

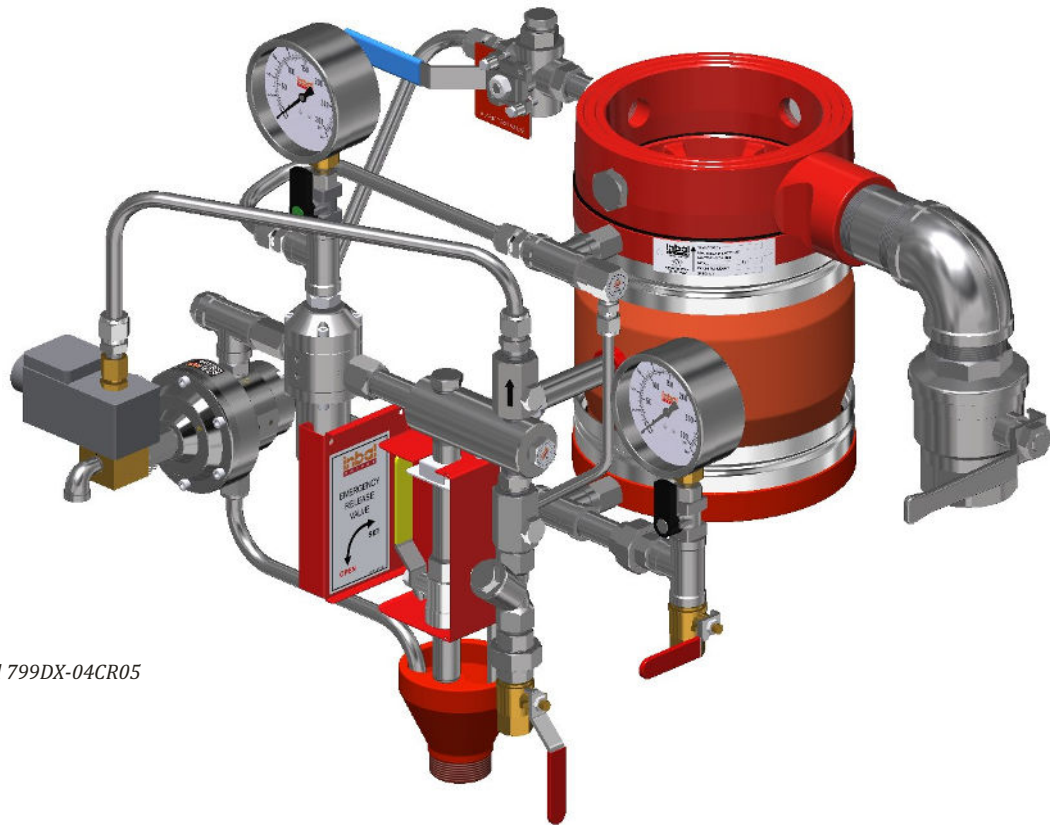
# Inbal Deluge Valve, Pressure Control

Series 700D/DG/DX - 04/24CR05

Electric Actuation, Local Resetting



*F M Approved*



Model 799DX-04CR05

## General Description

The **Inbal** Pressure Control, Electrically Actuated Deluge Valve is specifically designed for use in fire protection systems which require pressure control, actuated by an electric detection and release system. The **Inbal** Valve, when in operation, automatically reduces a higher inlet pressure to a preset delivery pressure which remains steady and unaffected by the variations or fluctuations in the pressure inlet line.

The **Inbal** Pressure Control, Electrically Actuated Deluge Valve is used for automatic or manual operation. Electric activation of the **Inbal** Deluge System requires a solenoid valve controlled by a control (fire alarm & releasing) panel either manually or by heat, smoke, or flame detectors. When the detection system operates, the control panel activates the Solenoid Valve to open. When the Solenoid Valve is actuated either automatically or manually or when a manual release station is operated locally or remotely, the **Inbal** Deluge Valve opens and water flows from all open sprinklers and/or nozzles on the system.

While the valve operates, the deluge system pressure is maintained at the preset level within a narrow range. If the downstream pressure changes slightly, the pilot control responds immediately to modulate the **Inbal** Valve for the preset pressure.

The use of the **Inbal** Pressure Control Deluge Valve balances the distribution of the water capacity available, throughout the system and prevents a higher demand from the areas which are of lower altitude or are located closer to the pressure source. Thus, the total system demand is balanced and the excess flow through the system with high pressure water supplies is reduced to the desired level. The adjustment of the valve's delivery pressure can be easily modified at the site.

Standard material **Inbal** Pressure Control Deluge Valves are rated to 300 psi (21 bar) and are available in sizes 1½" (40 mm) to 12" (300 mm) with threaded, flanged, grooved, or wafer ends.

The only moving part in the **Inbal** Valve, when it operates, is the reinforced sleeve which forms a drip tight seal with the corrosion resistant core. It has a smooth opening to prevent any water hammer in the piping system.

The unique design of the **Inbal** Valve and the pilot control, and variety of materials and coatings, make the **Inbal** Pressure Control Deluge Valve suitable for use with brackish or sea water similar to those found in chemical and petrochemical facilities or in offshore platforms.

## Technical Data

### Approvals

The **Inbal** Electrically Controlled Deluge System models:

711D -24CR05	733D -24CR05	799D -24CR05
711DX -24CR05	733DX -24CR05	799DX -24CR05
711DX -04CR05	733DX -04CR05	799DX -04CR05
711DG -24CR05	733DG -24CR05	799DG -24CR05
711DG -04CR05	733DG -04CR05	799DG -04CR05

are all FM approved to 300 psi (21 bar)\* in sizes 2", 3", 4", 6", 8", 10" and 12" (50, 80, 100, 150, 200, 250 and 300 mm), with threaded, flanged and wafer ends. Consult the FM Approval Guide for acceptable applications. **Inbal** Deluge Valves have Lloyd's, DNV-GL, and ABS Type Approvals for all sizes.

\* Provided it is the pressure rating of the solenoid valve in use

### Model Numbers

Inlet End	Outlet End	Model No.
Threaded	Threaded	711DX-04CR05
Threaded	Grooved	716DX-04CR05
Flanged	Flanged	733DX-04CR05
Flanged	Grooved	736DX-04CR05
Grooved	Grooved	766DX-04CR05
Wafer	Wafer	799DX-04CR05

"DX" can be replaced with "D" or "DG" depends on the **Inbal** Automatic Water Control Valve series in use. See bulletins F02-01, F02-02, and F02-03.

The above model numbers refer to potable water trimmed valves. For sea / brackish water control trim replace "04" with "24"; "34" — for foam control trim. For example: 799D-24CR05 is a wafer ends deluge valve with sea water, electrically actuated, pressure control trim.

### Sizes

Threaded Ends:

1½", 2", 2½" & 3" (40, 50, 65 & 80 mm).

Flanged and Grooved Ends:

1½", 2", 2½", 3", 4", 6", 8", 10" & 12" (40, 50, 65, 80, 100, 150, 200, 250 & 300 mm).

Wafer End:

3", 4", 6", 8", 10" & 12" (80, 100, 150, 200, 250 & 300 mm).

### End Standards

Threaded End:

NPT or BSPT.

Flanged End:

ANSI B16.5 class 150 & 300;<sup>1</sup>

ISO 7005 - PN10, 16 & 25;<sup>1</sup>

BS 10 Table D & E;<sup>2</sup>

AS 2129 Table D & E;<sup>2</sup>

Jis B 2212, 2213, 2214.<sup>2</sup>

Wafer End:

Fits most of the above standards.

Grooved End:

ANSI/AWWA C606-87.

(1) - On standard

(2) - On special request

### Pressure Rating

Maximum working pressure\*: 300 psi (21 bar). However, the pressure rating of the specific solenoid valve in use should not be lower than the maximum upstream pressure.

\* Standard material valve

### Adjustment Range

#### Standard\*

30 to 300 psi (2 to 21 bar).

\* Marked red

### Temperature Range

Water: Max. +150°F (+65°C).

### Installation Position

Vertical or horizontal.

### Solenoid Valve

Approved models:

3 way, normally open or multipurpose, series 151/3 of which the following solenoid valves are FM approved:

151-61A — Brass body; ¼"; 24 V DC; 8 Watt; IP 67; to 290 psi (20 bar)<sup>1</sup>

151-63A — St. St. 316 body; ¼"; 24 V DC; 8 Watt; IP 67; to 290 psi (20 bar)<sup>1</sup>

151-65A — Brass body; ¼"; 24 V DC; 8 Watt; EEx d IIC T4/5/6, IP 66; to 290 psi (20 bar)<sup>3</sup>

151-66A — Brass body; ¼"; 24 V DC; 8 Watt; EEx d IIC T4/5/6, IP 66; to 290 psi (20 bar)<sup>4</sup>

151-67A — St. St. 316 body; ¼"; 24 V DC; 8 Watt; EEx d IIC T4/5/6, IP 66; to 290 psi (20 bar)<sup>3</sup>

151-68A — St. St. 316 body; ¼"; 24 V DC; 8 Watt; EEx d IIC T4/5/6, IP 66; to 290 psi (20 bar)<sup>4</sup>

153-01A — Brass body; ¼"; 24 V DC; 9 Watt; IP65; to 435 psi (30 bar)<sup>1</sup>

153-02A — Brass body; ¼"; 24 V DC; 10 Watt; NEMA 1,2,3,3S,4,4X; to 435 psi (30 bar)<sup>2</sup>

153-12A — Brass body; ¼"; 24 V DC; 10 Watt; NEMA 1,2,3,3S,4,4X; to 435 psi (30 bar)<sup>2</sup>

153-15A — Brass body; ¼"; 24 V DC; 8 Watt; EEx dm IIC T4, IP67, Flameproof; to 435 psi (30 bar)<sup>3</sup>

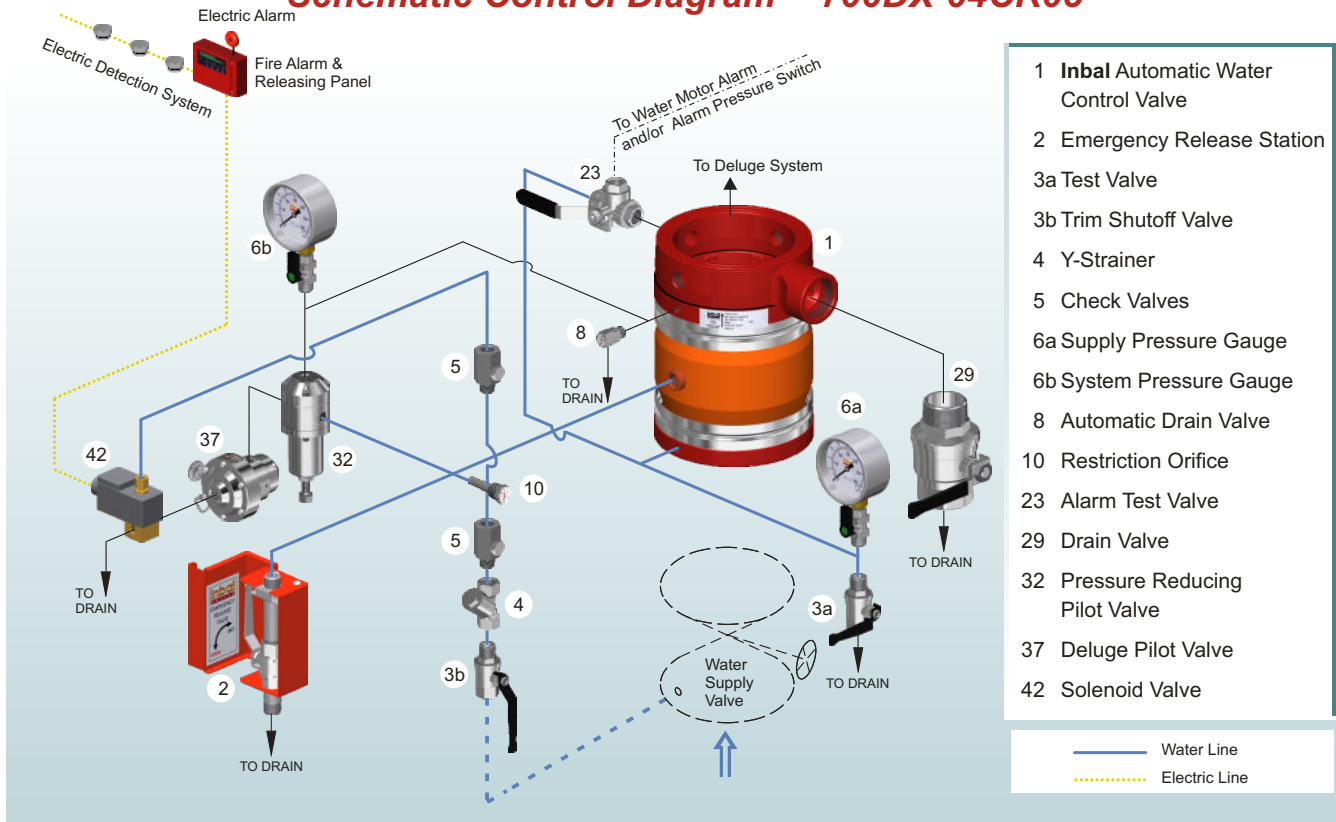
(1) - Din 43650A connector

(2) - ½" Conduit, 18" leads

(3) - M20x1.5

(4) - ½"NPTF

## Schematic Control Diagram – 700DX-04CR05



- 1 Inbal Automatic Water Control Valve
- 2 Emergency Release Station
- 3a Test Valve
- 3b Trim Shutoff Valve
- 4 Y-Strainer
- 5 Check Valves
- 6a Supply Pressure Gauge
- 6b System Pressure Gauge
- 8 Automatic Drain Valve
- 10 Restriction Orifice
- 23 Alarm Test Valve
- 29 Drain Valve
- 32 Pressure Reducing Pilot Valve
- 37 Deluge Pilot Valve
- 42 Solenoid Valve

— Water Line  
 ..... Electric Line

### Optional

Energized to open, energized to close types in various voltages, frequencies, enclosures, and pressure ratings. For the complete list of solenoid valves see bulletins F30-10-XX and F30-01.

### Materials

#### Standard

##### Valve Housing:

Carbon Steel (SAE 1021).

##### Valve Ends and Wafer Flow Test & Drain Ends:

Ductile Iron (ASTM A536-65 45 12).

##### Threaded, Flanged, and Grooved Flow Test & Drain Ends:

Carbon Steel (SAE 1020).

##### Sleeve:

SMR5 Elastomer reinforced with Poly-ester and Kevlar.

##### Control Trim:

Brass Nickel Chrome plated, Stainless Steel, and Galvanized Steel.

#### Optional

Cast Steel;

Bronze;

Nickel Aluminum Bronze;

Stainless Steel AISI 316;

Super Austenitic Stainless Steel;

Super Duplex Stainless Steel;

Titanium.

### Coating

#### Standard

Powder epoxy coated. Thickness: 0.004" (0.1 mm) external and internal surfaces.

#### Optional

High built epoxy coated and polyurethane finish. Thickness: 0.01" (0.3 mm).

Halar® coated. Thickness: 0.02" (0.5 mm).

Halar® is a registered trade mark of Ausimont USA Inc.

### Control Trim

On standard, the control trim is supplied preassembled in sections. If self-assembly is required, all the trim components are supplied in loose form. The complete control trim includes the following components:

- Solenoid Valve, 3 way.
- Deluge Pilot Valve, 2 way, with a built-in lock device<sup>2</sup>.
- Pressure Reducing Pilot Valve<sup>2</sup>.
- Y-Strainer with a stainless steel screen<sup>1</sup>.
- Alarm Test Valve — 3 way, L-port, quarter turn, ball valve.
- Trim Shutoff Valve<sup>1</sup>, Flow Test Valve and Drain Valve — 2 way, quarter turn, ball valve.
- Check Valve — spring loaded<sup>1</sup>.
- Supply and System Pressure Gauges with dual scale (psi and bar).
- Pressure Gauge Valves — 3 way, quarter turn ball valve.

- Drain Cup and drain tubes.
- Automatic Drain Valve.
- Emergency Release Station.
- Restriction Orifice.

*For Sea Water Control Trim:*

- (1) - *The Trim Shutoff Valve, Y-Strainer and Check Valve are replaced with Water Supply Unit (see bulletin F40-10).*
- (2) - *The Deluge Pilot Valve and the Pressure Reducing Pilot Valve are integrated into a single Remotely Controlled Pressure Reducing Pilot Valve with a latch mechanism (see bulletin F36-06).*

## Features

- Dual function control trim on a single valve body saves the use of two different control valves.
- No Moving Mechanical Parts (N.M.M.P.) construction ensures a long life of dependable operation and provides stable delivery pressure and a gradual closure, in case of increasing delivery pressure, to eliminate surges.
- Quick, yet soft opening performance – eliminates water hammer and consequent damages.
- Easily reset – no need to hold the reset knob pulled out while the pilot line is pressurized.
- Supplied as standard preassembled in sections – saves the self-assembly cost.
- Can be installed vertically or horizontally.
- Compact design - minimum space for valve and trim.
- Unique principle of operation prevents false operation due to water surges.
- Pressure rating to 300 psi (21 bar) for standard material valve provided a compatible solenoid valve is used.
- Balanced, single seat design pilot control for very accurate performance – not affected, even slightly, by inlet pressure fluctuations.
- Long spring design pilot control for sensitive setting and maintaining precise delivery pressure.
- Easily adjusted to the desired system pressure.
- Hydro dynamically designed **Inbal** Valve with streamline flow path - provides increased flow capacity.
- Wide range of sizes for an ideal system design.
- Control trim made of high grade materials as standard.
- Epoxy coating supplied as standard – ensures excellent corrosion resistance.
- Variety of available materials – to ensure corrosion-free service even under severe conditions.

## Operation

The Control Chamber of the **Inbal** Automatic Water Control Valve is the annular space between the Valve Housing and the Sleeve. The valve is held in closed position as long as inlet pressure is maintained in the Control Chamber.

The electric actuation trim consists of a Solenoid Valve, controlled by the detection system and the control (Fire Alarm & Releasing) panel. A manual emergency electric station and an alarm bell are incorporated electrically into the Fire Alarm & Releasing Panel and detector circuits. For "energized to open" Solenoid Valve, the Fire Alarm & Releasing Panel should include a battery charging circuit. In the event of power failure the Fire Alarm & Releasing Panel automatically switches to battery power.

In the set position, water pressure is applied to the **Inbal** Valve Control Chamber and to the Solenoid Valve from the upstream of the Water Supply Valve. The de-energized ("energized to open" type) or energized ("energized to close" type) Solenoid Valve is closed. Consequently, the **Inbal** Deluge Valve stays closed.

The **Inbal** Deluge Valve opens when the Solenoid Valve is actuated either by the detectors through the Fire Alarm & Releasing Panel or manually (energized or de-energized depending on the type of solenoid valve). The **Inbal** Valve opens also when the Emergency Release Valve opens.

Either one of these operations releases water from the **Inbal** Valve Control Chamber. The flow through the Pressure Reducing Pilot Valve responds to changes in the downstream pressure while controlling the pressure in the **Inbal** Valve Control Chamber. When the delivery pressure decreases, the pilot valve and the **Inbal** Valve open wider to increase the pressure. When the delivery pressure increases, the pilot valve and the **Inbal** Valve close to throttle further the flow and consequently the delivery pressure is decreased. Thus, the outlet pressure is maintained within a close limit. The operation of the **Inbal** Deluge Valve will flow water from any open sprinklers and/or spray nozzles on the system while activating the system's alarm devices.

Once the Deluge Pilot Valve operates, it latches in an open position, preventing the **Inbal** Pressure Control Deluge Valve from closing even if the solenoid valve returns from open to closed position. The **Inbal** Valve will close only when the Resetting procedure is followed.

Solenoid Valve available in types of "energized to open" and "energized to close" the **Inbal** Deluge Valve. When actuated, the Solenoid Valve allows the **Inbal** Deluge Valve to open.

The Emergency Release Valve is used for emergency actuation of the **Inbal** Deluge Valve and for routine testing.

---

## Installation

Refer to the Trim Chart applicable to the specific **Inbal** Pressure Control Deluge Valve model in use.

1. When the **Inbal** Deluge Valve is delivered, carefully unpack and check that there has been no damage to the operating components, piping, and fittings.
2. Always flush the pipelines before installing the **Inbal** Valve.
3. Place the **Inbal** Valve in the piping at the outlet of the Water Supply Valve. Verify that the arrow on the valve Housing matches the actual flow direction. Determine which side the system will be accessed from and locate the **Inbal** Deluge Valve accordingly.
4. Install the **Inbal** Deluge Valve in the pipeline. Use gaskets, bolts, stud bolts, bolt sleeves, and nuts as required by the valve ends.
5. Complete the trim assembly by connecting the preassembled sections, or assemble the trim if ordered in loose component form. Refer to the applicable Trim Chart and Installation Guide.
6. The water pressure supply to the control trim must always be sourced from the inlet of the Water Supply Valve through a 1/2" pipe.
7. Connect the drain tube of the Deluge Pilot Valve and all the other drain tubes to the drainage system.
8. The Solenoid Valve must be wired in accordance with the requirements of the authorities having jurisdiction and/or NEC, IEC, or CENELEC standards and codes. Wiring should be done by a licensed electrician.
9. The downstream pressure adjustment is recommended at a minimum flow velocity of 1.5 ft./sec (0.5 m/sec). When it is not feasible to flow the system, close the system shutoff valve and open the Drain Valve.
10. Operate the system to establish the minimum flow. Check the System Pressure Gauge reading. If adjustment is required, turn the pilot valve adjusting screw clockwise to increase or counter-clockwise to decrease the pressure setting.
11. Open the system shutoff valve and close the Drain Valve.
12. Set the **Inbal** Pressure Control Deluge Valve by following the Resetting procedure.
13. Test the **Inbal** Deluge Valve, the trim, and the alarms according to the Testing procedure.
3. De-energize the Solenoid Valve by resetting the detection system and the Fire Alarm & Releasing Panel. Verify that the Solenoid Valve is in a closed position and the Electric Alarm is reset.
4. Open the Flow Test Valve and Drain Valve, allowing all the water to drain.
5. Inspect and replace any portion of the detection system subjected to fire conditions.
6. Inspect the trim and alarm Y-Strainers. Clean if necessary.
7. Verify that the Emergency Release Valve is in a closed position.
  - 8a. Push the manual override knob on the solenoid valve body (refer to solenoid valve model 151-6XA).
  - 8b. Energize the solenoid valve (refer to solenoid valves model 151-01XA & 151-11XA)
9. Pull the Reset Knob (22) on the Pilot Valve and insert the Resetting Indicator between the Reset Knob and the Locking Device Cover [see Figure (1C) in bulletin F33-02].
  - 10a. Release the manual override knob on the solenoid valve body (refer to solenoid valves model 151-6XA).
  - 10b. De-energize the solenoid valve (refer to solenoid valves model 151-01XA & 151-11XA)
11. Open the Trim Shutoff Valve; allow water pressure to build up in the trim and in the **Inbal** Valve Control Chamber.
12. Verify that the Resetting Indicator falls down, hung by the secured chain. Wait and verify that the pressure readings on both pressure gauges are equal.
13. Slightly open the Water Supply Valve, allow the air that might be trapped in the section of pipe between the **Inbal** Valve and the Water Supply Valve to escape through the Flow Test Valve.
14. Close the Flow Test Valve.
15. Fully open the Water Supply Valve. Verify that there is no flow from the Drain Valve, downstream of the **Inbal** Valve.
16. Close the Drain valve.

## Resetting

The **Inbal** Pressure Control Deluge Valve system must be reset and restored to service as soon as possible after automatic, emergency, or manual actuation.

The procedure is as follows:

1. Close the Water Supply Valve. Water flow alarms are reset.
2. Close the Trim Shutoff Valve.

## Maintenance, Inspection, & Testing

It is recommended that periodic inspections and tests be conducted by qualified personnel to ensure that the **Inbal** Pressure Control Deluge Valve and related equipment are in good operating condition. The inspection and testing activities should be done according to NFPA Standards, the guidelines and regulations of the authorities having jurisdiction, and the following instructions. It is recommended that the Pressure Control Deluge Valve be tested, operated, cleaned, and inspected at least on a routine basis.

# Inbal Deluge Valve, Pressure Control



Series 700D/DG/DX - 04/24CR05

*F M A p p r o v e d*

## Inspection

A *weekly* Inspection is recommended:

1. Verify that the Water Supply Valve is sealed in fully open position.
2. Verify that the required water pressure is being applied to the **Inbal** Deluge Valve inlet and trim.
3. Verify that the Trim Shutoff Valve, Alarm Test Valve, Emergency Release Valve, Pressure Gauge Valves, Solenoid Valve, and Drain Valve (if in use) are in set position.
4. Check the Supply and System, Pressure Gauge readings.
5. Visually inspect for broken or missing parts, or other evidence of impaired protection.

## Strainer Cleaning

A *quarterly* Strainer Cleaning is recommended:

1. Close the Trim Shutoff Valve
2. Remove the covers of the trim and alarm Y-Strainers. Clean if necessary.
3. Open the Trim Shutoff Valve.

## Alarm Testing

A *quarterly* Alarm Testing is recommended:

1. Test the Water Motor Alarm or Alarm Pressure Switch by opening the Alarm Test Valve.
2. Water Motor Alarm should be audible. Alarm Pressure Switch should activate.
3. Close the Alarm Test Valve. All local alarms stop sounding and pressure switch is reset.
4. Verify that the supply piping to alarm drains properly.

## Deluge Trim Testing

A *semi-annual* Deluge Trim Testing is recommended. Testing of the control trim is conducted with no flow of water to the system.

1. Open the Flow Test Valve to flush away debris or foreign particles which may have accumulated in the **Inbal** Deluge Valve inlet.
2. Close the Flow Test Valve.
3. Close the water Supply Valve installed in the inlet of the **Inbal** Deluge Valve.
4. Activate the Solenoid Valve. Water should be drained from the deluge trim.
5. De-activate the Solenoid Valve.

6. Verify that the Deluge Pilot Valve latched in an open position and water does not stop flowing from the deluge trim.
7. Reset the valve by performing the instructions in Resetting.

## Trip Testing

An *annual* Trip Testing is recommended. By performing the Trip Testing, water will flow from all open sprinklers and/or nozzles. Prevent damage by taking the necessary precautions.

1. Trip the **Inbal** Valve to open by actuation of the Solenoid Valve. A flow of water is released from the trim. The **Inbal** Valve will open and water will flow to the system.
2. Check the Supply and System Pressure Gauge readings. Verify that the delivery pressure is as predetermined.
3. Record the actual flow rate and upstream and downstream pressures.
4. Verify that all the alarms operate properly.
5. De-activate the Solenoid Valve and verify that **Inbal** Valve remains in an open position.
6. Reset the system by performing the instructions in Resetting.
7. Verify that water supply pressure is restored to the normal level as recorded in (3) above.

## Removal

To remove the **Inbal** Deluge Valve:

1. Close all the pressure supply valves:
  - a) Water Supply Valves.
  - b) Trim Shutoff Valve.
2. Disconnect the electric wires from the solenoid valve. The electric work should be done by a licensed electrician.
3. Open the Emergency Release Valve to release the water pressure from the **Inbal** Valve Control Chamber.
4. Open the Drain Valve to allow all the water to drain.
5. Disconnect the union and remove the trim from the valve.
6. Remove the **Inbal** Deluge Valve from the line for inspection.
7. To reinstall, follow the Installation procedure (use new gaskets for flanged or wafer valve).

## Inquiries/Orders

The Data Sheet for Inquiries/Orders (bulletin F01-05) should be submitted. ●