



MARSHALL ENGINEERED PRODUCTS CO.

FORM 1568J

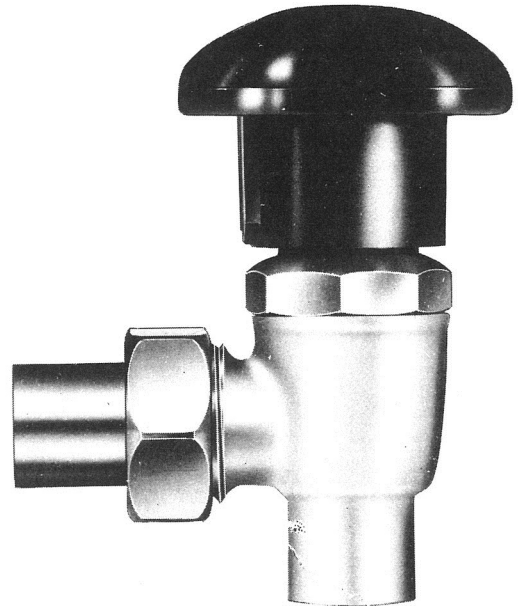
## STEAM SPECIALTIES

### Mil-Balancer Valve - No. 840A

#### APPLICATION

The MEPCO No. 840A Mil-Balancer may be applied to all types of forced water heating and cooling systems. It provides in one fitting a positive shut-off non-rising stem valve and a balancing fitting with an extremely high degree of accuracy. They are suitable for 200 psi working pressure and 250 degree temperatures.

The Mil-Balancer is installed on the exit side of the coil and may be used on any type of terminal equipment. This could be fan coil units, convectors, cabinet unit heaters, baseboard, finvector or unit ventilators. By using the Mil-Balancer the cost of one fitting and the cost of its installation is eliminated.

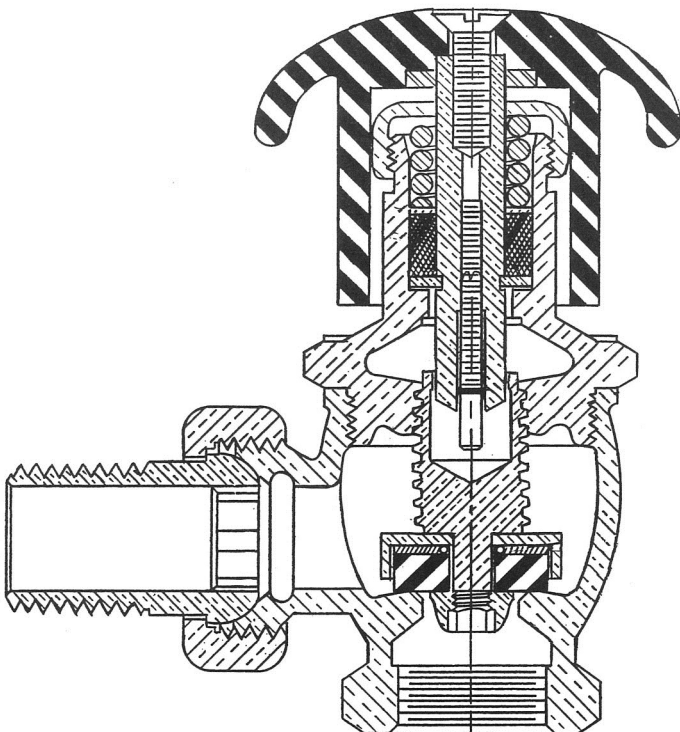


MODEL 1/2 AP2 MIL-BALANCER

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## CONSTRUCTION FEATURES

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MIL-BALANCER CONSTRUCTION

#### OPERATION

The valve disc provides positive shut-off and when the valve is opened it returns to the set balance position. The balance position is set and locked with a special tool which in effect makes the fitting tamper-proof. When used with a positive shut-off supply valve the heating or cooling element can be readily serviced if required.

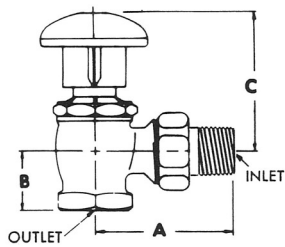
Valves when shipped from the factory will have the adjusting screw in the wide open position. Balancing is accomplished by turning the valve handle which lowers or raises the stem which in turn lowers or raises the control cone. When the proper balance position is obtained, the adjusting screw is run down until it seats on the valve holder. This prevents the valve from being opened further, but allows the valve to return to the position after being closed.

*MEPCO reserves the right to make revisions to its products, their specifications, this bulletin, and related information without notice.*

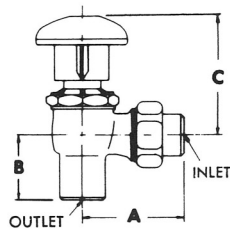
# DIMENSIONS AND WEIGHTS

FIG. NO.	MODEL	SIZE	OUTLET	INLET	DIMENSIONS IN INCHES				WGT. LBS.
					A	B	C	D	
1	AP-1	1/2	FPT	UNION NIPPLE MPT	2-1/4	1-1/16	2-7/8		1-1/8
1	AP-1	3/4	FPT	UNION NIPPLE MPT	2-9/16	1-1/4	2-7/8		1-1/2
1	AP-1	1	FPT	UNION NIPPLE MPT	3	1-7/16	3-3/16		1-7/8
1	AP-1	1-1/4	FPT	UNION NIPPLE MPT	3-1/4	1-5/8	3-5/16		2-1/4
1	AP-1	1-1/2	FPT	UNION NIPPLE MPT	3-9/16	1-7/8	3-11/16		3-1/4
2	AP-2	1/2	SWT	UNION NIPPLE SWT	1-11/16	1-3/16	2-7/8		7/8
2	AP-2	3/4	SWT	UNION NIPPLE SWT	2-3/16	1-5/8	2-7/8		1-1/4
3	AP-3	1/2	SWT	SWT	1-3/16	1-3/16	2-7/8		3/4
3	AP-3	3/4	SWT	SWT	1-9/16	1-5/8	2-7/8		1-1/8
4	AP-4	1/2	SWT	UNION NIPPLE MPT	2-1/4	1-3/16	2-7/8		1
4	AP-4	3/4	SWT	UNION NIPPLE MPT	2-11/16	1-5/8	2-7/8		1-3/8
5	AP-5	1/2	FPT	UNION NIPPLE SWT	1-5/8	1-1/16	2-7/8		1
5	AP-5	3/4	FPT	UNION NIPPLE SWT	2-1/8	1-1/4	2-7/8		1-3/8
5	AP-5	1	FPT	UNION NIPPLE SWT	2-1/2	1-7/16	3-3/16		1-3/4
5	AP-5	1-1/4	FPT	UNION NIPPLE SWT	2-13/16	1-5/8	3-5/16		2-1/4
5	AP-5	1-1/2	FPT	UNION NIPPLE SWT	3-5/8	1-7/8	3-11/16		3-1/8
6	ST-1	1/2	FPT	UNION NIPPLE MPT	2-1/4		3-3/16	1-15/16	1-1/4
6	ST-1	3/4	FPT	UNION NIPPLE MPT	2-5/8		3-1/4	1-9/16	1-5/8
6	ST-1	1	FPT	UNION NIPPLE MPT	3-9/16		4-3/16	1-7/8	2-1/2
6	ST-1	1-1/4	FPT	UNION NIPPLE MPT	3-11/16		4-7/16	2-1/16	3
6	ST-1	1-1/2	FPT	UNION NIPPLE MPT	4-1/4		4-15/16	2-5/16	4-3/4
7	ST-2	1/2	SWT	UNION NIPPLE SWT	1-11/16		3-3/16	1-1/2	1-1/8
7	ST-2	3/4	SWT	UNION NIPPLE SWT	2-1/8		3-1/4	2	1-5/8
7	ST-2	1	SWT	UNION NIPPLE SWT	2-11/16		3-11/16	2-3/8	2-1/4
8	ST-3	1/2	SWT	SWT	1-1/2		3-3/16	1-3/8	1
8	ST-3	3/4	SWT	SWT	2		3-1/4	1-7/8	1-3/8
8	ST-3	1	SWT	SWT	2-3/8		3-11/16	2-3/8	2-1/4
8	ST-3	1-1/4	SWT	SWT	2-5/8		4	2-1/2	2-1/2
9	ST-4	1/2	SWT	UNION NIPPLE MPT	2-1/4		3-3/16	1-1/2	1-1/4
9	ST-4	3/4	SWT	UNION NIPPLE MPT	2-5/8		3-1/4	2	1-3/4
9	ST-4	1	SWT	UNION NIPPLE MPT	3-3/16		3-11/16	2-3/8	2-3/8
10	ST-5	1/2	FPT	UNION NIPPLE SWT	1-11/16		3-3/16	1-5/16	1-1/4
10	ST-5	3/4	FPT	UNION NIPPLE SWT	2-1/8		3-1/4	1-9/16	1-1/2
10	ST-5	1	FPT	UNION NIPPLE SWT	3-1/16		4-3/16	1-7/8	2-3/8
10	ST-5	1-1/4	FPT	UNION NIPPLE SWT	3-1/4		4-7/16	2-1/16	2-7/8
10	ST-5	1-1/2	FPT	UNION NIPPLE SWT	4		4-15/16	2-5/16	4-5/8

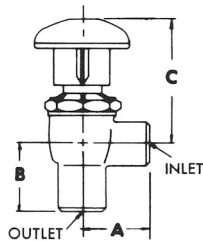
# CONSTRUCTION FEATURES



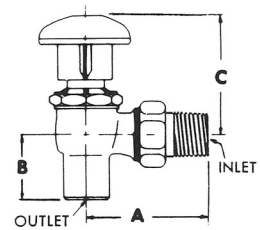
**FIGURE 1**  
**Model AP-1**



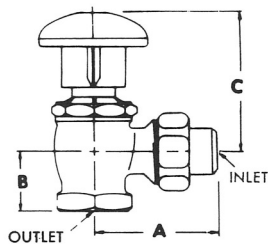
**FIGURE 2**  
**Model AP-2**



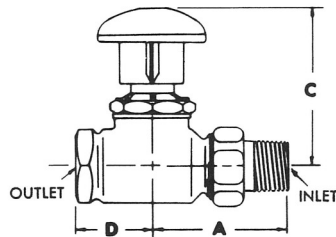
**FIGURE 3**  
**Model AP-3**



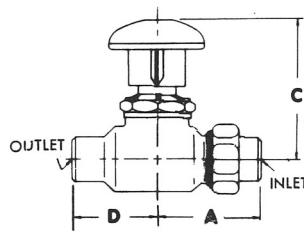
**FIGURE 4**  
**Model AP-4**



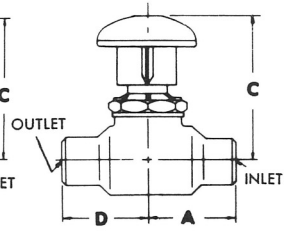
**FIGURE 5**  
**Model AP-5**



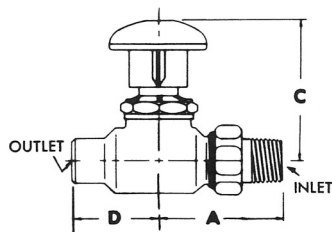
**FIGURE 6**  
**Model ST-1**



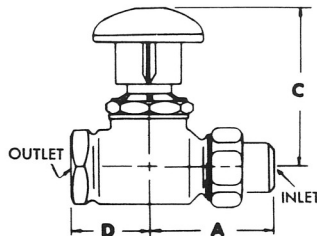
**FIGURE 7**  
**Model ST-2**



**FIGURE 8**  
**Model ST-3**



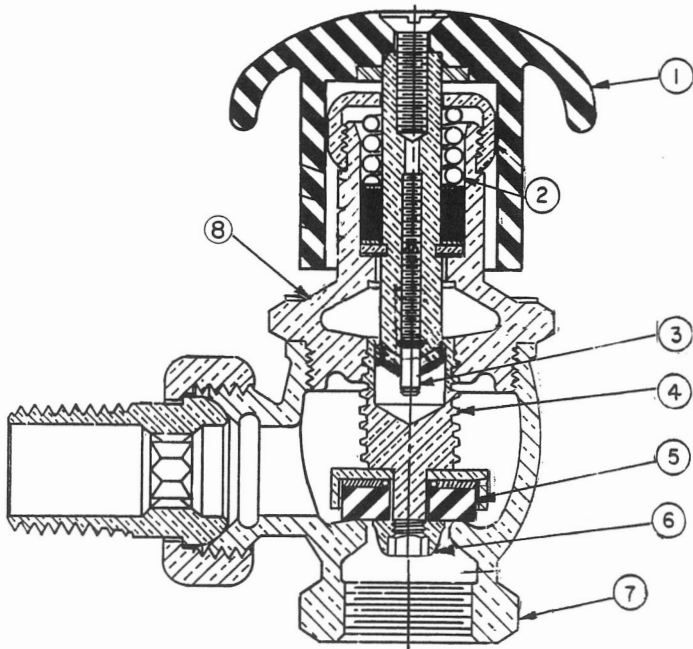
**FIGURE 9**  
**Model ST-4**



**FIGURE 10**  
**Model ST-5**



# CONSTRUCTION FEATURES



1. **HANDLE** - An attractive heavy duty plastic mushroom type handle with indicator is furnished as standard. Valve may be furnished less handle if desired.
2. **PACKING SPRING** - The Mil-Balancer is spring-packed for greater suitability to high rise buildings and lower maintenance expense.
3. **FLOW CONTROL SCREW** - Position determines total opening of valve available.
4. **VALVE HOLDER** - Flow control screw bottoms in valve holder preventing valve opening beyond setting of the control screw. Valve shown with minimum flow feature (optional).
5. **COMPOSITION DISC** - Provides positive shut-off when valve is in closed position.
6. **CONTROL CONE** - Contour design control cone gives extremely high degree of accuracy in balancing. The balance point can be more easily determined and on-job balancing more readily accomplished.
7. **BODY** - Heavy duty brass body for 200 psi working pressure. Furnished angle pattern or straightway, thread to thread, sweat to sweat, or thread to sweat.
8. **BONNET** - Heavy duty brass bonnet has indicator showing position of the valve.

## DETERMINING SETTING

The setting required is determined from the design data (flow rate and friction required) from the adjustment charts. A convenient time for establishing settings is at the time the piping is being sized. The proper setting is based on the principle that a system is balanced when the resistance to water flow is the same in each flow path. From the design data the amount by which the friction in the circuit path through the particular terminal is less than the friction through the longest circuit path is known, as is the water flow rate. Thus, knowing the friction needed to provide such equalization and the design water flow rate, the "turns open setting" for the given terminal unit is obtainable from the graphs on the following pages.

## TYPICAL SPECIFICATION

Furnish and install as shown in the plans and specifications on the return side of each piece of terminal equipment (fan coil, convactor, baseboard, cabinet unit heater, etc.) a MEPCO No. 840A Mil-Balancer valve. This valve to be spring packed and suitable for 200 psi working pressure and 250 degree temperature. It shall be repackable under pressure. It shall be a combination tight shut-off valve and balancing fitting with memory in one piece. Accurate balancing to be accomplished with contoured and characterized control cone.

## FLOW COEFFICIENT (Cv)

### EXAMPLE

The flow coefficient utilized throughout the pressure drop curves is defined as:

**Cv** = Valve flow rate (GPM) that causes a valve pressure drop of 1 psi (or 2.3 ft.) Its basic algebraic relationship being. 
$$\frac{(Hd)^{1/2}}{Qd} = \frac{(2.3')^{1/2}}{Cv}$$

**Cv** = Flow coefficient

**Hd** = Design loss, ft.

**Qd** = Design flow, GPM

### EXAMPLE

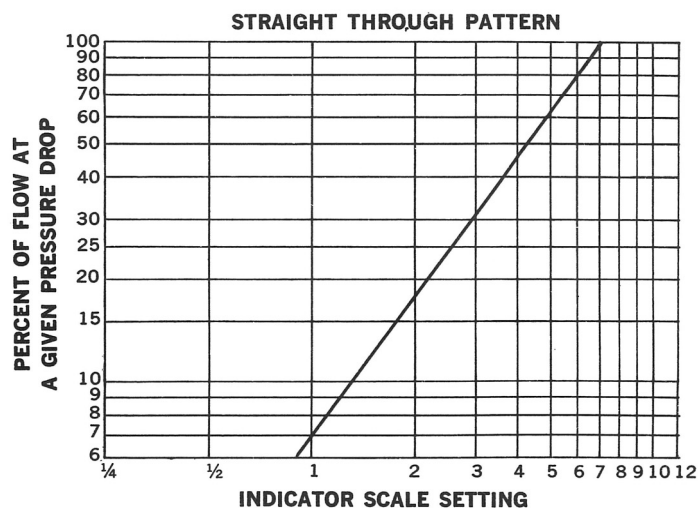
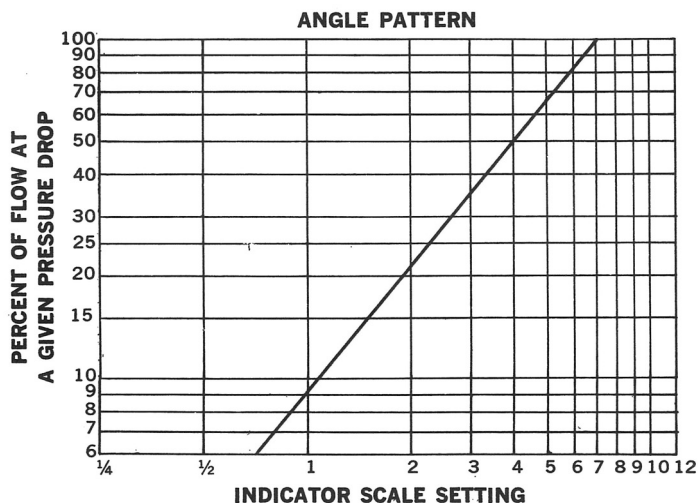
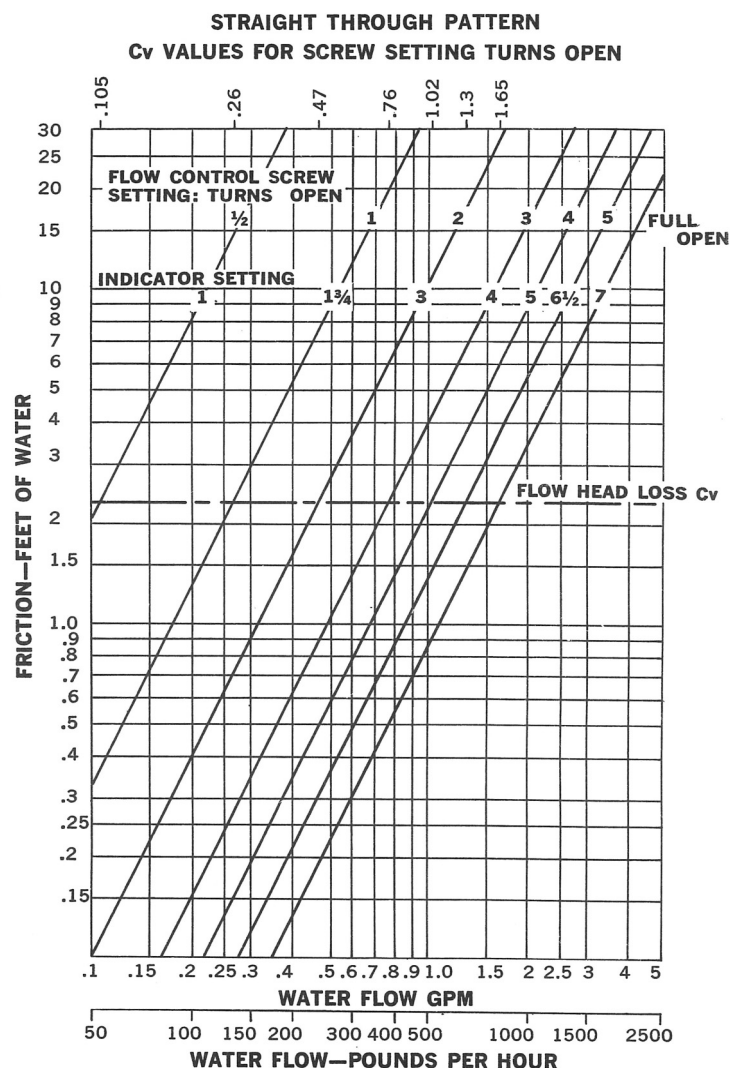
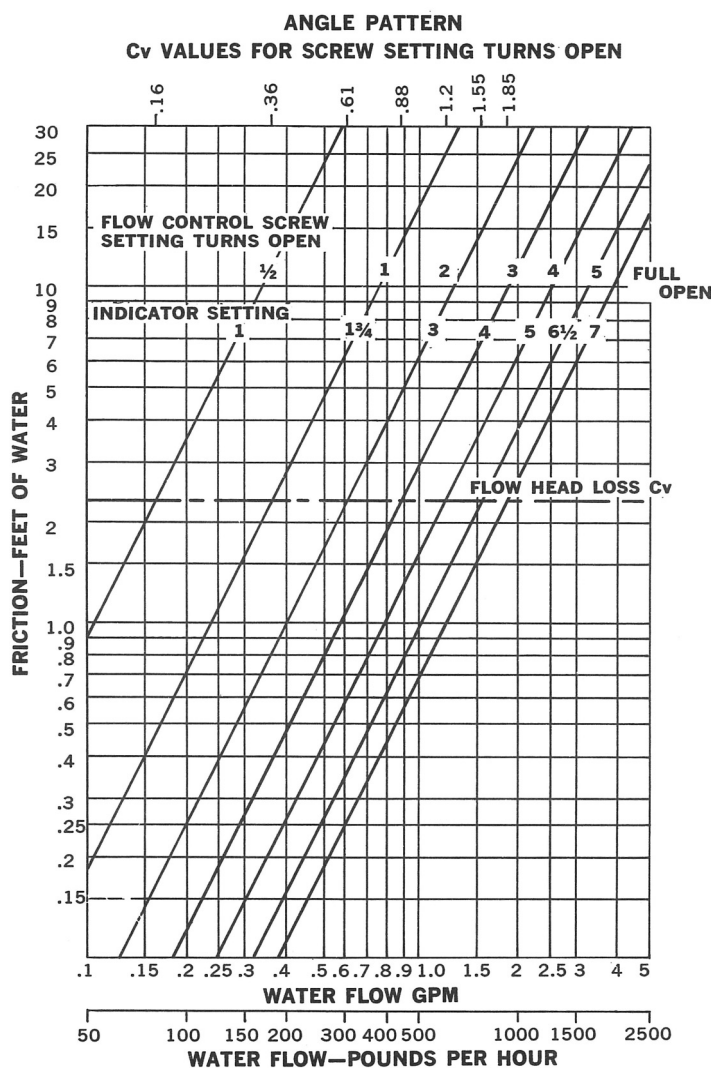
The valve pattern is known to be of the angle type. Required GPM flow rate is 1.0 GPM and the desired head loss is 3 ft. The **Cv** rating can be determined directly from the angle pattern curve on page 4, or may be derived from the relationship shown above. The flow coefficient is found to be **Cv** = .88.



# PRESSURE DROP CURVES

FRICTION LOSS CHART

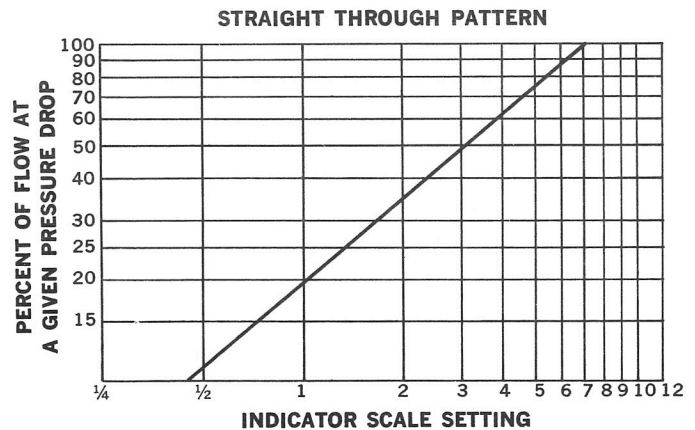
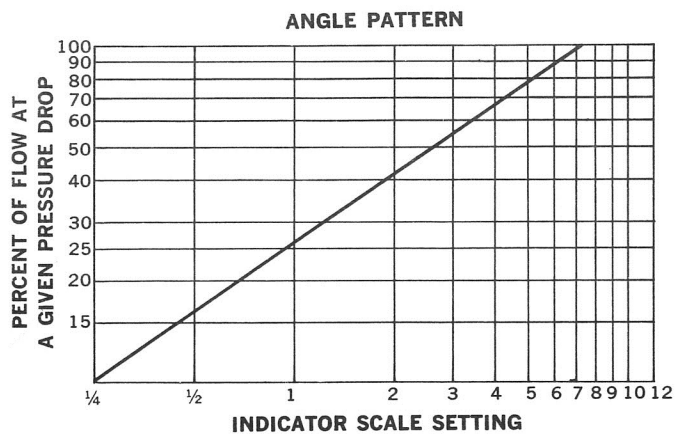
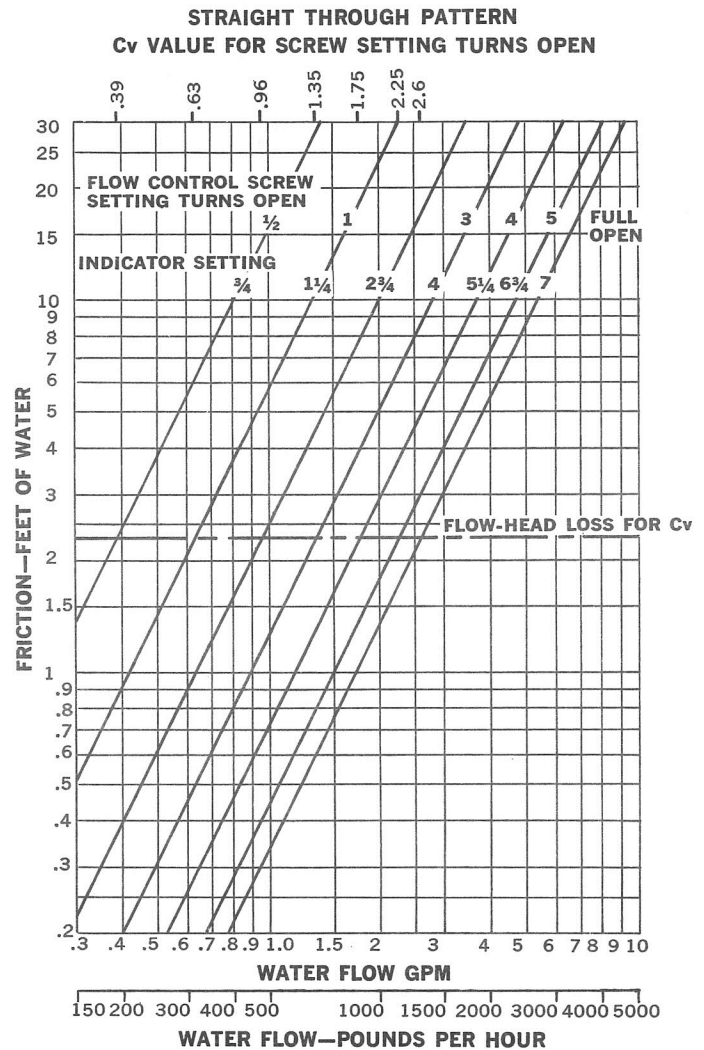
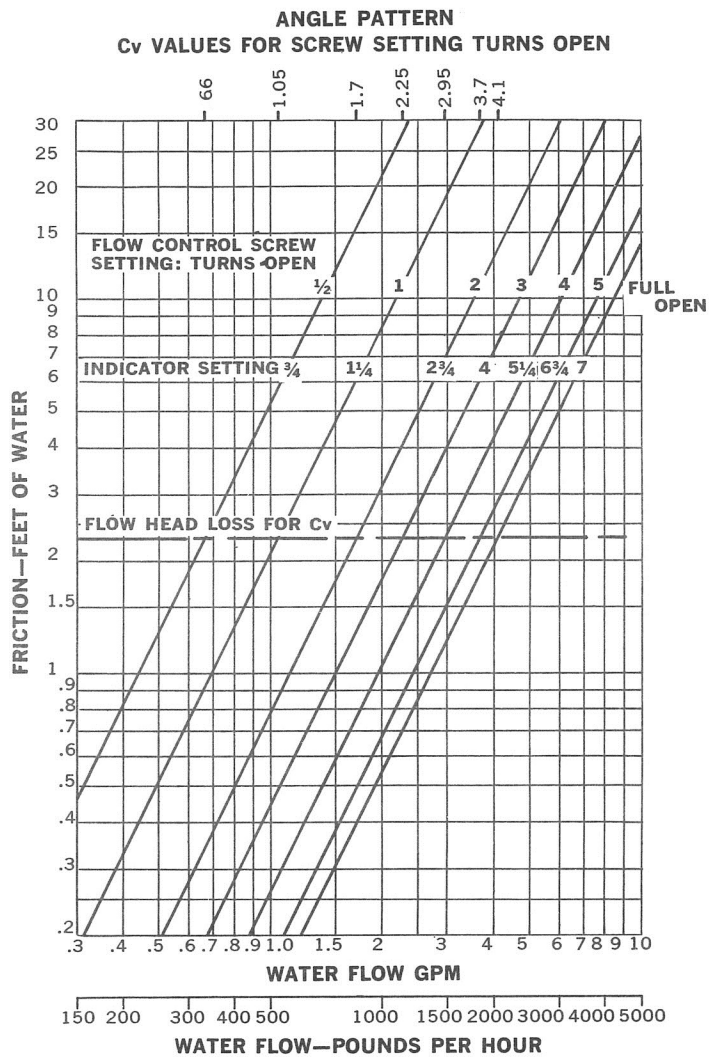
1/2" - 840A MIL-BALANCER VALVE



# PRESSURE DROP CURVES

FRICTION LOSS CHART

3/4" - 840A MIL-BALANCER VALVE



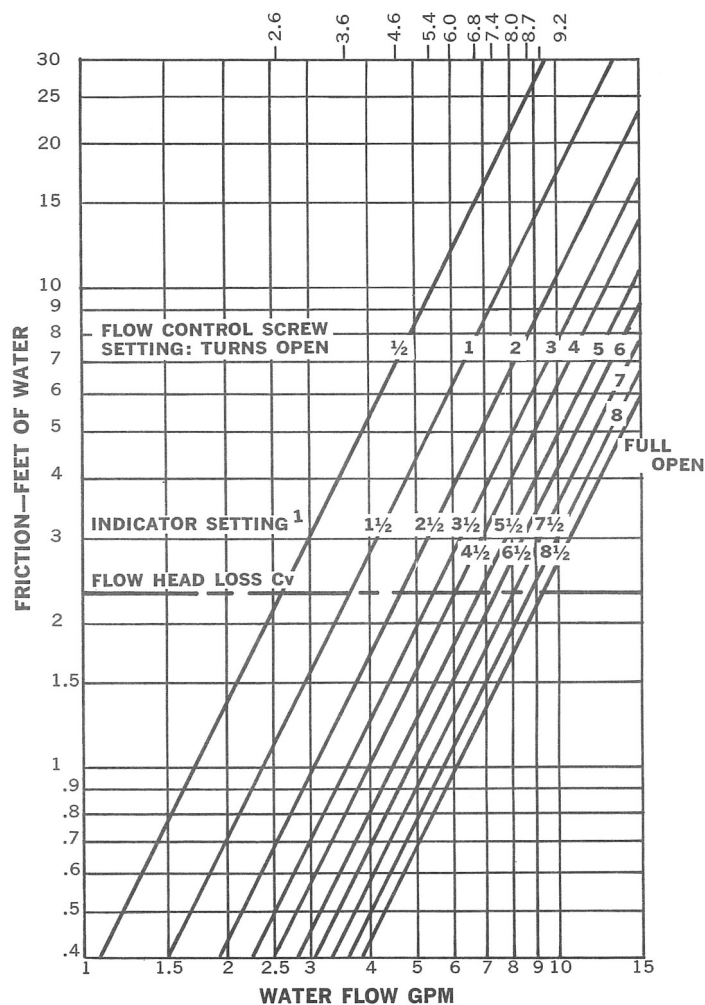


# PRESSURE DROP CURVES

FRICTION LOSS CHART

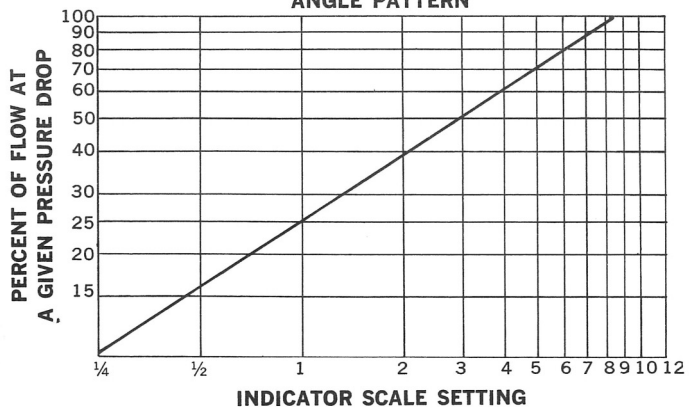
1" - 840A MIL-BALANCER VALVE

**ANGLE PATTERN**  
Cv VALUES FOR SCREW SETTING TURNS OPEN

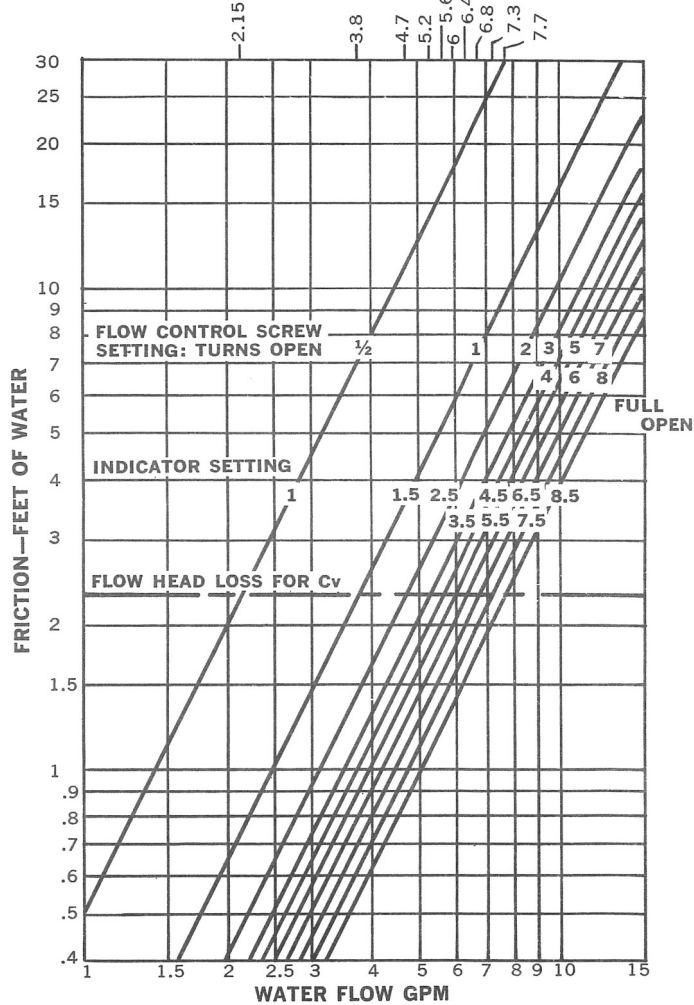


WATER FLOW—POUNDS PER HOUR

**ANGLE PATTERN**

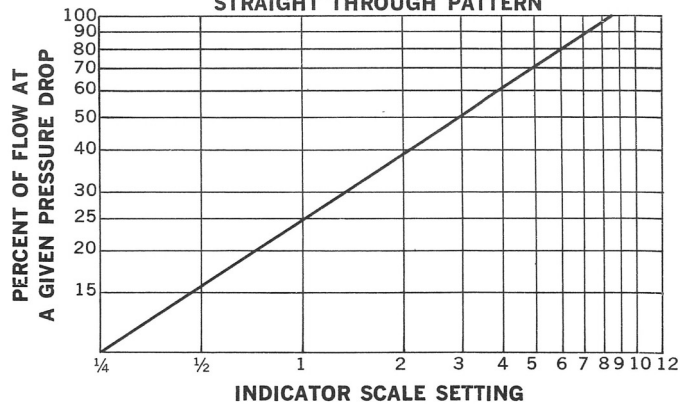


**STRAIGHT THROUGH PATTERN**  
Cv VALUES FOR SCREW SETTING TURNS OPEN



WATER FLOW—POUNDS PER HOUR

**STRAIGHT THROUGH PATTERN**



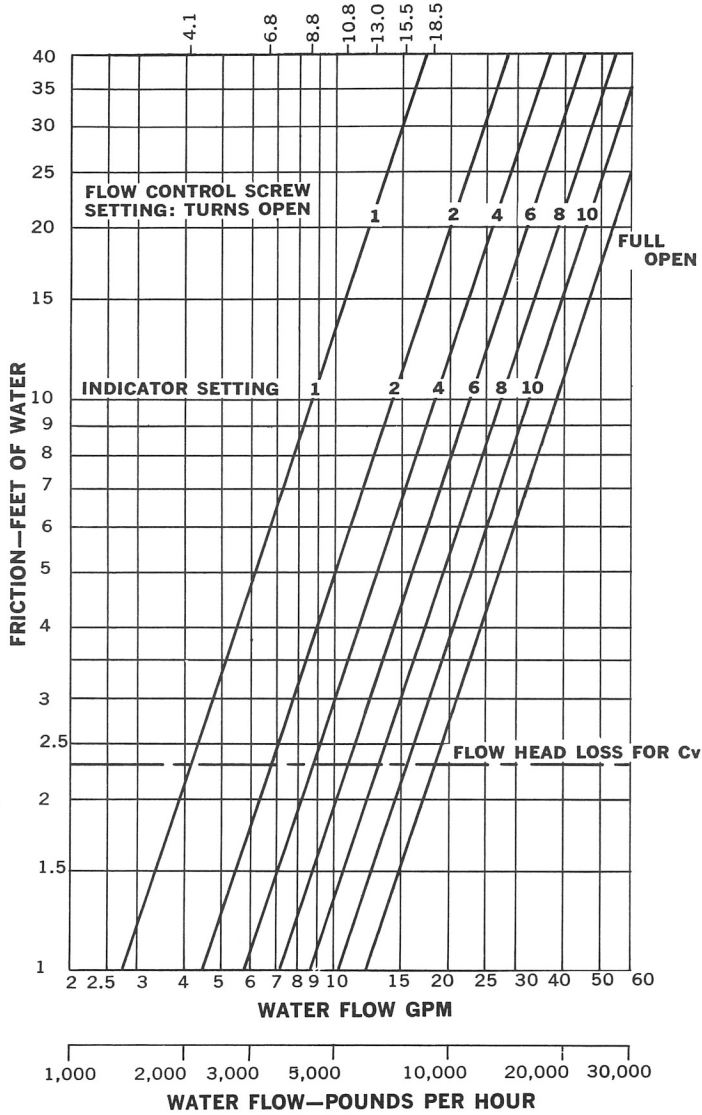


# PRESSURE DROP CURVES

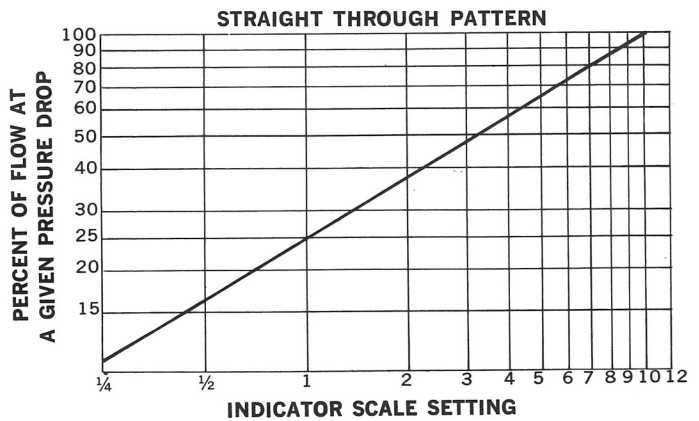
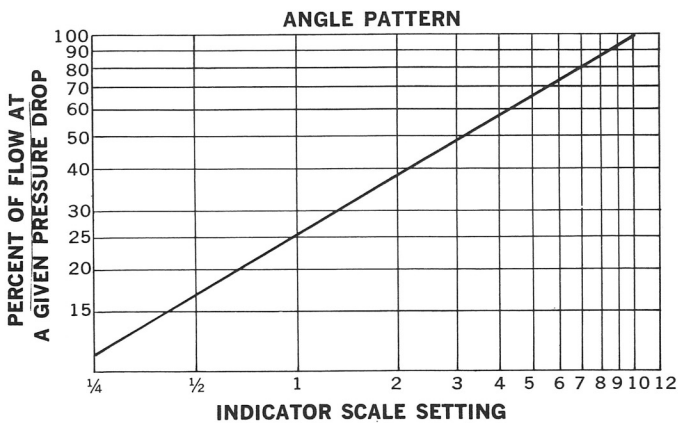
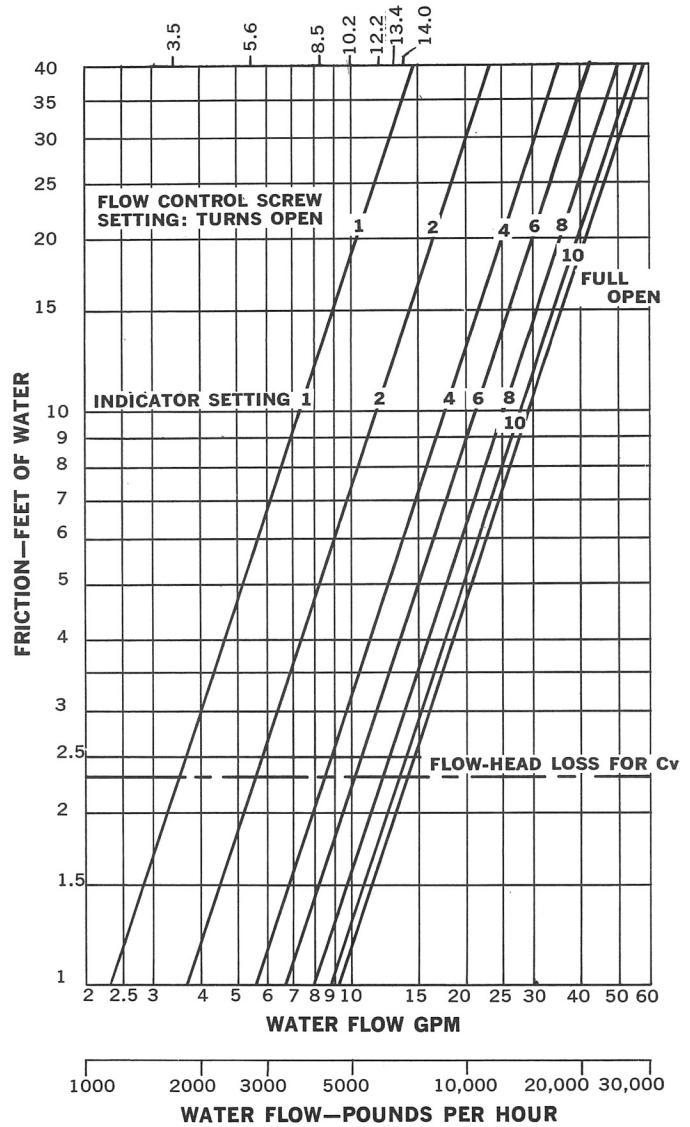
FRICTION LOSS CHART

1-1/4" - 840A MIL-BALANCER VALVE

**ANGLE PATTERN**  
Cv VALUES FOR SCREW SETTING TURNS OPEN



**STRAIGHT THROUGH PATTERN**  
Cv VALUES FOR SCREW SETTING TURNS OPEN



# PRESSURE DROP CURVES

## FRICTION LOSS CHART

1-1/2" - 840A MIL-BALANCER VALVE

