

# SOLENOID CONTROLLED THROTTLING VALVE

Purpose: Control system level, flow or pressure

Model Number: 42AFCV

**Sizes:** 2" - 48"

**Type:** Throttling

**Primarily Controlled By:** Electricity

**Located:** In line/In line near storage

**Purpose:** To control system level, flow or downstream/upstream pressure

**Piston:** Can be locked in any position

**Inlet Pressure:** Maximum: 300 psi

**Inlet Pressure:** Minimum: 5 psi

**Construction:** Body: 2" - 36" - Cast iron (semi-steel) with bronze trim  
40" - 48" - Ductile iron, with bronze/stainless steel trim

**Voltages:** AC or DC

**Manual Control:** To open or close the valve in case of a power failure.

**Control Devices:**

**Strainer:** Model 5F-2

**Valves:**

Needle: Two Speed Control - in series with solenoid pilot valves

Pilot: Solenoid - Two 2 Way

## Options

1. Angle body design (90 degree)
2. Cast steel or ductile iron body and stainless steel trim
3. Feed back potentiometer - to indicate precise valve position or to match with an input signal through an electronic bridge to hold a command position.
4. Spring assist - to either open or close valve
5. Teflon coated cylinders

## Customized Features

Any one or a selection of features can be added to the solenoid controlled, throttling valve.

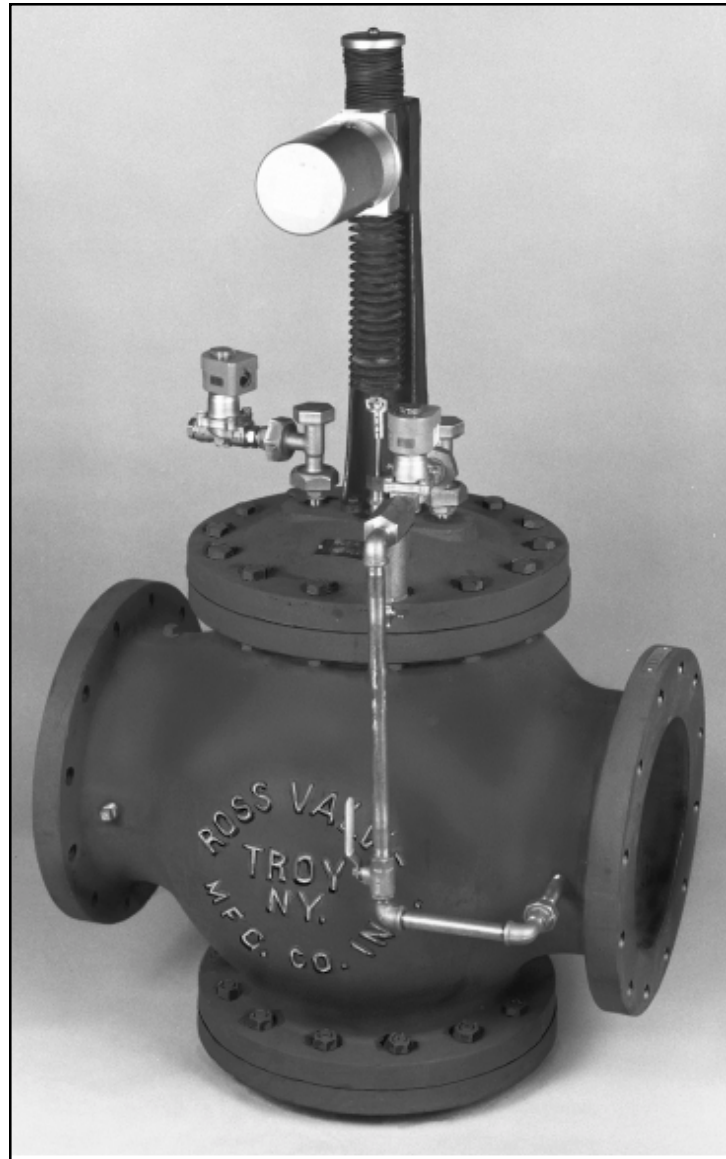
### Code

Computer Based Panels

**MC2000L** - Level Control Panel

**MC2000F** - Flow Control Panel

**MC2000PT** - Pressure Control Panel



Ross engineers customize the basic **42AFCV** to accommodate individual needs.

Mechanical Options

**ACAV** - Anti-cavitation Trim

**CI** - Check Feature (Internal)

**ES** - Higher Efficiency Strainer

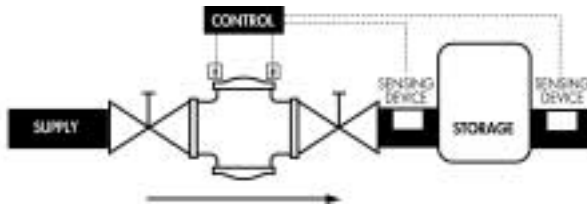
# SOLENOID CONTROLLED THROTTLING VALVE

Basic Applications

Model Number: 42AFCV

## Basic Applications: Storage Flow Maintenance

1. Control flow into a reservoir, tank or basin in direct proportion to draw down.
2. Control flow in a line when monitored and positioned from a remote point.



**If:** Flow rate filling storage needs to be controlled

**Ross Main Valve will:** Position piston to maintain the desired flow.

**If:** Flow into storage needs to be in direct proportion to flow out

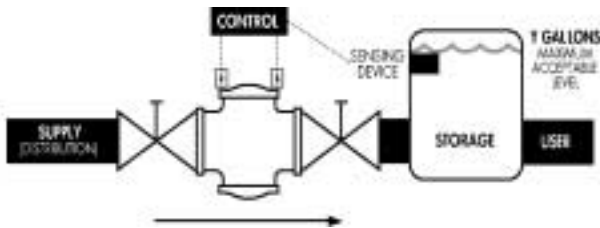
**Ross Main Valve will:** Position piston to control the desired flow.

**If:** Supply needs to be isolated from the user

**Ross Main Valve will:** Full close to stop flow.

## Basic Applications: Storage Level Maintenance

Controls levels in tanks, basins, reservoirs, deep wells, etc.



**If:** Storage level falls below Y Gallons

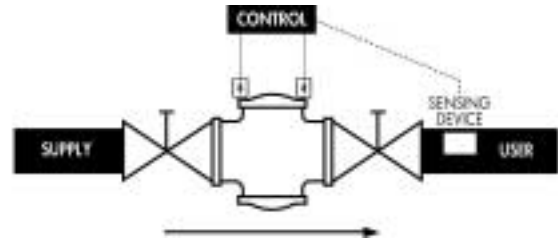
**Ross Main Valve will:** Open proportional to drawdown to allow greater flow into storage.

**If:** Storage level reaches Y Gallons

**Ross Main Valve will:** Full close to stop the flow.

## Basic Applications: Pressure Maintenance

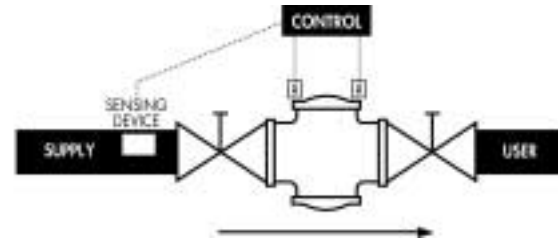
Downstream



**If:** Downstream pressure needs to be maintained at a set pressure

**Ross Main Valve will:** Position piston to maintain the desired pressure.

Upstream



**If:** Upstream pressure needs to be maintained at a set pressure

**Ross Main Valve will:** Position piston to maintain the desired pressure.

# SOLENOID CONTROLLED THROTTLING VALVE

## Customized Features

### MC2000 & MC2001 Series

The 1st & 2nd generation MC2000 series, programmable control panels, provide the most up to date computer technology and offer unparalleled diversity, accuracy and control.

#### **Panels include:**

**MC2000L - Level Control**

**MC2000F - Flow Control**

**MC2000PT - Pressure Control**

MC2001P - Pump Control (Described in the Pump Control section)

The units' advanced technology combined with the extraordinarily durable and versatile Ross piston valve, supplies solutions that are unparalleled in the industry.

Because the programmed control panel is designed with the latest technology, Ross engineers continuously explore new ways to increase its functionality and flexibility. At any point, the exact product offered will be of outstanding quality and fully supported over time.

Because computer technology continuously changes, the catalogue describes basic applications for each unit. **Contact a Ross representative for the latest detailed information including features, options and operation.**

### Ross Services

The PLC (programmable controller) provides a programmed external connection that facilitates direct on-line factory service via a standard telephone modem.

#### **Services include:**

REMOTE MONITORING

REMOTE TROUBLESHOOTING

REMOTE PROGRAMMING



Ross engineers customize the **MC2000** to accommodate individual needs.

### Consult a Ross Representative

For the most current description of the features, options and operation.

# SOLENOID CONTROLLED THROTTLING VALVE

Model Number: 42AFCV

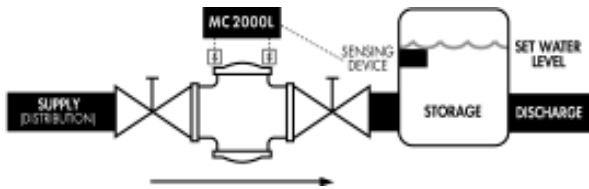
## MC2000L

### Level Control Panel - Computer Based

**Primarily Controlled By:** Programming  
**Located:** Accessible to field technician  
**Purpose:** To provide incomparable valve control accuracy in order to maintain exact water level in storage

### Basic Application

Insure extremely accurate level maintenance in a basin, reservoir, deep well, etc., as a stand alone panel or interfacing with any larger system, for example a SCADA system.



**When:** Sensor relays to the panel that the water is at a preset level

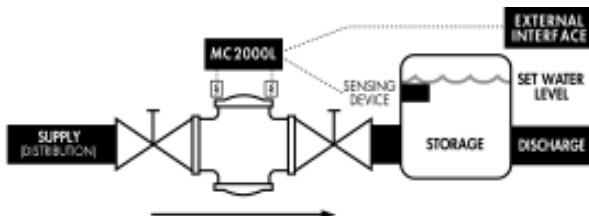
**Panel will:** De-activate the solenoid ports

**Ross Main Valve will:** Lock.

**When:** Sensor relays to the panel that the water is above its preset level

**Panel will:** Activate/de-activate the appropriate solenoid ports

**Ross Main Valve will:** Close



**When:** Sensor relays to the panel that water is falling below a preset level

**Panel will:** Activate/de-activate the appropriate solenoid ports

**Ross Main Valve will:** Open wider to allow flow into storage and maintain the preset level.

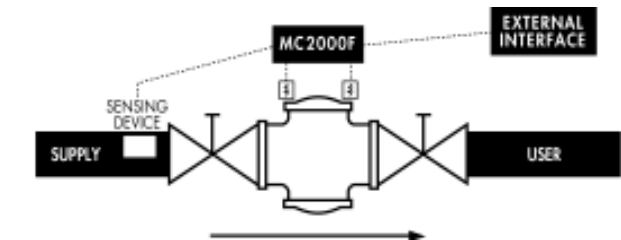
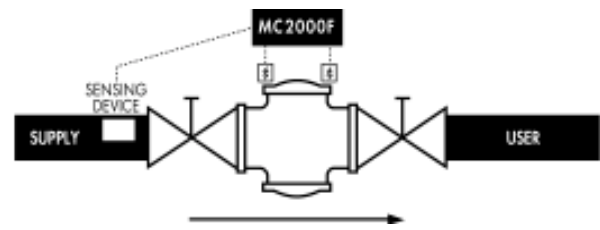
## MC2000F

### Flow Control Panel - Computer Based

**Primarily Controlled By:** Programming  
**Located:** Accessible to field technician  
**Purpose:** To provide incomparable valve control accuracy in order to maintain an exact flow in the line

### Basic Application

Insure extremely accurate flow maintenance in the line as a stand alone panel or interfacing with any larger system, for example a SCADA system.



**When:** Flow is set at an exact rate

**Panel will:** React to the sensor flow measurement by activating/de-activating the appropriate solenoid pilots

**Ross Main Valve:** Will position the piston to maintain the desired flow rate.

### Note

Sensor placement in the diagrams are just examples. A sensor actually can be placed anywhere in the system; upstream, downstream, on remote piping, etc. to control the flow rate.

(Customized Features continued on next page)

# SOLENOID CONTROLLED THROTTLING VALVE

## Customized Features (continued)

### MC2000PT

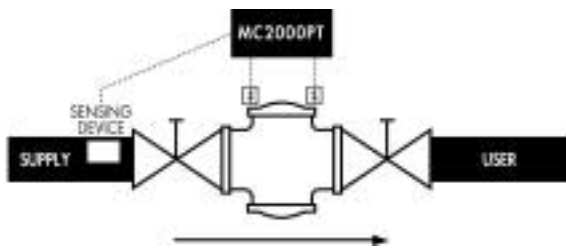
#### Pressure Control Panel - Computer Based

**Primarily Controlled By:** Programming  
**Located:** Accessible to field technician  
**Purpose:** To provide incomparable valve control accuracy in order to maintain an exact pressure in a line.

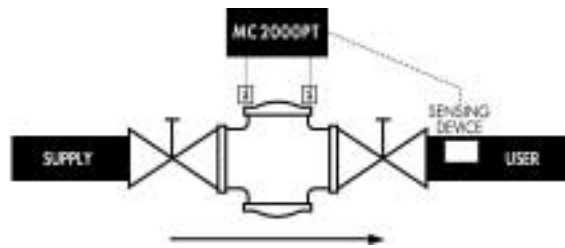
#### Basic Application: Overall

Insure extremely accurate pressure maintenance as a stand alone panel or interfacing with any larger system, for example a SCADA system.

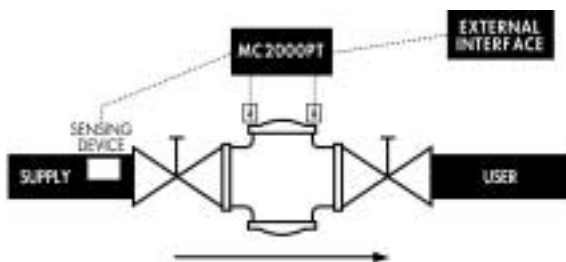
##### Stand Alone



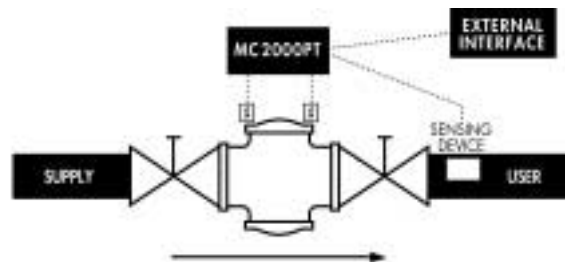
##### Stand Alone



##### Remote



##### Remote



#### Upstream Pressure Control

**When:** Upstream pressure is set at an exact level  
**Panel will:** React to the sensor pressure measurement by activating/de-activating the appropriate solenoid pilot valves  
**Ross Main Valve:** Will position the piston to maintain the pressure.

#### Downstream Pressure Control

**When:** Downstream pressure is set at an exact level  
**Panel will:** React to the sensor pressure measurement by activating/de-activating the appropriate solenoid pilots  
**Ross Main Valve:** Will position the piston to maintain the set pressure.

# SOLENOID CONTROLLED THROTTLING VALVE

## Operation

### ACAV - Anti-Cavitation Seat Trim

**Located:** Inside the main valve

**Purpose:** To provide protection against cavitation damage to the internals of the valve

**BASIC APPLICATION:** To control potential cavitation in a column of water, away from the valve's surfaces.

### CI - Check Feature (Internal Modification)

**Primarily Controlled By:** Hydraulic pressure

**Located:** Inside the main valve

**Purpose:** To prevent reverse flow through the main valve

**BASIC APPLICATIONS:**

1. Provides extra protection against back flow in situations, for example if there is a sudden drop in inlet pressure (from supply flowing into the valve).
2. If the supply line in a separate fill-empty system breaks, provides extra protection against back flow or dumping the tank.

**NOTE:** The exact modification differs according to need. Some types can only be incorporated in the factory before the valve is shipped and, once done, can't be changed without substantial parts replacement.

**CONSULT A ROSS ENGINEER:** To recommend the appropriate internal modification.

### ES - Higher Efficiency Strainer

**Located:** On external piping

**Purpose:** To provide extra protection against fouling or damaging the control system from foreign particles

**BASIC APPLICATION:** Protect external piping and controls when extremely fine particles and/or more than usual debris is expected.

**NOTE:** This strainer offers an increased capacity to hold debris and comes with a finer screen than the standard strainer.

**COMMON CONFIGURATIONS**

- |   |                 |
|---|-----------------|
| 1 | 42AFCV-MC2000L  |
| 2 | 42AFCV-MC2000F  |
| 3 | 42AFCV-MC2000PT |
| 4 | 42AFCV-CI       |

### Control Unit

An external piping circuit, which reacts to the upstream (supply side) pressure, controls flow in and out of the operating chamber.

It includes:

1. Into the operating chamber
  - a. External piping also attached to the inlet side of the valve - Introduces main line water into the operating chamber.
  - b. 2 Way Solenoid pilot - Opens on electric command to control flow into the chamber.
  - c. Needle valve - Limits flow into the operating chamber. (Can be adjusted to increase or decrease the rate at which water flows into chamber.)
2. Out of operating chamber
  - a. External piping also attached to the outlet side of the valve - Directs water from the operating chamber to downstream flow or to waste.
  - b. 2 Way Solenoid pilot - Opens on electric command to allow flow out of operating chamber.
  - c. Needle valve - Limits flow out of the operating chamber. (Can be adjusted to increase or decrease the rate at which water flows out of the chamber.)

### Operation

The valve operation offers tremendous versatility which includes responding to and controlling the storage level, system flow, or downstream/upstream pressure.

1. When the level, flow or pressure is on target, the
  - a. Solenoids are de-energized.
  - b. Main valve piston locks in place.
  - c. Water level, flow or pressure remains constant.
2. When the level, flow or pressure needs to be decreased, the
  - a. Solenoid controlling flow into the operating chamber is energized to open the line.
  - b. Solenoid controlling flow out of the operating chamber is de-energized to close the line.
  - c. Water flows into the operating chamber where it gets trapped.
  - d. Main valve throttles (closes), decreasing flow through the valve.
2. When the level, flow or pressure needs to be increased, the
  - a. Solenoid controlling flow into the operating chamber is de-energized to close the line.
  - b. Solenoid controlling flow out of the operating chamber is energized to open the line.
  - c. Water flows out the operating chamber.
  - d. Main valve throttles (opens), increasing flow through the valve.

### Approximate Shipping Weights (lbs.)

Valve Size	(2"-4")	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"	42"	48"
125 lb. Flanges	235	390	755	965	1530	2120	2750	3300	4050	5200	9800	11800	18300	23000
250 lb. Flanges	275	430	810	1050	1610	2275	2900	3500	4400	5500	10800	12800	19400	24500

**Factory:** Telephone (518) 274-0961; Fax (518) 274-0210

# SOLENOID CONTROLLED THROTTLING VALVE

## Pilot Valve

### ROSS ADVANTAGE

1. Ross engineers provide in depth service based on
  - a. state of the art technology and
  - b. the company's experience which dates back to 1879.
2. Rugged construction materials provide a longer valve life and insure that the valve WILL NOT experience sudden breakdowns due to component failures.
3. Valve is completely pre-piped, tested and adjusted in the factory.
4. All parts are built and manufactured in the USA.

### Additional Information

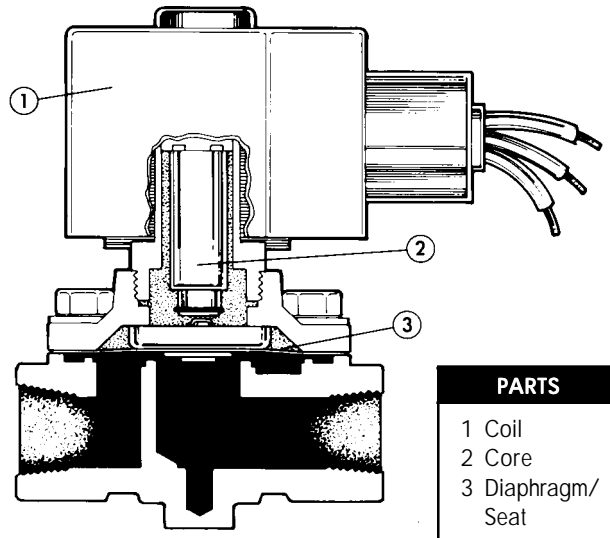
Item	Page
Alternative Seats .....	EN - 12
Differential Pressure Guide .....	EN - 6
Dimensions - Angle Body (Without Controls) .....	EN -16
- Globe Body (Without Controls) .....	EN - 14
- Standard External Controls .....	EN -17
- Strainers .....	EN - 26, 27
Head Loss Guide .....	EN - 3
Limit Switch .....	EN - 50
MC2001P .....	P - 2
Needle Valve .....	EN - 47
Parts List - Angle Body (Without Controls) .....	EN - 31
- Standard External Controls .....	EN - 32
- Globe Body (Without Controls) .....	EN - 30
- Strainers .....	EN - 42

### Consult a Ross Representative

To build a customized valve for any specific requirements.

### Watt Rating and Power Consumption

All standard voltages			
DC	AC		
Watts	Watts	VA Holding	VA Inrush
33	28	57	250



### Pilot: Solenoid - 2 Way

- Primarily Controlled By:** Electricity  
**Located:** Two installed on the main valve external piping circuit:
1. Between the operating chamber and inlet side of the valve.
  2. Between the operating chamber and outlet side of the valve.
- Pilot ports control flow along external piping into and out of the operating chamber.
- Purpose:** To control flow in and out of the operating chamber

### Operation

The pilot port is normally closed.

When the solenoid pilot is positioned on external piping between the inlet side of the main valve and operating chamber.

**Solenoid pilot can be:**  
**Closed** when **de-energized** which stops flow into the operating chamber.  
**Open** when **energized** which allows flow into the operating chamber, closing the main valve.

When the solenoid pilot is positioned between the operating chamber and outlet side of the main valve.

**Solenoid pilot can be:**  
**Open** when **energized** which allows flow out of the operating chamber, opening the main valve.  
**Closed** when **de-energized** which stops flow out of the operating chamber.

# SOLENOID CONTROLLED THROTTLING VALVE

## Specifications

Model Number: 42AFCV

### Basic Valve: Solenoid Controlled Throttling Valve (42AFCV)

The solenoid controlled throttling valve shall be a hydraulically operated piston type valve.

The valve shall be ruggedly constructed with a size \_\_\_\_\_ inch, 125 lb. / 250 lb. flanged, full ported globe / angle body design.

The solenoid controlled throttling valve shall be fully bronze mounted, external pilot operated, with a rugged internal free floating piston (operated without springs, diaphragm or levers), single seat with seat bore equal to size of valve.

The minimum travel of the piston shall be equal to 25% of the diameter of the seat.

For true alignment (to correct lateral thrust and stem binding) the piston shall be guided above and below the seat a distance no less than 75% of the seat diameter.

The piston shall carry a contoured cushion device that will cause a gradual change in flow area as the valve approaches the seat. The cushion device must move with the piston to minimize head loss when the valve is fully opened and so designed as to insure positive closure.

The main valve shall be packed with leather (or other soft material) to insure tight closure and prevent metal to metal friction and seating.

The main valve shall include a position indicator to show position of opening of the piston.

The main valve will include gauge cocks for testing purposes.

The valve shall be controlled by two 2 way solenoid pilot valves or a dual solenoid pilot valve with a closed center position. Energizing one solenoid will cause the valve to open; energizing the other will cause the valve to close. With both solenoids de-energized the pilot will 'lock' the main valve piston.

The pilot valve, controlling operation of the main valve, shall be easily accessible and so arranged to allow for its removal from the main valve while the main valve is under pressure.

The pilot valve and all associated piping and fittings necessary for proper operation shall be factory assembled and furnished with the solenoid controlled throttling valve.

Ball valves shall be installed in the control piping to completely isolate the pilot valve when conditions may require pilot isolation for maintenance or repair.

An external strainer with blow-off will be provided in the control circuit to protect the pilot and needle valves.

The design shall be such that repairs and dismantling internally of the main valve may be made without its removal from the line.

### Operation

MC2000L - The valve will include a **computer based level control panel**

MC2000F - The valve will include a **computer based flow control panel**

MC2000PT - The valve will include a **computer based pressure control panel**

ACAV - The valve will include an **anti-cavitation trim feature** to prevent cavitation damage to the valve internals.

CI - The valve will include an **internal check feature** to prevent reverse flow through the valve.

ES - The valve will include a **higher efficiency strainer** to provide extra protection against fouling or damaging the control system.

### Physical and Chemical Properties

The 125 lb. and 250 lb. flanged assemblies shall conform to ANSI standards for flange thickness and drilling and wall thickness of body and caps.

The valve shall be ruggedly constructed of first class grey iron.

The grey iron shall be free from cold shuts, defective or spongy spots and conforming to ASTM specification A-126 Class B with bronze or stainless steel trim.

The bronze parts shall conform to ASTM specification B-62.

#### **For sizes 2" - 12"**

The seat disc shall be bronze.

The main cup plates shall be bronze.

The main bushing shall be bronze.

#### **For sizes 14" - 36"**

The seat disc shall be a cast iron center/bronze outer ring.

The main cup plates shall be bronze.

The main bushing shall be bronze.

#### **For sizes 42" - 48"**

The seat disc shall be a cast steel.

The main cup plates shall be cast steel.

The main bushing shall be stainless steel.

#### **For all sizes**

The external pilot valve shall be bronze

The rugged internal piston shall be bronze.

The seat ring shall be bronze.

The stem nuts shall be bronze.

The seat packing support shall be bronze.

The position indicator shall be bronze.

The bottom cap cylinder shall be bronze.

Piping shall be rigid brass pipe.

The strainer shall be bronze body with stainless steel screen.

The ball valves shall be full ported with stainless steel shaft, nut and adjusting handle.

Stainless steel shall be Grade 303 / 304 / 316 / CF8M / \_\_\_\_\_.

# SOLENOID CONTROLLED THROTTLING VALVE

Specifications (continued)

Model Number: 42AFCV

(Option) The bottom cap cylinder shall be bronze and teflon coated. The Teflon shall be applied in two parts: Part 1 shall be a primer Teflon coating with a minimum thickness of 5 mils. Part 2 shall be a finish coat of Teflon TFE with a minimum thickness of 5 mils. for a final coat minimum thickness of 10 mils.

**NOTE:** The Ross Valve Mfg. Co., Inc. reserves the right to modify valve construction which will result in equal or superior performance to existing designs. These modifications may be made at any time and at the sole discretion of the manufacturer.

## Test

The test before shipment may be witnessed by a representative of the Engineers for simulated field conditions and a cold hydrostatic test of at least 100% above the maximum pressure for which the valve is to be operated.

## Painting

Ferrous surfaces of the valve shall be coated with NSF Certified Epoxy in accordance with ANSI/NSF Std. 61, and conforms to AWWA D102 Inside System No. 1.

## Reference

**The valve will be equal in all respects to the 42AFCV\_\_\_\_\_model** as manufactured by the Ross Valve Mfg. Co., Inc., 6 Oakwood Ave., Troy, NY 12181

**NOTE:** To indicate the basic valve with the required customized features, simply add the related codes to the basic valve number.

**Example:** The valve will be equal in all respects to the 42AFCV-MC2000L model as manufactured by the Ross Valve Mfg. Co., Inc. 6 Oakwood Ave., Troy, NY 12181. (42AFCV-MC2000L = 42AFCV with a PLC based level control panel.)

### **Customized Feature Codes**

MC2000L - Level Control Panel - PLC based  
MC2000F - Flow Control Panel - PLC based  
MC2000PT - Pressure Control Panel - PLC based  
ACAV - Anti-cavitation Trim  
CI - Check Feature: Internal  
ES - Higher Efficiency Strainer