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Fisher® WhisperFlo® Aerodynamic Noise Attenuation Trim

Fisher WhisperFlo trim represents state of the art solutions for applications that demand ultimate noise attenuation.

Control valves with WhisperFlo cages (figure 1) provide additional attenuation for aerodynamic noise in very demanding vapor or gas applications with high-pressure drops. A WhisperFlo cage with an appropriately sized valve body is designed to reduce the noise level up to −40 dBA. For special applications, −50 dBA attenuation can be achieved.

Features

- **High Performance—**Use of the WhisperFlo trim provides excellent noise attenuation for very demanding applications. It should be considered for those applications that more conventional solutions can't reach.

- **Easy Maintenance—**Quick change trim allows fast and easy inspection of the cage without taking the valve body out of the line. WhisperFlo trim is interchangeable with standard control valve trim.

- **Long Trim Life—**Hardened materials or a patented wear surface construction are standard to provide excellent wear resistance. The patented, three dimensional flow path, pressure-staging, and special passage shapes uniquely combine to equalize energy dissipation.

- **High Capacity—**WhisperFlo trim has higher capacity at conventional valve travels and port sizes than tortuous path designs.

- **Simple Retrofit—**Standardized port sizes provide capability to retrofit existing valves.

W6980 / IL

WhisperFlo CAGE

W8916-1 / IL

Figure 1. Typical Valve with Fisher WhisperFlo Aerodynamic Trim

Table 1. Standard Fisher WhisperFlo Cages (Levels X, Y, and Z)

VALVE TYPE	VALVE SIZE(1)	PORT DIAMETER		MAXIMUM VALVE PLUG TRAVEL	
		mm	Inch	mm	Inch
easy-e®	4	87	3.4375	76	3
	6X4	87	3.4375	102	4
	8X4	87	3.4375	102	4
	6	136	5.375	76	3
	8X6	136	5.375	127	5
	12X6	136	5.375	165	6.5
	8	178	7	152	6
	10X8	178	7	152	6
	12X8	178	7	203	8
	12	279	11	203	8
	16X12	279	11	203	8
	16	375	14.75	203	8
	20X16	375	14.75	276	10.875
	24X16	375	14.75	378	14.875
	20	464	18.25	378	14.875
	24X20	464	18.25	378	14.875

1. For a two-number valve size, the first number indicates nominal valve body size and the second number indicates nominal port size.

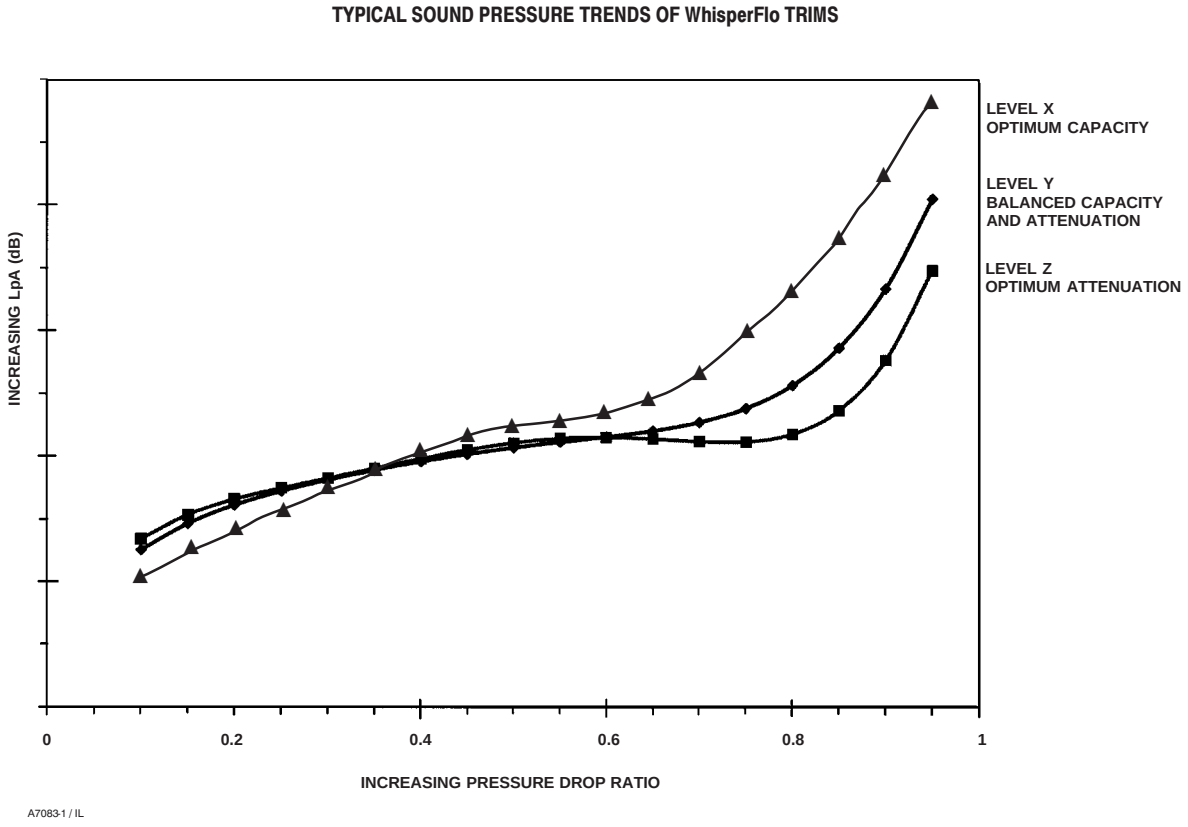

Figure 2. Fisher WhisperFlo $\Delta P/P_1$ Ranges

Coefficients

Table 2. Fisher WhisperFlo, X Level, Flow Up through the Seat Ring and out through the Cage Orifices

WhisperFlo Level X — **Linear Characteristic**

Valve Size, NPS	Port Diameter		Maximum Travel		Flow Coefficient	Valve Opening—Percent of Total Travel										
	mm	Inch	mm	Inch		Min	10	20	30	40	50	60	70	80	90	100
4	87.3	3.4375	76	3	C_v	6.4	12.7	27.8	41.9	55.4	68.5	81.4	91.9	101	108	114
					X_T	0.654	0.654	0.753	0.737	0.727	0.714	0.708	0.732	0.760	0.831	0.842
6x4	87.3	3.4375	102	4	C_v	6.4	16.7	35.3	52.5	69.5	87.6	105	121	136	154	164
					X_T	0.763	0.763	0.783	0.751	0.726	0.696	0.691	0.699	0.738	0.719	0.720
8x4	87.3	3.4375	102	4	C_v	6.4	17.8	35.8	52.5	69.7	86.9	104	121	137	153	165
					X_T	0.705	0.705	0.790	0.763	0.747	0.720	0.722	0.717	0.701	0.691	0.676
6	136.5	5.375	76	3	C_v	10.4	20.7	47.3	70.4	94.6	116	137	159	175	189	199
					X_T	0.638	0.638	0.673	0.716	0.688	0.692	0.723	0.708	0.735	0.747	0.770
8x6	136.5	5.375	127	5	C_v	10.4	45.7	92.0	138	181	223	265	299	331	350	365
					X_T	0.640	0.640	0.648	0.633	0.617	0.624	0.642	0.682	0.710	0.769	0.803
12x6	136.5	5.375	165	6.5	C_v	10.4	56.9	114	170	224	288	328	377	425	472	510
					X_T	0.735	0.735	0.759	0.741	0.726	0.661	0.699	0.707	0.706	0.718	0.724
8	177.8	7	152	6	C_v	30.4	60.9	120	179	237	287	331	368	397	421	441
					X_T	0.702	0.702	0.704	0.669	0.647	0.668	0.699	0.740	0.783	0.809	0.829
10x8	177.8	7	152	6	C_v	30.4	61.4	120	179	238	296	352	408	459	508	550
					X_T	0.694	0.694	0.713	0.662	0.641	0.629	0.637	0.632	0.640	0.667	0.673
12x8	177.8	7	203	8	C_v	30.4	103	188	277	353	432	515	583	652	703	736
					X_T	0.656	0.656	0.678	0.627	0.656	0.666	0.657	0.667	0.684	0.709	0.749
12	279.4	11	203	8	C_v	62.2	128	257	382	508	633	728	820	901	978	1019
					X_T	0.886	0.886	0.777	0.799	0.737	0.688	0.727	0.776	0.734	0.721	0.758
16x12	279.4	11	203	8	C_v	62.2	124	258	388	523	648	784	896	1001	1096	1175
					X_T	0.556	0.556	0.580	0.614	0.612	0.629	0.615	0.665	0.678	0.691	0.719
16	374.7	14.75	203	8	C_v	60.2	170	358	541	720	890	1052	1205	1348	1481	1604
					X_T	0.534	0.711	0.697	0.688	0.684	0.684	0.687	0.694	0.703	0.715	0.729
20x16	374.7	14.75	203	8	C_v	60.2	170	359	546	731	912	1089	1260	1427	1587	1741
					X_T	0.534	0.713	0.699	0.687	0.677	0.669	0.663	0.659	0.656	0.655	0.654
20x16	374.7	14.75	276	10.875	C_v	60.2	238	494	745	990	1226	1452	1667	1870	2061	2240
					X_T	0.534	0.708	0.690	0.676	0.666	0.659	0.656	0.654	0.655	0.658	0.662
20x16	374.7	14.75	378	14.875	C_v	60.2	332	679	1015	1339	1633	1911	2165	2397	2606	2793
					X_T	0.534	0.701	0.679	0.665	0.657	0.654	0.656	0.660	0.667	0.676	0.686
24x16	374.7	14.75	203	8	C_v	60.2	170	360	548	735	921	1104	1285	1462	1636	1807
					X_T	0.534	0.716	0.703	0.692	0.682	0.673	0.665	0.658	0.652	0.647	0.642
24x16	374.7	14.75	276	10.875	C_v	60.2	238	495	750	1001	1248	1490	1725	1953	2173	2385
					X_T	0.534	0.711	0.695	0.681	0.669	0.659	0.651	0.644	0.639	0.635	0.632
24x16	374.7	14.75	378	14.875	C_v	60.2	333	683	1027	1363	1687	1999	2296	2578	2843	3092
					X_T	0.534	0.705	0.685	0.668	0.655	0.645	0.638	0.633	0.630	0.628	0.628
20	463.6	18.25	203	8	C_v	86.5	207	431	655	834	1087	1294	1493	1683	1865	2036
					X_T	0.534	0.713	0.701	0.692	0.686	0.683	0.682	0.683	0.687	0.693	0.700
20	463.6	18.25	276	10.875	C_v	86.5	286	592	891	1179	1453	1712	1954	2179	2386	2576
					X_T	0.534	0.708	0.694	0.685	0.682	0.683	0.688	0.696	0.708	0.722	0.738
20	463.6	18.25	378	14.875	C_v	86.5	399	813	1208	1577	1917	2223	2497	2740	2954	3141
					X_T	0.534	0.702	0.687	0.682	0.685	0.695	0.711	0.731	0.755	0.781	0.809
24x20	463.6	18.25	203	8	C_v	86.5	207	431	658	882	1104	1322	1537	1747	1952	2152
					X_T	0.534	0.714	0.703	0.692	0.683	0.676	0.669	0.664	0.660	0.657	0.655
24x20	463.6	18.25	276	10.875	C_v	86.5	286	595	900	1200	1493	1779	2056	2322	2578	2823
					X_T	0.534	0.710	0.695	0.683	0.673	0.665	0.659	0.656	0.654	0.653	0.654
24x20	463.6	18.25	378	14.875	C_v	86.5	400	820	1231	1630	2012	2376	2720	3043	3343	3622
					X_T	0.534	0.704	0.686	0.672	0.662	0.656	0.653	0.653	0.655	0.659	0.665

Table 3. Fisher WhisperFlo, Y Level, Flow Up through the Seat Ring and out through the Cage Orifices

WhisperFlo Level Y

Linear Characteristic

Valve Size, NPS	Port Diameter		Maximum Travel		Flow Coefficient	Valve Opening—Percent of Total Travel										
	mm	Inch	mm	Inch		Min	10	20	30	40	50	60	70	80	90	100
4	87.3	3.4375	76	3	C_v	6	12	23	35	47	59	70	82	94	105	117
					X_T	0.536	0.536	0.532	0.525	0.510	0.503	0.507	0.514	0.528	0.532	0.575
6x4	87.3	3.4375	102	4	C_v	6	16	31	47	63	79	94	110	126	141	157
					X_T	0.536	0.536	0.532	0.525	0.510	0.503	0.507	0.514	0.528	0.532	0.575
8x4	87.3	3.4375	102	4	C_v	6	16	31	47	63	79	94	110	126	141	157
					X_T	0.536	0.536	0.532	0.525	0.510	0.503	0.507	0.514	0.528	0.532	0.575
6	136.5	5.375	76	3	C_v	9	18	36	55	73	91	109	127	146	164	182
					X_T	0.536	0.536	0.532	0.525	0.510	0.503	0.507	0.514	0.528	0.532	0.575
8x6	136.5	5.375	127	5	C_v	10	31	61	92	123	154	184	215	246	276	307
					X_T	0.536	0.536	0.532	0.525	0.510	0.503	0.507	0.514	0.528	0.532	0.575
12x6	136.5	5.375	165	6.5	C_v	9	39	78	116	155	194	233	272	310	349	388
					X_T	0.536	0.536	0.532	0.525	0.510	0.503	0.507	0.514	0.528	0.532	0.575
8	177.8	7	152	6	C_v	11	42	84	125	167	209	251	293	334	376	418
					X_T	0.510	0.510	0.543	0.547	0.536	0.460	0.496	0.496	0.514	0.547	0.609
10x8	177.8	7	152	6	C_v	11	42	84	125	167	209	251	293	334	376	418
					X_T	0.510	0.510	0.543	0.547	0.536	0.460	0.496	0.496	0.514	0.547	0.609
12x8	177.8	7	203	8	C_v	12	59	118	177	236	295	354	413	472	531	590
					X_T	0.562	0.562	0.573	0.543	0.525	0.539	0.558	0.558	0.577	0.577	0.577
12	279.4	11	203	8	C_v	35	90	180	270	360	450	540	630	720	810	900
					X_T	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532
16x12	279.4	11	203	8	C_v	35	90	180	270	360	450	540	630	720	810	900
					X_T	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532
16	374.7	14.75	203	8	C_v	53.4	124.3	258	392	525	654	779	901	1018	1130	1238
					X_T	0.534	0.616	0.607	0.600	0.596	0.594	0.593	0.594	0.598	0.602	0.608
20x16	374.7	14.75	203	8	C_v	53.4	124	259	394	529	662	794	923	1051	1176	1298
					X_T	0.534	0.617	0.608	0.601	0.594	0.588	0.584	0.580	0.577	0.575	0.573
20x16	374.7	14.75	276	10.875	C_v	53.4	171	356	539	720	897	1070	1239	1402	1560	1712
					X_T	0.534	0.614	0.603	0.594	0.586	0.581	0.577	0.574	0.573	0.573	0.574
20x16	374.7	14.75	378	14.875	C_v	53.4	239	491	738	979	1212	1435	1648	1849	2038	2216
					X_T	0.534	0.609	0.596	0.586	0.579	0.574	0.573	0.573	0.575	0.579	0.585
24x16	374.7	14.75	203	8	C_v	53.4	125	259	395	531	666	800	933	1065	1195	1324
					X_T	0.534	0.619	0.611	0.604	0.598	0.592	0.587	0.582	0.578	0.574	0.570
24x16	374.7	14.75	276	10.875	C_v	53.4	171	357	541	724	906	1085	1262	1436	1607	1774
					X_T	0.534	0.616	0.606	0.597	0.590	0.583	0.577	0.572	0.568	0.564	0.561
24x16	374.7	14.75	378	14.875	C_v	53.4	240	492	743	991	1234	1472	1703	1928	2146	2356
					X_T	0.534	0.612	0.600	0.589	0.580	0.573	0.567	0.562	0.559	0.556	0.555
20	463.6	18.25	203	8	C_v	77.3	148	294	448	601	751	899	1045	1188	1267	1462
					X_T	0.534	0.578	0.572	0.567	0.563	0.560	0.558	0.557	0.557	0.558	0.560
20	463.6	18.25	276	10.875	C_v	77.3	198	405	612	816	1016	1210	1397	1577	1750	1915
					X_T	0.534	0.576	0.568	0.562	0.559	0.557	0.557	0.559	0.562	0.567	0.574
20	463.6	18.25	378	14.875	C_v	77.3	272	558	837	1108	1367	1614	1849	2063	2265	2452
					X_T	0.534	0.573	0.564	0.558	0.557	0.559	0.563	0.571	0.581	0.593	0.607
24x20	463.6	18.25	203	8	C_v	77.3	148	294	449	603	757	909	1060	1209	1357	1503
					X_T	0.534	0.579	0.573	0.568	0.563	0.558	0.554	0.551	0.548	0.545	0.543
24x20	463.6	18.25	276	10.875	C_v	77.3	198	406	615	823	1029	1232	1433	1629	1822	2010
					X_T	0.534	0.577	0.569	0.562	0.556	0.552	0.548	0.544	0.542	0.540	0.539
24x20	463.6	18.25	378	14.875	C_v	77.3	272	560	845	1125	1401	1669	1931	2183	2427	2662
					X_T	0.534	0.574	0.564	0.556	0.550	0.545	0.542	0.540	0.539	0.540	0.541

Table 4. Fisher WhisperFlo, Z Level, Flow Up through the Seat Ring and out through the Cage Orifices

WhisperFlo Level Z

Linear Characteristic

Valve Size, NPS	Port Diameter		Maximum Travel		Flow Coefficient	Valve Opening—Percent of Total Travel										
	mm	Inch	mm	Inch		Min	10	20	30	40	50	60	70	80	90	100
4	87.3	3.4375	76	3	C_v	3	6	13	19	25	32	38	44	50	57	63
					X_T	0.600	0.600	0.539	0.521	0.528	0.528	0.547	0.539	0.525	0.507	0.525
6x4	87.3	3.4375	102	4	C_v	3	9	17	26	34	43	52	60	69	77	86
					X_T	0.600	0.600	0.539	0.521	0.528	0.528	0.547	0.539	0.525	0.507	0.525
8x4	87.3	3.4375	102	4	C_v	3	9	17	26	34	43	52	60	69	77	86
					X_T	0.600	0.600	0.539	0.521	0.528	0.528	0.547	0.539	0.525	0.507	0.525
6	136.5	5.375	76	3	C_v	5	10	20	30	40	51	61	71	81	91	101
					X_T	0.600	0.600	0.539	0.521	0.528	0.528	0.547	0.539	0.525	0.507	0.525
8x6	136.5	5.375	127	5	C_v	5	17	35	52	69	87	104	121	138	156	173
					X_T	0.600	0.600	0.539	0.521	0.528	0.528	0.547	0.539	0.525	0.507	0.525
12x6	136.5	5.375	165	6.5	C_v	5	23	45	68	90	113	135	158	180	203	225
					X_T	0.600	0.600	0.539	0.521	0.528	0.528	0.547	0.539	0.525	0.507	0.525
8	177.8	7	152	6	C_v	7	26	52	78	104	130	156	182	208	234	260
					X_T	0.600	0.600	0.539	0.521	0.528	0.528	0.547	0.539	0.525	0.507	0.525
10x8	177.8	7	152	6	C_v	7	26	52	78	104	130	156	182	208	234	260
					X_T	0.600	0.600	0.539	0.521	0.528	0.528	0.547	0.539	0.525	0.507	0.525
12x8	177.8	7	203	8	C_v	7	35	71	106	141	177	212	247	282	318	353
					X_T	0.600	0.600	0.539	0.521	0.528	0.528	0.547	0.539	0.525	0.507	0.525
12	279.4	11	203	8	C_v	21	55	110	165	220	275	330	385	440	495	550
					X_T	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532
16x12	279.4	11	203	8	C_v	21	55	110	165	220	275	330	385	440	495	550
					X_T	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532
16	374.7	14.75	203	8	C_v	48.1	91	179	273	366	578	548	638	725	811	895
					X_T	0.534	0.466	0.462	0.459	0.456	0.454	0.453	0.453	0.453	0.454	0.456
20x16	374.7	14.75	203	8	C_v	48.1	91	179	273	367	460	553	645	737	827	917
					X_T	0.534	0.467	0.463	0.459	0.456	0.453	0.45	0.448	0.446	0.445	0.444
20x16	374.7	14.75	276	10.875	C_v	48.1	121	247	374	501	627	751	874	994	1113	1229
					X_T	0.534	0.465	0.46	0.456	0.452	0.449	0.446	0.444	0.443	0.442	0.442
20x16	374.7	14.75	378	14.875	C_v	48.1	166	341	514	685	854	1019	1180	1336	1488	1634
					X_T	0.534	0.463	0.457	0.451	0.447	0.444	0.443	0.442	0.442	0.443	0.445
24x16	374.7	14.75	203	8	C_v	48.1	91	179	273	368	462	555	649	742	834	926
					X_T	0.534	0.468	0.464	0.461	0.458	0.455	0.453	0.45	0.448	0.446	0.444
24x16	374.7	14.75	276	10.875	C_v	48.1	121	267	375	503	630	756	881	1006	1129	1251
					X_T	0.534	0.466	0.462	0.458	0.454	0.451	0.447	0.445	0.442	0.44	0.438
24x16	374.7	14.75	378	14.875	C_v	48.1	166	341	516	689	861	1032	1200	1365	1528	1688
					X_T	0.534	0.465	0.459	0.454	0.449	0.445	0.442	0.439	0.437	0.435	0.434
20	463.6	18.25	203	8	C_v	71.8	113	214	323	434	544	653	761	868	974	1078
					X_T	0.534	0.454	0.45	0.448	0.445	0.443	0.442	0.441	0.44	0.44	0.441
20	463.6	18.25	276	10.875	C_v	71.8	148	288	437	585	731	875	1016	1155	1290	1422
					X_T	0.534	0.453	0.448	0.445	0.443	0.441	0.44	0.44	0.441	0.442	0.445
20	463.6	18.25	378	14.875	C_v	71.8	200	403	607	808	1005	1196	1381	1560	1730	1894
					X_T	0.534	0.451	0.446	0.442	0.441	0.44	0.441	0.444	0.448	0.453	0.459
24x20	463.6	18.25	203	8	C_v	71.8	113	214	324	435	546	657	767	877	986	1094
					X_T	0.534	0.454	0.451	0.448	0.446	0.443	0.441	0.439	0.437	0.436	0.434
24x20	463.6	18.25	276	10.875	C_v	71.8	149	292	444	595	745	894	1042	1188	1333	1476
					X_T	0.534	0.453	0.449	0.446	0.442	0.44	0.437	0.435	0.433	0.432	0.431
24x20	463.6	18.25	378	14.875	C_v	71.8	200	404	610	815	1018	1218	1416	1609	1800	1986
					X_T	0.534	0.452	0.446	0.442	0.438	0.435	0.433	0.431	0.43	0.43	0.43

Specifications

Availability

For standard offerings, see table 1.
Designs are also available for Fisher HP, EH, FB, and TBX valves. Contact your Emerson Process Management sales office for details

Trim Material and Selection

■ 316L Stainless Steel/R31233 Wear Resistant Surfaces (7-inch port and smaller only)
■ 316L Stainless Steel/Chrome Coat Bore (11-inch port and larger)
■ N04400/R31233 Wear Resistant Surfaces (7-inch port and smaller only)
■ Duplex Stainless Steel/R31233 Wear Resistant Surfaces (7-inch port and smaller only)
■ 4130 Alloy Steel/R31233 Wear Resistant Surfaces (7-inch port and smaller only)
■ 410 Stainless Steel (all port sizes)
■ Other materials available per application
See appropriate valve bulletin or contact your Emerson Process Management sales office

Temperature Capability(1)

■ −73 to 593°C (−100 to 1100°F)
■ Cryogenic cages for use to −198°C (−324°F) are available. Contact your Emerson Process Management sales office for special information on specifying Cryogenic cages
■ Others per application
See appropriate valve bulletin for complementary information

Maximum Pressure Drops(1)

As shown in appropriate valve bulletin, do not exceed these limits. WhisperFlo trim is available up to Class 2500 and higher

Velocity Limits

WhisperFlo trim is designed to control the throttling noise source in the control valve. A valve-outlet or downstream velocity greater than 0.3 MACH1 may create a second noise source. IEC 60534-8-3 noise prediction will account for both sources

Flow Characteristic

Linear (restricted linear cages and characterized cages are available--consult your Emerson Process Management sales office)

Rangeability

Varies with size.
NPS 4 ET, level X: 30:1
NPS 24x20 EW, level X: 65:1
High rangeability in excess of 250:1 is available in some constructions.
Contact your Emerson Process Management sales office for details

Flow Direction

Flow up--through the seat ring and out through the cage orifices

Noise Attenuation

Approximately −40 dBA maximum depending on the $\triangle P/P_1$ ratio per IEC 60534-8-3 calculation procedure.

WhisperFlo X, Y, and Z levels are optimized for a specific $\triangle P/P_1$ range, but each design is useable over the entire range (see figure 2).

Sizing Coefficients

See Coefficients section in this bulletin or Catalog 12, section 1

Shutoff Classification

■ Class IV
■ Others per application
See appropriate valve bulletin

1. Do not exceed the pressure/temperature limits in this bulletin. Any applicable standard or code limitations should not be exceeded.

Note

Neither Emerson, Emerson Process Management, nor any of their affiliated entities assumes responsibility for the selection, use, or maintenance of any product. Responsibility for the selection, use, and maintenance of any product remains with the purchaser and end-user.

WhisperFlo Trim

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