automatic preaction sprinkler system in accordance with NFPA 13 **[**year**]** edition.

Cabinet shall contain a domestically factory-assembled and tested preaction system riser assembly with galvanized electric actuation trim. Cabinet size shall be limited to an area of **[**4.5 ft2 (2”, 2-1/2”, 3” size)**] [**5.2 ft2 (4” & 6” size)**] [**7.0 ft2 (8” size)**]**. The cabinet shall be 12-gauge steel with rustproof exterior powder-coated black finish, and rustproof interior powder-coated white finish for improved interior cabinet visibility. Cabinet enclosure shall have removable panels for access to interior components. Cabinet door shall be lined with a neoprene gasket and shall contain viewing ports for water supply pressure, supervisory air pressure, and system pressure gauges that are securely mounted.

The low-pressure dry-pipe system riser assembly shall include a properly sized water control valve, water supply manifold and drain manifold with grooved end connections, system drain, grooved end system control indicating butterfly valve with a pre-wired supervisory tamper switch assembly, grooved-end system discharge outlet, and associated pneumatic actuation release trim listed as part of the dry-pipe valve assembly. Dry valve trim shall be galvanized and shall consist of all components necessary to enable the system to be used as a low-pressure system. These components include a low-pressure dry pilot actuator, main drain, alarm line test, water pressure gauges, push rod chamber supply connections, manual emergency release valve, pressurizing line connection, and closed drain assembly. A condensate drain valve shall also be included to prevent water columning above the clapper. Low air supervisory and water flow alarm pressure switches shall be included as part of this assembly.

Supervisory air supply shall be as described elsewhere in this specification. Dry-pipe system supervisory air shall be regulated through a regulating pressure maintenance device set in accordance with the manufacturers data sheet.

A 120/220 VAC watertight terminal box mounted inside the cabinet shall be provided for power connection to the air compressor. Wiring of control valve supervisory switch, low pressure alarm switch, waterflow alarm pressure switch, and optional low nitrogen pressure switch shall be translated to a watertight terminal box mounted inside the cabinet. All field wiring shall be connected to these boxes.

Assembled unit preaction system to be **[**2”**] [**2½”**] [**3”**] [**4”**] [**6”**] [**8”**]** Reliable Model DDX-LP DryPaK. Refer to Reliable Bulletin 748 for associated information.

### **Deluge Valve**

Dry-pipe valve shall be a **[**cULus Listed**] [**FM Approved**]** hydraulically operated, differential latching clapper-type valve. Valve construction shall be of lightweight, ductile-iron construction with “screw in” stainless steel seat and clapper assembly. Seat shall have O-ring seals to resist corrosion and leakage. Clapper facing shall be pressure actuated, providing a limited compression seat for the sealing force between the clapper rubber facing and the valve seat. Valve shall have an external reset knob for resetting the clapper without having to remove the valve face plate. Push-rod chamber design shall consist of a stainless steel piston/pushrod and spring assembly with diaphragm seal secured to the casting through a pushrod guide constructed of a synthetic engineering plastic to resist corrosion. Casting shall have a bleeder hole located on the pushrod chamber for air/water leakage indication. Trip ratio shall be approximately a 3:1 force differential. Valve shall be of the straight-through design to minimize friction loss and shall be activated by pneumatic actuation trim. Inlet restriction orifice shall be factory installed into inlet port of dry-pipe valve push-rod cover plate and not be a separate part of the valve trim. Valve trim shall consist of galvanized and brass components specifically **[**cULus Listed**] [**FM Approved**]** with the dry-pipe valve. Trim components shall include 2” main drain, alarm line test, water pressure gauges, push rod chamber supply connections, manual emergency release valve, and closed drain assembly. Condensate drain valve shall also be included to prevent water columning above the clapper. Dry-pipe valve releasing device shall be a low pneumatic pressure dry pilot actuator of cast iron construction, utilizing a diaphragm and compression spring design to separate the push-rod chamber water pressure from the system piping pneumatic supervisory pressure. The low-pressure actuator shall require a minimum of 8 psi (0.6 bar) and a maximum of 28 psi (1.9 bar) supervisory pressure for proper setting in accordance with the manufacturer’s instructions. Low-pressure actuator shall be the Reliable Model LP actuator (Reliable Bulletin 505). Dry-pipe valve shall be **[**2” (50 mm)**] [**2½” (65 mm)**] [**3” (80 mm)**] [**4” (100 mm)**] [**6” (150 mm)**] [**8” (200 mm)**]** with grooved end connections per ANSI/AWWA C606. Dry-pipe valve shall have a rated working pressure of **[**250 psi (17.2 bar) and shall be factory hydrostatic tested at 500 psi (34.5 bar)**]** **[for 4”, 6” & 165mm valves only:** 300 psi (20.7 bar) and shall be factory hydrostatic tested at 600 psi (41.4 bar)**]**.

Dry-pipe valve shall be the Reliable Model DDX-LP. Refer to Reliable Bulletin 338 for associated information.

**SYSTEM COMPONENTS:**

### **System Control Valve**

A **[**2½” (65mm)**] [**3” (76mm)**] [**4”(100mm)**] [**6” (150mm)**] [**8” (203mm)**]** slow close grooved indicating butterfly control valve shall be **[**cULus Listed**]** **[**FM Approved**]** for fire protection systems. The valve shall have AWWA C606 grooved end connections with integral supervisory tamper switch. The valve shall be supervised **[**Open (yellow indicator)**] [**Closed (white indicator)**]**. The valve body construction shall be coated brass with Nylon-11, an EPDM encapsulated coated disc in accordance with ASTM A-536, and 416 stainless steel stem. The valve shall have a weatherproof gear operator rated for indoor/outdoor use with handwheel and raised position indicator.

Two internal factory-mounted supervisory switches shall be housed within the switch box housing; a S.P.S.T. switch having a rating of 15A @ 125 VAC, 1/2A @ 125 VDC, and a S.P.D.T. switch having a rating of 11A @ 125 VAC, 1 A @ 28 VDC. All lead wires for external connections shall be 18 AWG, exiting the switch box housing through a single hole suitable for ½” conduit fittings. The Butterfly Control Valve shall be listed for 300 psi (20.7 bar) working pressure with a maximum working temperature of 250°F.

The grooved water supply control valve shall be a Reliable Model BFG 300 Butterfly Valve. Refer to Reliable Bulletin 831 for associated information.

### **Sprinklers**

Insert applicable sprinkler specifications here.

**SUPERVISORY AIR SUPPLY OPTIONS**

**Compressed Air Supply**

Supervisory air supply shall be provided by an integral automatic tank-mounted air compressor sized for the capacity (volume) of the double interlock preaction system piping and be capable of restoring normal air pressure in the system within 30 minutes. Double interlock preaction system shall only require between 10 and 28 psi (0.7 to 1,9 bar) supervisory pressure for proper setting of the low-pressure pneumatic actuator in accordance with the manufacturer’s instructions. Tank mounted compressor shall be a motor mounted, oil-less, piston compressor, including gauge, regulating pressure switch, check valve, drain valve, and safety relief valve. Single-phase motor shall have internal thermal protection. Air supply shall be equipped with an automatic pressure maintenance device capable of maintaining a constant system pressure regardless of pressure fluctuations in the compressed air source, or system piping.

**Owner’s Air Supply**

Supervisory air supply shall be provided by an owner supplied air system in conjunction with **[**cULus Listed**] [**FM Approved**]** automatic pressure maintenance device, capable of maintaining a constant system pressure regardless of pressure fluctuations. Double interlock preaction system shall only require between 10 and 28 psi (0.7 to 1.5 bar) supervisory pressure for proper setting of the low-pressure pneumatic actuator in accordance with the manufacturer’s instructions. The pressure maintenance device shall consist of galvanized trim and brass parts, including a strainer and a field adjustable pressure regulator, and have a working pressure rating of 175 psi (12.1 bar). The pressure regulator shall have an adjustable outlet pressure range of 5 to 75 psi (.34 to 5,2 bar). Pressure maintenance device shall be the Reliable Model A.

**Nitrogen**

Nitrogen cylinders provided by an approved source shall provide the nitrogen supply. Double interlock preaction system shall only require between 10 and 28 psi (0.7 to 1,9 bar) supervisory pressure for proper setting of the low-pressure pneumatic actuator in accordance with the manufacturer’s instructions. The nitrogen cylinder pressure shall be regulated and supervised using a nitrogen regulating device and low-pressure trim kit.

This device shall consist of a brass, single stage pressure regulator, equipped with high pressure inlet and low-pressure outlet gauges, and ¼” copper connection tubing with galvanized ¾” x ¼” reducer bushing. Low-pressure trim kit shall be included to monitor the regulated nitrogen supply pressure to provide a low-pressure supervisory alarm. This kit shall include a low-pressure switch with associated galvanized connection trim. Assembly shall be a Reliable Nitrogen Regulating Device.

This device is to be used in conjunction with the Reliable Model A pressure maintenance device.

### **Low Air Supervisory Pressure Switch**

Supervisory air pressure within the preaction system piping shall be monitored using a low air supervisory pressure switch. Supervisory air pressure switch shall be **[**cULus Listed**] [**FM Approved**]**, field-adjustable, bellows-activated type pressure switch compatible with system devices. The pressure switch shall have the capability to provide alarm response between 10 and 60 psi but shall be factory wired to respond at 18 psi on decreasing pressure and 28 psi on increasing pressure. The pressure switch shall have a field replaceable SPDT (Form C) contact(s) rated at 10.0 amp @ 125/250 VAC and 2.5 amp @ 6/12/24 VDC. Switch shall be provided with a ½” NPT male glass-reinforced nylon pressure connection and shall have a maximum pressure rating of 250 psi. Two conduit connection holes shall be provided in the mounting plate to accept standard ½” conduit fittings. The switch enclosure shall be weatherproof and carry a UL 4x/NEMA 4 rating when used with proper electrical fittings and conduit. The cover shall have the wiring diagram cast into it and incorporate tamper-resistant screws. Low air supervisory pressure switch shall be a Potter Electric PS 25-2 pressure switch.

### **Waterflow Pressure Switch**

An alarm pressure switch installed on the alarm line trim of the deluge valve shall provide a water flow alarm. It shall be **[**cULus Listed**] [**FM Approved**]**. The switch shall be a field-adjustable, bellows-activated type pressure switch compatible with system devices. The pressure switch shall have the capability to provide alarm response between 4 and 20 psi but shall be factory adjusted to respond at 4 to 8 psi on rising pressure. The pressure switch shall have a field replaceable SPDT (Form C) contact(s) rated at 10.0 amp @ 125/250 VAC and 2.5 amp @ 6/12/24 VDC. Switch shall be provided with a ½” NPT male glass-reinforced nylon pressure connection and shall have a maximum pressure rating of 250 psi. Two conduit connection holes shall be provided in the mounting plate to accept standard ½” conduit fittings. The switch enclosure shall be weatherproof and carry a UL 4x/NEMA 4 rating when used with proper electrical fittings and conduit. The cover shall have the wiring diagram cast into it and incorporate tamper-resistant screws. Alarm pressure switch shall be a Potter Electric PS 10-2 pressure switch.

**Pressure Maintenance Device**

An automatic, regulating type of pressure maintenance shall be used with pneumatic supplies provided by a source of compressed air or nitrogen cylinders equipped with a regulating device. The pressure maintenance device shall be **[**cULus Listed**] [**FM Approved**]** capable of maintaining a constant system pressure, automatically, regardless of any pressure fluctuations from the compressed air of nitrogen source. The device shall be constructed of galvanized trim and brass parts, consisting of ¼” supply bypass piping and a ¾” section of piping for rapid restoration of system pneumatic pressure. The ¼” bypass piping shall contain shutoff valves, a strainer, a check valve and a field adjustable pressure regulator. The pressure regulator shall have an adjustable outlet pressure range of 5 to 75 psi (.34 to 5,2 bar). The ¾” section of piping shall contain a ball valve for rapid restoration of system pressure and associated trim for connection to the dry pipe valve system air supply line. The assembly shall have a working pressure rating of 175 psi (12,1 bar). The pressure maintenance device shall be the Reliable Model A.

### **Desiccant Air Dryer**

Where dry air is desired, a dehydrator assembly shall be factory installed in the air trim, with bowl guard, supply control and drain valves. Dehydrator shall be manually generated desiccant-type air dryer, the desiccant acting as a moisture indicator by changing color. Desiccant dehydrator shall be Wilkerson Model X04

**Mechanical Accelerator**

For system capacities in accordance with NFPA 13 up to a maximum of 1500 gallons (5678 L) a mechanical accelerator with associated galvanized trim kit shall be provided to exhaust air pressure from the pneumatic actuator trim piping in order to hasten operation of the dry-pipe system. Minimum pneumatic pressure shall be 15 psi (1.0 bar) to ensure proper accelerator operation. Accelerator shall be **[**cULus Listed**] [**FM Approved**]** for use with the low pressure dry-pipe valve trim. Accelerator shall be capable of adjusting for small fluctuations in system air pressure without causing operation. The accelerator shall contain an integral Accelo-Check (anti-flooding) assembly to prevent entry of water and debris into critical internal areas during operation. Accelerator body and dome to be of cast aluminum and epoxy coated inside and out. Diaphragm construction shall consist of Dupont Fairprene BN 5049 with stainless steel filter assembly. Trim kit shall consist of all galvanized and brass parts, including an isolating ball valve. Accelerator and trim kit shall be Reliable Model B-1.

**Electronic Accelerator (cULus only)**

For system capacities in accordance with NFPA 13 up to a maximum of 1690 gallons (6397 L) an electronic accelerator with associated galvanized trim kit shall be provided to exhaust air pressure from the pneumatic actuator trim piping in order to hasten operation of the dry-pipe system. The electronic accelerator shall be cULus Listed, field-adjustable with an air pressure range from 10 psi (0.69 bar) to 65 psi (4.48 bar). The electronic accelerator shall be housed in a NEMA 2 rated 18-gauge steel enclosure having a hinged door with a keyed lock. Power shall be supplied by a single 120 VAC (0.75 A) circuit, with 24-hour rated battery back-up provided by two 12-volt (1.3 AH) batteries located inside the cabinet. The accelerator shall sound a local audible for trouble and supervisory conditions, and shall provide individual LED indication of AC Power, Trouble/Supervisory, Battery Trouble and a Tripped condition. Electronic accelerator shall be a VIZOR as manufactured by Tyco/Johnson Controls, Inc.