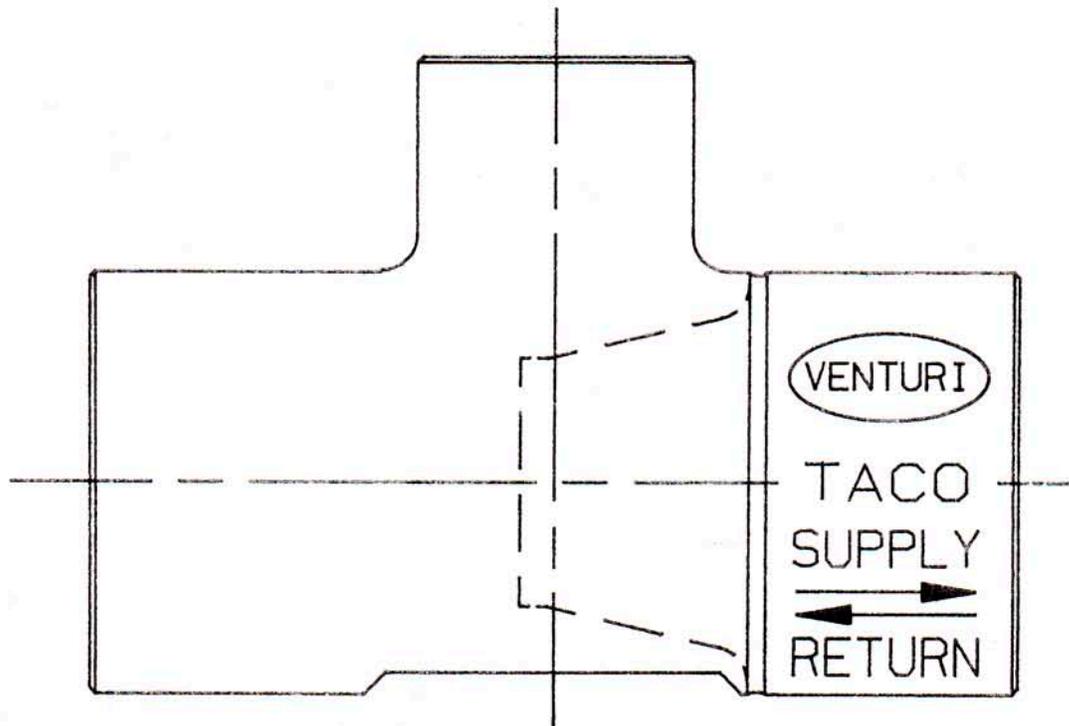# VENTURI TEE FITTINGS

APPLICATION: The Taco Venturi Fittings are designed to divert water flow from a given zone to the by-pass loop. The flow from the zone is partially diverted through the by-pass and then returned back into the zone. The Venturi Fitting creates a differential pressure that makes some of the flow want to divert through the by-pass and back to the zone. The Taco Venturi Fitting can be used in upfeed or downfeed applications. The typical application for the Taco Venturi Fitting is to divert heated water through kickspace heaters, convectors, radiators or baseboard. The Venturi is ideal for retro-fit applications where more radiation needs to be added to an existing job, or a higher flow rate is desired. A particularly cold area can be more evenly heated by retro-fitting a Venturi Fitting into an existing zone and adding radiation. A floor kickspace heater with Venturi Fittings can be added to those locations where the required space for baseboard radiation is not available. These Venturi Fittings allow the installer to add radiation without putting in a separate dedicated zone, thus eliminating the additional piping and fittings associated with a separate zone.

VENTURI TEE FITTINGS

SIZING: Sizing is simplified with the Taco Venturi Fitting system. The Venturi flow and pressure drop charts illustrate the percentage increase in flow and pressure drop when they are installed in the traditional return side, on the supply side, or on both the return and supply sides. These charts help show the installer how the flow and pressure drop are affected when the Venturi Fittings are installed in the different locations. When the fitting is installed on the supply side of the by-pass, it will provide the best results of a single Venturi installation. If two Venturi's are installed, they will provide the maximum flow through the by-pass. These percentages of increase in flow for the various Venturi installation locations are illustrated in the Increase in By-Pass Flow Chart, and the percentage of pressure drop is listed in the Increase in Pressure Drop Chart.

SIZING CHARTS:

Size Inches	INCREASE IN PRESSURE DROP		
	1 Downstream (Return)	1 Upstream (Supply)	2 Fittings
3/4x1/2	1.0	1.5	2.4
1x1/2	1.0	1.3	1.7
1x3/4			
1 1/4x1/2	1.0	1.4	1.8
1 1/4x3/4			

Q_M=CONSTANT

Size Inches	INCREASE IN BY-PASS FLOW		
	1 Downstream (Return)	1 Upstream (Supply)	2 Fittings
3/4x1/2	1.0	1.2	1.5
1x1/2	1.0	1.1	1.3
1x3/4			
1 1/4x1/2	1.0	1.2	1.3
1 1/4x3/4			

C_{VB}=CONTANT
Q_M=CONSTANT

DIMENSIONS/Cv CHART:

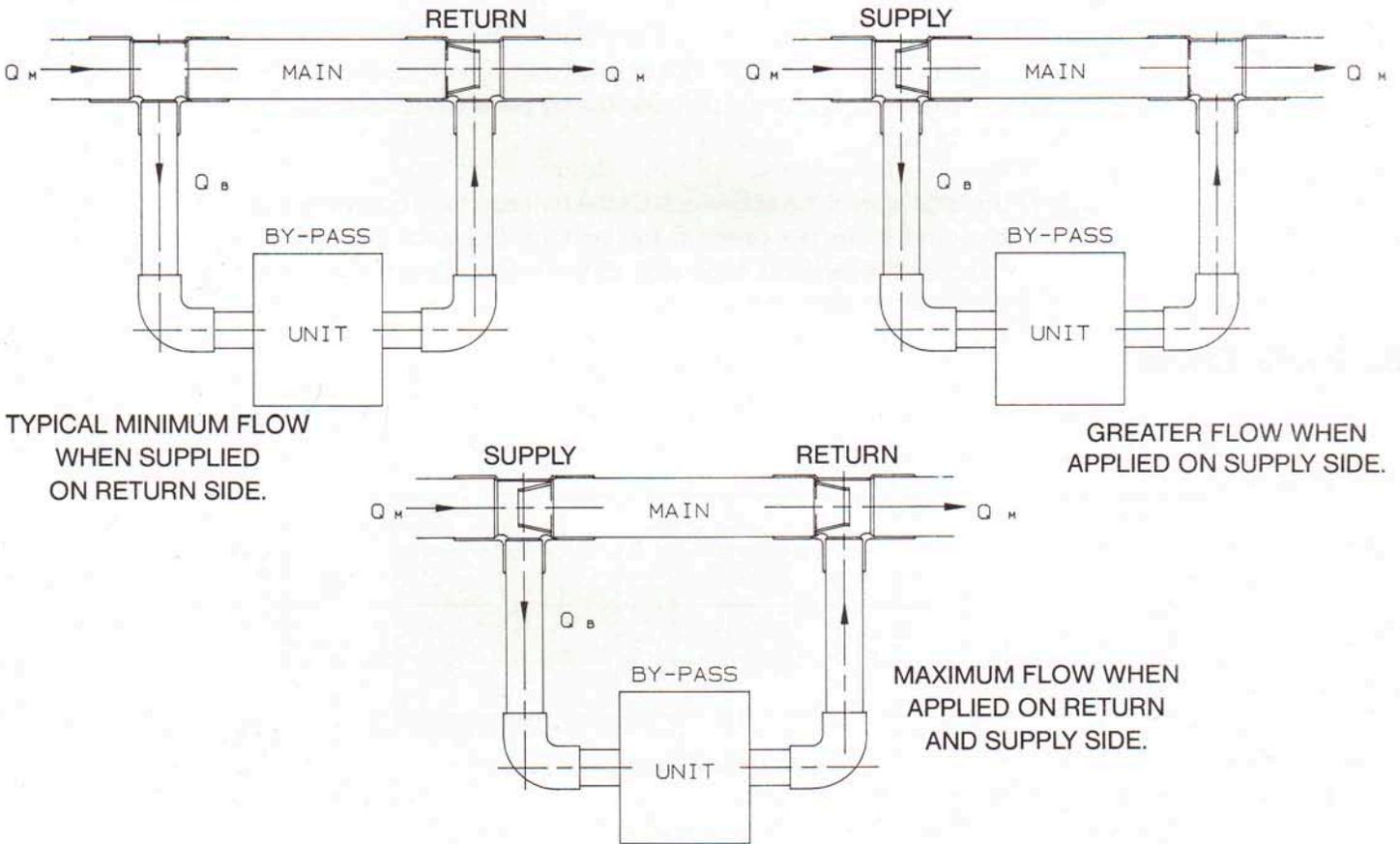| Model No.	Size Inches	Dimensions-Inches		Venturi Cv			Approx. Ship. Wt. Lbs. Each
		A	B	1 Downstream (Return)	1 Upstream (Supply)	2 Fittings	
VF-075-050	3/4x1/2	2.30	1.00	4.9	4.0	3.2	1/4
VF-100-050	1x1/2	2.75	1.22	13.1	11.5	10.0	1/2
VF-100-075	1x3/4	3.0	1.41				
VF-125-050	1 1/4x1/2	3.0	1.30	20.0	17.0	15.0	1/2
VF-125-075	1 1/4x3/4	3.30	1.50				

FIGURE 1
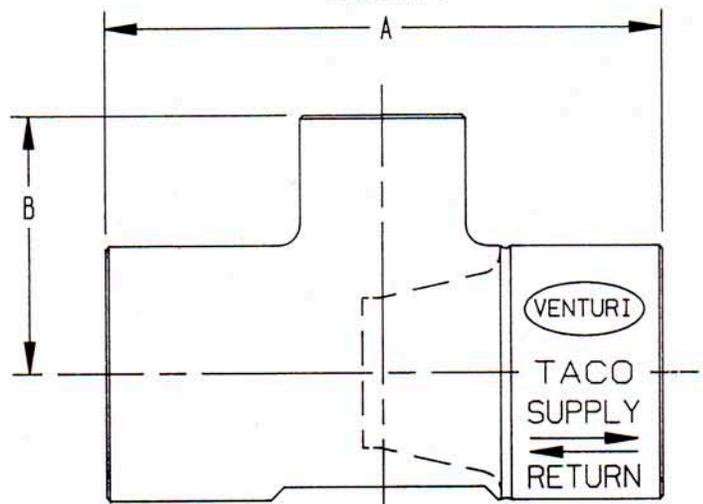
VENTURI INSTALLATION

INSTALLATION: Install the Taco Venturi Fitting in a zone where flow needs to be automatically diverted to an existing radiation unit, or an additional add-on radiation unit. Install the Venturi Fitting on the return side. Where additional flow is required through the by-pass, place the Venturi Fitting on the supply side or, for maximum flow through the by-pass, use two Venturi Fittings (one on the return side and one on the supply side). Make sure that the arrows on the Venturi Fittings are pointing in the proper direction for return or supply installation. Figure 1 (Dimensional Cv Chart) illustrates the arrows, and the side with the Venturi marking. The Venturi Fitting should always be installed with the Venturi marking between the by-pass supply and return lines.
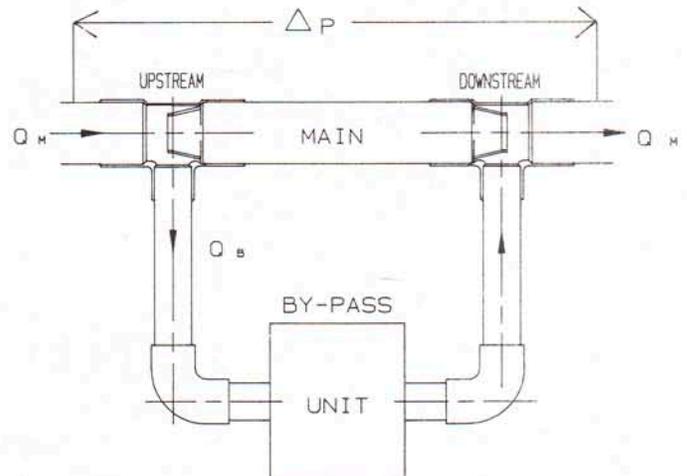
TYPICAL INSTALLATION:

TYPICAL MINIMUM FLOW
WHEN SUPPLIED
ON RETURN SIDE.

GREATER FLOW WHEN
APPLIED ON SUPPLY SIDE.

MAXIMUM FLOW WHEN
APPLIED ON RETURN
AND SUPPLY SIDE.

PRESSURE DROP CALCULATION:

$$\triangle P = (Qm/Cv)^2$$

$\triangle P$–Additional pressure drop to the zone, because of the Venturi Fittings

Qm–Flow through the zone (GPM)

Cv–Venturi Cv Chart

TACO VENTURI

FLOW CALCULATION:

The flow through the by-pass can be calculated by solving for Qb. Flow through the zone remains constant on either side of the by-pass supply, and return pipe, because the flow is diverted from the zone and then returned to the zone.

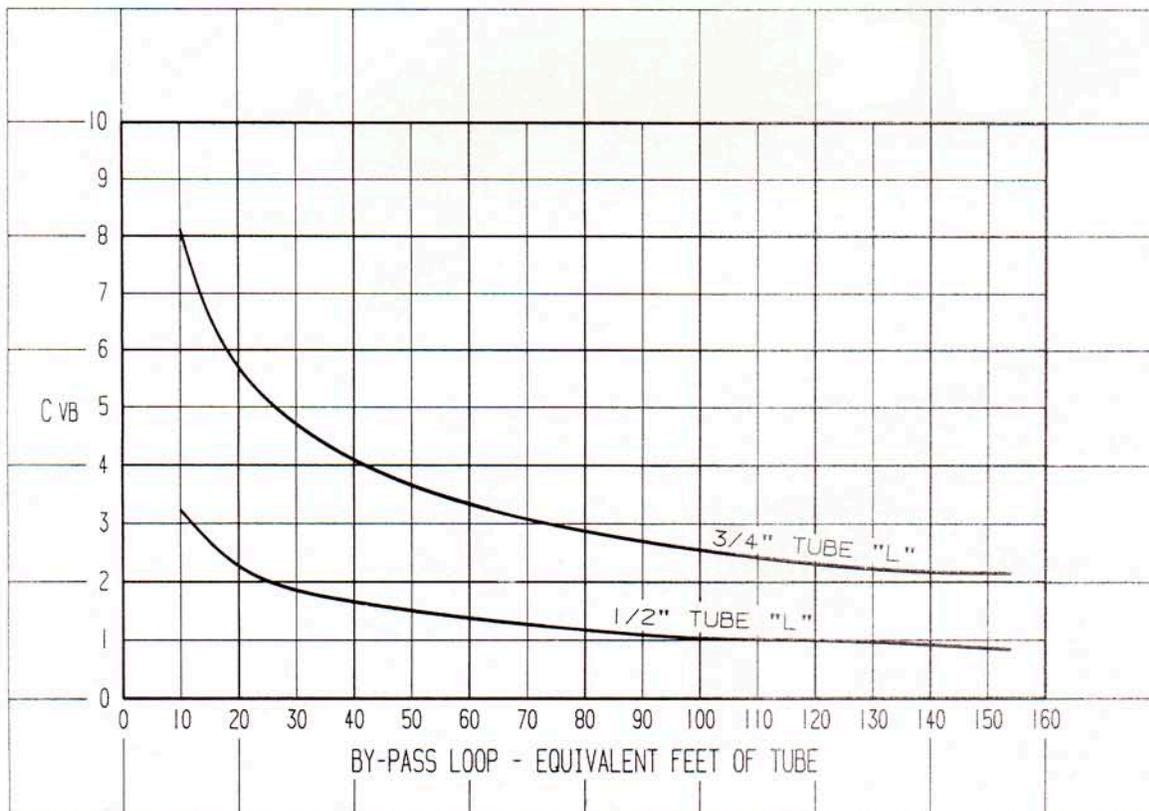$$Qb = (1.2)(Cvb)(Qm/Cv)$$

Qb–Flow through the by-pass (GPM)

Cv–Venturi Cv Chart

Cvb–Cv for the by-pass. The by-pass chart will calculate the Cvb given the total equivalent feet of tube. Equivalent feet—Sum of the following:

—Add the total length of tubing in feet to and from the by-pass, including any baseboard radiation.
—Add 2.5 feet for each additional 90 degree elbow.
—Add total equivalent feet of any heating unit (kickspace heater or fancoil). If given in Cv for the unit, use the by-pass chart to convert Cv to equivalent feet of tube.

The total sum of the above equals the by-pass loop equivalent feet of tube. Take this total and enter the chart at the bottom. Intersect the curve (1/2″ or 3/4″) that matches the by-pass tube size. At the intersection, read over to the Cvb.

BY-PASS CHART:

CVB vs. BY-PASS LOOP - EQUIVALENT FEET OF TUBE (3/4" TUBE "L", 1/2" TUBE "L")

COMPARE. YOU'LL TAKE TACO.