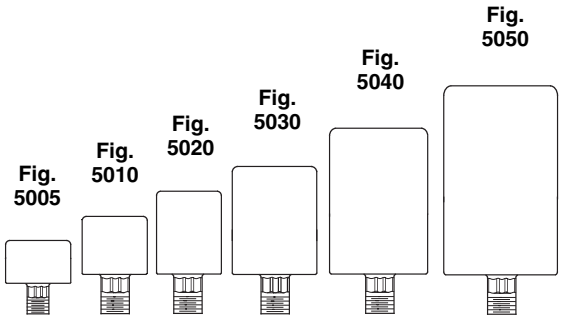
SMITH®

CUSTOMER DRIVEN

HYDROTROL

WATER HAMMER ARRESTERS

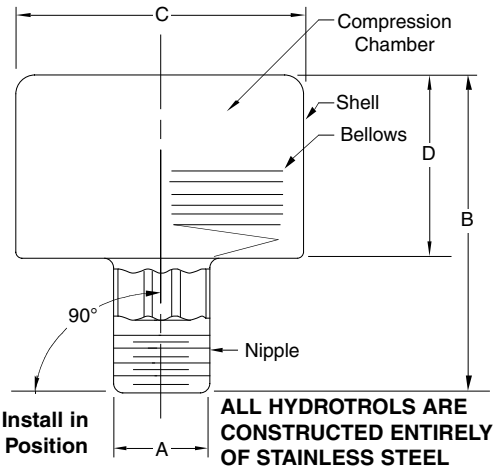
HYDROTROLS ARE PRE-CHARGED AND PERMANENTLY SEALED AT THE FACTORY



Hydrotrols Fig. 5005 to 5050 inclusive have been tested and certified in accordance with the Plumbing and Drainage Institute "Standard P.D.I. WH-201"

Hydrotrols Fig. 5005 to 5050 inclusive conforms to ASSE Standard #1010.

Certificate of compliance available upon request.



Always Install in Upright Position

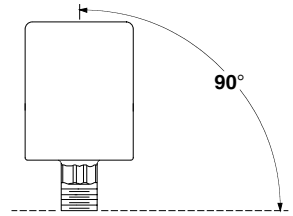
ALL HYDROTROLS ARE CONSTRUCTED ENTIRELY OF STAINLESS STEEL

IMPORTANT INSTALLATION NOTE

ALWAYS INSTALL IN UPRIGHT POSITION.

HYDROTROL SHOULD BE PLACED AT LOCATION DENOTED ON ENGINEER'S PLANS. UNIT MUST BE INSTALLED IN A VERTICAL (UPRIGHT) POSITION TO INSURE PROPER OPERATION OF THE INTERNAL BELLOWS.

WHEN INSTALLING, PLACE WRENCH ON NIPPLE ONLY. NEVER TIGHTEN BY GRIPPING SHELL.



CORRECT POSITION

SIZING AND PLACEMENT OF HYDROTROLS

ALL SIZING AND PLACEMENT DATA IS IN ACCORDANCE WITH PLUMBING AND DRAINAGE INSTITUTE STANDARD PDI WH-201

SIZING - SINGLE and MULTIPLE FIXTURE BRANCH LINES

Most Engineers employ the fixture unit method for sizing water piping systems. Smith uses the P.D.I. simplified method of sizing HYDROTROLS based on fixture unit weight. The correct size HYDROTROL can therefore be specified and located at the same time that the pipe sizes are determined.

Table 1 indicates the fixture unit weights for most popular plumbing fixtures and is based upon information offered in the National Plumbing Code. Certain local codes may vary and should be reviewed prior to using table 1.

Fixture	Type of Supply Control	Weight in Fixture Units			
		Public		Private	
		C.W.	H.W.	C.W	H.W.
Water Closet	Flush Valve	10	-	6	-
Water Closet	Flush Tank	5	-	3	-
Pedestal Urinal	Flush Valve	10	-	-	-
Stall or Wall Urinal	Flush Valve	5	-	-	-
Stall or Wall Urinal	Flush Tank	3	-	-	-
Lavatory	Faucet	1 1/2	1 1/2	1	1
Bathtub	Faucet	2	3	1 1/2	1 1/2
Shower Head	Mixing Valve	2	3	1	2
Bathroom Group	Flush Valve Closet	-	-	8	3
Bathroom Group	Flush Tank Closet	-	-	6	3
Separate Shower	Mixing Valve	-	-	1	2
Service Sink	Faucet	3	3	-	-
Laundry Tubs (1-3)	Faucet	-	-	3	3
Combination Fixture	Faucet	-	-	3	3

Table 1

Fig. No.	P.D.I. Symbol	Fixture Unit Rating	A Size	B
5005	A	1-11	3/4(19)	2.62(67)
5010	B	12-32	1(25)	2.97(75)
5020	C	33-60	1(25)	3.59(91)
5030	D	61-113	1(25)	4.50(114)
5040	E	114-154	1(25)	5.52(140)
5050	F	155-330	1(25)	6.67(169)

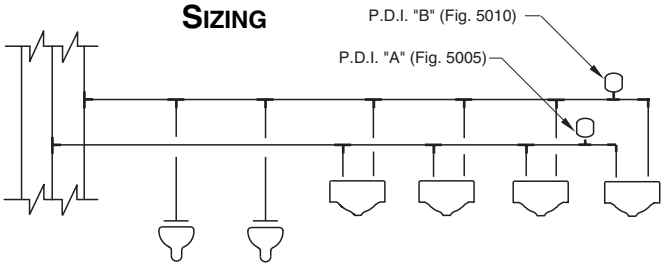
NOTE: WHEN WATER PRESSURE IN LINE EXCEEDS 65 PSI, SPECIFY THE NEXT LARGER HYDROTROL.

Table 2

Table 2 indicates fixture unit ratings for P.D.I. certified categories and the corresponding Smith HYDROTROL for each category. Where several fixtures are installed in a branch usually only one fixture valve at a time will be closed. Table 2 takes into consideration other design factors including the simultaneous usage of one or more fixtures, pipe size, length, flow pressure and velocity. Therefore, this method offers a simple fast determination of the proper size water hammer arrester for a given battery of plumbing fixtures.

Sizing and Placement of Hydrotrols

Sizing



Example 1

Find fixture unit weight of each fixture using Table 1. Total weights for both hot and cold branches.

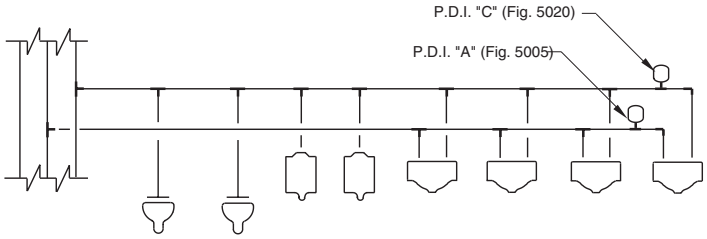
Cold Water Branch
2 W.C. at 10 F.U. ea. = 20
4 Lav. at 1 1/2 F.U. ea. = 6
Total 26

Hot Water Branch
4 Lav. at 1 1/2 F.U. ea. = 6
Total 6

Select P.D.I. "B" Unit — Select P.D.I. "A" Unit

Select correct size HYDROTROL using Table 2.

Cold Water Branch Fig. 5010 — Hot Water Branch Fig. 5005



Example 2

Find fixture unit weight of each fixture using Table 1. Total weights for both hot and cold branches.

Cold Water Branch
2 W.C. at 10 F.U. ea. = 20
2 Ur. at 5 F.U. . . . .ea. = 10
4 Lav. at 1 1/2 F.U. ea. = 6
Total 36

Hot Water Branch
4 Lav. at 1 1/2 F.U. ea. = 6
Total 6

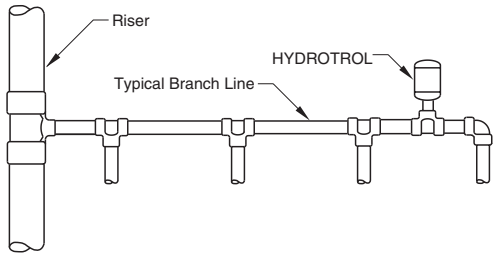
Select P.D.I. "C" Unit — Select P.D.I. "A" Unit

Select correct size HYDROTROL using Table 2.

Cold Water Branch Fig. 5020 — Hot Water Branch Fig. 5005

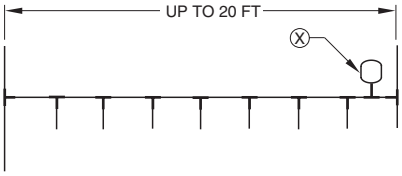
Placement

It has been established that the preferred location for the water hammer arrester is at the end of the branch line between the last two fixtures served.



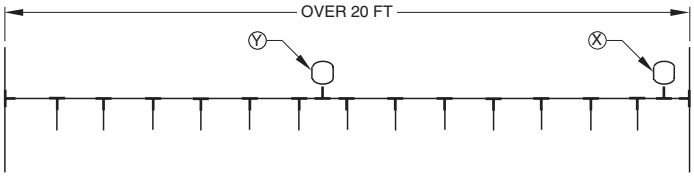
Two basic rules were established - one for branches up to 20' in length, and another for branches over 20' in length.

Rule 1



Rule 1, covers multiple fixture branch lines which do not exceed 20 ft. in length. Hydrotrol Sizing Table 2 is used to select the required unit.

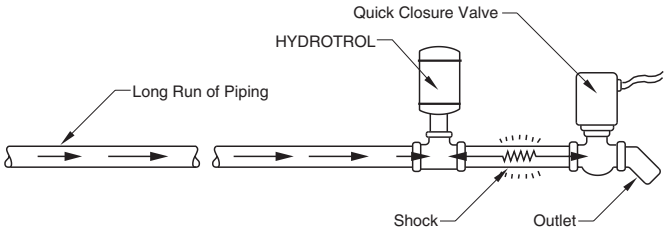
Rule 2



Rule 2, covers multiple fixture branch lines which do exceed 20 ft. in length. Hydrotrol Sizing Table 2 is used to select the required unit. The sum of the Fixture Unit Ratings of units Ⓧ and Ⓨ shall be equal to or greater than the demand of the branches.

Long Runs of Piping to Single Fixtures, Appliances or Equipment

Table 3 indicates the size HYDROTROL required for long runs of piping which feed a single remote fixture or appliance. HYDROTROL unit should be sized by using Table 3 and located as close to the point of quick closure as possible.



Hydrotrol Selection Chart

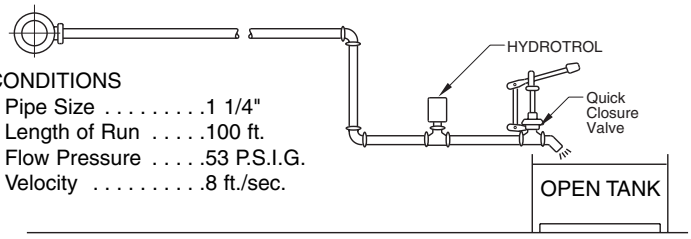
Length of Pipe	Nominal Pipe Size 1/2"	3/4"	1"	1 1/4"	1 1/2"	2
25	5005	5005	5010	5020	5030	5040
50	5005	5010	5020	5030	5040	5050
75	5010	5020	5030	1-5005 1-5040	5050	1-5040 1-5050
100	5020	5030	5040	5050	1-5020 1-5050	2-5050
125	5020	5030	5050	1-5005 1-5050	1-5040 1-5050	1-5040 2-5050
150	5030	5040	5050	1-5030 1-5050	2-5050	3-5050

Table 3

Note: Table 3 shows lengths of run of branch piping. The length of run used should be the length of the pipe from point of valve closure to a point of relief, such as a large pipe riser twice the size of the branch line, main line or water tank.

All sizing recommendations shown in Table 3 are based on an operating water pressure of 65 PSI or under and an average velocity between 5 and 10 feet per second. If operating pressures are over 65 PSI use the next larger HYDROTROL unit. When pressures are anticipated above 85 PSI a pressure reducing valve is recommended.

Sizing Example



CONDITIONS
Pipe Size . . . . . .1 1/4"
Length of Run . . . . .100 ft.
Flow Pressure . . . . .53 P.S.I.G.
Velocity . . . . . .8 ft./sec.

RECOMMENDATION:
Smith Fig. 5050 HYDROTROL installed as shown