Fisher™ 6010, 6011, 6012, 6013, and Whisper Disk Diffusers

Because valves can be substantial noise contributors when controlling industrial processes, a complete line of Fisher diffusers is offered to provide optimum noise attenuation. A diffuser is a pressure-reducing device that is installed downstream from the control valve. When installed, the total pressure drop of the system is divided across the valve and diffuser. This enables the valve to operate at a lower pressure drop ratio, thereby lowering the noise level generated from the process flowing through the control valve.

Inline Diffusers

Fisher 6010, 6011 and Whisper Disk inline diffusers are installed downstream of any control valve. These diffusers do not need to be placed adjacent to a control valve. Multiple diffuser types are available, providing an increased level of flexibility to meet a range of applications. Inline diffusers are used in steam, gas, and vapor flow applications to achieve minimum noise generation.

Vent Diffusers

Fisher 6012 and 6013 (figure 1) vent diffusers reduce the noise generated by the venting of compressible fluids to atmosphere.

6010

WHISPER DISK

6011

6012

Note: Diffusers are not hydrostatically tested

Specifications

Available Configurations

6010: Inline diffuser (with integral outlet head)
6011: Inline diffuser (pipe-style)
Whisper Disk: Inline diffuser (flat plate)
6012: Drilled-hole vent diffuser
6013: Drilled-hole vent diffuser (with outer shell)

Sizes

6010: NPS 1 x 3 to NPS 26 x 48 (inlet x outlet)
6011: NPS 2 to NPS 30
Whisper Disk: NPS 2 to NPS 24
6012: NPS 2 to NPS 26
6013: NPS 2 to NPS 26 (outer shell NPS 4 to 36)

End Connections

6010: Any combination of flanged (raised-face, ring-type joint, and flat-face) or welded end (buttweld or socket weld)
6011: Wafer flanged(1)
Whisper Disk: Raised-face or ring-type joint flanged
6012 and 6013: Raised-face flanged, ring-type joint flanged, or buttweld end

Materials

See table 1

Weights & Dimensions(2)

6010: See figure 2 and table 3.
6011: See figure 3 and table 5.
6012: See figure 5 and table 9.
6013: See figure 6 and table 10.
Whisper Disk: See figure 4

Design Standards

Diffuser wall thicknesses are designed in accordance with the ASME Boiler and Pressure Vessel Code, Section VIII, Division 1 and materials used are listed in Section II, Part D

End connection flanges are in compliance with ASME B16.5 and buttweld ends are in compliance with ASME B16.25

Contact your Emerson sales office for availability of PED 97/23/EC compliant materials of construction

Note

Inline and vent diffusers are not hydrostatically tested.

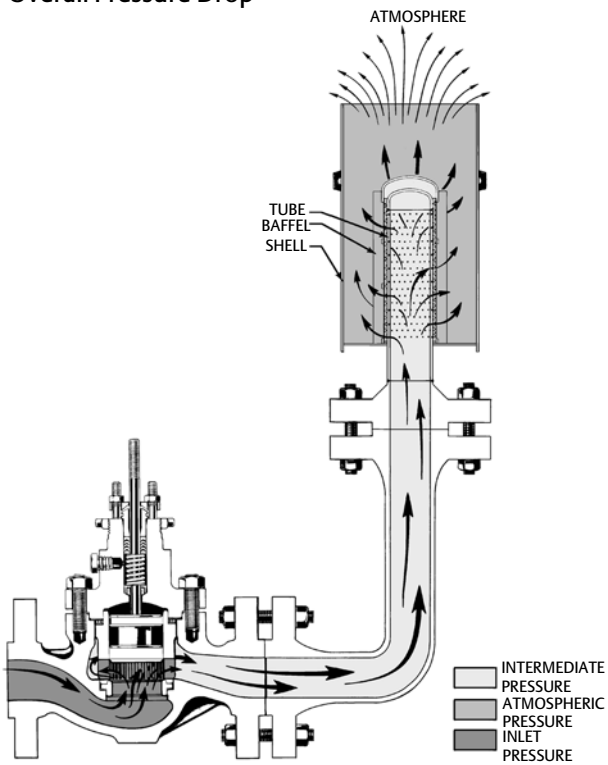
1. Downstream flange requires concentric expander. Refer to figure 3.
2. Your Emerson sales office can determine actual weights and lengths after the diffuser has been sized for pressure and noise conditions.

Table 1. Construction Materials

MATERIAL	DIFFUSER FLANGE OR WHISPER DISK	DIFFUSER TUBE	DIFFUSER HEAD CAP	TEMPERATURE LIMITS	
				°C	°F
Carbon Steel(1)	SA-105	SA-106 Gr B	WPB	-29 to 427	-20 to 800
2 1/4Cr-1Mo(2)	F22	P22	WP22	-29 to 593	-20 to 1100
9Cr-1Mo-V(3)	F91	P91	WP91	-29 to 593	-20 to 1100
S31600 (316 SST)	F316	TP316	WP316	-198 to 649	-325 to 1200
S30400 (304 SST)	F304	TP304	WP304	-198 to 649	-325 to 1200
N04400 (Alloy 400)	N04400	N04400	N04400	-198 to 482	-325 to 900

1. NACE MR0175−2002, NACE MR0175−2003, and NACE MR0175/ISO 15156 approved material also available.
2. Wrought equivalent to WC9.
3. Wrought equivalent to C12A.

Figure 1. Control Valve and Diffuser Divide the Overall Pressure Drop



TYPICAL FISHER 6013 DIFFUSER INSTALLATION

Features

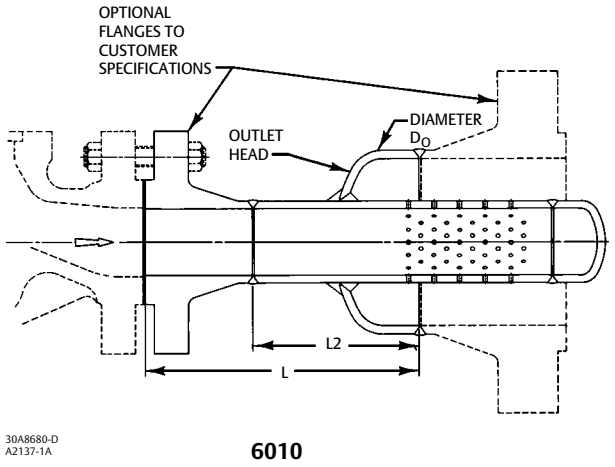
- Versatility— The diffuser concept is used in several unique versions, providing optimum solutions for various applications. The diffuser need not be installed adjacent to the control valve.
- Noise Attenuation— A properly selected diffuser-valve combination can result in up to 40 dBA noise reduction.
- Total Control— A diffuser-valve combination retains the pressure/flow control associated with a standard control valve. Just as important, it controls the generation of potentially damaging noise and vibration.
- Lower Life-Cycle Cost— All Fisher diffusers, both inline and vent, are ruggedly built static devices requiring no maintenance after installation. These features combine to offer increased noise control at a minimum investment.

Ordering Information

Contact your Emerson sales office to order diffusers. Sales representatives should complete standard order entry in addition to the Diffuser Engineering Form that is available on FishWeb. Sales representatives should also send the Diffuser Engineering Form and Customer Data Sheet to MasterSchedSPG.EPMMTN@Emerson.com.

Fisher 6010 Inline Diffuser

Figure 2. Fisher 6010 Diffuser Dimensions



NOTE:
Overall diffuser tube length may exceed face-to-face length.

Table 2. Typical Fisher 6010 Diffuser Dimensions[1]

DIFFUSER SIZE[2]	FLANGED L		BUTTWELD L_2		D_o[3]		APPROXIMATE WEIGHT[4]	
	mm	Inch	mm	Inch	mm	Inch	kg	lb
1 x 3	152	6.00	84	3.31	76	3	1.3	2.75
1.5 x 3	165	6.50	89	3.50	76	3	1.6	3.50
2 x 4	203	8.00	122	4.81	102	4	2.5	5.50
2 x 6	229	9.00	148	5.81	152	6	4.3	9.50
2.5 x 6	229	9.00	141	5.56	152	6	5.2	11.50
3 x 6	229	9.00	138	5.44	152	6	7.8	17
3 x 8	241	9.50	151	5.94	203	8	10	23
4 x 8	279	11.00	170	6.69	203	8	14	31
6 x 12	330	13.00	205	8.06	305	12	33	72
8 x 16	381	15.00	240	9.44	406	16	48	105
10 x 14	356	14.00	195	7.69	356	14	73	160
10 x 16	406	16.00	246	9.69	406	16	77	170
10 x 20	457	18.00	297	11.69	508	20	93	205
12 x 24	483	19.00	319	12.56	610	24	122	270
14 x 28	483	19.00	310	12.19	711	28	249	550
16 x 32	483	19.00	297	11.69	813	32	374	824
18 x 36	508	20.00	316	12.44	914	36	443	976
20 x 36	508	20.00	310	12.19	914	36	536	1181
24 x 36	533	21.00	322	12.69	914	36	714	1573

1. Dimensions may vary to meet specific sound attenuation or piping requirements.
2. Inlet x outlet nominal pipe sizes.
3. Dimensions are nominal pipe size.
4. Weights do not include optional flanges.

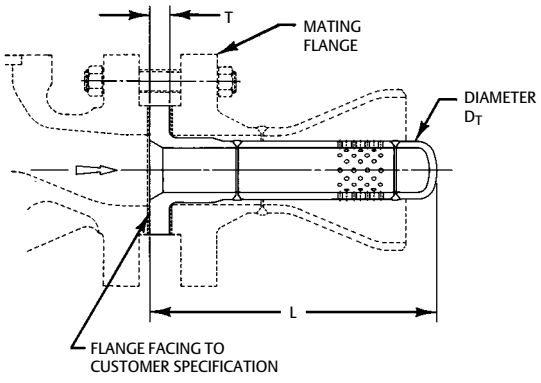
Table 3. Minimum Outlet Head Size for Fisher 6010 Diffusers[1]

INLET TUBE SIZE, NPS	MINIMUM OUTLET HEAD[2] SIZE, NPS	MAXIMUM HEAD SCHEDULE	MAXIMUM HEAD WALL THICKNESS	
			mm	Inches
1	2	80	5.5	0.218
1	2.5	80	7.0	0.276
1.5	3	80	7.6	0.300
2	4	XXS	17.1	0.674
2.5	4	80	8.6	0.337
3	5	80	9.5	0.375
4	6	80	10.9	0.432
6	10	160	28.6	1.125
8	12	160	33.3	1.312
10	14	XS	12.7	0.500
12	18	80	23.8	0.938
14	20	80	26.2	1.031
16	20	STD only	9.5	0.375
18	24	40	17.5	0.688
20	26	20	12.7	0.500
24	30	30	15.9	0.625

1. This chart may be used to determine physical size limitations. It is not intended to be used as a guide or substitute for outlet velocity calculations or outlet sizing.
2. Larger head sizes are available on all inlet sizes.

Fisher 6011 Inline Diffuser

Figure 3. Fisher 6011 Diffuser Dimensions



6011

Table 4. Typical Fisher 6011 Diffuser Dimensions[1]

DIFFUSER SIZE[2], NPS (MATING FLANGE)	MAXIMUM L		T		MAXIMUM TUBE SIZE D_T[3,4]		APPROXIMATE WEIGHT	
	mm	Inch	mm	Inch	mm	Inch	kg	lb
2	483	19	16	0.63	32	1.25	2.7	6
3	635	25	19	0.75	64	2.50	9	20
4	711	28	22	0.88	76	3	14	30
6	1295	51	28	1.12	127	5	41	90
8	1473	58	32	1.25	152	6	68	150
10	1778	70	38	1.50	203	8	113	250
12	2134	84	44	1.75	254	10	159	350
14	2184	86	44	1.75	254	10	181	400
16	2286	90	51	2.00	305	12	268	590
18	2286	90	51	2.00	356	14	340	750
20	2286	90	51	2.00	406	16	397	875
24	2286	90	51	2.00	508	20	544	1200
26	2286	90	70	2.75	508	20	544	1200
30	2286	90	70	2.75	610	24	635	1400

1. Dimensions may vary to meet specific sound attenuation or piping requirements.
2. Specify mating flange size for diffuser size.
3. Heavy schedule mating flange may require smaller tube size.
4. Smaller tube sizes available for increased annular area.

Table 5. Maximum Tube Size for Fisher 6011 Diffusers[1]

MATING LINE				MAXIMUM 6011 TUBE SIZE, NPS
Mating Flange Line Size, NPS	Maximum Schedule Allowed	Maximum Allowable Wall Thickness		
		mm	Inches	
2	STD only	3.9	0.154	1-1/2
2	XS	5.5	0.218	1-1/4
3	STD only	5.4	0.216	2-1/2
3	160	11.1	0.438	2
4	80	8.6	0.337	3
6	80	11.0	0.432	5
6	160	18.3	0.719	4
8	120	18.3	0.719	6
10	100	18.3	0.719	8
12	160	33.3	1.312	8
12	60	14.3	0.562	10
14	80	19.1	0.750	10
16	80	21.4	0.844	12
18	80	23.8	0.938	14
20	60	20.6	0.812	16
24	XS	12.7	0.500	20
26	XS	12.7	0.500	20
30	XS	12.7	0.500	24

1. This chart may be used to determine physical size limitations. It is not intended to be used as a guide or substitute for outlet velocity calculations, or outlet sizing.

Whisper Disk Inline Diffuser

Table 6. Available Size/Pressure Class for Whisper Disk Diffusers

SIZE, NPS	PRESSURE RATING(1)						
	CL150	CL300	CL400	CL600	CL900	CL1500	CL2500
2	X	X	X	X	X	X	X
2-1/2	X	X	X	X	X	X	NA
3	X	X	X	X	X	X	NA
4	X	X	X	X	X	NA	NA
6	X	X	X	X	NA	NA	NA
8	X	X	X	NA	NA	NA	NA
10	X	X	NA	NA	NA	NA	NA
12	X	X	NA	NA	NA	NA	NA
14-24	X	NA	NA	NA	NA	NA	NA

1. Ratings are for raised face flanges. Flange ratings higher than those listed may be available. Consult your Emerson sales office for higher flange ratings, other sizes, and RTJ (ring-type joint) facing.

Table 7. Whisper Disk Maximum Allowable C_v Per Disk Size and Pressure Drop Ratio (Pressure Drop Ratio of Disk, Not System) (1, 2)

Size, NPS	$\triangle P/P_1$ (psia) Maximum of 0.60	$\triangle P/P_1$ (psia) Maximum of 0.75	$\triangle P/P_1$ (psia) Maximum of 0.85	$\triangle P/P_1$ (psia) Maximum of 0.99
2	14	6	3	1
2-1/2	22	10	5	2
3	37	33	14	12
4	95	35	32	21
6	189	119	74	36
8	321	196	101	82
10	500	321	167	125
12	718	482	246	196
14	889	500	304	234
16	893	650	407	324
18	893	839	529	343
20	893	893	771	432
24	893	893	893	643

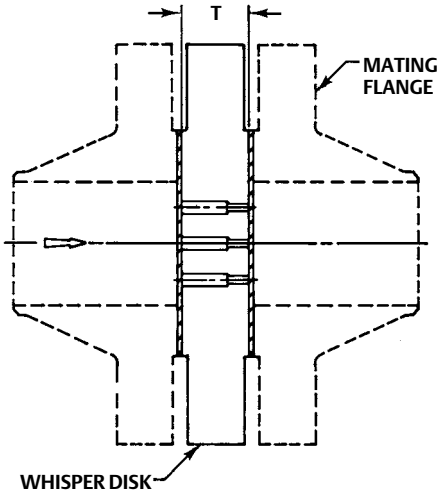
1. Above Cv values based on standard weight pipe upstream and downstream of disk diffuser. For heavier schedule or heavier flange maximum Cv values, consult your Emerson sales office.
2. All maximum Cv values assume an Xt of 0.496.

Table 8. Thickness Dimension T for Whisper Disk Diffusers

SIZE, NPS(1)	T, MILLIMETERS						T, INCHES					
	Pressure Rating						Pressure Rating					
	CL150	CL300	CL400	CL600	CL900	CL1500	CL150	CL300	CL400	CL600	CL900	CL1500
2	19	22	32	32	44	44	0.75	0.88	1.25	1.25	1.75	1.75
2-1/2	22	25	35	35	48	48	0.88	1.00	1.38	1.38	1.88	1.88
3	24	28	38	38	44	54	0.94	1.12	1.50	1.50	1.75	2.12
4	24	32	41	44	51	54	0.94	1.25	1.62	1.75	2.00	2.12
6	25	37	48	54	---	---	1.00	1.44	1.88	2.12	---	---
8	28	41	54	---	---	---	1.12	1.62	2.12	---	---	---
10	30	48	---	---	---	---	1.19	1.88	---	---	---	---
12	32	51	---	---	---	---	1.25	2.00	---	---	---	---
14	35	---	---	---	---	---	1.38	---	---	---	---	---
16	37	---	---	---	---	---	1.44	---	---	---	---	---
18	40	---	---	---	---	---	1.56	---	---	---	---	---
20	43	---	---	---	---	---	1.69	---	---	---	---	---
24	48	---	---	---	---	---	1.88	---	---	---	---	---

1. For sizes and ratings not shown, contact your Emerson sales office.

Figure 4. Thickness Dimension T for Whisper Disk Diffusers



Fisher 6012 Vent Diffuser

Figure 5. Fisher 6012 Vent Diffuser Dimensions

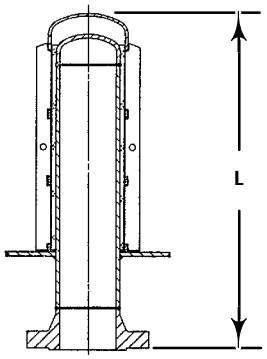


Table 9. Typical Fisher 6012 Diffuser Dimensions(1)

INLET SIZE, NPS	L		WEIGHT(2)	
	mm	Inches	kg	lb
2	533	21.00	14	30
3	610	24.00	21	47
4	914	36.00	32	70
6	1143	45.00	61	135
8	1626	64.00	136	300
10	2032	80.00	206	455
12	2642	104.00	354	780
14	2743	108.00	372	820
16	2794	110.00	499	1100
18	3353	132.00	782	1725
20	3962	156.00	816	1800

1. Dimensions may vary to meet specific sound attenuation or piping requirements.
2. Weights do not include flanges.

Fisher 6013 Vent Diffuser

Figure 6. Fisher 6013 Vent Diffuser Dimensions

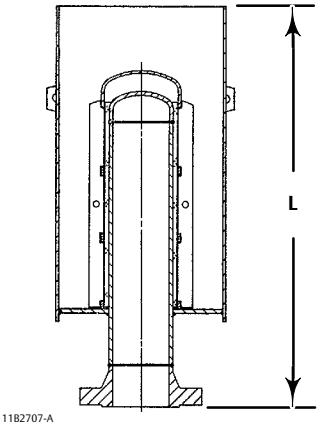


Table 10. Typical Fisher 6013 Diffuser Dimensions(1)

INLET SIZE, NPS	L		WEIGHT(2)	
	mm	Inches	kg	lb
2	1118	44.00	64	140
3	1219	48.00	88	195
4	1524	60.00	113	250
6	1829	72.00	191	420
8	2134	84.00	329	725
10	2743	108.00	465	1025
12	3353	132.00	748	1650
14	3353	132.00	767	1690
16	3505	138.00	984	2170
18	3962	156.00	1383	3050
20	4572	180.00	1569	3460

1. Dimensions may vary to meet specific sound attenuation or piping requirements.
2. Weights do not include flanges.

Table 11. Minimum Shell Size for Fisher 6013 Diffuser

Diffuser Inlet Size	**mm**	51	76	102	152	203	254	305	356	406	457	508
	NPS	2	3	4	6	8	10	12	14	16	18	20
Nominal Shell Size	**mm**	203	254	305	356	406	508	610	610	711	762	813
	Inches	8	10	12	14	16	20	24	24	28	30	32

Emerson Automation Solutions
Marshalltown, Iowa 50158 USA
Sorocaba, 18087 Brazil
Cernay, 68700 France
Dubai, United Arab Emirates
Singapore 128461 Singapore

www.Fisher.com