

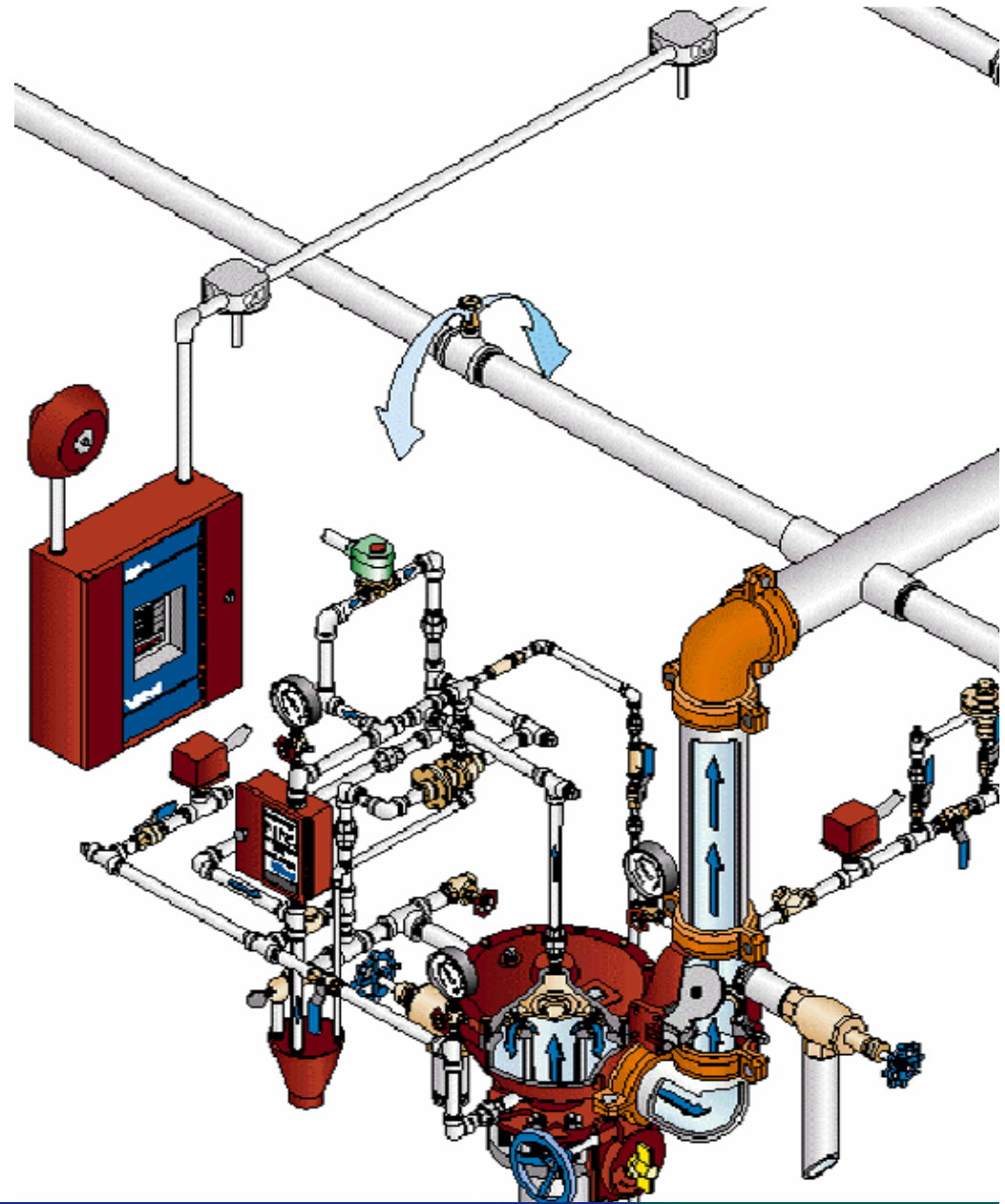
**VIKING**

# Viking SureFire Pre-action Systems

Worldwide Fire Protection

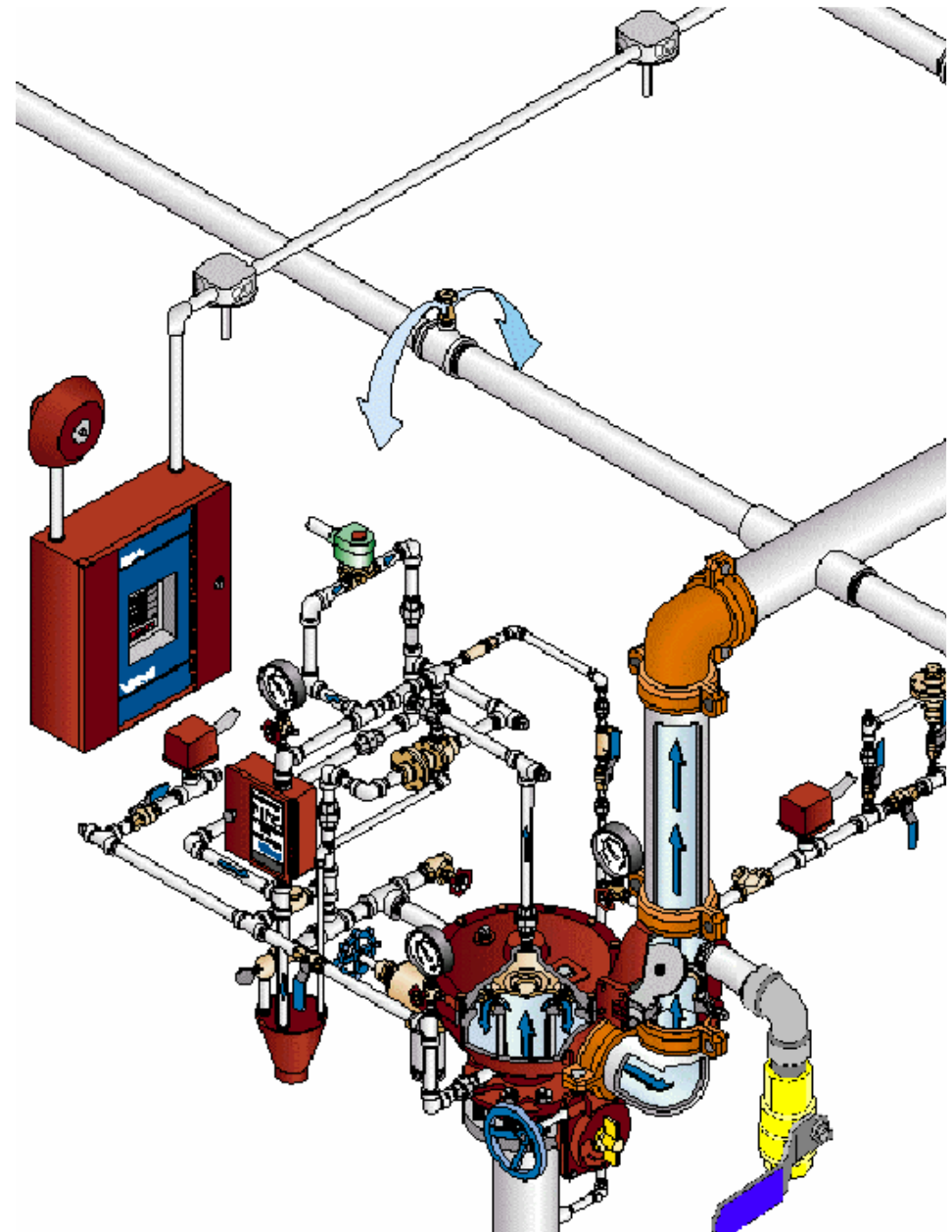
# Pre-action Systems

**Are: Fixed fire protection systems with CLOSED sprinklers connected to piping pressurized with air or nitrogen with a dependable water supply controlled by a normally closed Deluge Valve activated by a release system**



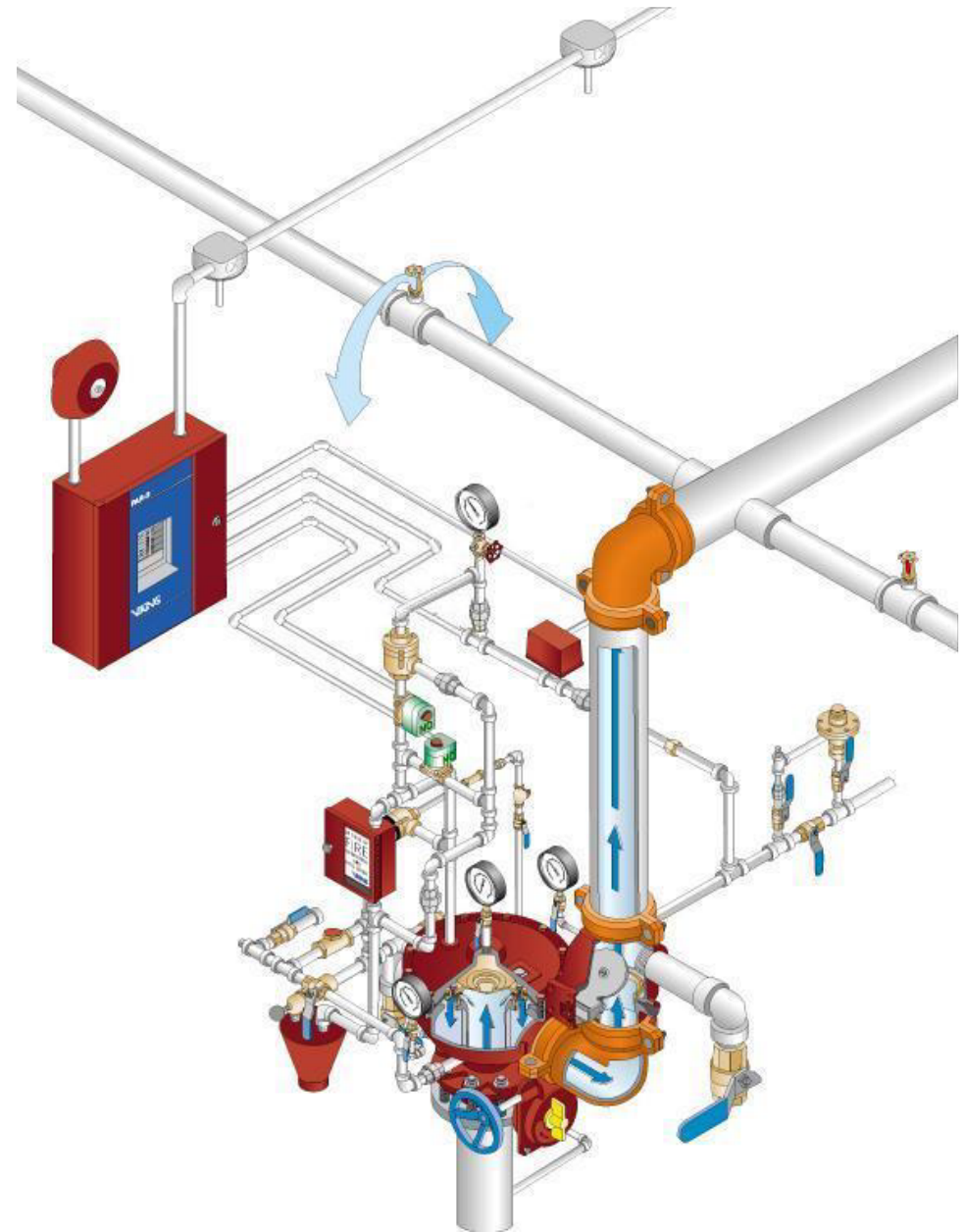
# Pre-action Systems

Are Recommended :  
To prevent water damage due to mechanical damage to system piping.  
For hazards where fast application of water in fire conditions is important



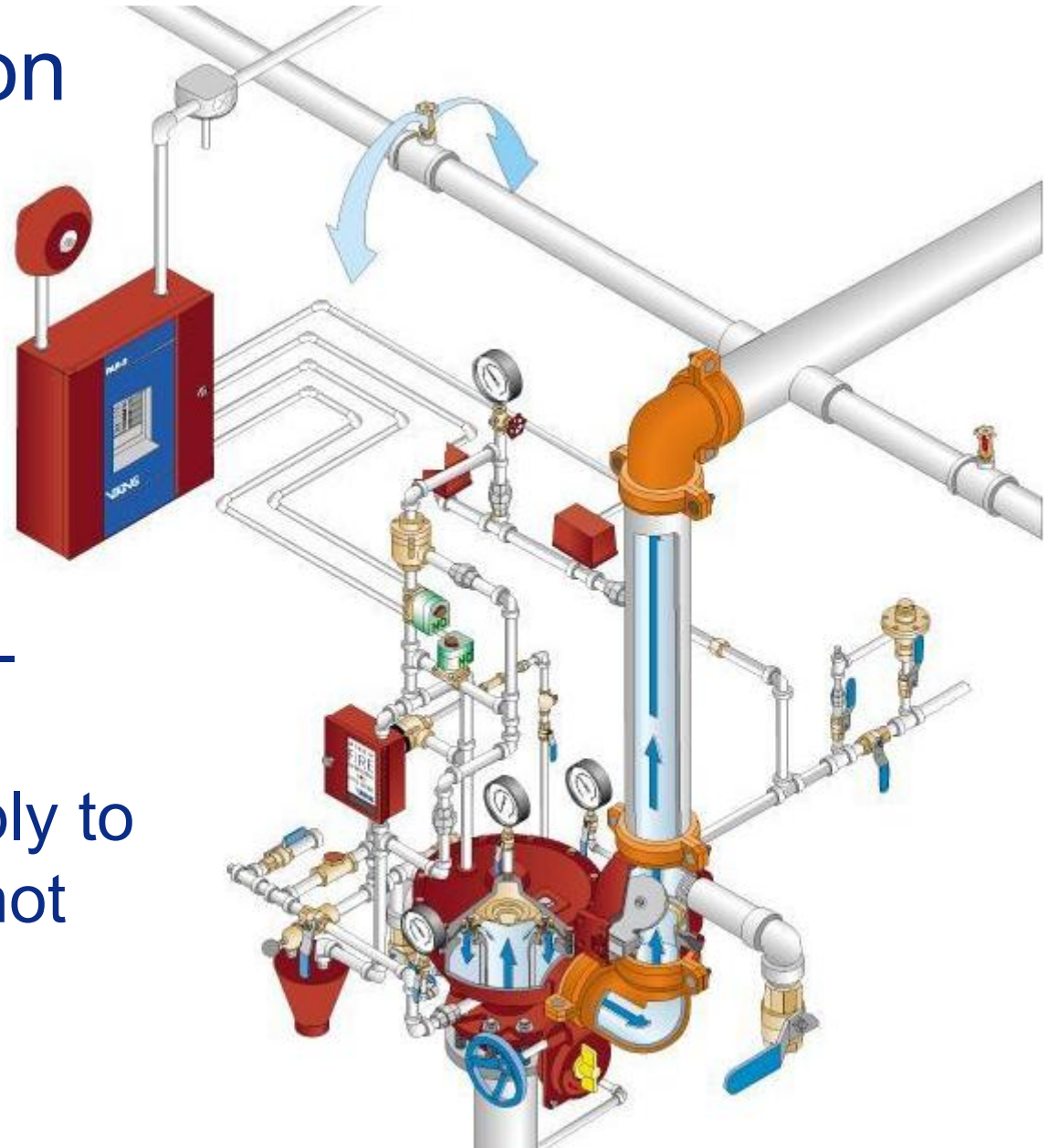
# SureFire Pre-action Systems

**Are: Operate in the same manner as standard pre-action. SureFire Pre-action provides the ability for the system to operate in the absence of power. Standard electric release pre-action systems will not operate without power.**



# SureFire Pre-action Systems

Are Recommended :  
Where “Fail-Safe” pre-action is required, or where the power supply to the control panel cannot be depended upon.



# SINGLE INTERLOCKED OPERATION

**The Release System must activate .....**

**-(Detection ) Solenoid valve opens**

**-(an alarm will sound)**

**In fire conditions,**

**-After the release system operates water travels from the Deluge Valve to the open sprinkler.**

**-Upon sprinkler opening water flows from sprinkler orifice onto fire.**

**Single interlock preaction does not have the water delivery delay that a double interlock preaction system has.**

The logo for VIKING, featuring the word "VIKING" in a bold, white, sans-serif font. A small white flame icon is positioned at the end of the letter "G".

VIKING

# SYSTEM COMPONENTS

Worldwide Fire Protection

# Pre-action System -Components

Single Interlocked  
Sure-Fire Pre-action

Sprinklers and Piping

Release control  
panel

Deluge Valve  
Deluge Valve trim

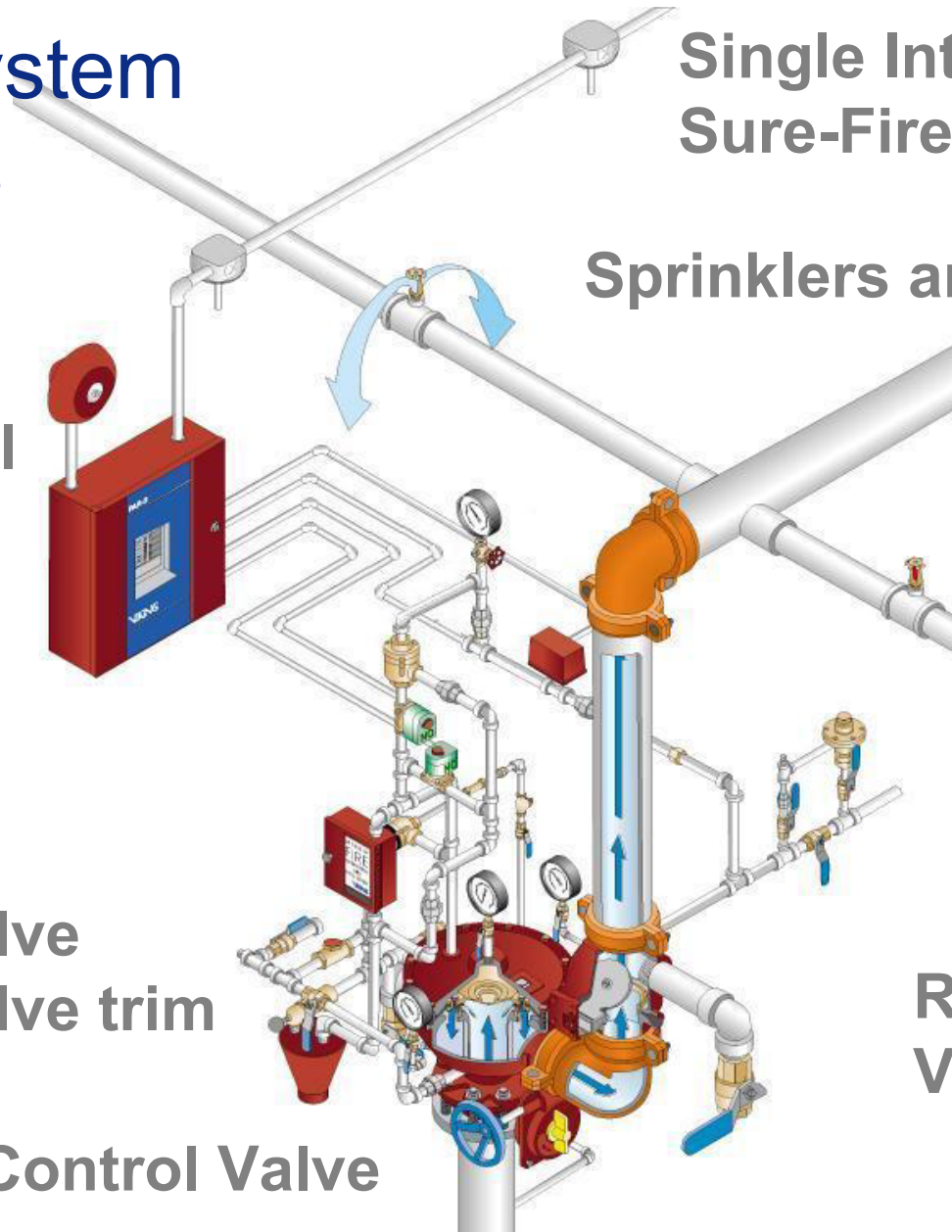
System Control Valve

Air  
Supply

Riser Check  
Valve

VIKING

Worldwide Fire Protection





# Pre-action System -Components

Deluge Valve  
Deluge Valve trim

Double Interlocked Sure-Fire  
Pre-action

System Control Valve

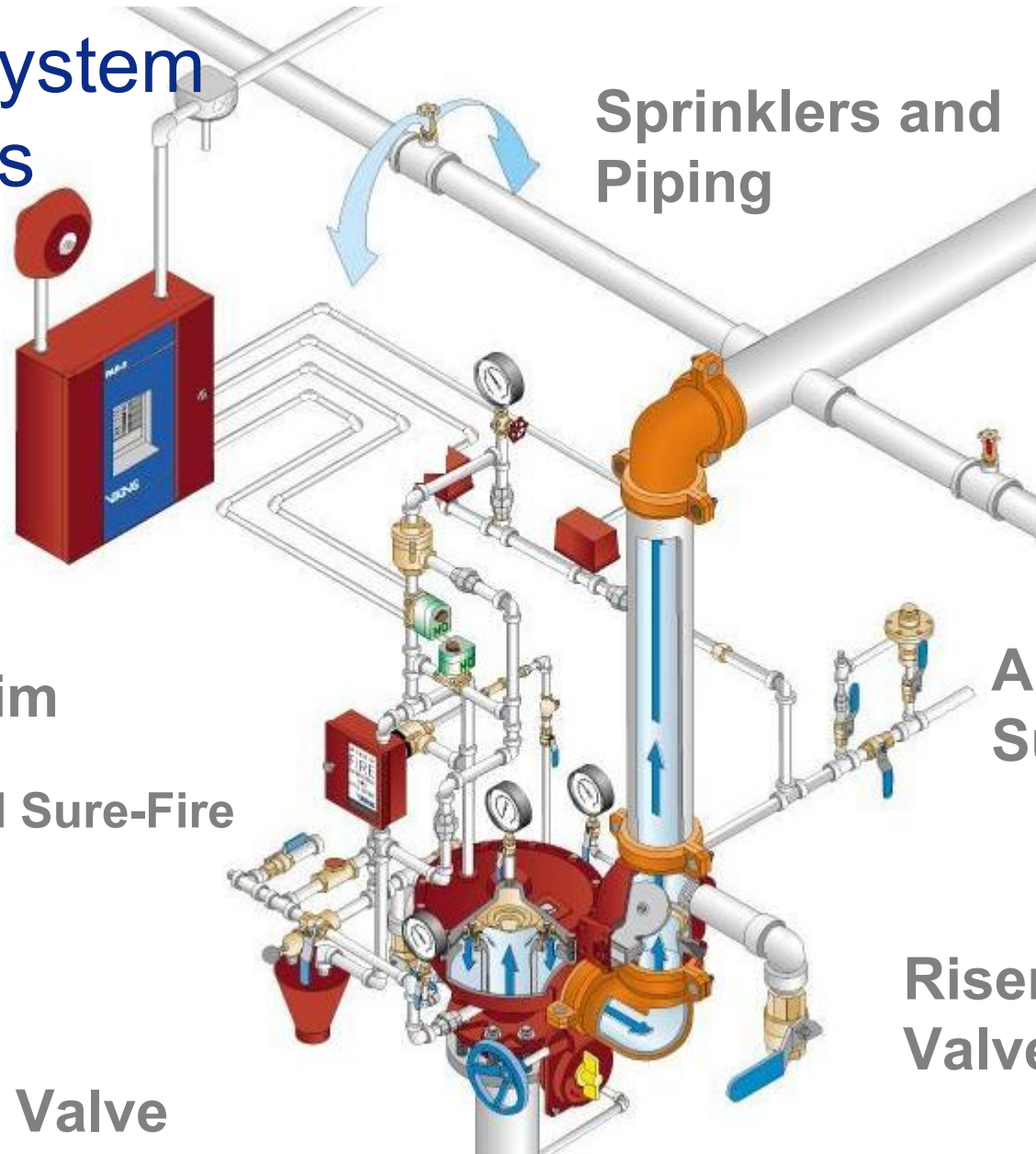
Sprinklers and  
Piping

Air  
Supply

Riser Check  
Valve

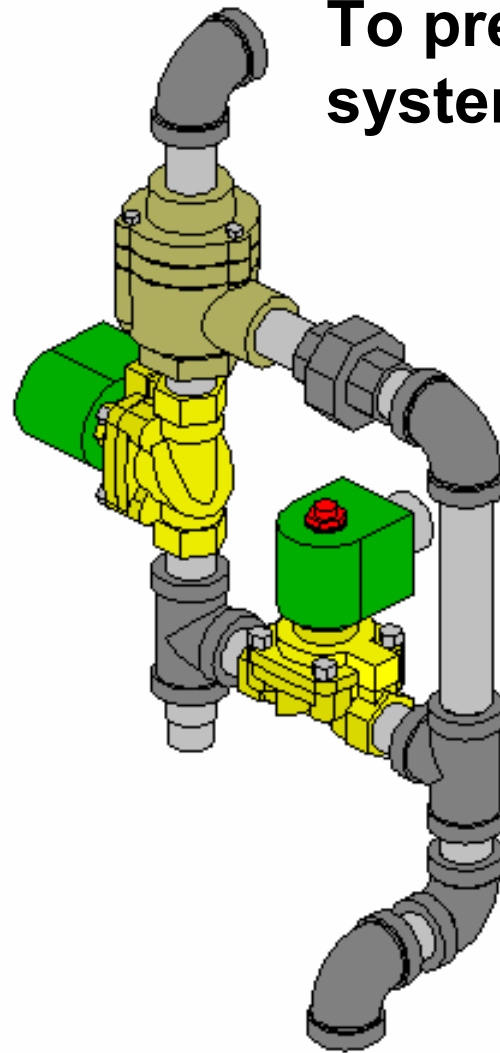
VIKING

Worldwide Fire Protection



# Viking SureFire Release Trim Module

**Normally Open  
Solenoid Valve**



**To pressurized  
system piping**

**Normally Closed  
Solenoid Valve**

The logo for VIKING, featuring the word "VIKING" in a bold, white, sans-serif font. A small white flame icon is positioned to the right of the letter "G".

**VIKING**

# VIKING DELUGE VALVES

Worldwide Fire Protection

# Deluge Valves

**Deluge valves are held shut with pressurized water placed in the valve's priming chamber. The priming chamber controls a mechanism that keeps the deluge valve's clapper closed.**

**The release system controls the water in the deluge valve's priming chamber. When the release system operates, the priming chamber is relieved of the priming water, allowing deluge valve clapper to open.**

# Deluge Valves

**The priming chamber has to be pressurized before the water control valve can be opened, allowing water pressure against the deluge valve clapper. A connection has to be placed before the water control valve, so the deluge valve can be primed. Once most deluge systems have operated, they have to be manually shut down before they can be put back in service.**

Available 2" through 6"

Listed at  
250 PSI

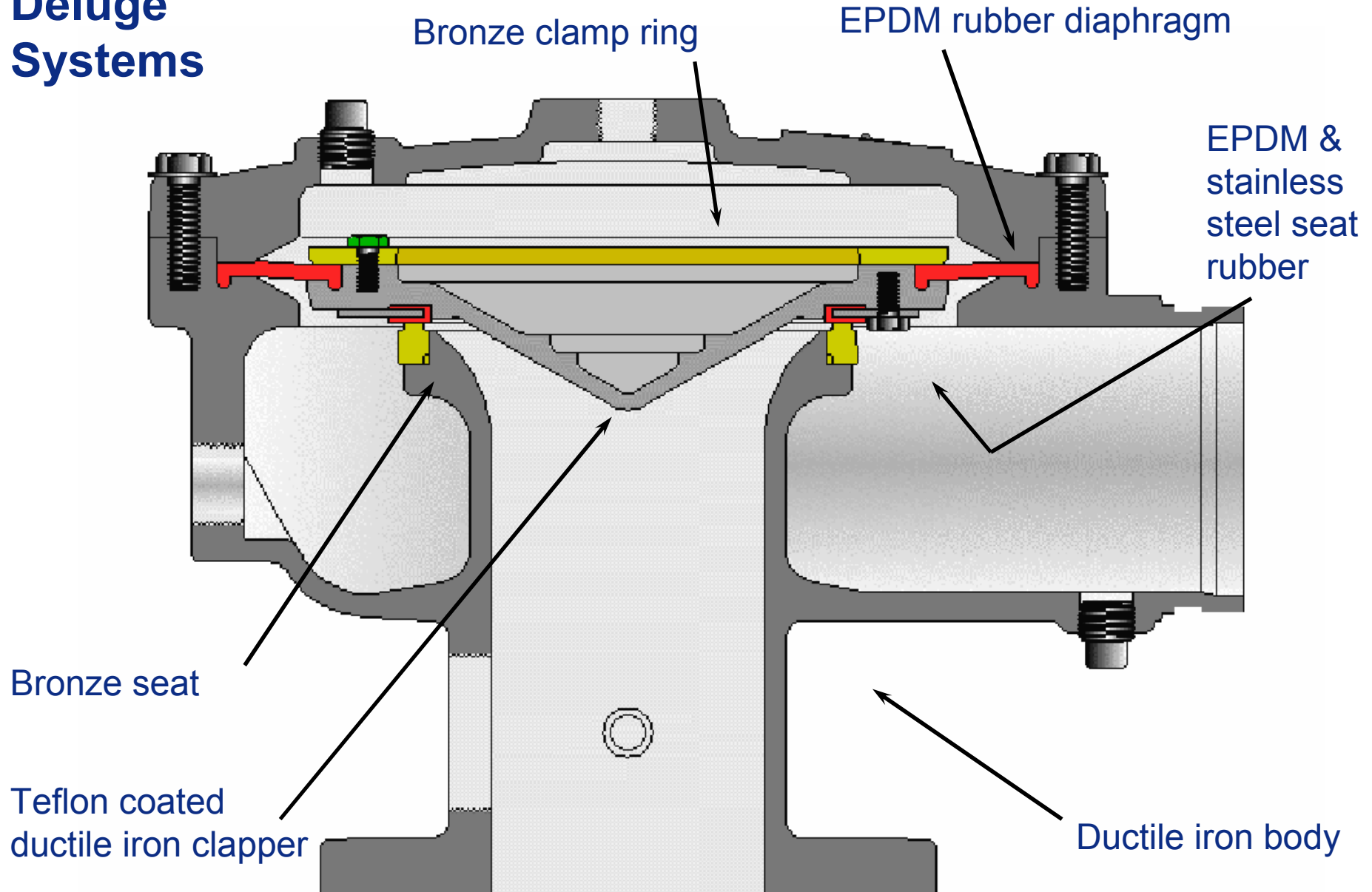
Viking  
Model E-1  
Deluge Valve



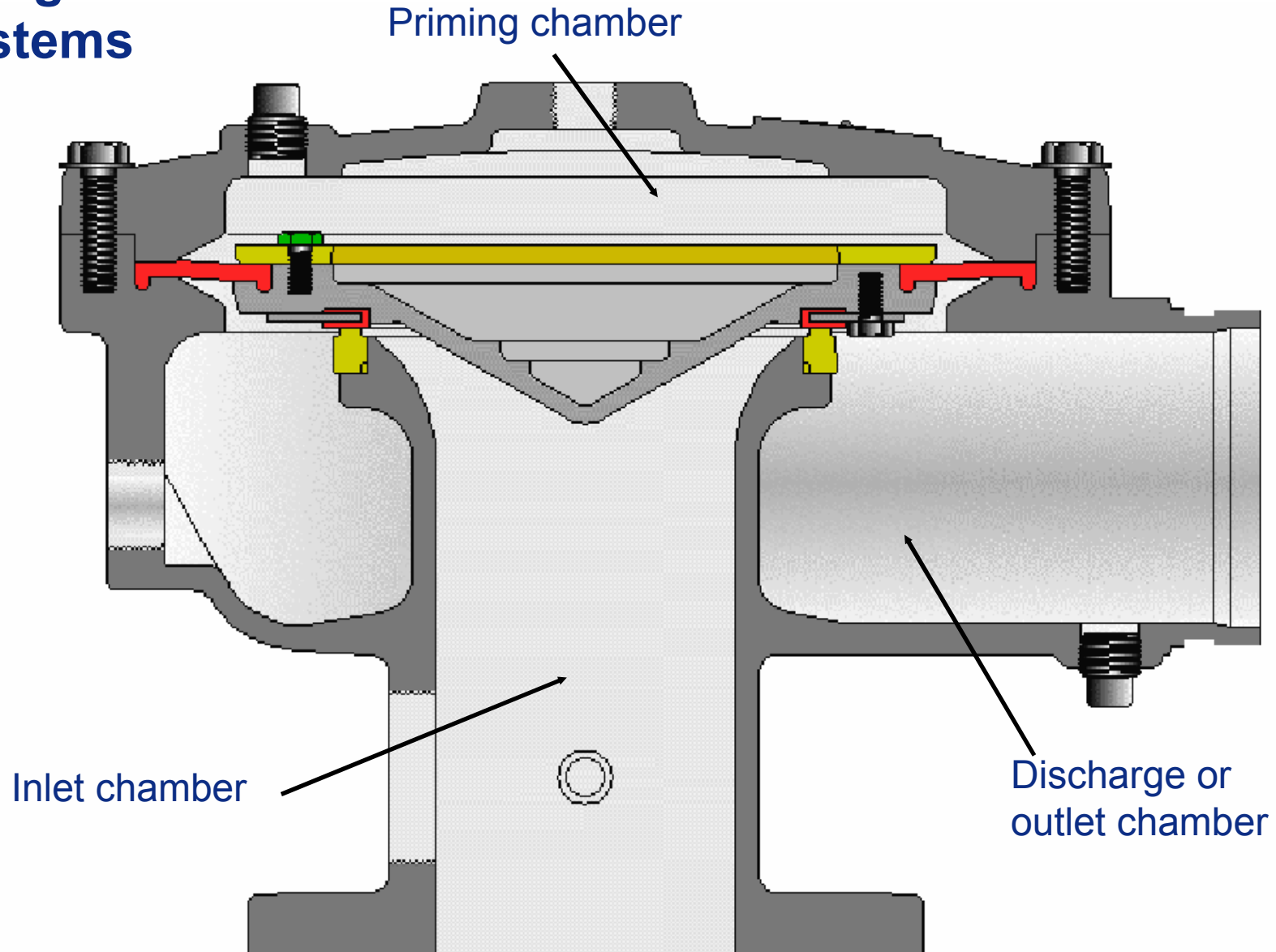
**VIKING**

Worldwide Fire Protection

# Deluge Systems

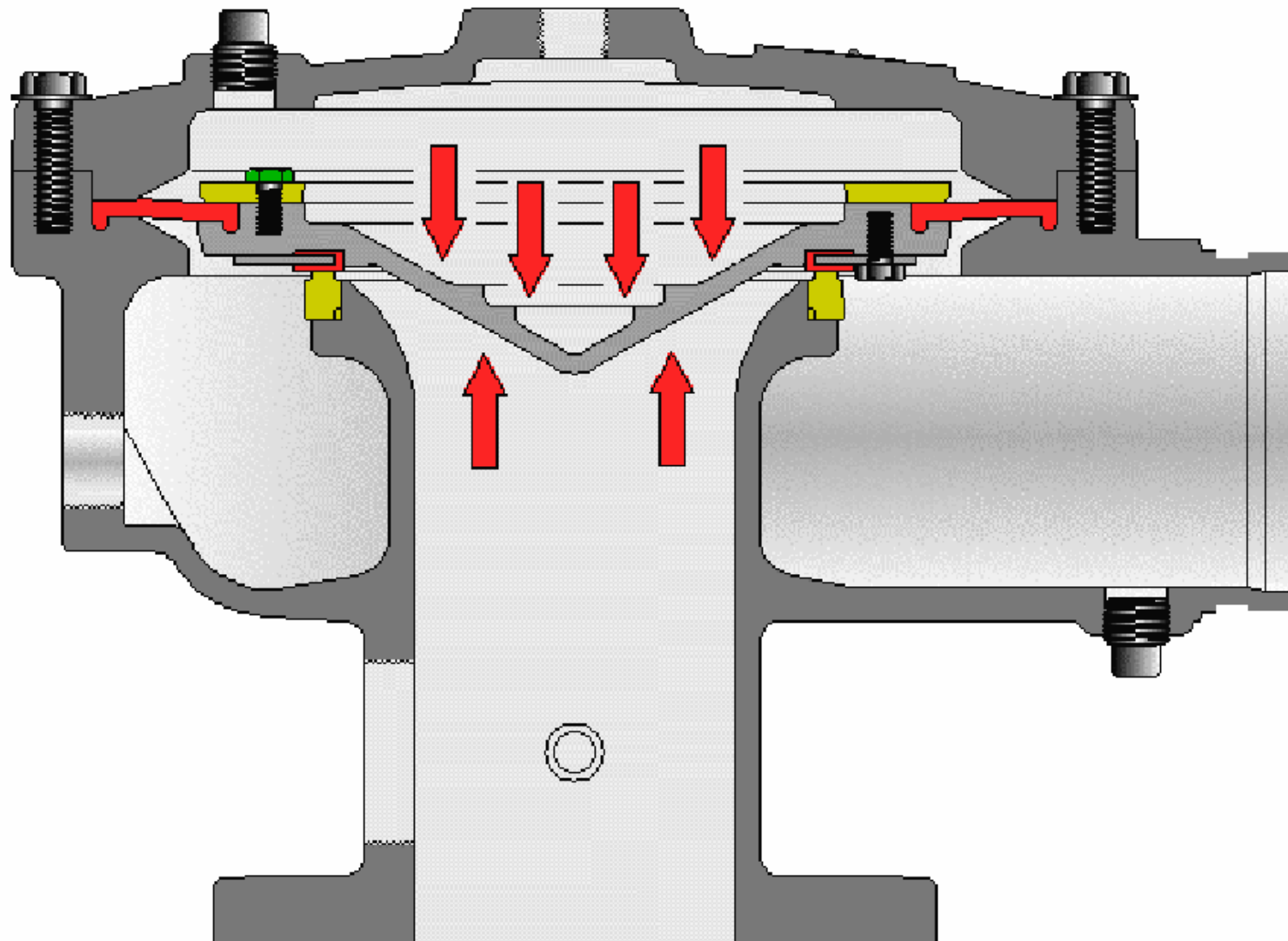


# Deluge Systems

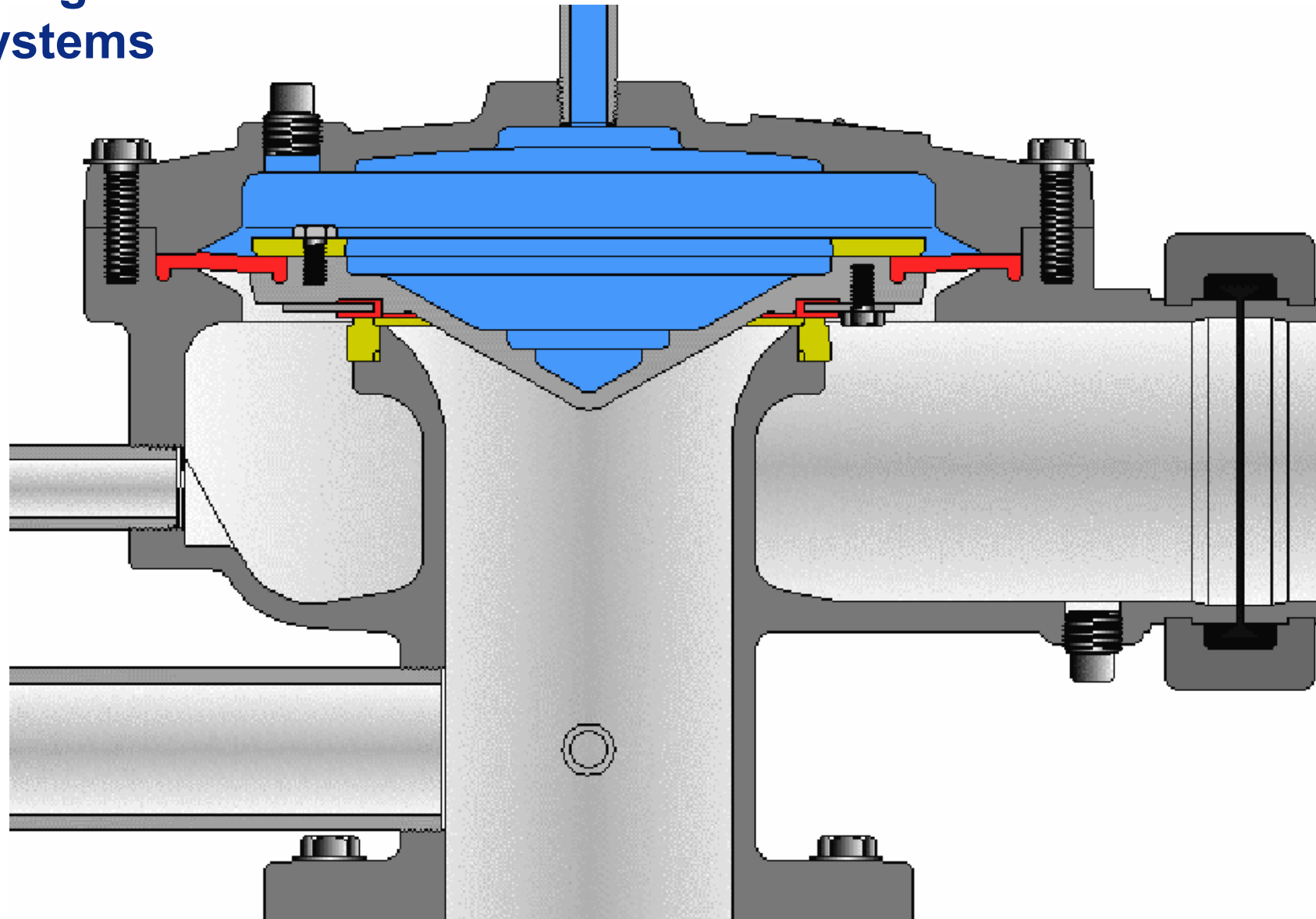




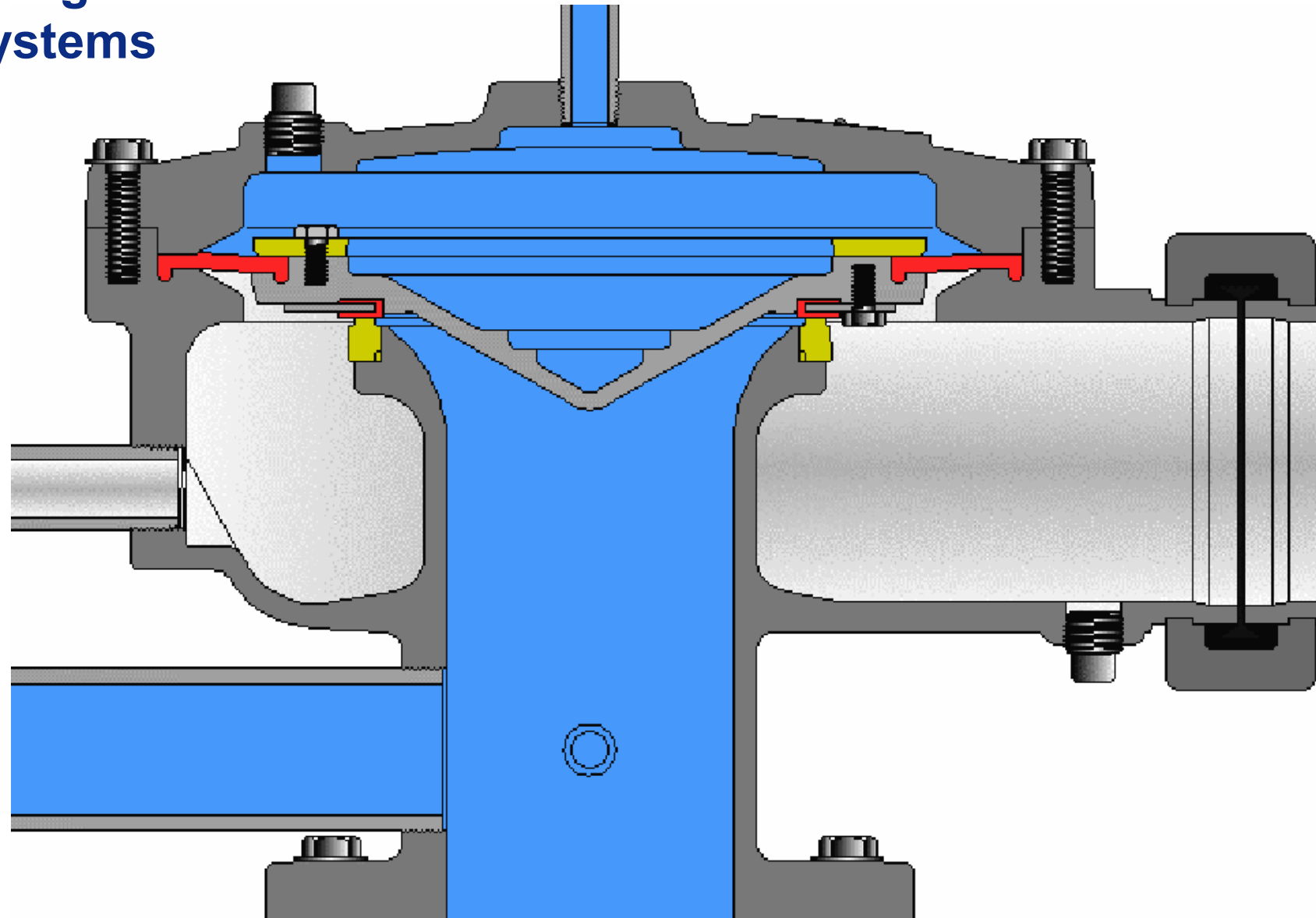
# Deluge Systems



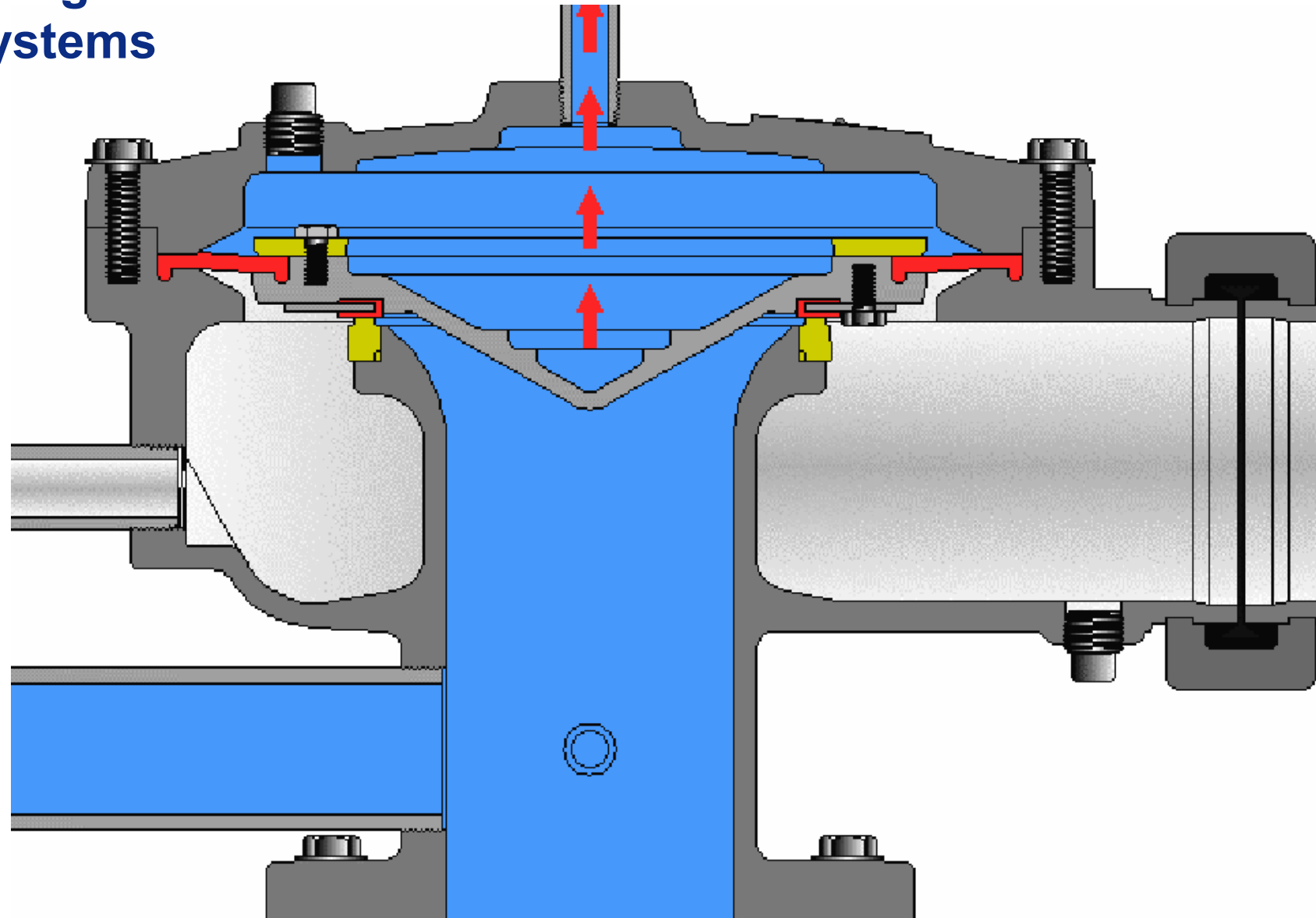
# Deluge Systems



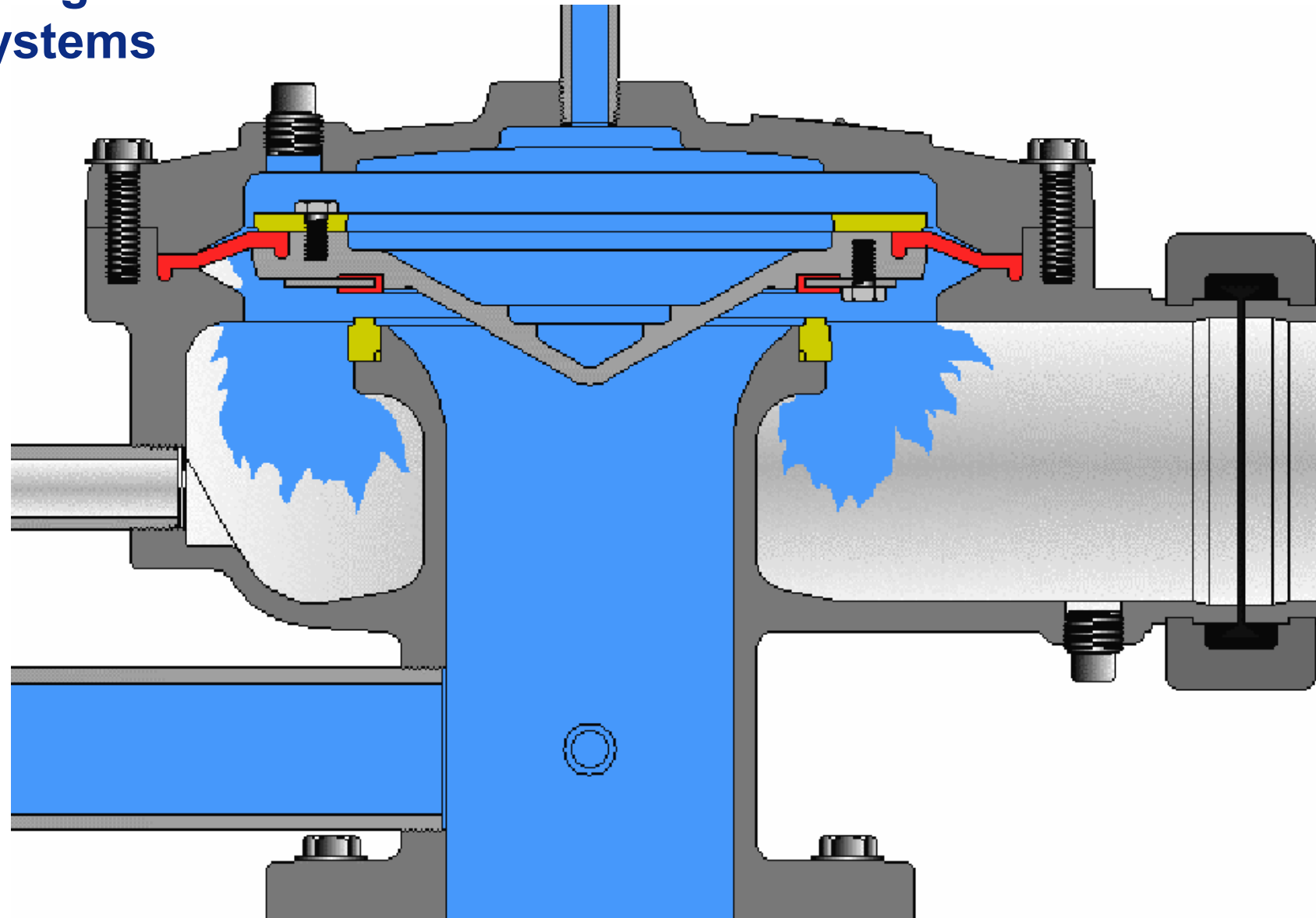
# Deluge Systems



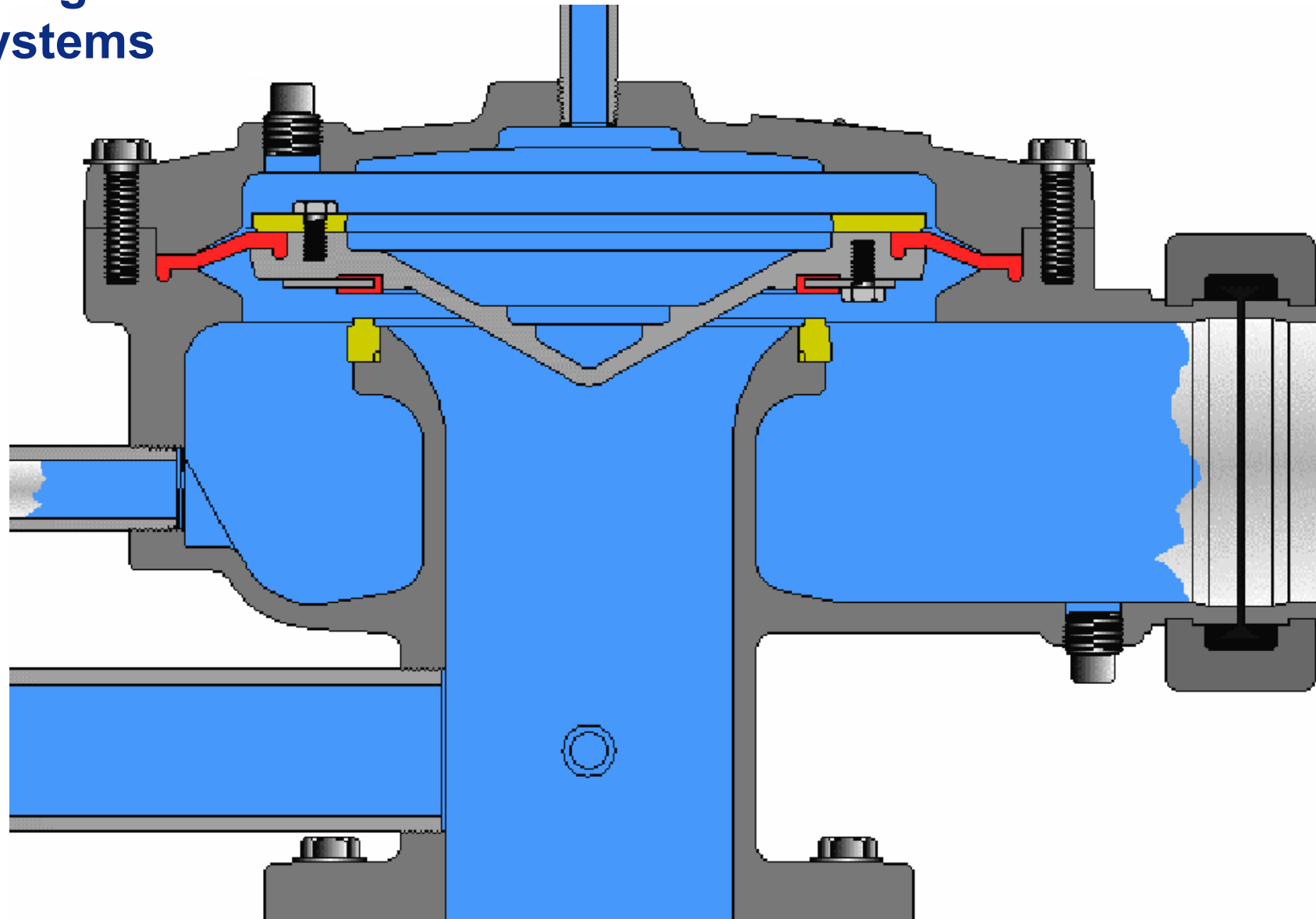
# Deluge Systems



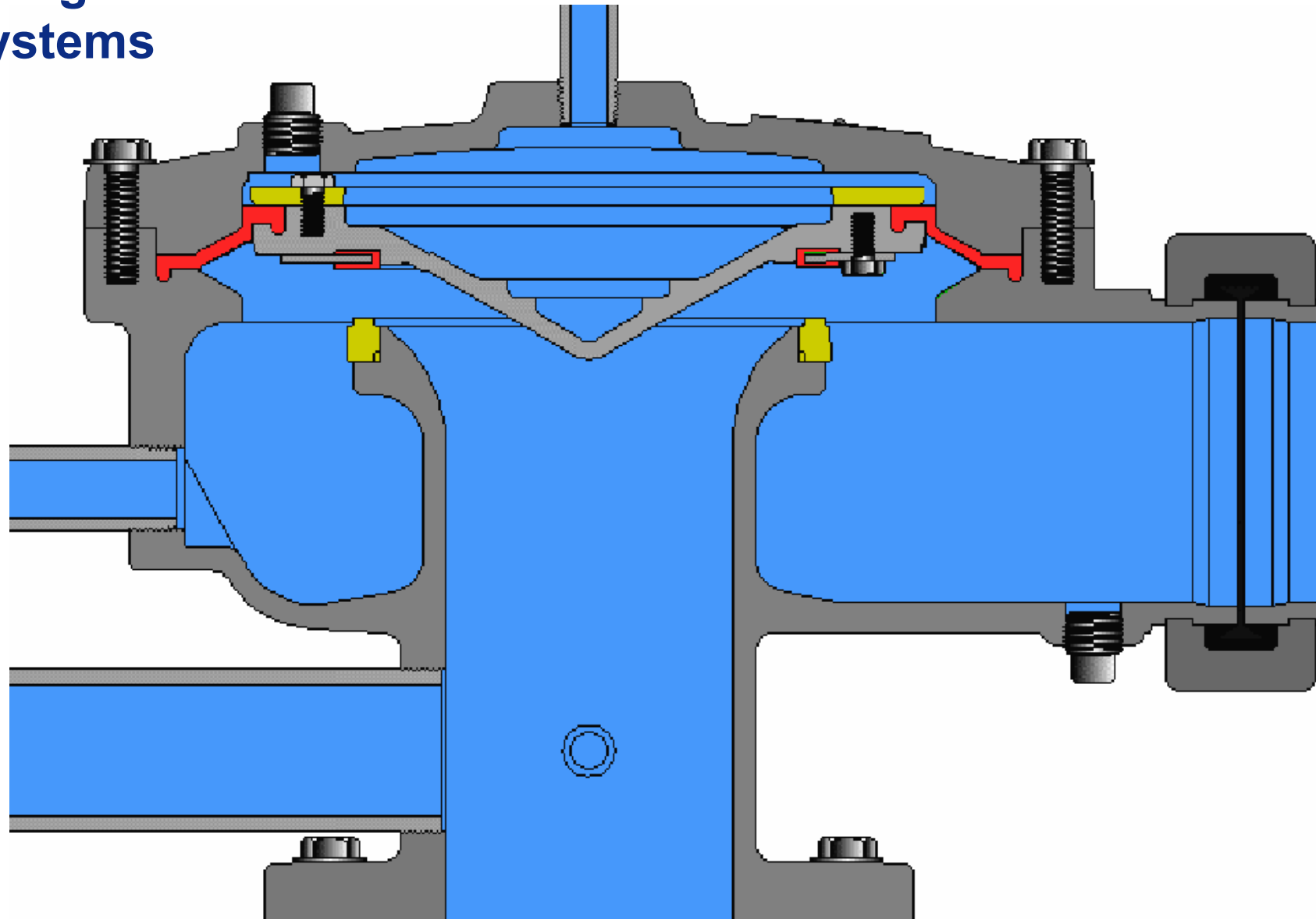
# Deluge Systems



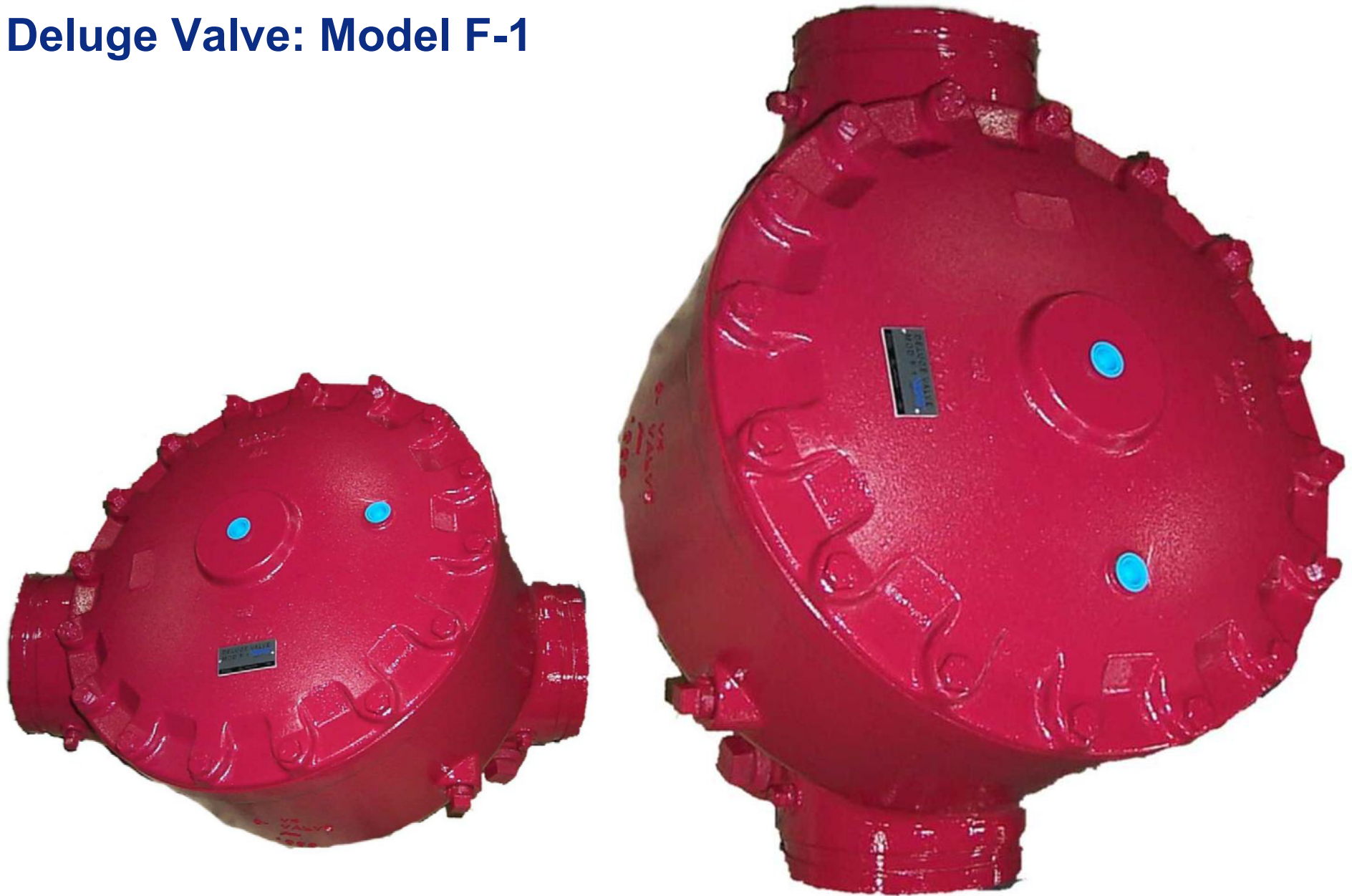
# Deluge Systems



# Deluge Systems



## Deluge Valve: Model F-1

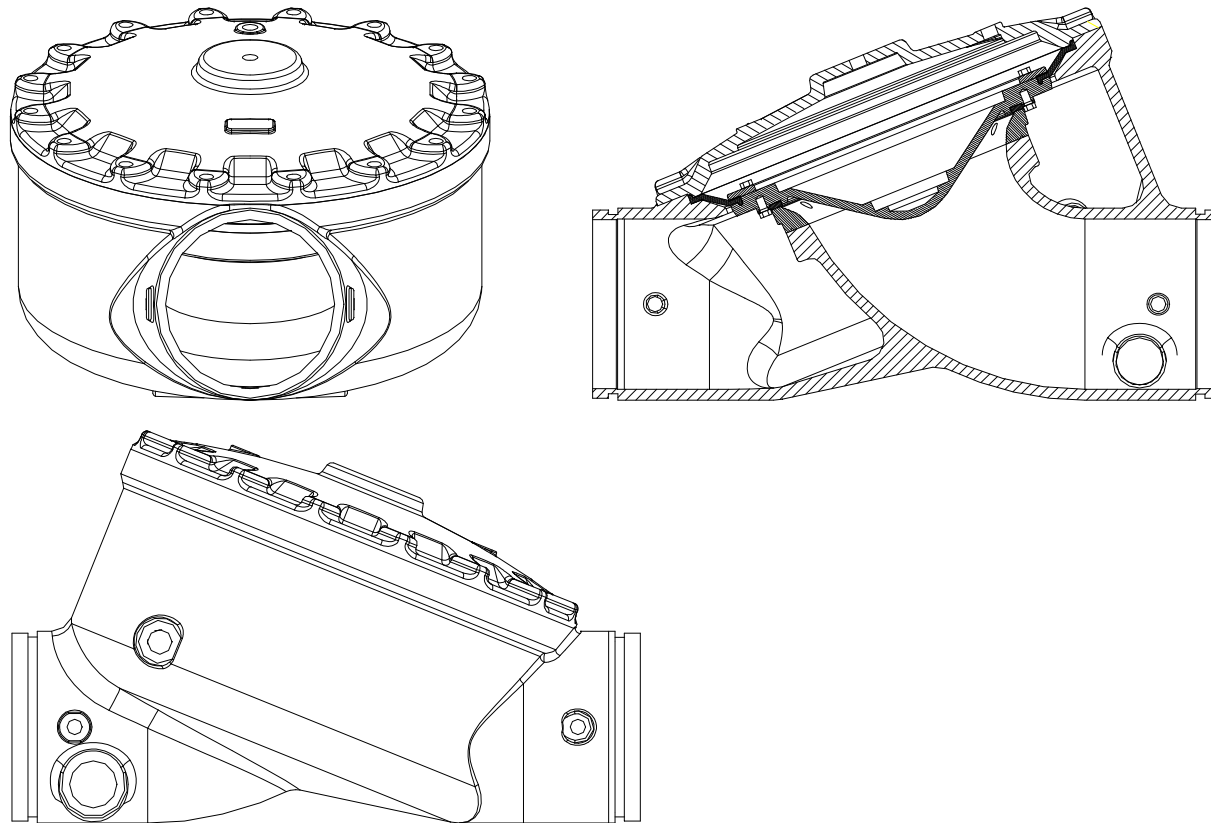


**VIKING**

Worldwide Fire Protection



# Model F-1 Deluge Valve



**VIKING**

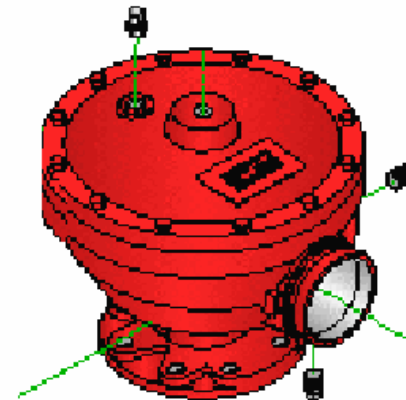
Worldwide Fire Protection

# EZ DELUGE VALVE TRIM

- INSTALLATION &  
PURPOSE

# Deluge Valve

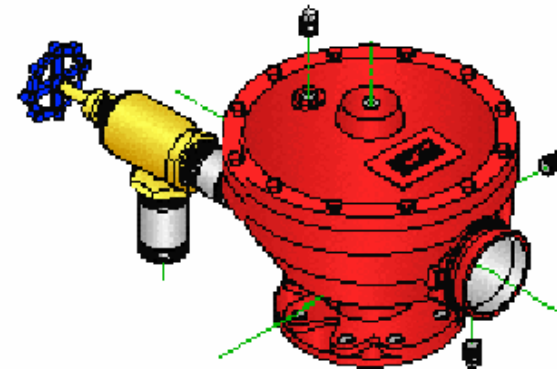
**Install the Deluge Valve above a water supply control valve**



# Deluge Valve

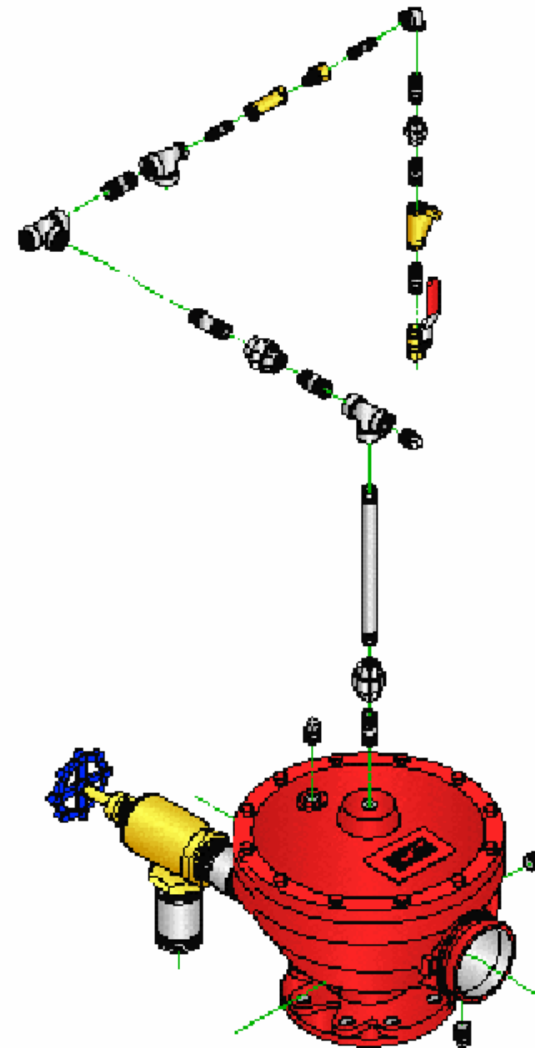
A flow test valve is connected to the inlet chamber of the deluge valve

NFPA 25 (1992 ed) recommends “Main Drain Test” to be performed quarterly to determine if there has been a change in the water supply piping or control valves.



# Deluge Valve

Priming line



# Deluge Valve

Priming line

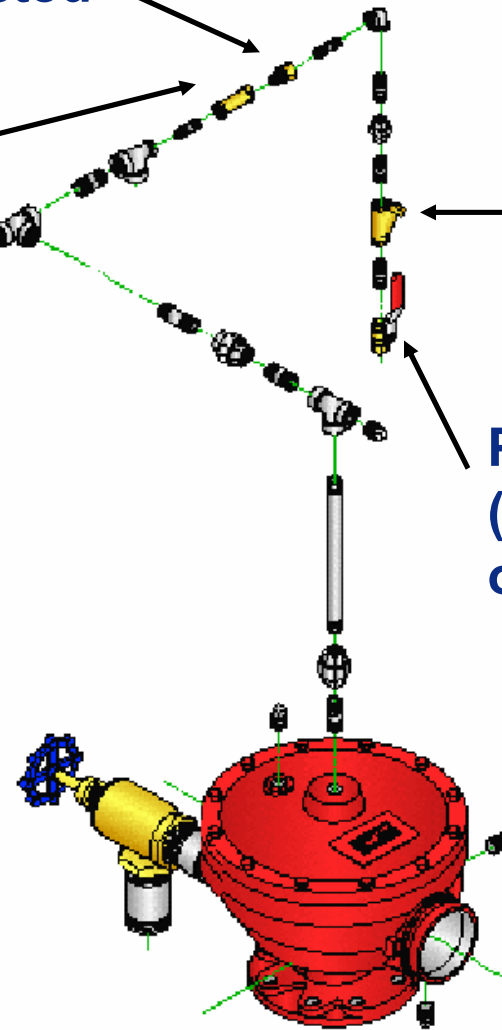
Check valve

Restricted orifice

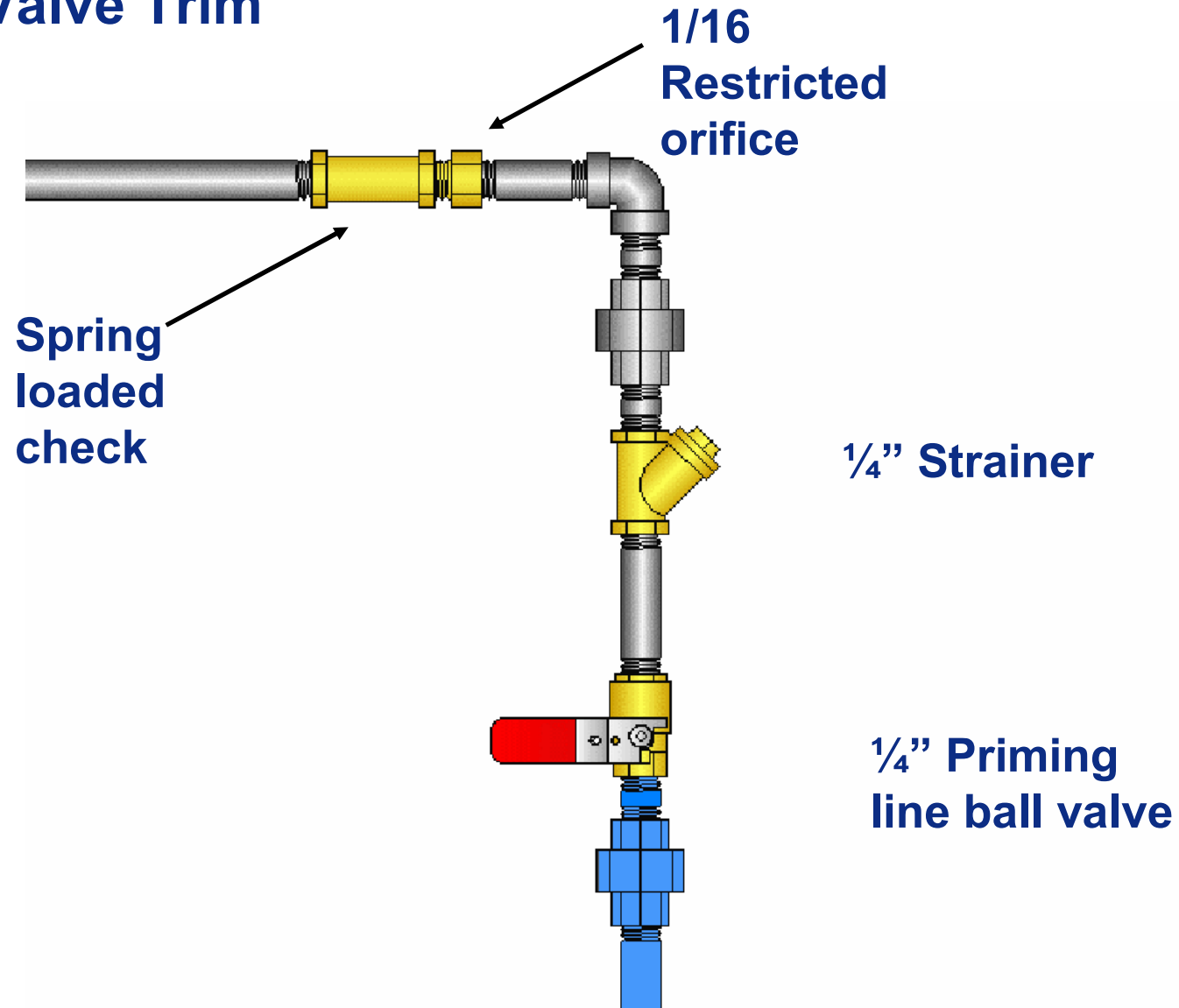
Strainer

Priming valve (normally open)

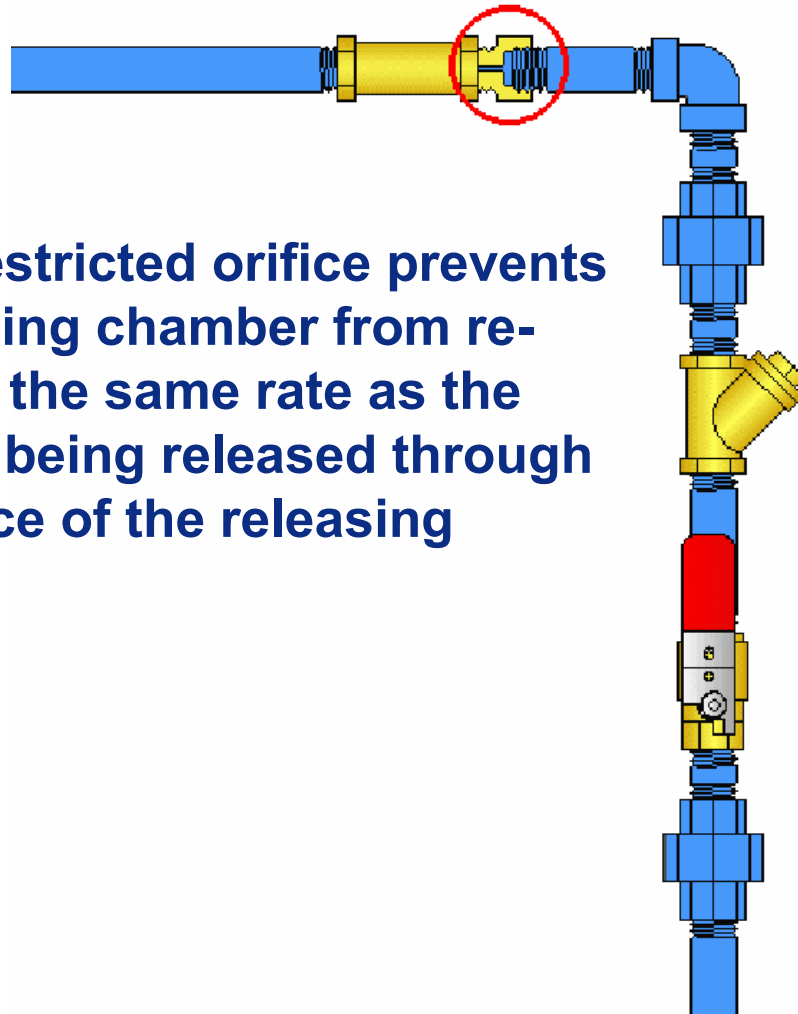
Connect priming line supply below water supply control valve



# Deluge Valve Trim



# Deluge Valve Trim



**1/16" Restricted orifice prevents the priming chamber from re-filling at the same rate as the water is being released through the orifice of the releasing device**



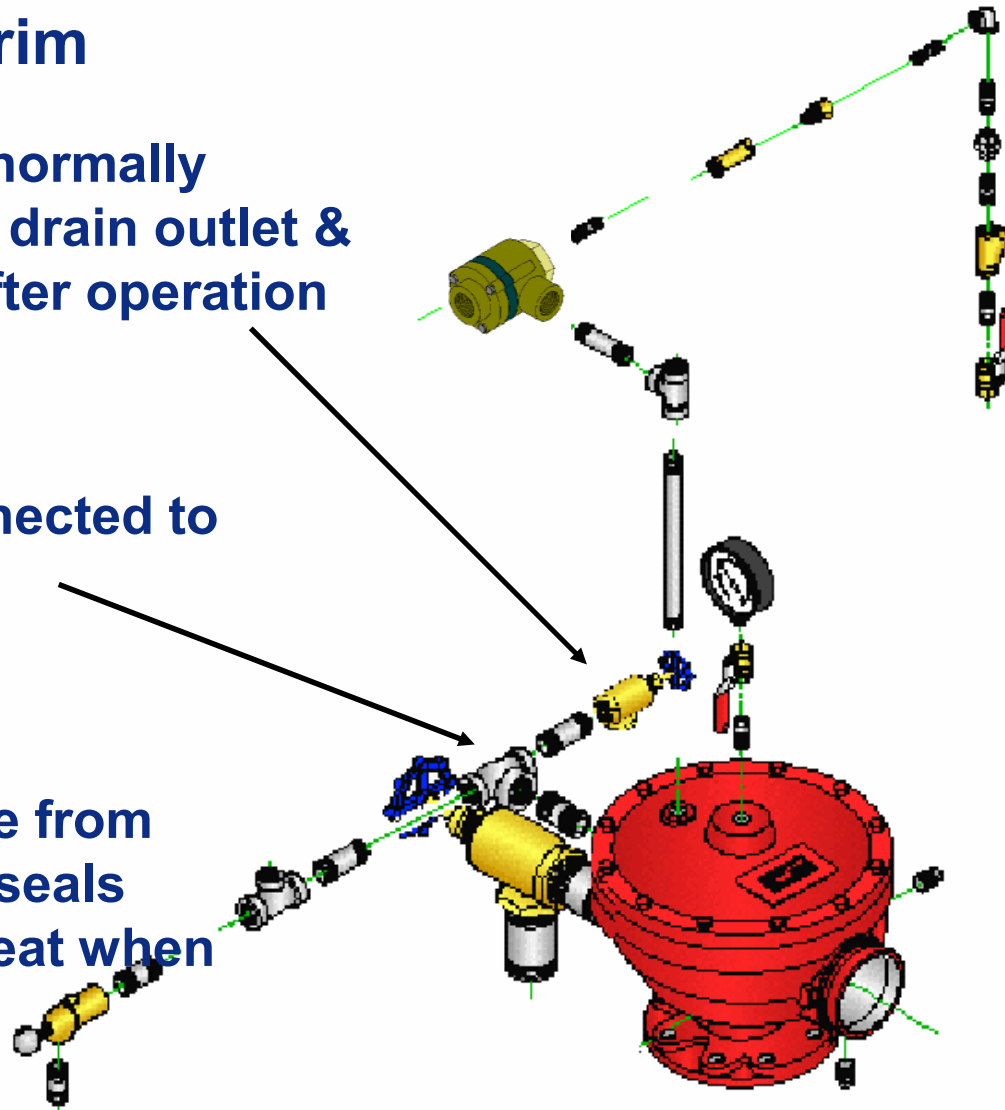
# Deluge Valve Trim

Auxiliary drain (normally Closed) Open to drain outlet & system piping after operation

Trim piping connected to outlet chamber

Drip check allows moisture to escape from outlet chamber. It seals against notched seat when outlet chamber is pressurized.

To open drain cup



# Deluge Valve Trim

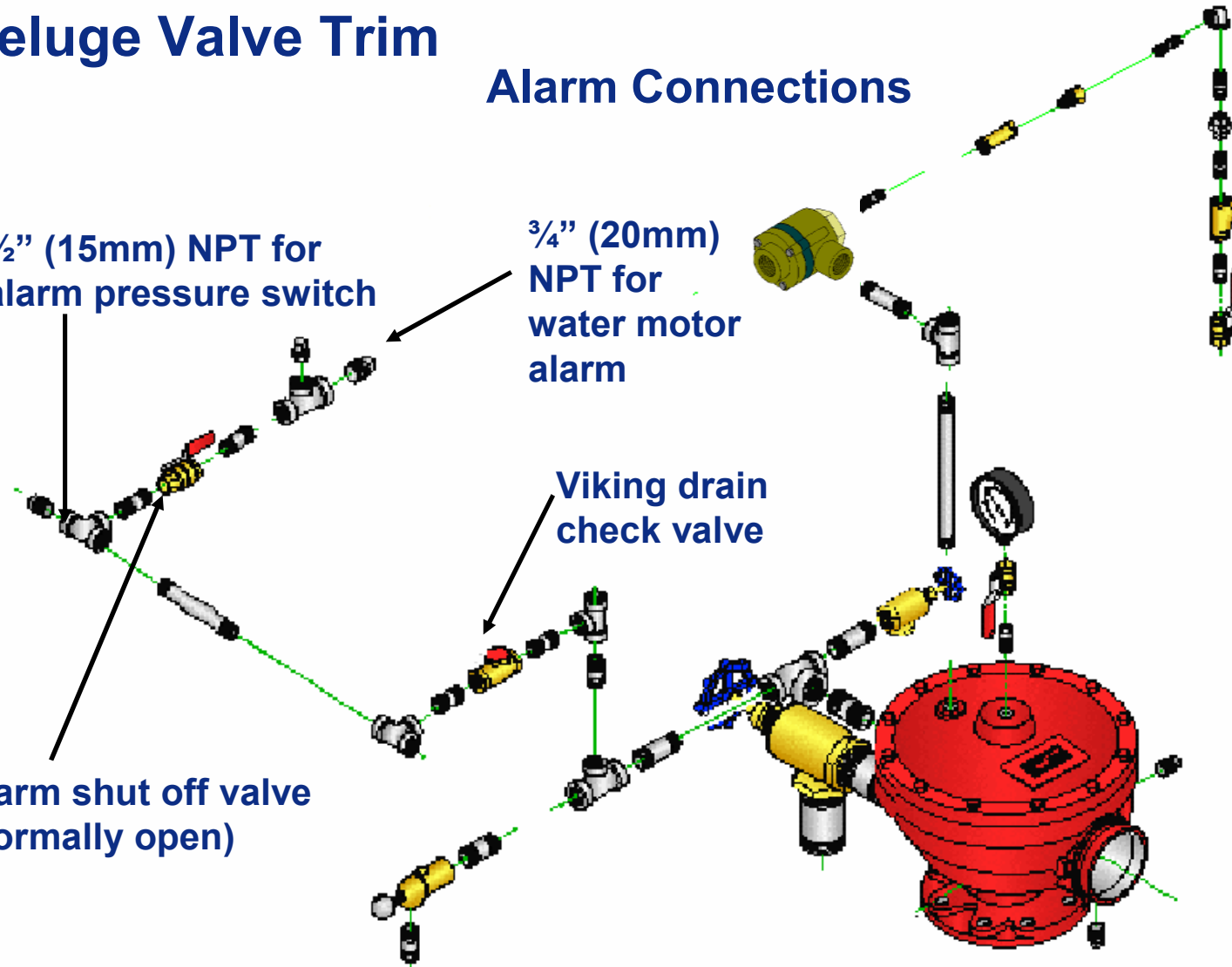
## Alarm Connections

1/2" (15mm) NPT for alarm pressure switch

3/4" (20mm) NPT for water motor alarm

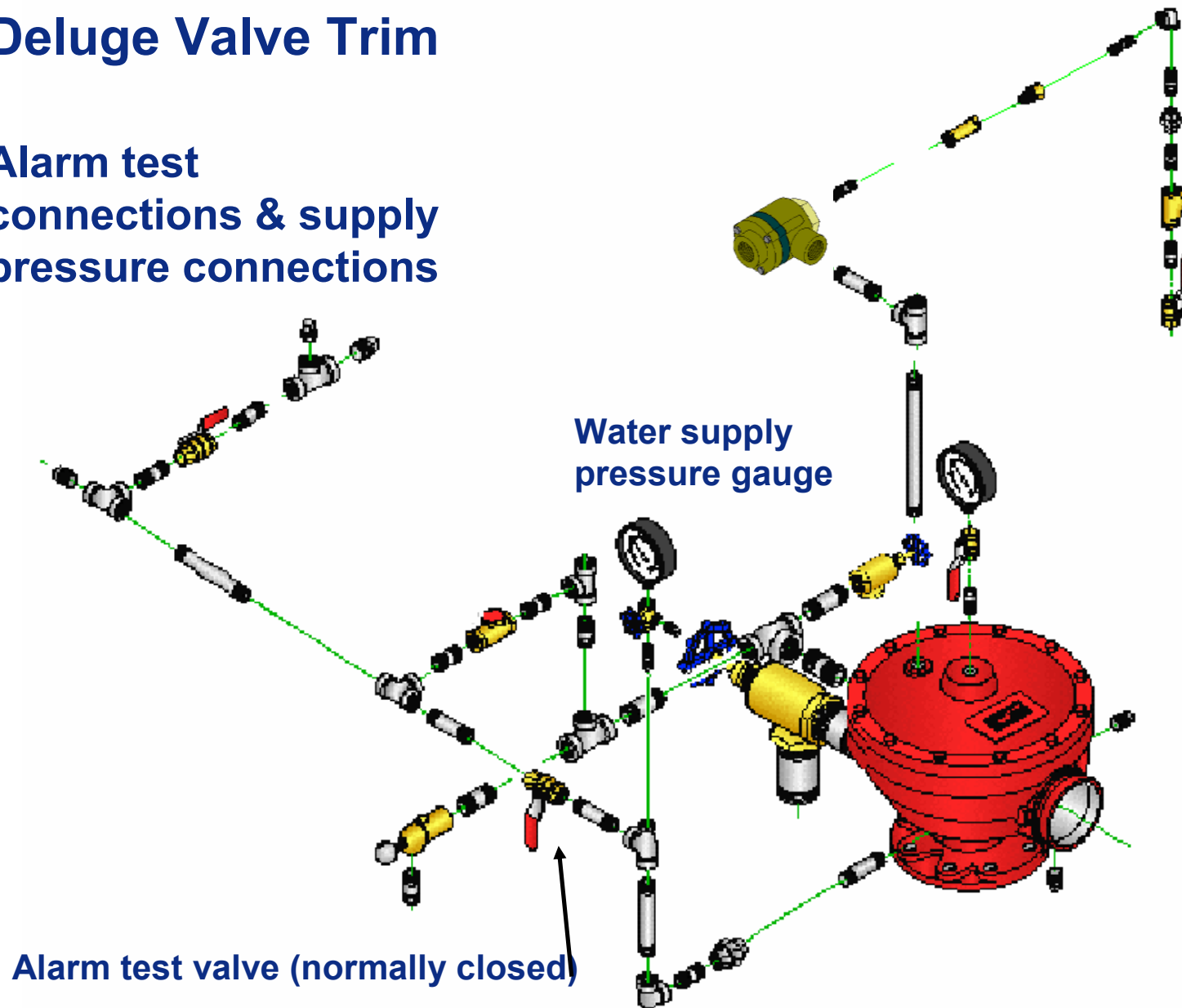
Viking drain check valve

Alarm shut off valve (normally open)

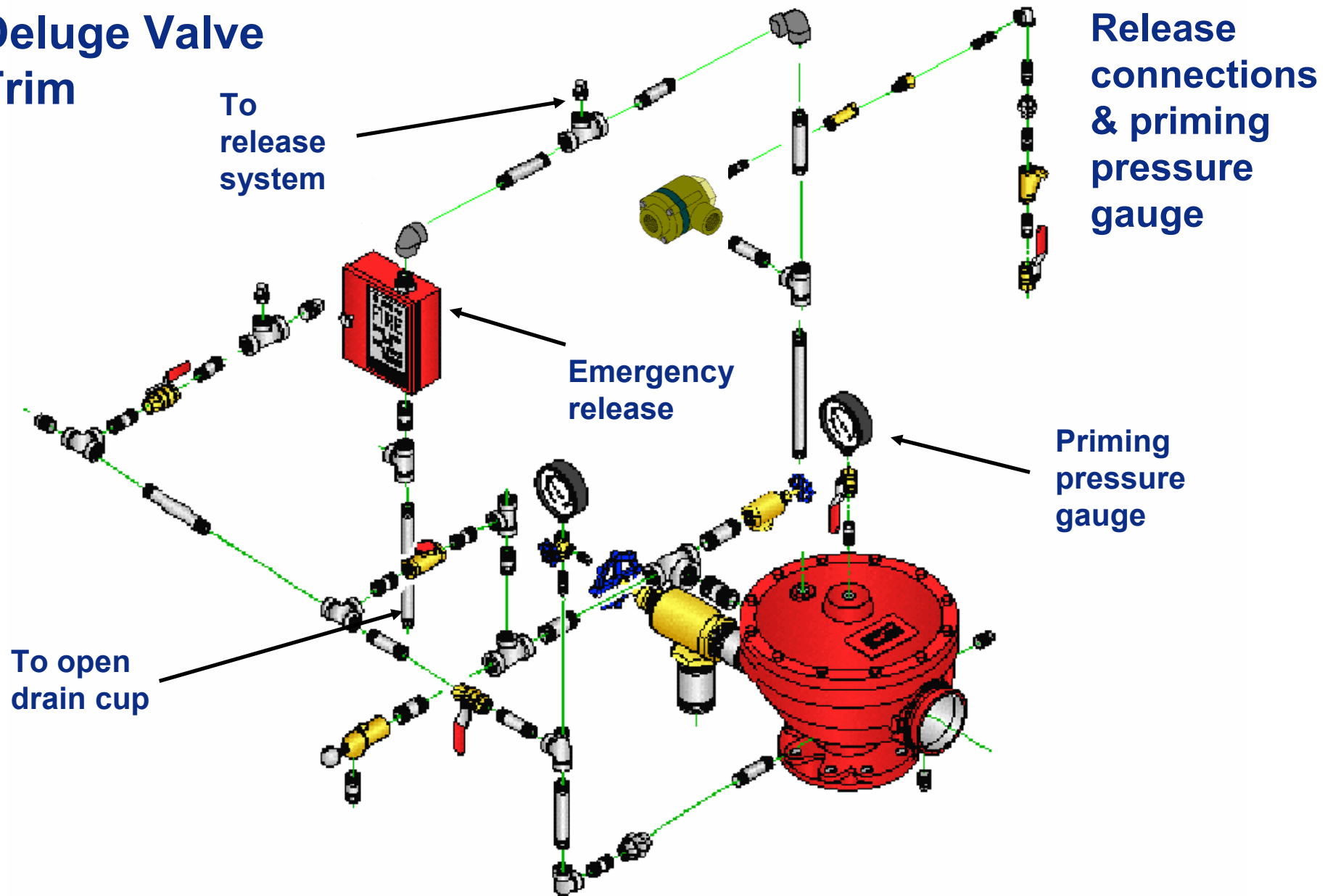


# Deluge Valve Trim

Alarm test connections & supply pressure connections

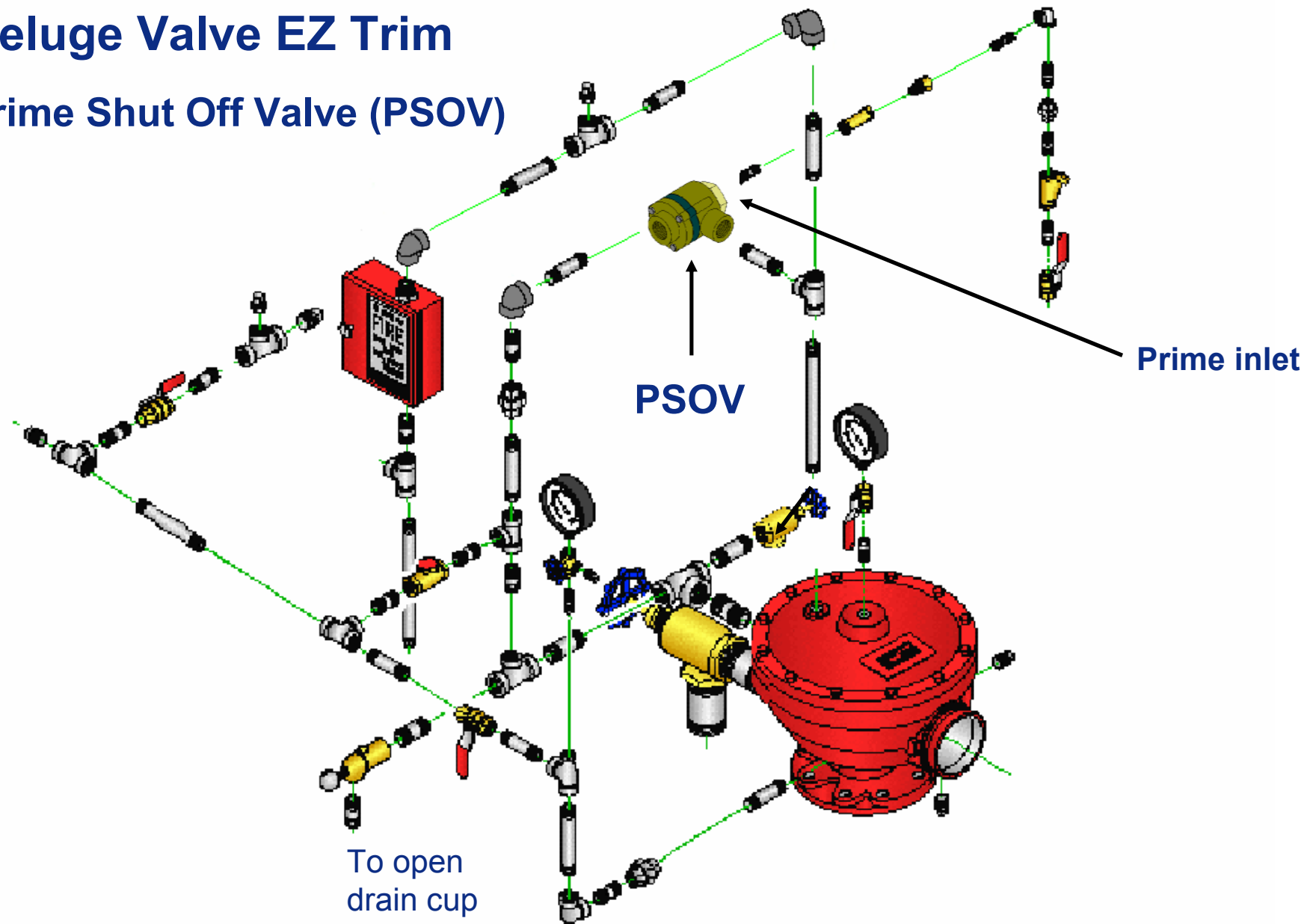


# Deluge Valve Trim



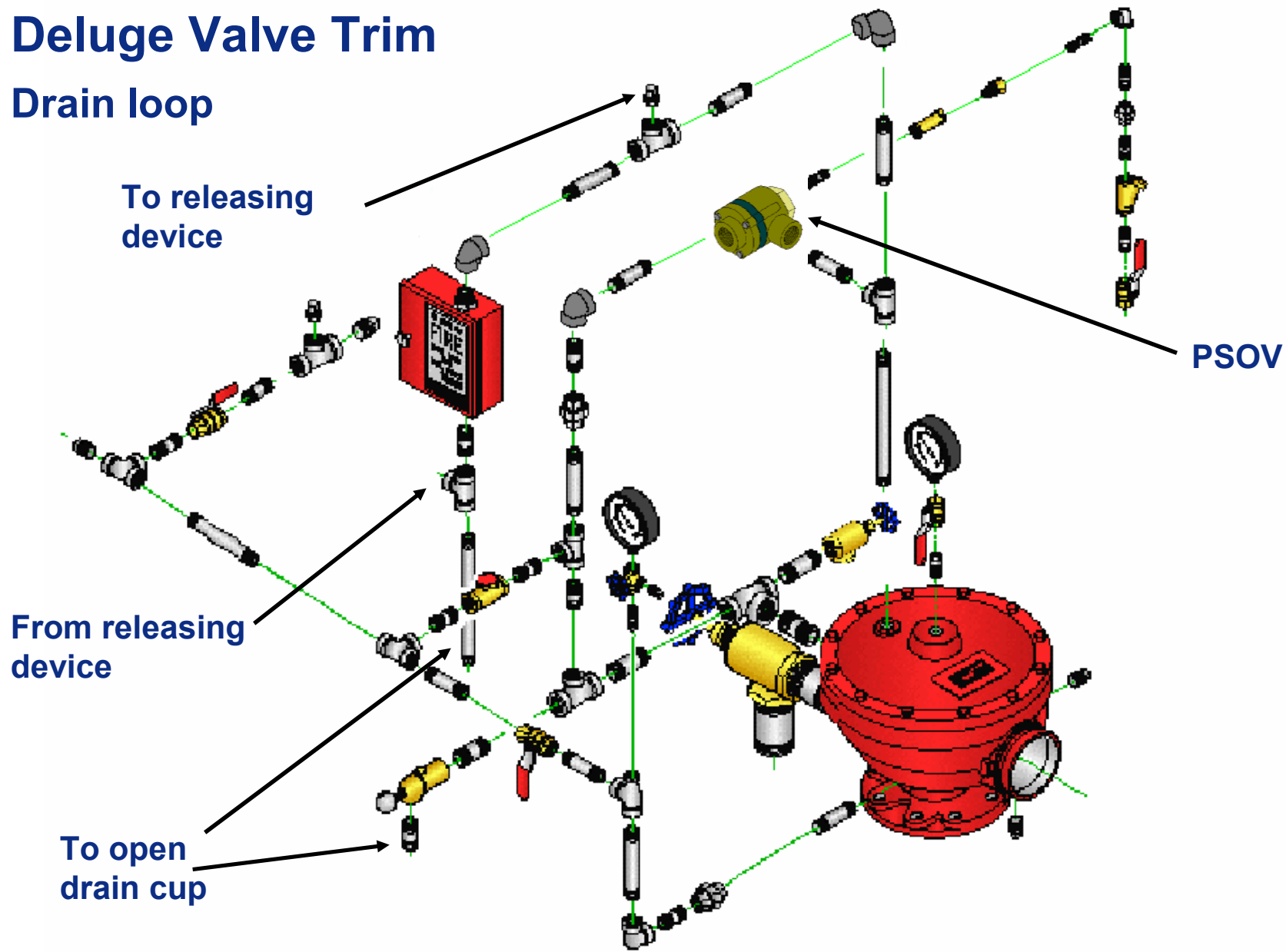
# Deluge Valve EZ Trim

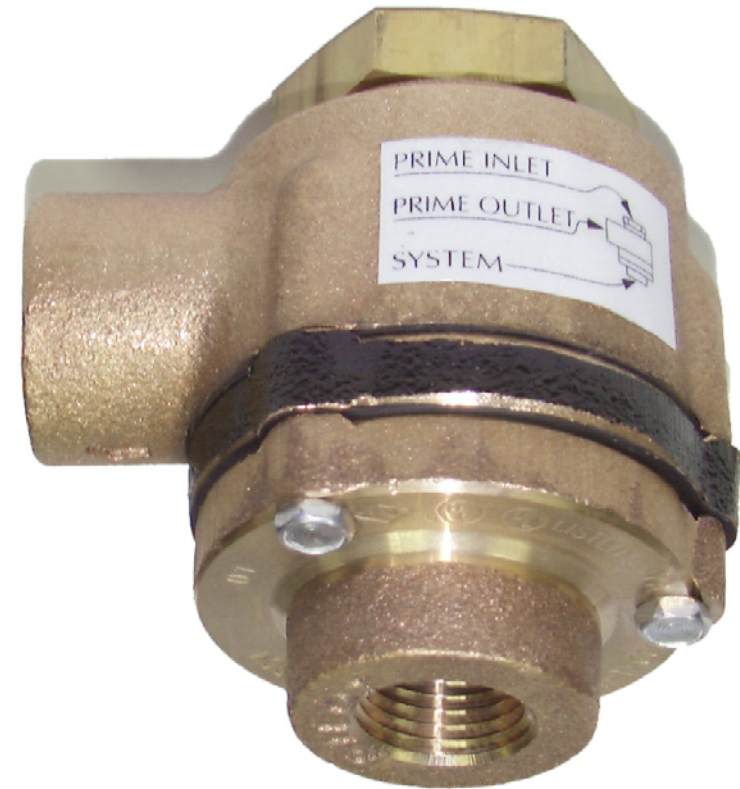
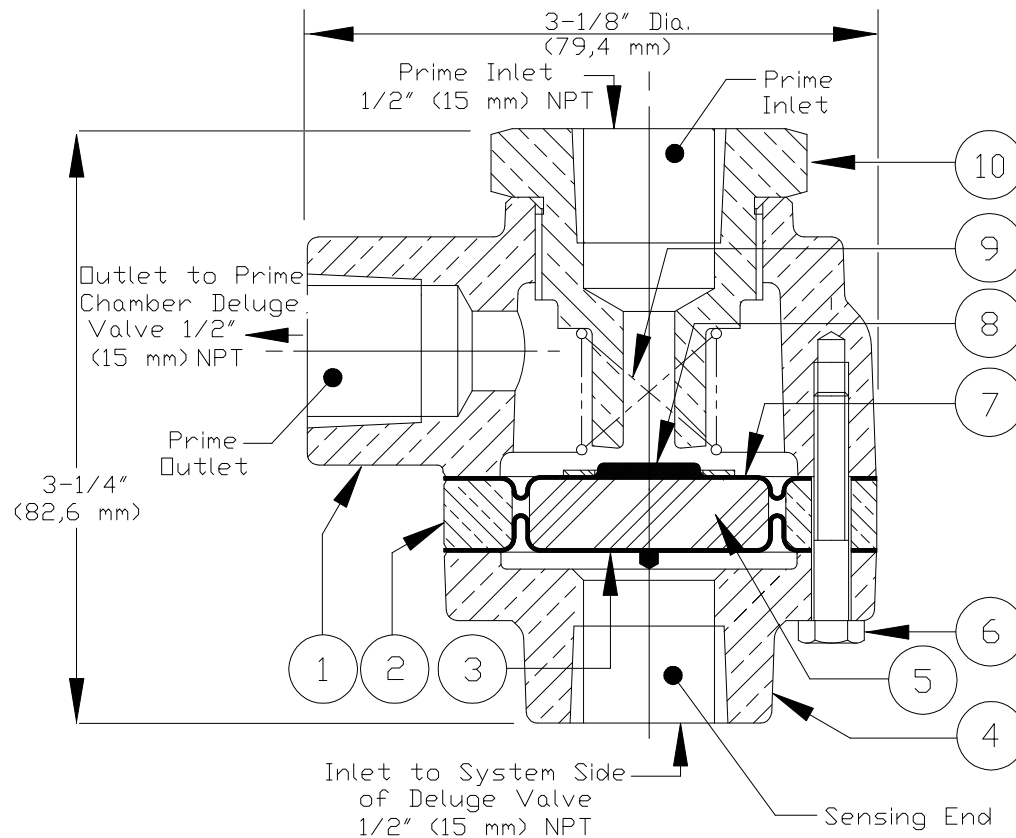
## Prime Shut Off Valve (PSOV)



# Deluge Valve Trim

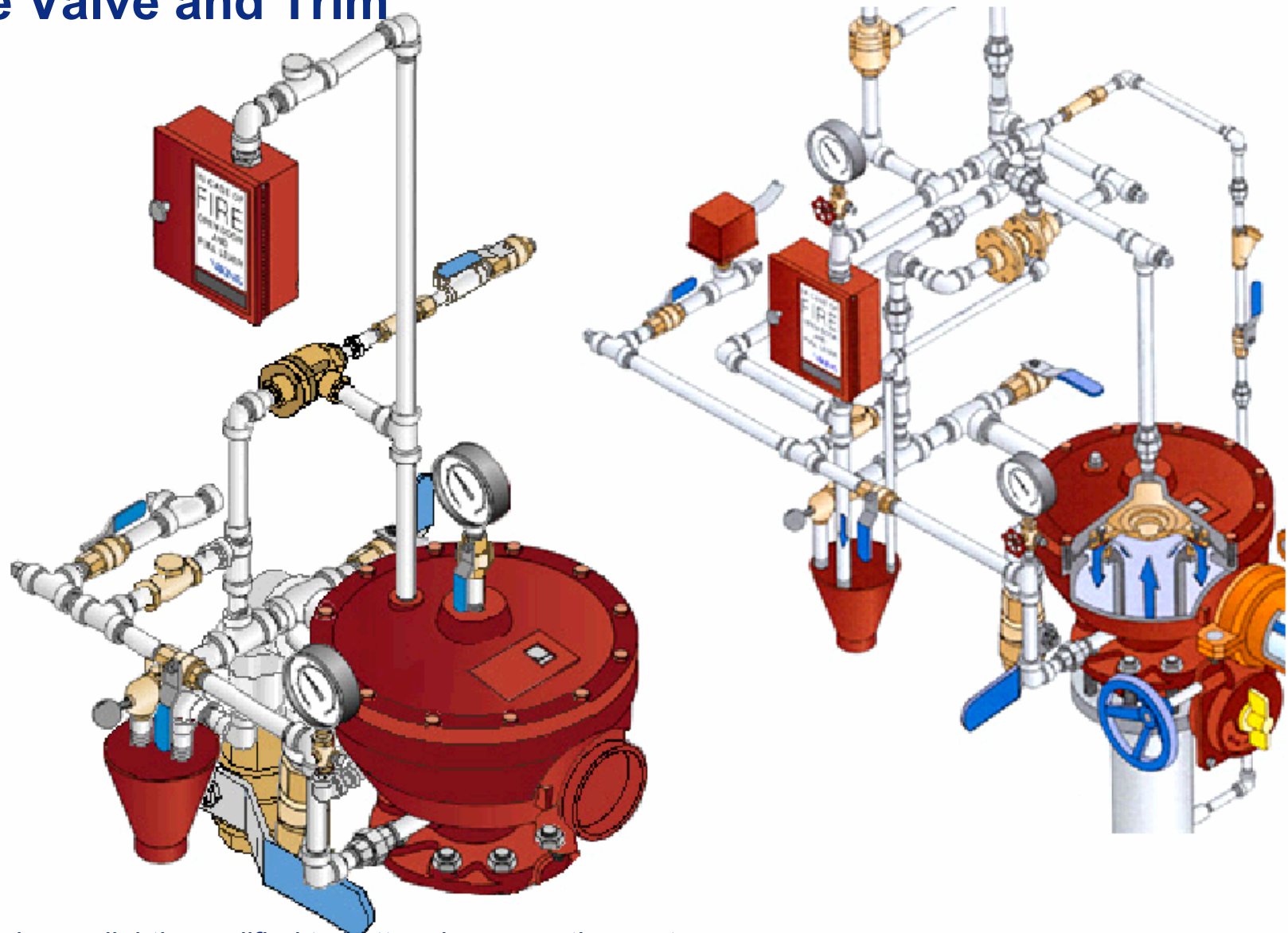
## Drain loop





**Viking PSOV (Prime Shut Off Valve)  
Eliminates the PORV and shuts OFF the  
water supply to the priming chamber**

## Deluge Valve and Trim

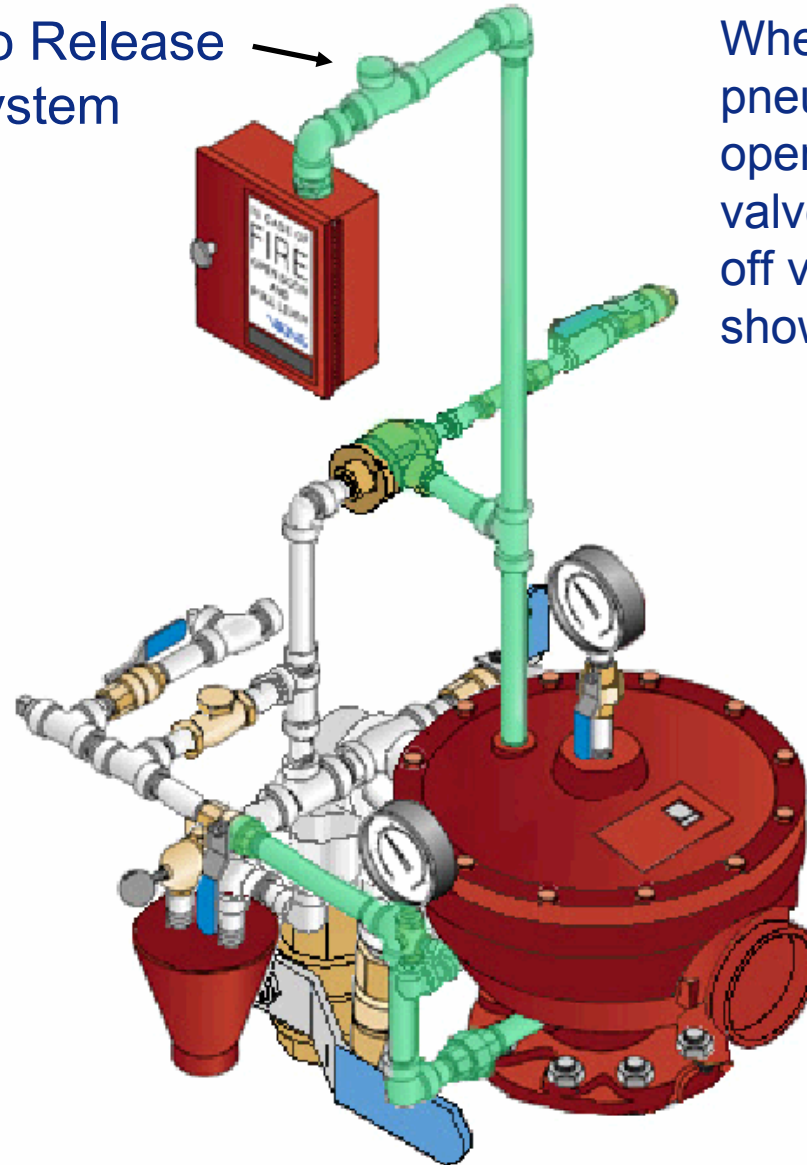


The trim has been slightly modified to better view operating parts



# Deluge Valve Trim

To Release system

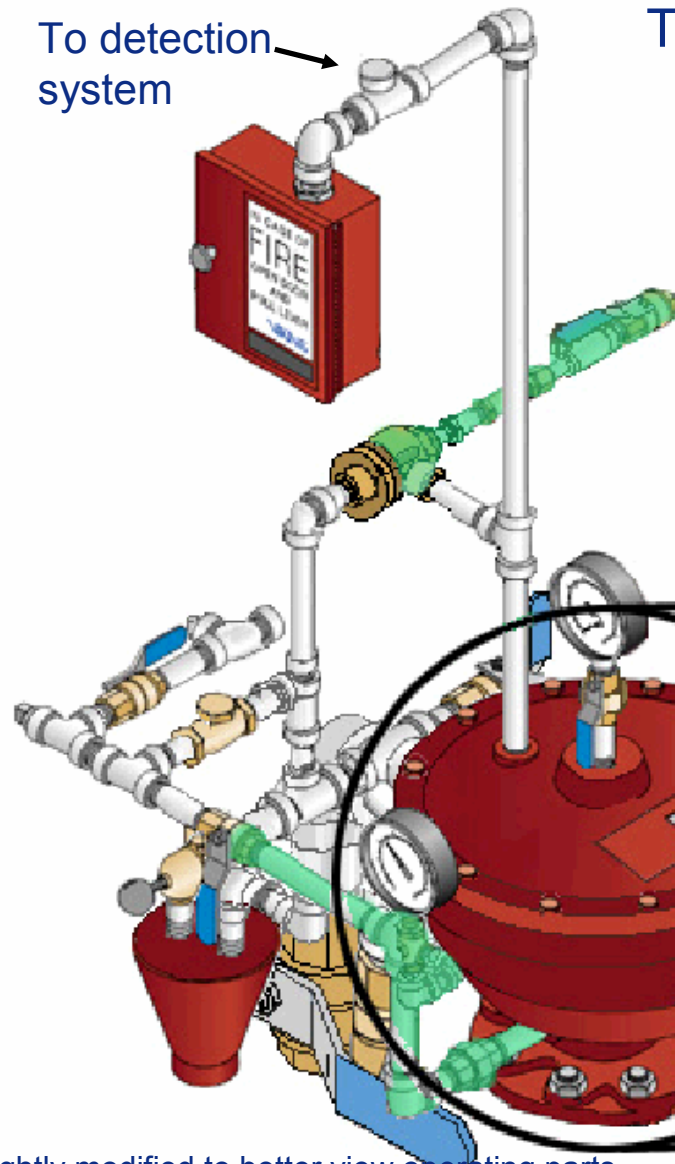


When the hydraulic, electric, or pneumatic detection system has operated and the Viking deluge valve is tripped, the priming shut off valve (PSOV) is activated as shown in the following animation.

**WARNING!!** Do not use this trim for any automatically resettable detection systems, or for pressure regulating valves!

The trim has been slightly modified to better view operating parts

# Deluge Systems

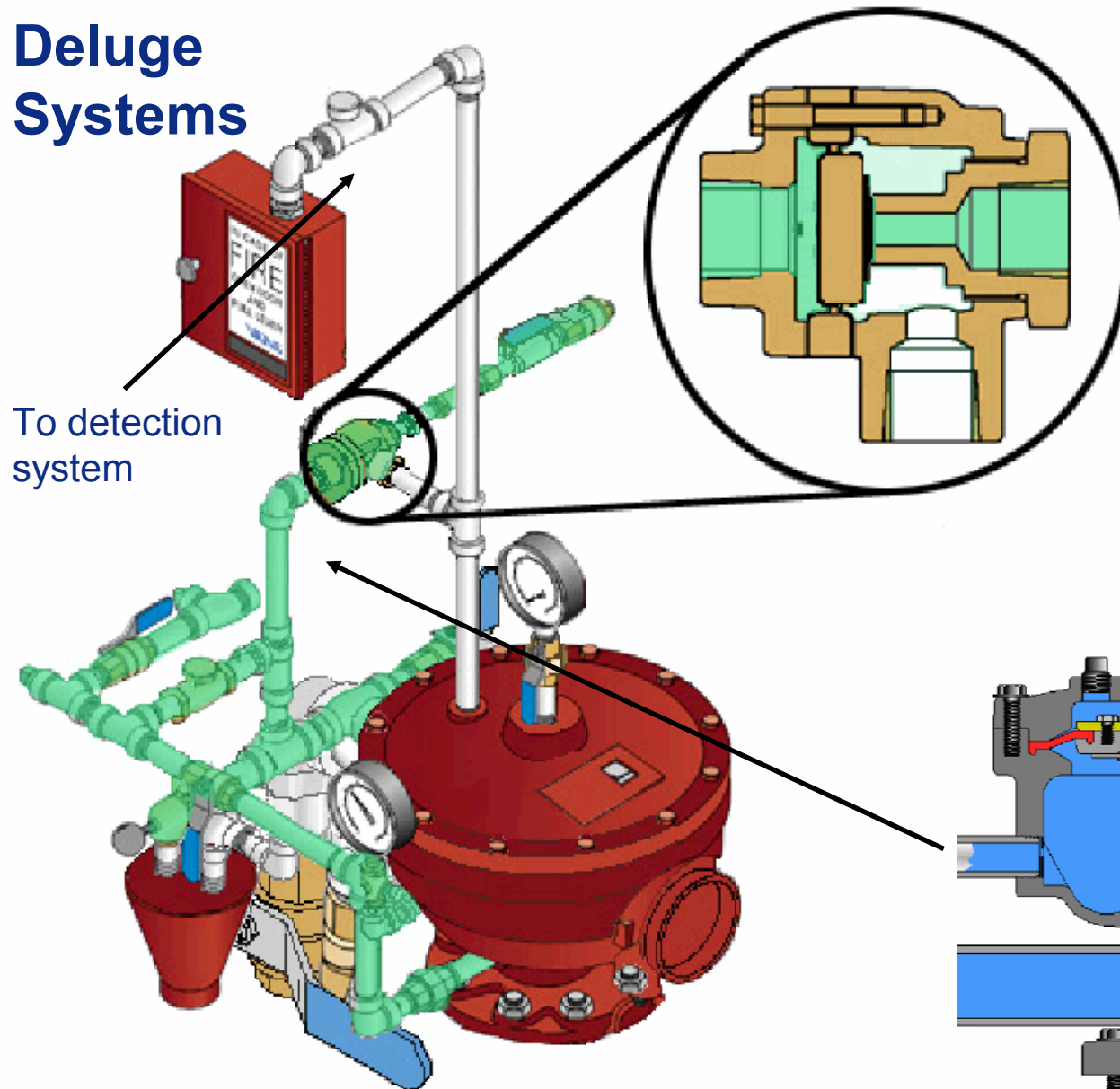


The deluge valve will be tripped either:

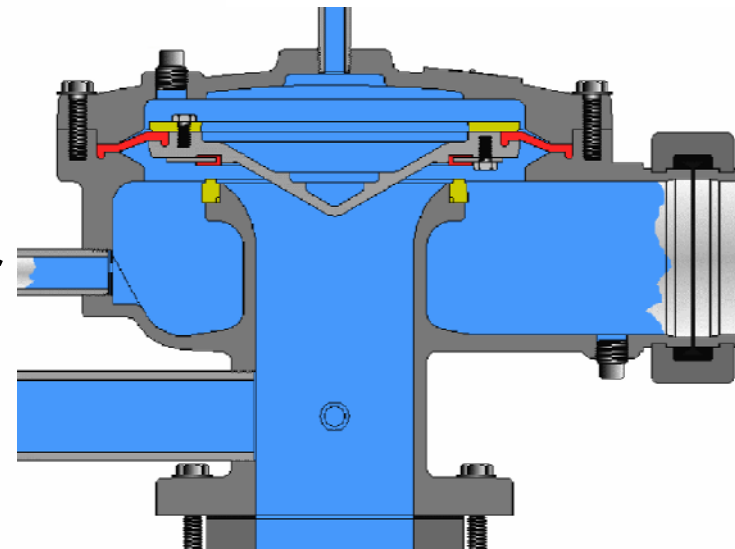
- Pneumatically (by either pilot sprinklers or fixed temperature devices)
- Hydraulically (by either pilot sprinklers or fixed temperature devices)
- Electrically (by smoke or heat detectors. Etc., that cause a solenoid valve to open.)

The trim has been slightly modified to better view operating parts

# Deluge Systems



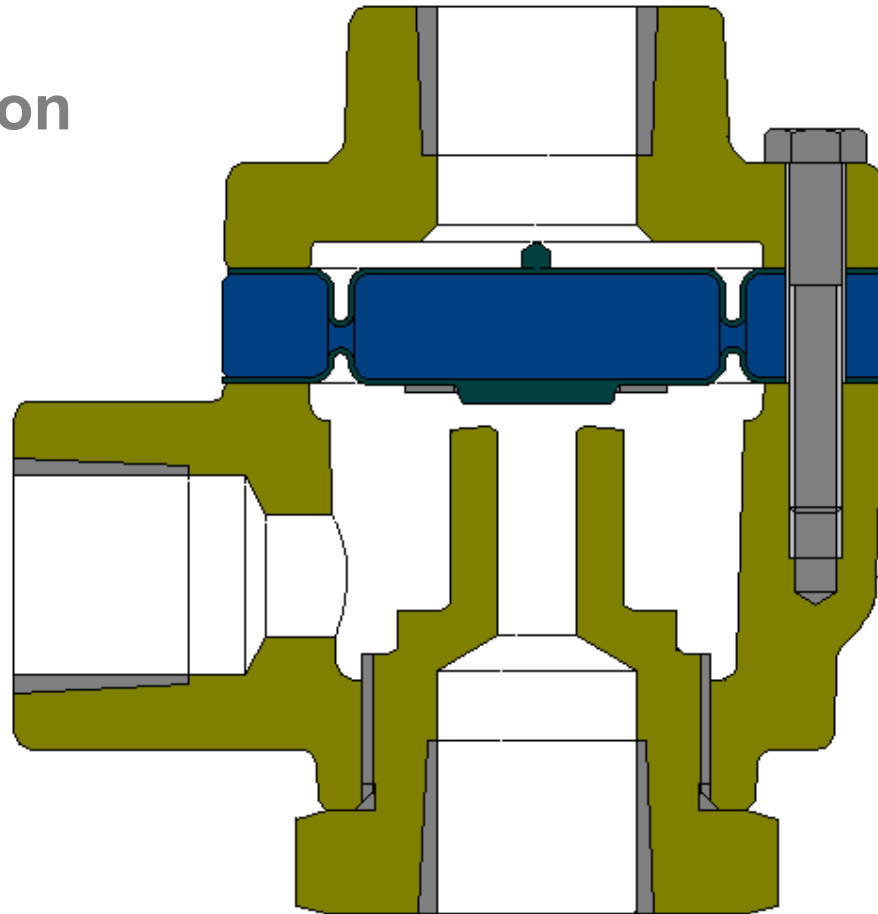
When the valve trips, water pressure from the discharge side of the valve will enter the sensing side of the PSOV forcing the clapper of the PSOV to close against the priming pressure, because of its mechanical advantage.



The trim has been slightly modified to better view operating parts

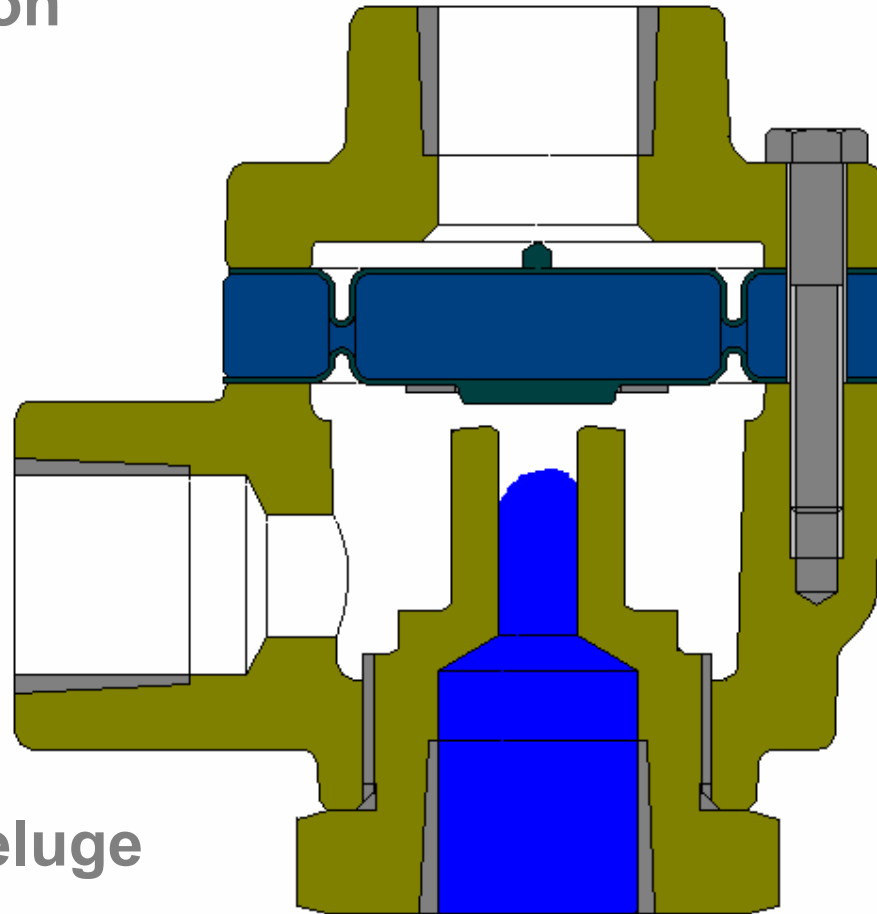
# Deluge Systems

## PSOV Operation



# Deluge Systems

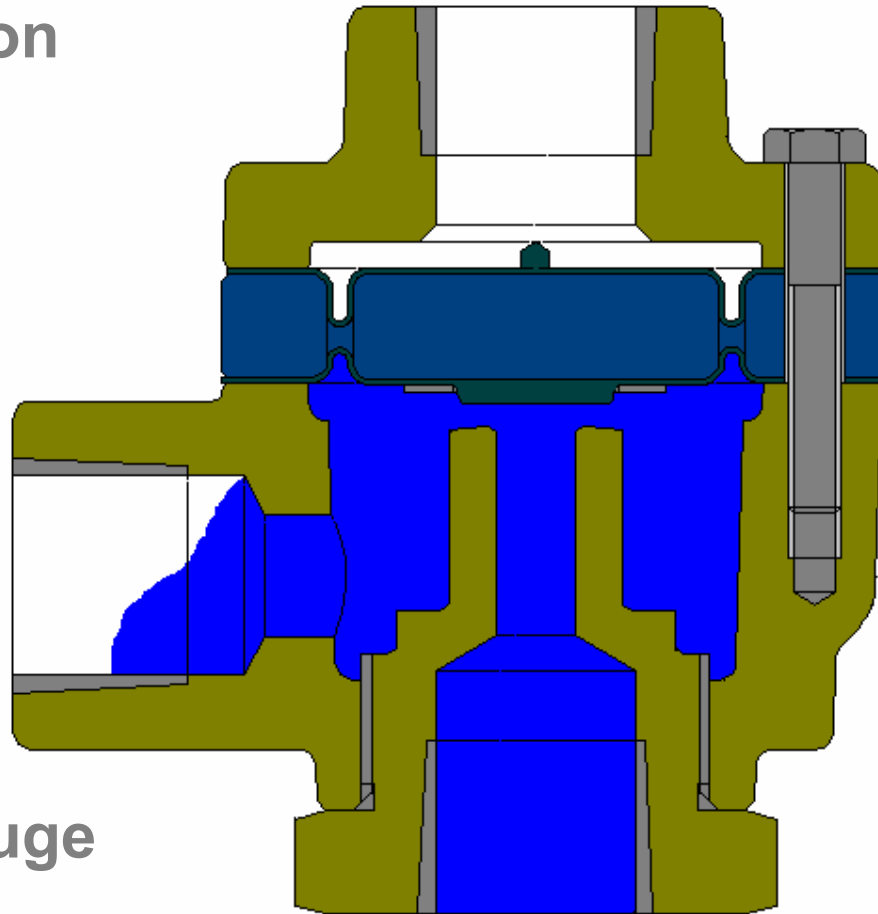
## PSOV Operation



Priming the Deluge Valve

# Deluge Systems

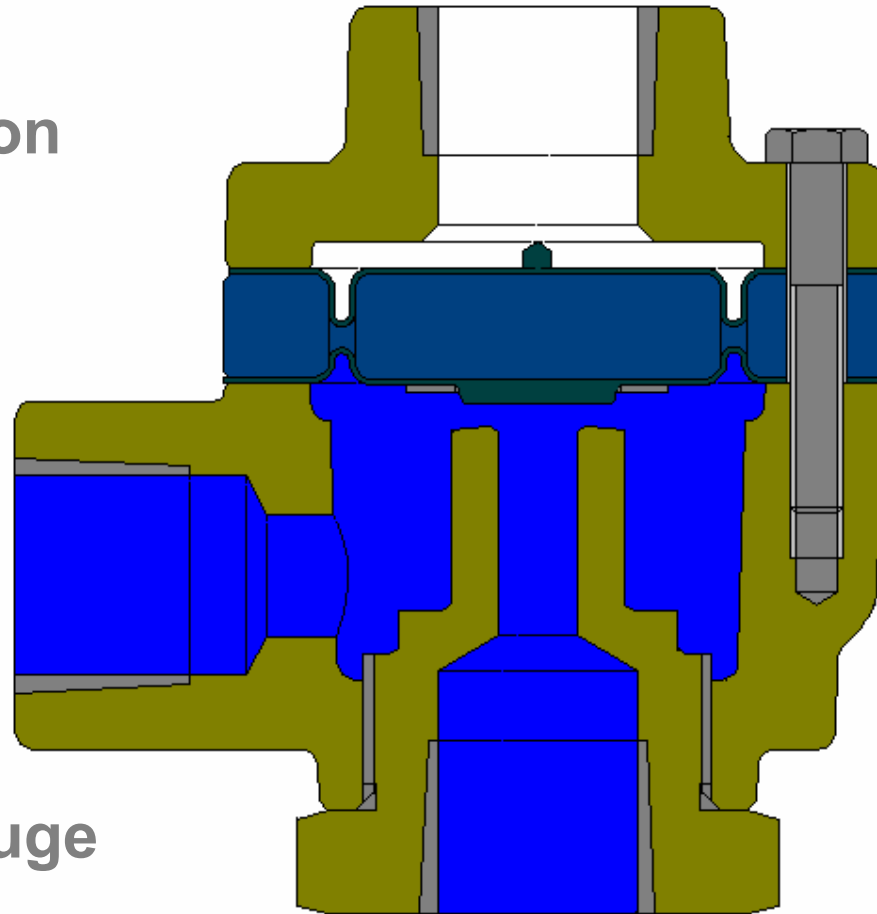
## PSOV Operation



## Priming the Deluge Valve

# Deluge Systems

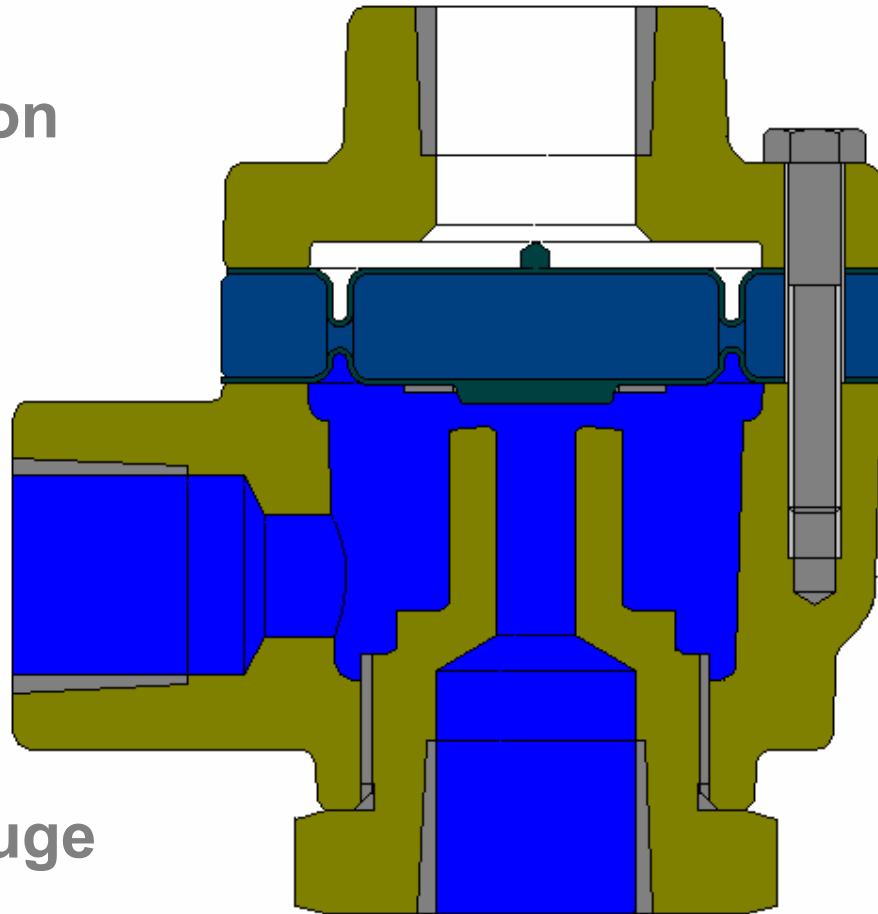
PSOV Operation



Priming the Deluge Valve

# Deluge Systems

PSOV Operation

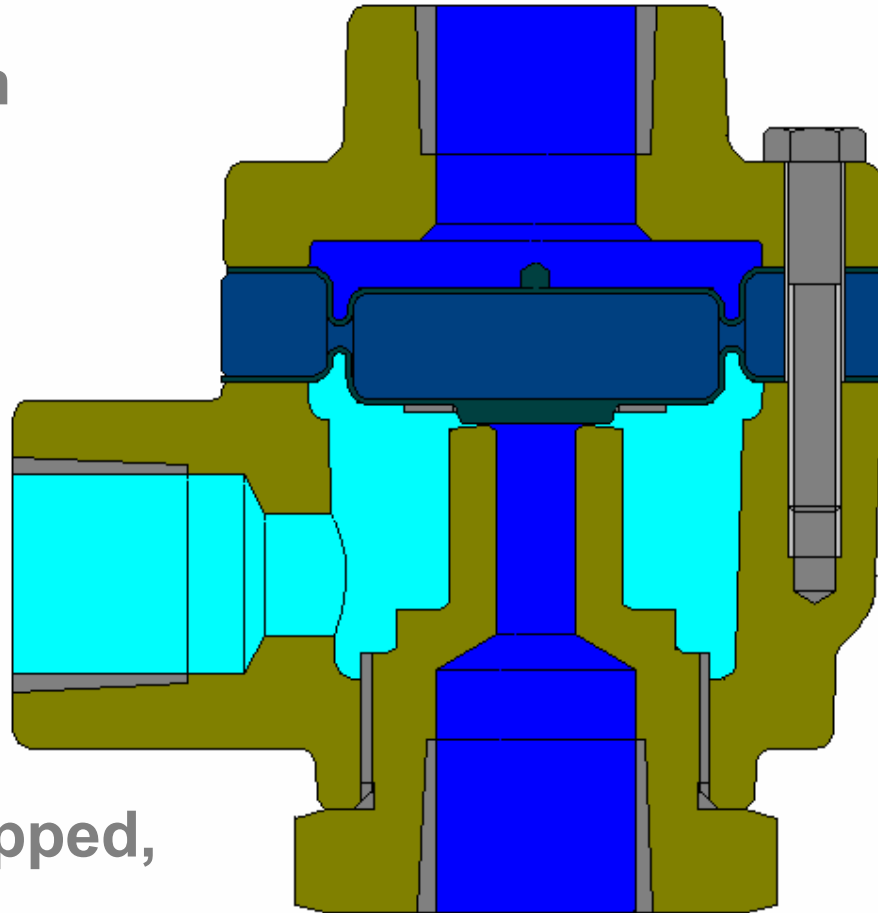


Priming the Deluge Valve



# Deluge Systems

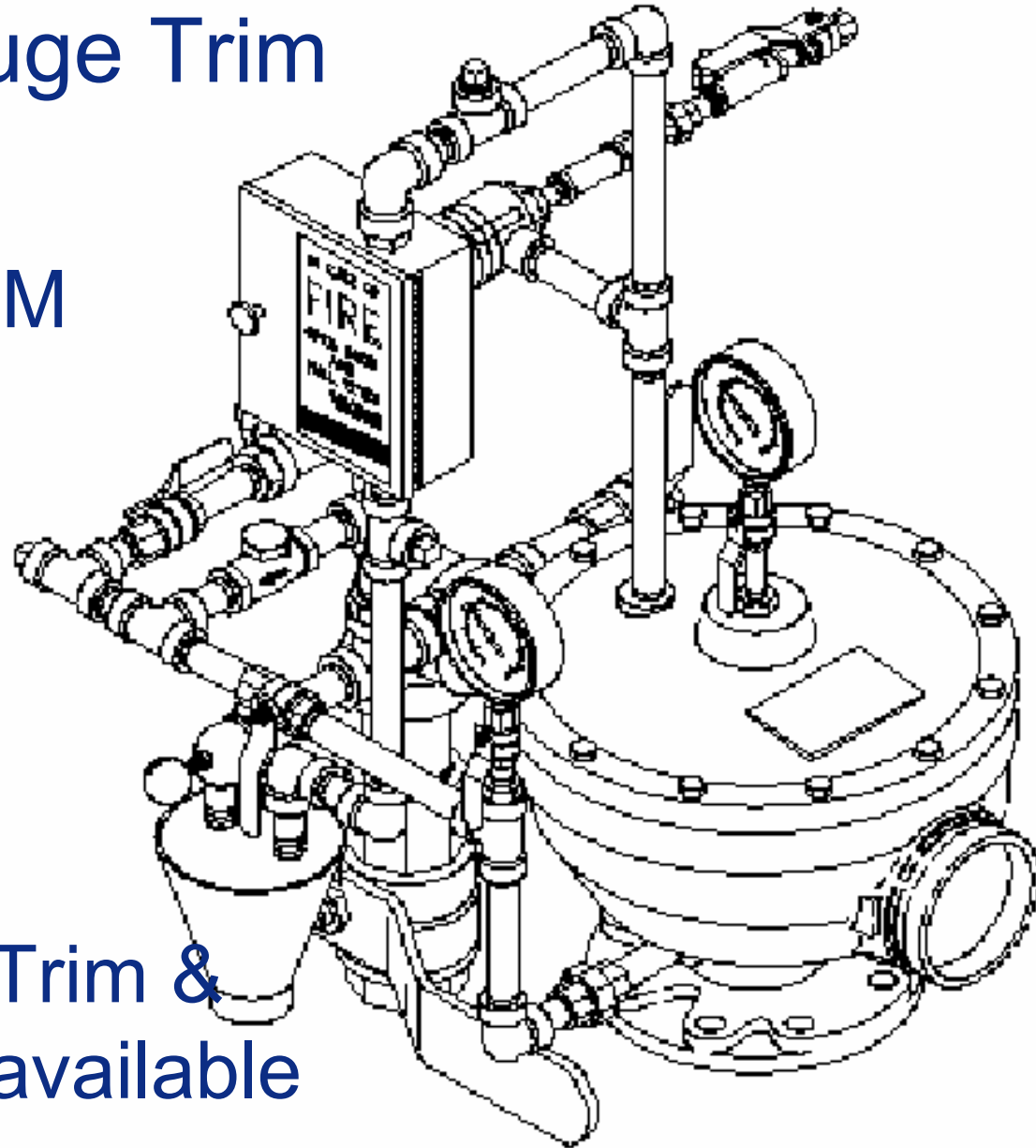
## PSOV Operation



Deluge valve tripped,  
Shutting off priming water

# EZ Deluge Trim

- UL Listed and FM Approved



- Stainless Steel Trim & Brass Trim also available

# SureFire Release Systems

**Deluge valves are held shut by their release system. In a single interlocked SureFire pre-action system, we use one release module.**

**We will discuss the SureFire release system as it pertains to the deluge valve and its trim**

# Electric Release

Electric release systems are the most prevalent type of release systems. Electric release offers the most flexibility, as the detection system can be configured in many ways, and the choices in release devices are greater than hydraulic or pneumatic.

# Solenoid Valves

Solenoid valves are described by their position when non-powered:

## 1) Normally Open

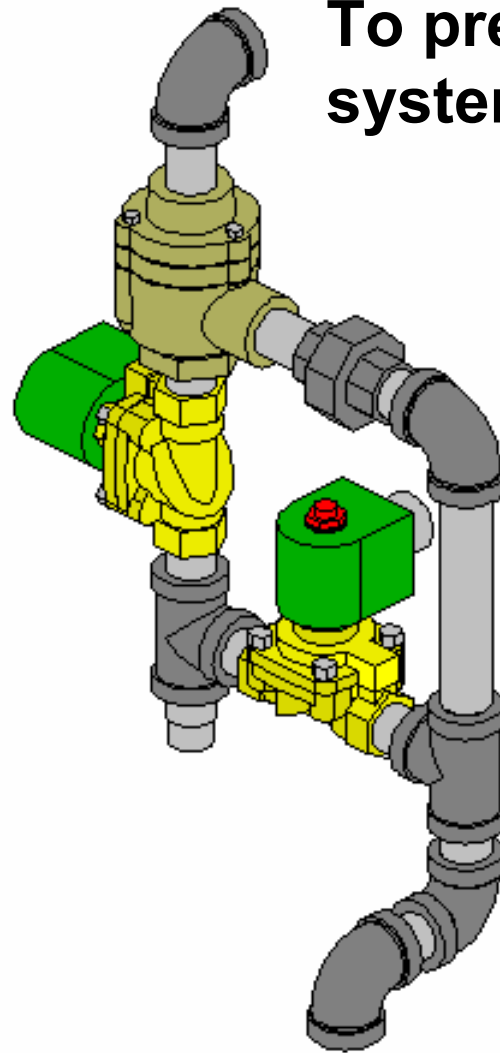
When non-powered the solenoid valve is open

## 2) Normally Closed

When non-powered the solenoid valve is closed

# Viking SureFire Release Trim Module

**Normally Open  
Solenoid Valve**



**To pressurized  
system piping**

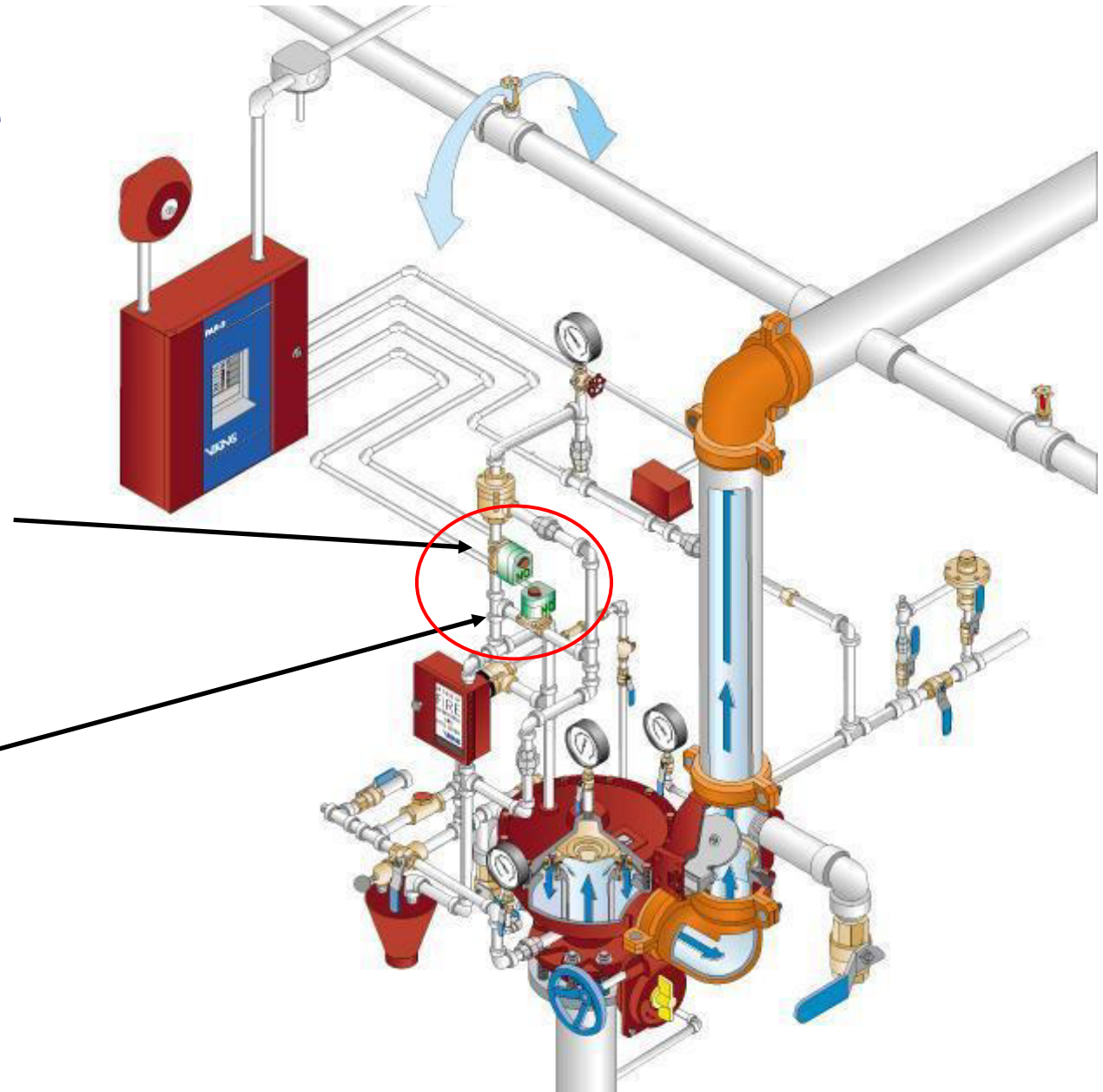
**Normally Closed  
Solenoid Valve**

# Viking SureFire Release Trim Module

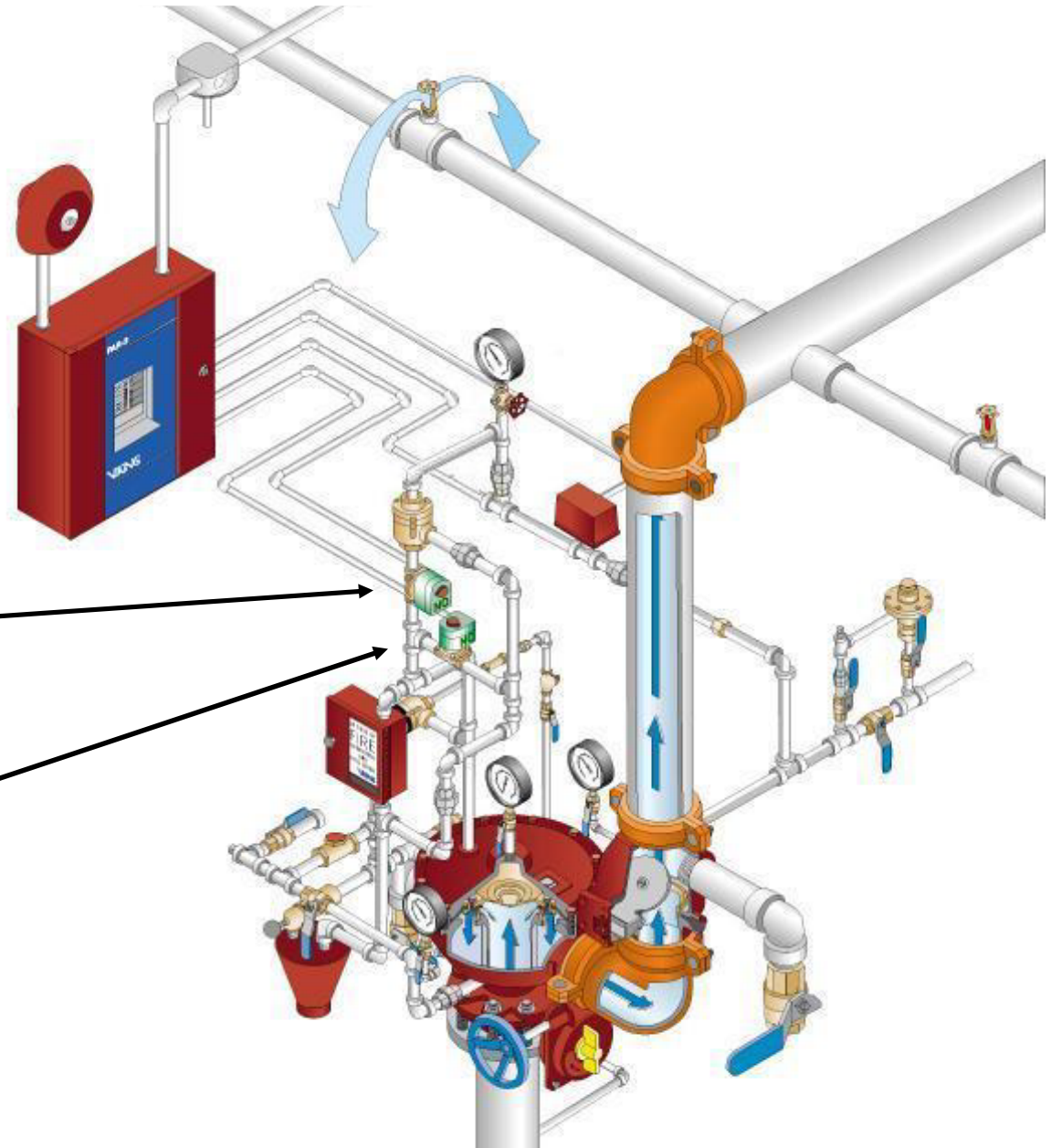
24vdc Electric solenoid  
(normally open)

24vdc Electric solenoid  
(normally closed)

Release  
Systems



# Viking SureFire release trim module



24vdc Electric solenoid  
(normally open)

24vdc Electric solenoid  
(normally closed)

## Release Systems



PAR-3

DELUGE - PREACTION CONTROL PANEL  
MODEL 3-1

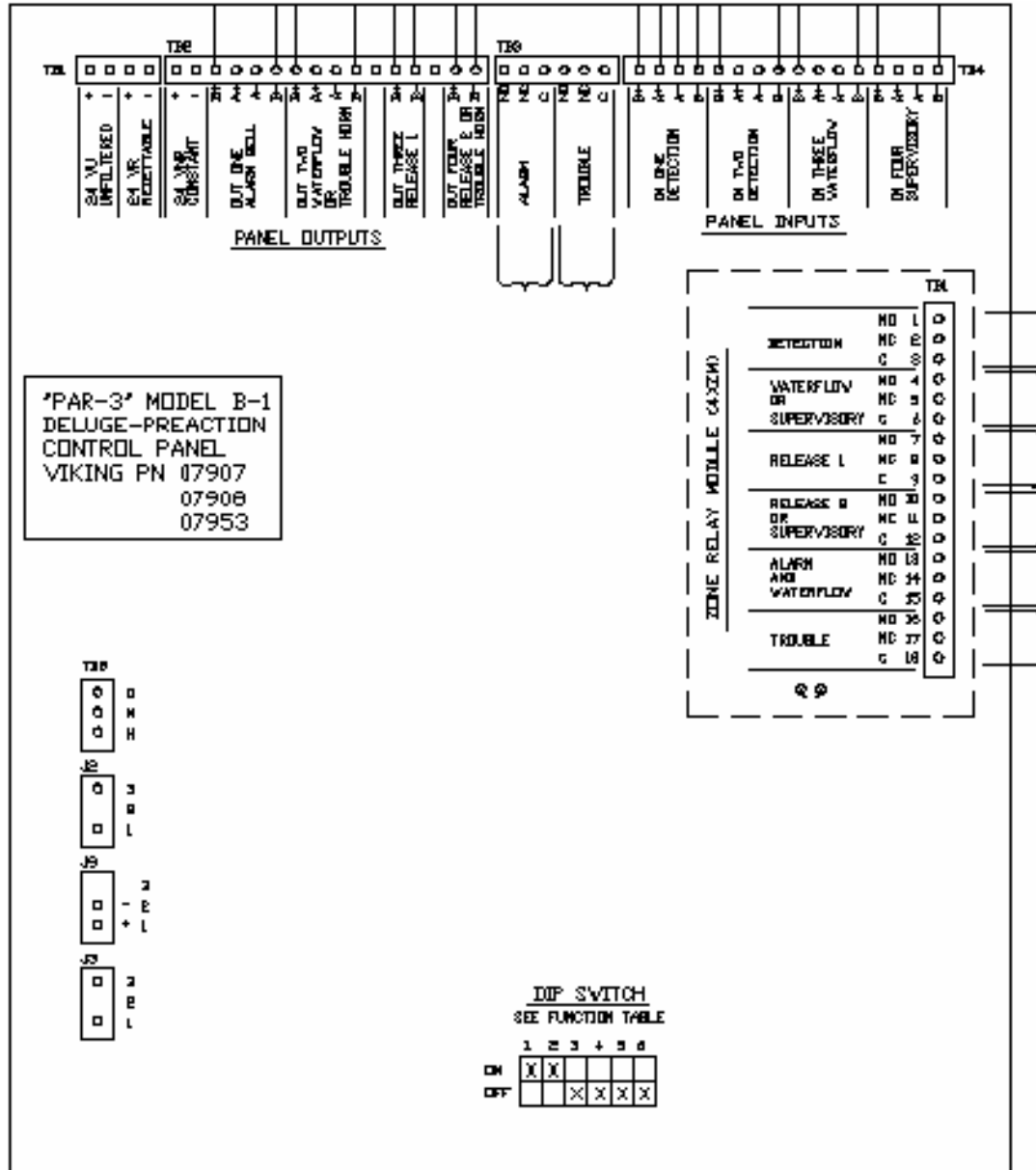


**VIKING**

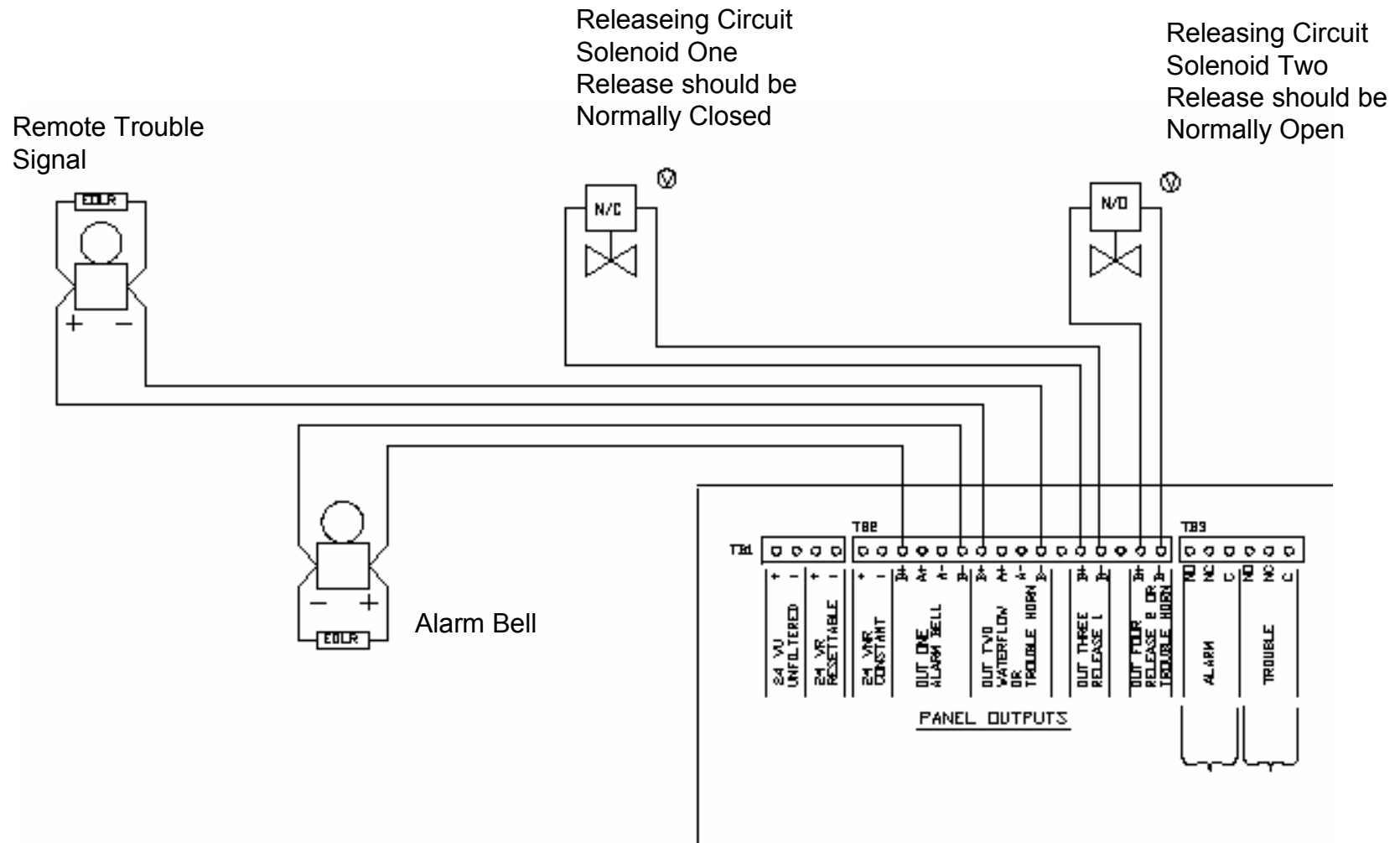
THE VIKING CORPORATION  
HASTINGS MOOR USA 19238

**VIKING**

Worldwide Fire Protection



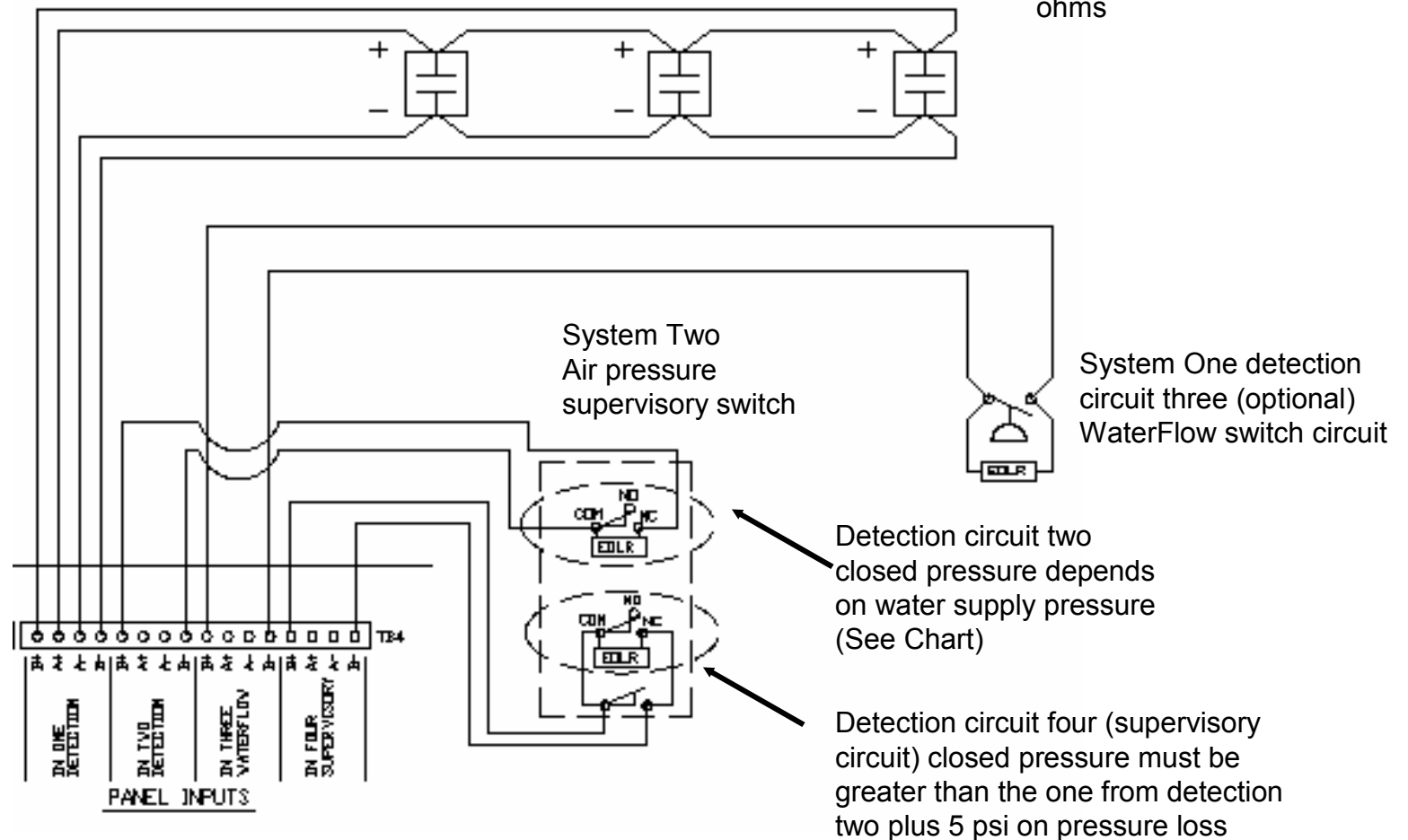
# SureFire Single Interlock Preaction Wiring Schematic



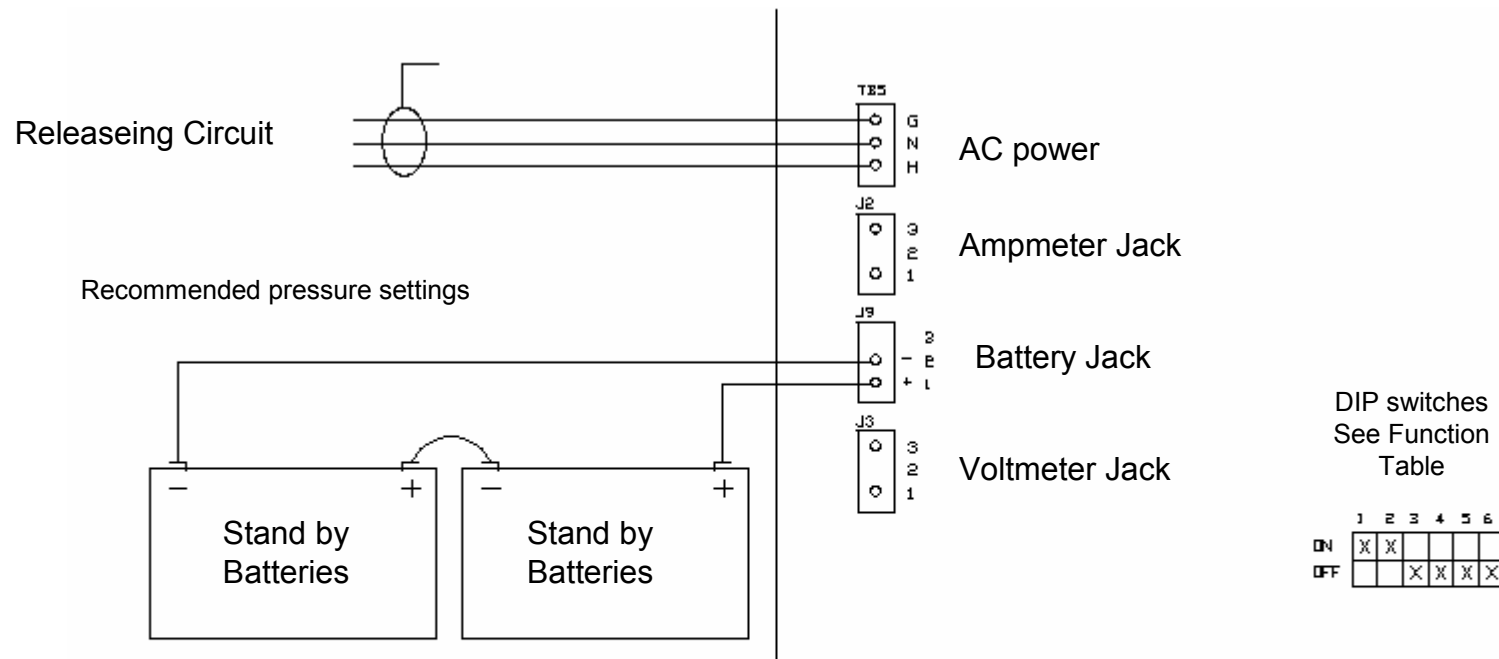
# SureFire Single Interlock Preaction Wiring Schematic

Detection circuit one  
Normally open  
detectors

maximum loop  
resistance is 200  
ohms



# SureFire Single Interlock Preaction Wiring Schematic



Recommended pressure settings			
Water Supply (psi)	Detection Circuit Two (psi)	Detection Circuit Four (psi)	System Air (psi)
0-100	15+	25	30
100-200	25+	35	40
200-250	35+	45	50

# SureFire Single Interlock Preaction Wiring Schematic

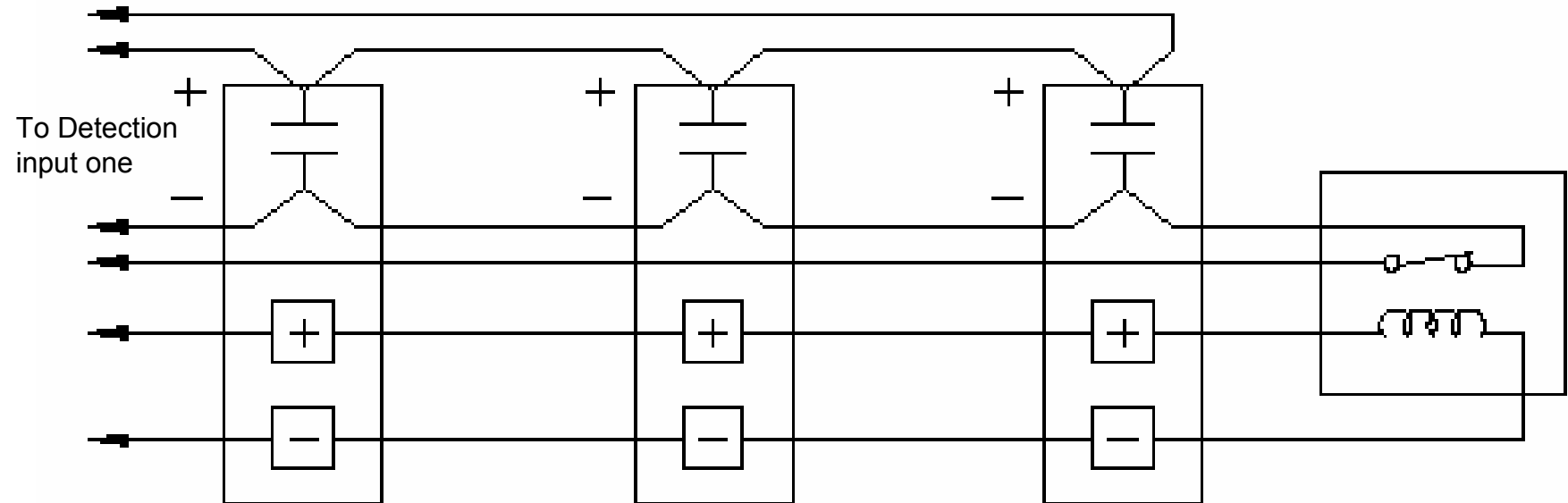
Par 3 Release Panel Function Table

INPUT CIRCUITS		TYPE	OPEN	EOLR NOTE 3	SHORT	OUTPUT CIRCUITS NOTE 2						RELAY MODULE NOTE 2					
						ALARM BELL	REMOTE TROUBLE HORN	RELEASE SOLENOID 1	RELEASE SOLENOID 2	ALARM RELAY	TROUBLE RELAY	ALARM RELAY	SUPERVISORY RELAY	RELEASE 1 RELAY	RELEASE 2 RELAY	ALARM RELAY	TROUBLE RELAY
1	DETECTOR CIRCUIT 1	L	T	N	A	X		X		X	T	X		X		X	T
2	DETECTOR CIRCUIT 2	L NOTE 1	T	N	A	X			X	X	T	X			X	X	T
3	WATERFLOW	L	T	N	A	X				X	T	X				X	T
4	SUPERVISORY	L	T	N	S		X				T		X				T
5	ALARM ACTIVATE SWITCH	L				X				X		X				X	

ACTION  
L=LATCH A=ALARM T=TBL  
N=NORMAL S=SUPV

# SureFire Single Interlock Preaction Wiring Schematic

## 4-Wire Smoke Detector Connections



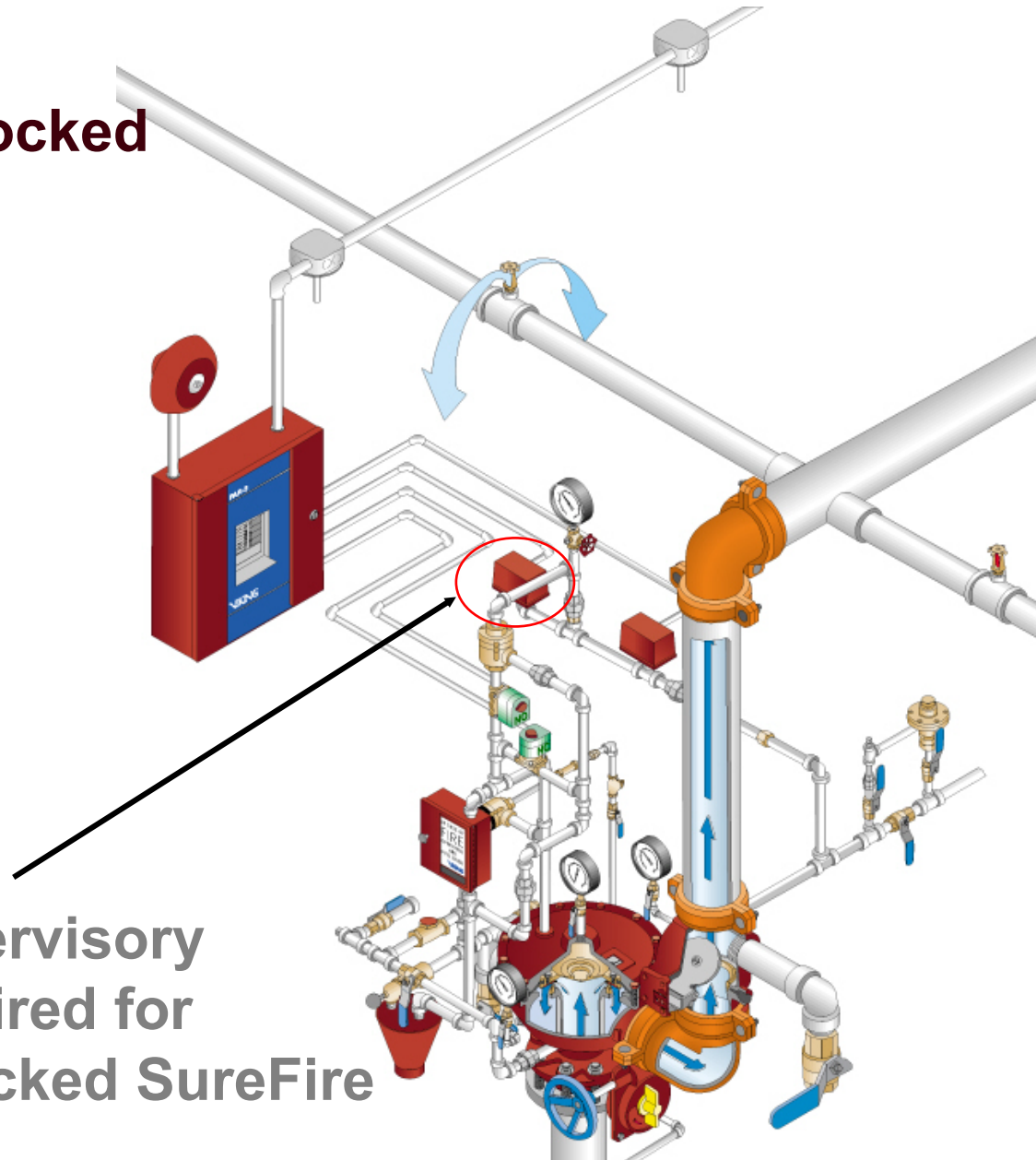
**VIKING**

# Viking SureFire Double Interlocked Pre-action

Worldwide Fire Protection



# SureFire – Double-Interlocked Pre-Action



A second supervisory  
Switch is required for  
Double interlocked SureFire

# DOUBLE INTERLOCKED OPERATION

**The Release System must activate .....**

**-(an alarm will sound)**

**-AND,**

**-Pressure in the sprinkler piping must be reduced-(due to a sprinkler opening in fire conditions) To trip open the Deluge Valve.**

**In fire conditions,**

**- After the release system operates and the sprinkler opens, water needs to travel from the Deluge Valve to the open sprinkler.**

**There may be a time delay similar to a Dry System.**

# DOUBLE INTERLOCKED OPERATION

**The Release System must activate .....**

**-(an alarm will sound)**

**-AND,**

**-Pressure in the sprinkler piping must be reduced-(due to a sprinkler opening in fire conditions)**

**To trip open the Deluge Valve.**

**In fire conditions,**

**- After the release system operates and the sprinkler opens, water needs to travel from the Deluge Valve to the open sprinkler.**

**There may be a time delay similar to a Dry System.**

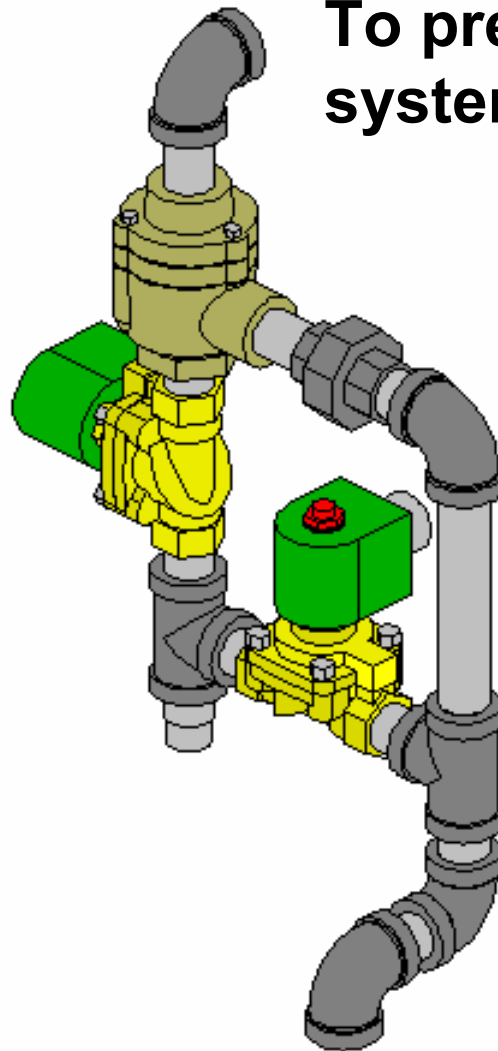
# DOUBLE INTERLOCKED OPERATION

**SureFire release trim is the same for either single or double interlocked pre-action. Double interlocked SureFire requires a second supervisory switch in the air supply line to the riser.**

**The second supervisory switch operates the normally closed solenoid valve only after the detection circuit has operated. Both the detection and air pressure has to be lost prior to the normally closed solenoid operating.**

# Viking SureFire Release Trim Module

**Normally Open  
Solenoid Valve**

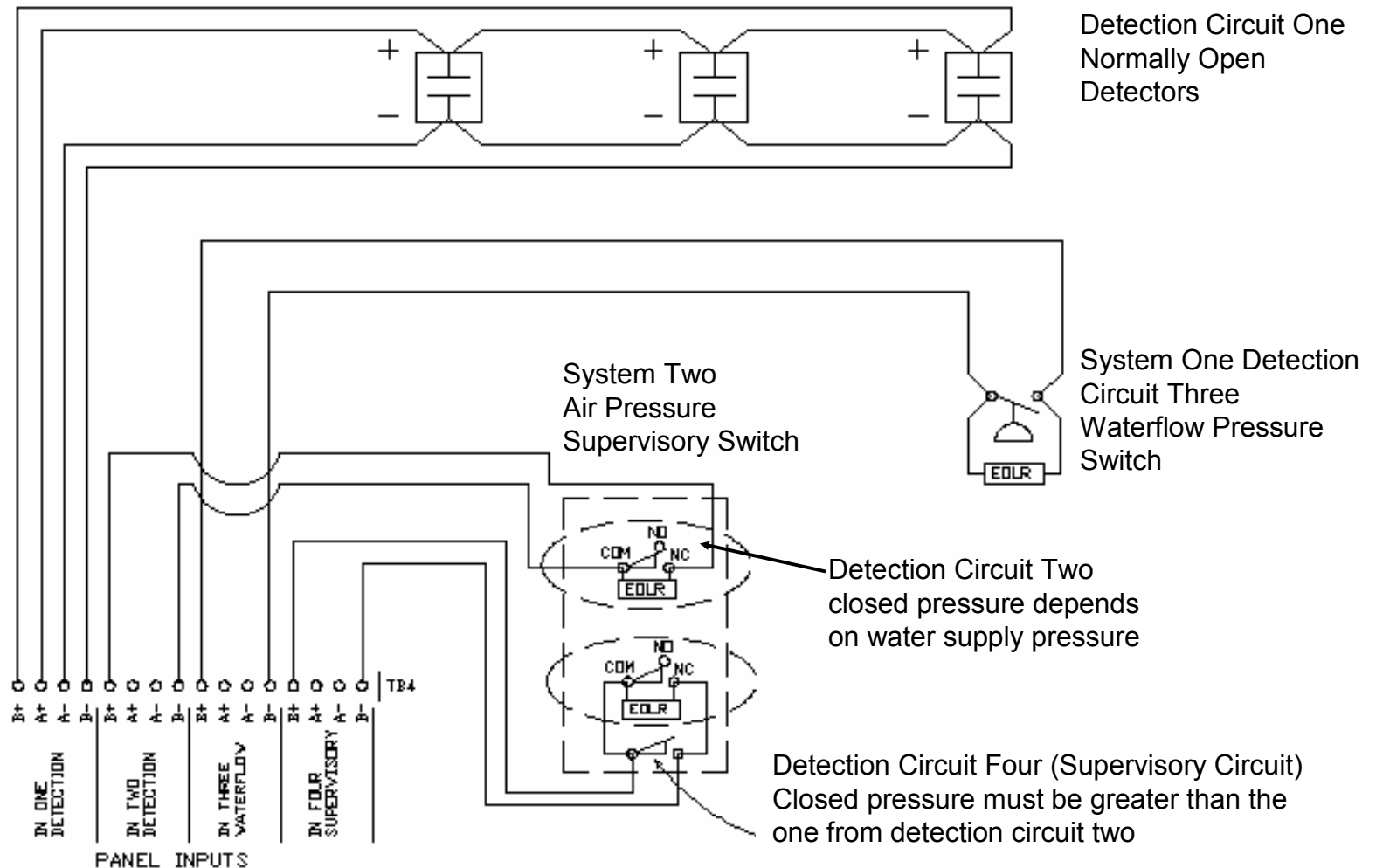


**To pressurized  
system piping**

**Normally Closed  
Solenoid Valve**

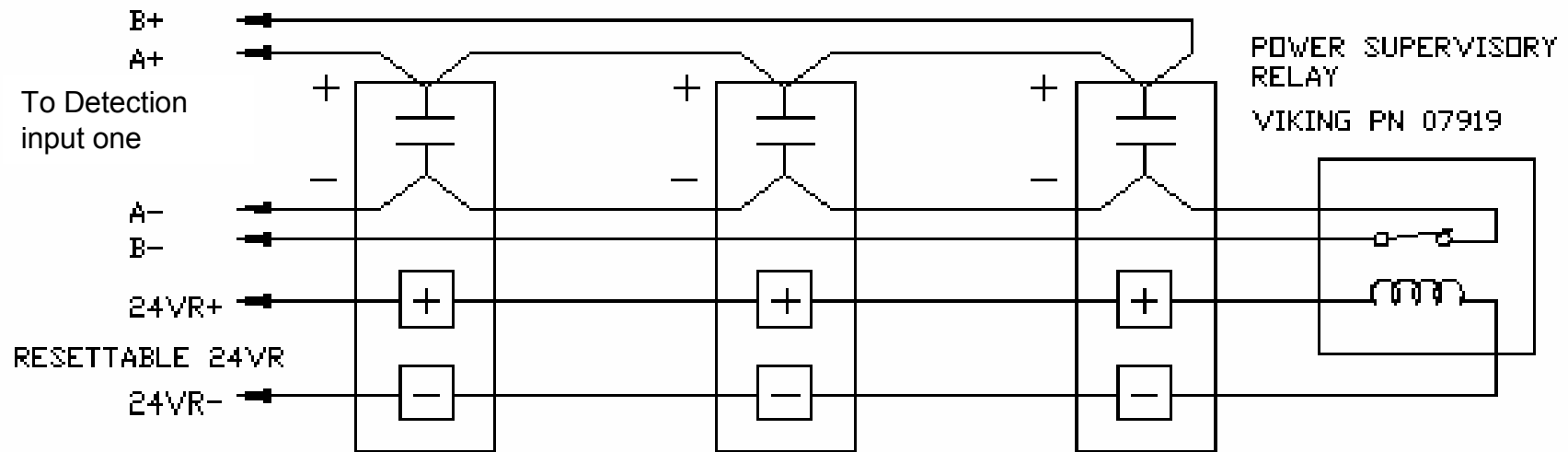


# SureFire Double Interlock Preaction Wiring Schematic



# SureFire Single Interlock Preaction Wiring Schematic

## 4-Wire Smoke Detector Connections





# SureFire Single Interlock Preaction Wiring Schematic

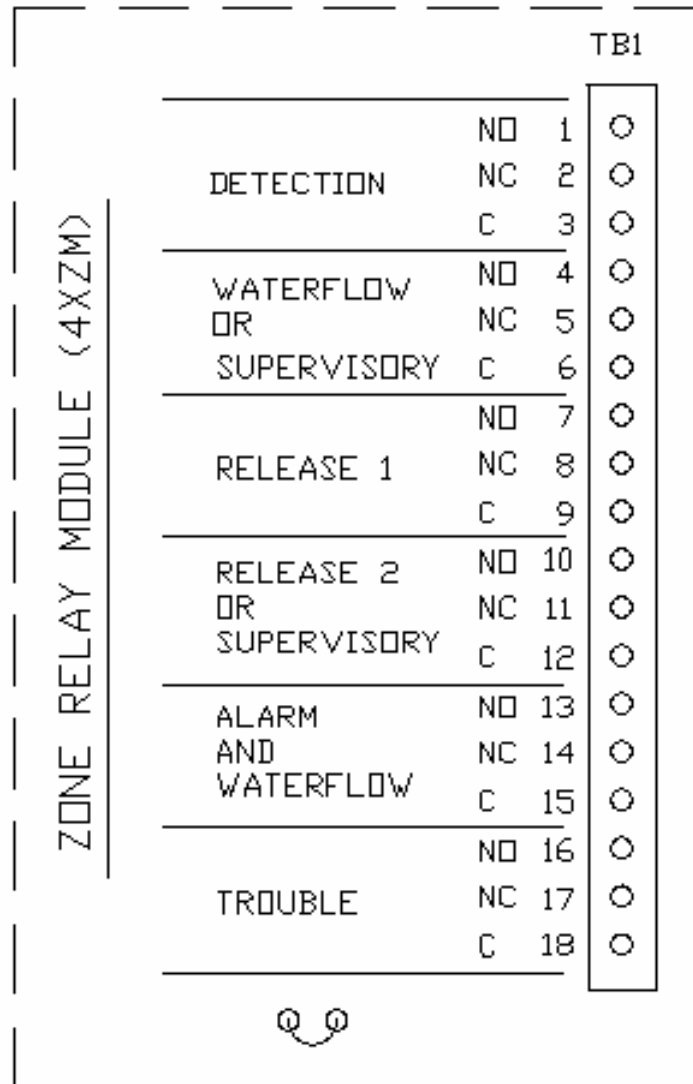
Par 3 Release Panel Function Table

INPUT CIRCUITS		TYPE	OPEN	EOLR NOTE 3	SHORT	OUTPUT CIRCUITS NOTE 2						RELAY MODULE NOTE 2					
						ALARM BELL	REMOTE TROUBLE HORN	RELEASE SOLENOID 1	RELEASE SOLENOID 2	ALARM RELAY	TROUBLE RELAY	ALARM RELAY	SUPERVISORY RELAY	RELEASE 1 RELAY	RELEASE 2 RELAY	ALARM RELAY	TROUBLE RELAY
1	DETECTOR CIRCUIT 1	L	T	N	A	X		X		X	T	X		X		X	T
2	DETECTOR CIRCUIT 2	L NOTE 1	T	N	A	X			X	X	T	X			X	X	T
3	WATERFLOW	L	T	N	A	X				X	T	X				X	T
4	SUPERVISORY	L	T	N	S		X				T		X				T
5	ALARM ACTIVATE SWITCH	L				X				X		X				X	

ACTION  
L=LATCH A=ALARM T=TBL  
N=NORMAL S=SUPV

# SureFire Single Interlock Preaction Wiring Schematic

Remote Trouble Signal



## Relay contacts actuated by

Detection Circuit input one or two or waterflow alarm switch, input three

Supervisory switches, valve tamper, air pressure Etc. input four

Detection Circuit Input one

Detection circuit input two

Detection circuit input one or two or waterflow alarm switch input three

Panel malfunction or fault in field wiring

**VIKING**

**Thank You**

**Worldwide Fire Protection**