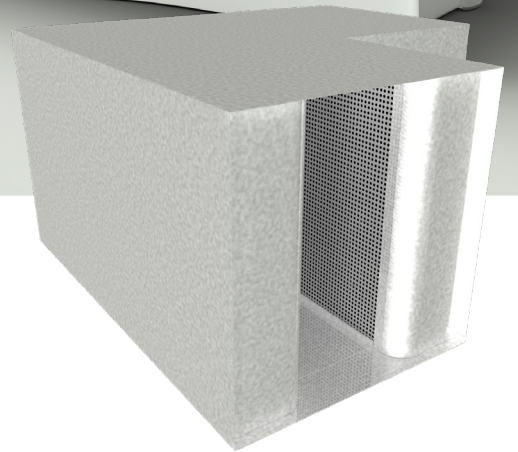


PERM

RECTANGULAR ELBOW SILENCER PACKLESS



price | NOISE
CONTROL

HOLYOAKE
AIR MANAGEMENT SOLUTIONS | by **price**

PERM

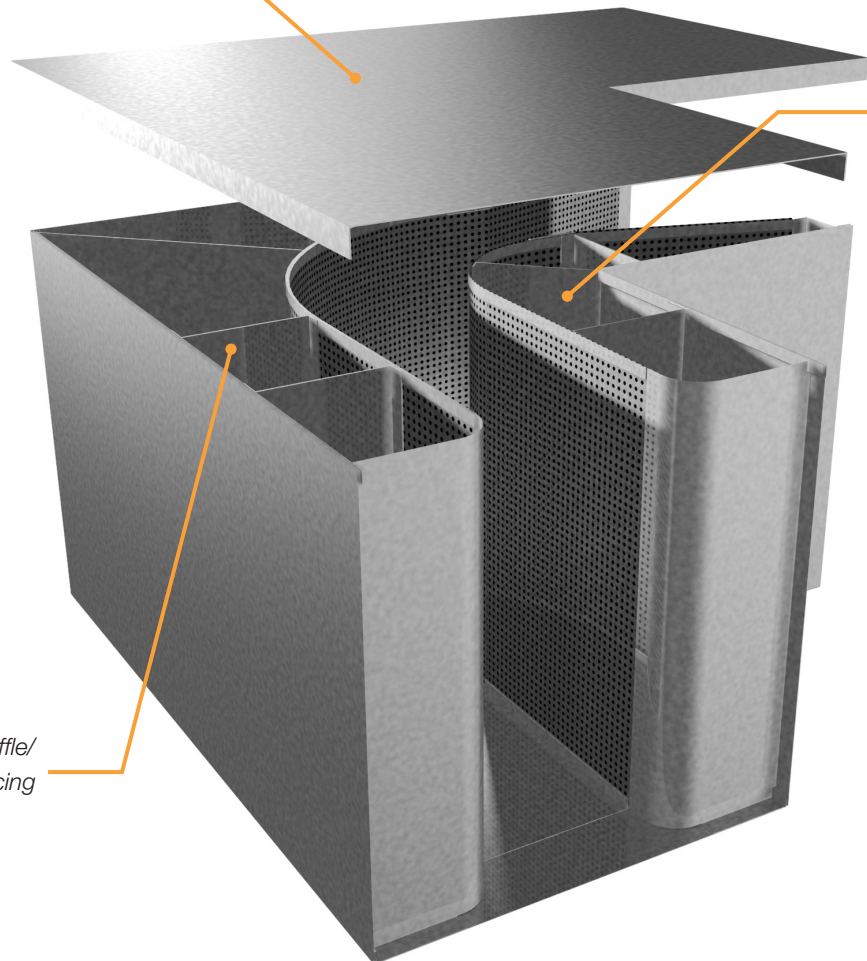
Rectangular Elbow Silencer Packless

The Rectangular Elbow Silencer Packless (PERM) provides a unique solution for noise control applications where fibrous acoustic material is not permitted in the air stream, and where a 90° elbow is necessary due to space constraints.

*90° elbow is suitable
for applications with
limited space*

*No acoustic
media is ideal
for critical
environment
applications*

*Optimized baffle/
splitter spacing*

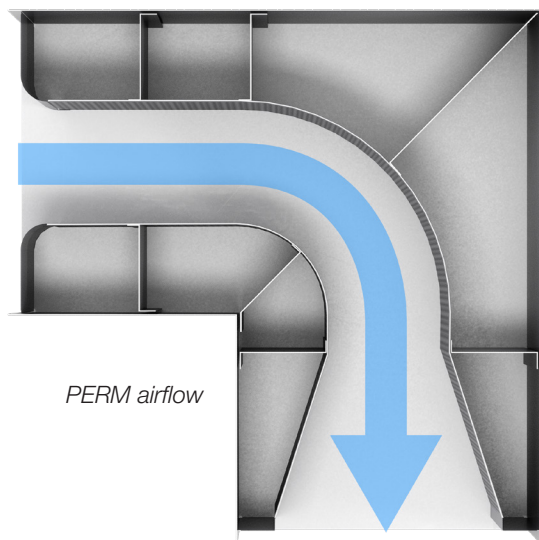


IDEAL FOR CRITICAL ENVIRONMENTS

- + Packless elbow silencers do not contain any acoustic media and consist of a solid metal casing and perforated metal liner.
- + The media free, optional stainless steel construction is safe for use in applications where corrosive gasses are present.
- + Lack of fibrous acoustic media eliminates the possibility of fibers entering the airstream and makes sanitation easy by eliminating absorptive material.

ELBOW SHAPE

- + The elbow shape of the PERM silencer makes it extremely versatile and an excellent choice for systems where straight lengths of ductwork are not available.
- + Elbow silencers perform at or above the level of rectangular silencers with a small increase in pressure drop on the system, and can be configured to suit most duct sizes without the use of transitions.



TYPICAL APPLICATIONS

The PERM is an ideal solution for undesirable noise in applications where fibrous acoustic material is not permitted in the air stream, such as washdown and high contaminant areas, including computer rooms, hospitals, cleanrooms and laboratories. The elbow shape of the PERM is ideal for applications with limited space where straight lengths of ductwork are not available.

CONSTRUCTION OPTIONS

- + Construction Type
 - 22 gauge
 - 18 gauge
 - 16 gauge
- + Material
 - Galvanized Steel
 - Aluminum
 - 304 Stainless Steel
- + Accessories
 - Flanges
 - Slip & drive connections
 - Access doors
 - Transitions
 - Drainage plugs

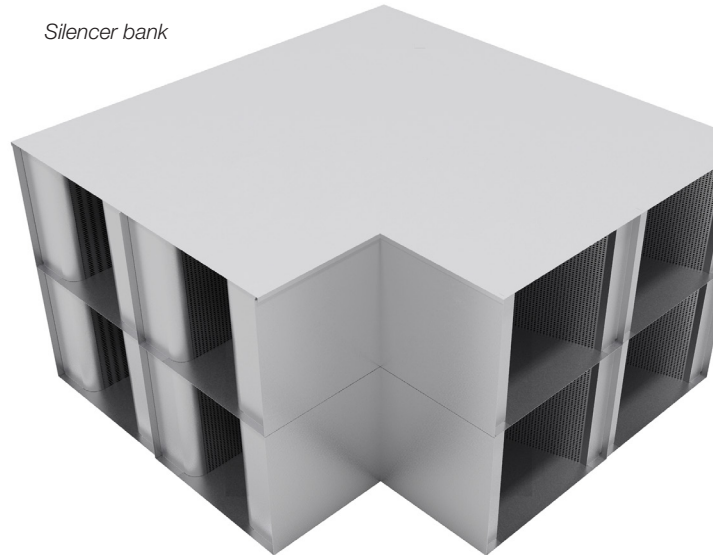
PERM

Rectangular Elbow Silencer Packless

DESIGN FLEXIBILITY

- + Available in a large range of sizes, the PERM offers excellent flexibility to accommodate a variety of ductwork designs. For non-standard sizes, the PERM can be custom built to suit the ductwork and application.
- + Elbow silencers that exceed a width of 1475 mm or a height of 1200 mm will be built in multiple components, then field assembled (by others) into a bank that matches the duct dimensions.

Silencer bank



OPTIMIZED PERFORMANCE

- + Ideal for low to medium velocity applications, the PERM provides high levels of insertion loss across the targeted range of frequencies, and makes use of a tapered tail baffle arrangement to allow for static regain and minimize pressure drop.

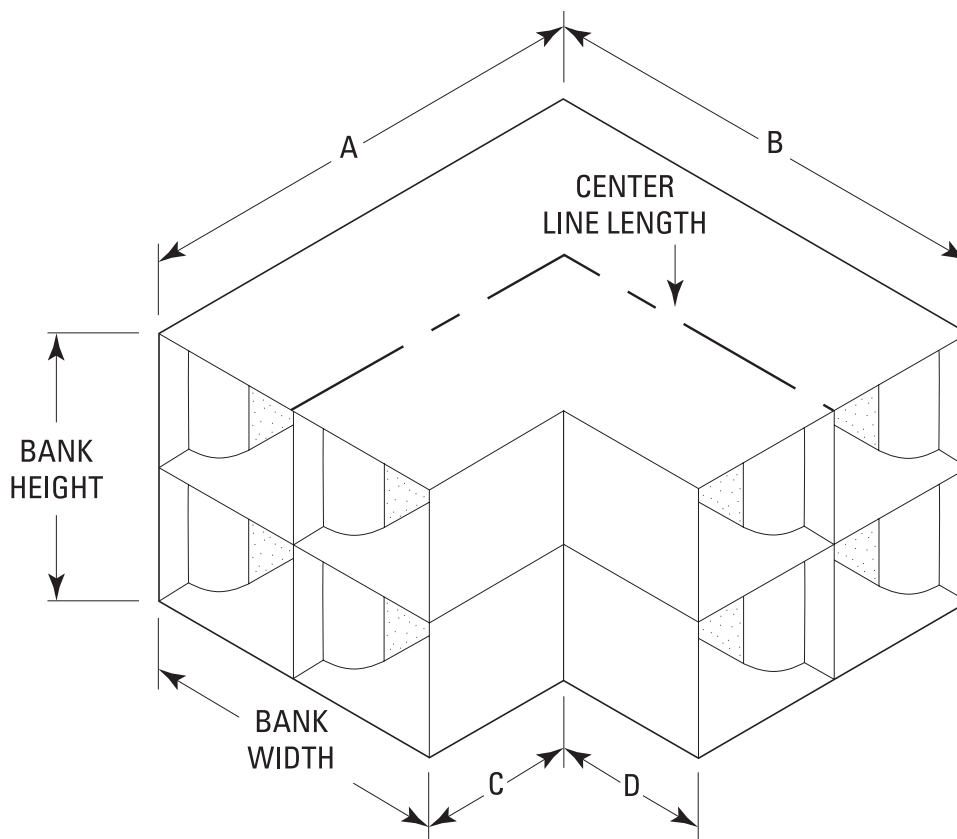


PERM

Rectangular Elbow Silencer Packless

DIMENSIONAL DATA

The PERM is built to match the duct dimensions, therefore the width, height and length dimensions for the silencer must always be specified.



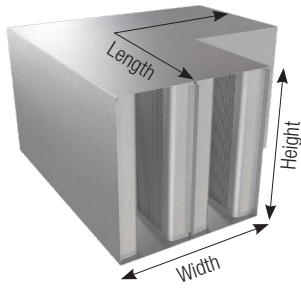
*Bank width & height typically equal the duct dimensions.

Standard Dimension Limits

Bank Width		Bank Height		Length		Component Width		Component Height	
Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
300	2950	150	12000	900	3600	300	1475	150	1200

Leg A		Leg B		Leg C		Leg D	
Min	Max	Min	Max	Min	Max	Min	Max
475	2525	475	2525	175	2350	175	2350

1. All dimensions are in millimeters
2. Standard sizes are based on raw material sizes and acceptable structural engineering practices.
3. Bank width greater than 1475 mm requires to components.
4. When multiple components are required, components will be identical, and configuration type nested.
5. For sizes outside the standard range, please contact your local Holyoake office.



PERFORMANCE DATA

Width (mm): 600

Pressure Attenuation (PA) Code: B

Modules: 2

Dynamic Insertion Loss (DIL)

Length (mm)	Weight (kg)	Face Velocity (m/s)	Pressure Drop (Pa)	Octave Band Dynamic Insertion Loss (dB)							
				63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
950	34	6.4	35	5	6	15	20	19	13	9	7
		3.8	12	5	5	13	18	16	11	9	7
		0	0	5	3	10	16	14	10	8	7
		-3.8	12	6	5	13	19	16	11	9	8
		-6.4	35	6	6	15	21	19	12	9	8
1500	54	6.4	40	6	6	15	21	21	14	10	8
		3.8	15	6	5	14	20	18	12	10	8
		0	0	5	4	11	17	15	11	9	8
		-3.8	15	7	5	14	20	18	13	10	8
		-6.4	40	7	7	16	22	20	14	10	8
2100	75	6.4	45	8	8	17	25	24	17	13	10
		3.8	15	7	7	16	22	21	15	12	10
		0	0	6	5	13	19	19	14	12	10
		-3.8	15	8	7	16	23	21	15	12	10
		-6.4	45	8	8	19	26	22	16	12	10
2700	97	6.4	50	9	8	17	25	24	17	15	12
		3.8	17	9	8	17	25	24	17	15	12
		0	0	7	5	15	21	23	17	14	12
		-3.8	17	10	9	18	26	25	17	14	11
		-6.4	50	10	10	21	30	24	19	14	11

Generated Noise (GN)

Length (mm)	Face Velocity (m/s)	Octave Band Generated Noise (dB)							
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
All Lengths	6.4	59	44	41	44	46	50	50	40
	3.8	42	26	27	34	37	34	34	20
	0	30	25	20	15	10	10	10	10
	-3.8	44	26	30	35	36	33	33	21
	-6.4	56	42	40	43	46	47	49	40

Generated Noise Correction Factors

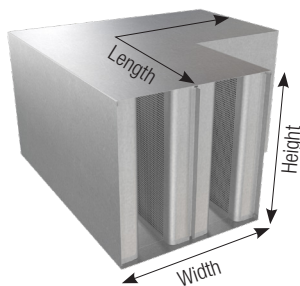
Face Area (Sqmm)	0.05	0.09	0.19	0.37	0.74	1.49	2.97	5.95	11.89
dB	-9	-6	-3	0	3	6	9	12	15

Performance Notes:

1. Data tables are derived from test data in conformance with ASTM E477-20.
2. "+" indicates performance data for forward flow (supply) applications.
3. "-" indicates performance data for reverse flow (return) applications.
4. Dynamic Insertion Loss is limited to 55 dB due to flanking.
5. For performance data specific to a configuration not cataloged, please use Price AIO Selection Software.
6. The performance data above is based on a 600mm x 600mm component.

PERM

Rectangular Elbow Silencer Packless



PERFORMANCE DATA

Width (mm): 600

Pressure Attenuation (PA) Code: D

Modules: 2

Dynamic Insertion Loss (DIL)

Length (mm)	Weight (kg)	Face Velocity (m/s)	Pressure Drop (Pa)	Octave Band Dynamic Insertion Loss (dB)							
				63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
950	35	6.4	52	7	7	17	22	23	15	11	9
		3.8	20	7	6	15	21	19	13	10	9
		0	0	7	4	12	18	16	12	10	9
		-3.8	20	8	6	15	21	19	13	10	9
		-6.4	52	9	8	17	23	23	15	10	9
1500	55	6.4	62	9	8	18	24	24	17	0	10
		3.8	22	8	7	16	22	21	15	11	10
		0	0	8	5	13	19	18	13	11	10
		-3.8	22	9	7	16	23	21	15	11	10
		-6.4	62	10	9	19	25	24	16	11	10
2100	77	6.4	72	11	10	20	28	28	20	15	13
		3.8	27	10	9	18	25	25	18	14	12
		0	0	9	6	15	21	22	17	14	12
		-3.8	27	12	10	19	26	25	18	14	12
		-6.4	72	12	11	22	29	26	19	14	12
2700	99	6.4	85	14	12	23	32	31	23	17	15
		3.8	30	13	10	20	28	29	20	17	15
		0	0	10	7	18	24	27	20	16	14
		-3.8	30	14	12	21	29	30	20	16	14
		-6.4	85	14	13	24	34	28	22	16	14

Generated Noise (GN)

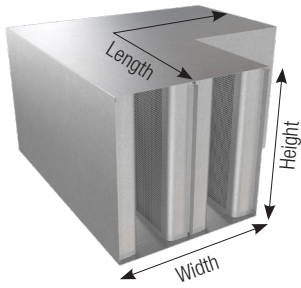
Length (mm)	Face Velocity (m/s)	Octave Band Generated Noise (dB)							
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
All Lengths	6.4	68	54	49	49	51	59	59	52
	3.8	51	36	35	39	42	43	43	32
	0	30	25	20	15	10	10	10	10
	-3.8	51	35	36	40	41	41	42	31
	-6.4	63	50	46	48	51	55	58	50

Generated Noise Correction Factors

Face Area (Sqmm)	0.05	0.09	0.19	0.37	0.74	1.49	2.97	5.95	11.89
dB	-9	-6	-3	0	3	6	9	12	15

Performance Notes:

1. Data tables are derived from test data in conformance with ASTM E477-20.
2. "+" indicates performance data for forward flow (supply) applications.
3. "-" indicates performance data for reverse flow (return) applications.
4. Dynamic Insertion Loss is limited to 55 dB due to flanking.
5. For performance data specific to a configuration not cataloged, please use Price AIO Selection Software.
6. The performance data above is based on a 600mm x 600mm component.



PERFORMANCE DATA

Width (mm): 600

Pressure Attenuation (PA) Code: F

Modules: 2

Dynamic Insertion Loss (DIL)

Length (mm)	Weight (kg)	Face Velocity (m/s)	Pressure Drop (Pa)	Octave Band Dynamic Insertion Loss (dB)							
				63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
950	35	6.4	152	7	9	19	24	27	20	16	14
		3.8	55	7	9	19	22	23	17	16	14
		0	0	9	7	16	19	19	16	15	13
		-3.8	55	9	10	19	23	22	17	16	13
		-6.4	152	10	12	22	24	26	17	15	13
1500	55	6.4	157	9	10	20	26	28	21	18	15
		3.8	57	8	9	20	23	25	19	17	15
		0	0	9	8	17	21	21	17	16	14
		-3.8	57	10	11	20	25	24	18	17	14
		-6.4	157	11	13	23	26	27	19	16	14
2100	77	6.4	164	11	12	23	30	32	25	20	18
		3.8	60	10	11	22	27	29	22	20	18
		0	0	10	9	20	23	26	20	19	16
		-3.8	60	12	14	23	28	28	21	19	16
		-6.4	164	13	15	26	30	29	22	19	16
2700	99	6.4	172	14	14	25	34	35	28	23	20
		3.8	62	13	13	24	30	33	25	23	20
		0	0	12	10	22	25	30	23	21	18
		-3.8	62	15	16	25	31	33	24	22	18
		-6.4	172	15	17	29	35	32	25	22	17

Generated Noise (GN)

Length (mm)	Face Velocity (m/s)	Octave Band Generated Noise (dB)							
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
All Lengths	6.4	82	68	60	57	59	73	71	67
	3.8	65	50	46	47	50	56	55	47
	0	30	25	20	15	10	10	10	10
	-3.8	61	47	44	46	49	52	55	46
	-6.4	73	63	55	55	59	67	70	65

Generated Noise Correction Factors

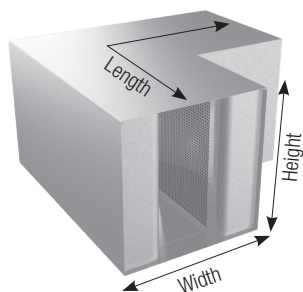
Face Area (Sqmm)	0.05	0.09	0.19	0.37	0.74	1.49	2.97	5.95	11.89
dB	-9	-6	-3	0	3	6	9	12	15

Performance Notes:

1. Data tables are derived from test data in conformance with ASTM E477-20.
2. "+" indicates performance data for forward flow (supply) applications.
3. "-" indicates performance data for reverse flow (return) applications.
4. Dynamic Insertion Loss is limited to 55 dB due to flanking.
5. For performance data specific to a configuration not cataloged, please use Price AIO Selection Software.
6. The performance data above is based on a 600mm x 600mm component.

PERM

Rectangular Elbow Silencer Packless



PERFORMANCE DATA

Width (mm): 600

Pressure Attenuation (PA) Code: B

Modules: 1

Dynamic Insertion Loss (DIL)

Length (mm)	Weight (kg)	Face Velocity (m/s)	Pressure Drop (Pa)	Octave Band Dynamic Insertion Loss (dB)							
				63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
950	28	6.4	22	3	6	14	16	10	8	6	4
		3.8	7	2	5	14	15	9	8	5	4
		0	0	2	4	14	12	9	6	3	4
		-3.8	7	6	5	14	13	9	6	3	3
		-6.4	22	4	5	14	14	10	6	4	4
1500	44	6.4	25	6	7	16	21	13	11	8	6
		3.8	10	6	6	16	20	11	10	7	6
		0	0	6	5	16	17	10	8	5	5
		-3.8	10	8	7	16	18	10	8	5	5
		-6.4	25	7	7	16	19	12	9	6	5
2100	61	6.4	27	9	9	19	26	15	13	10	8
		3.8	10	10	8	18	25	13	12	10	7
		0	0	10	7	17	22	11	10	8	7
		-3.8	10	10	8	18	23	12	11	8	6
		-6.4	27	11	9	19	25	14	12	8	7
2700	79	6.4	30	12	10	22	32	17	16	13	9
		3.8	10	13	9	20	30	14	15	13	9
		0	0	14	9	19	28	13	13	10	8
		-3.8	10	13	9	20	29	14	13	10	8
		-6.4	30	14	11	22	31	17	14	10	8

Generated Noise (GN)

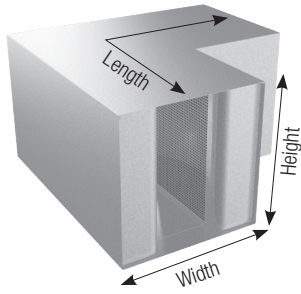
Length (mm)	Face Velocity (m/s)	Octave Band Generated Noise (dB)							
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
All Lengths	6.4	59	44	41	44	46	50	50	40
	3.8	42	26	27	34	37	34	34	20
	0	30	25	20	15	10	10	10	10
	-3.8	44	26	30	35	36	33	33	21
	-6.4	56	42	40	43	46	47	49	40

Generated Noise Correction Factors

Face Area (Sqm)	0.05	0.09	0.19	0.37	0.74	1.49	2.97	5.95	11.89
dB	-9	-6	-3	0	3	6	9	12	15

Performance Notes:

1. Data tables are derived from test data in conformance with ASTM E477-20.
2. "+" indicates performance data for forward flow (supply) applications.
3. "-" indicates performance data for reverse flow (return) applications.
4. Dynamic Insertion Loss is limited to 55 dB due to flanking.
5. For performance data specific to a configuration not cataloged, please use Price AIO Selection Software.
6. The performance data above is based on a 600mm x 600mm component.



PERFORMANCE DATA

Width (mm): 600

Pressure Attenuation (PA) Code: D

Modules: 1

Dynamic Insertion Loss (DIL)

Length (mm)	Weight (kg)	Face Velocity (m/s)	Pressure Drop (Pa)	Octave Band Dynamic Insertion Loss (dB)							
				63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
950	29	6.4	82	6	9	16	18	13	9	5	5
		3.8	30	5	7	15	17	11	8	5	5
		0	0	4	5	16	15	11	8	5	6
		-3.8	30	7	8	18	16	11	8	5	5
		-6.4	82	7	8	17	17	12	8	5	5
1500	45	6.4	75	9	10	18	23	15	11	7	6
		3.8	27	8	8	17	22	13	11	7	6
		0	0	7	7	18	19	12	10	7	7
		-3.8	27	10	9	19	21	12	10	7	6
		-6.4	75	11	10	20	23	14	11	7	7
2100	64	6.4	70	12	11	21	29	17	14	10	8
		3.8	25	12	10	20	27	15	13	10	8
		0	0	11	8	19	25	13	12	10	8
		-3.8	25	12	11	21	26	14	13	10	8
		-6.4	70	14	12	23	29	16	13	10	8
2700	82	6.4	62	15	12	24	34	19	17	12	10
		3.8	22	16	11	22	32	16	16	12	10
		0	0	15	10	21	30	15	15	12	10
		-3.8	22	15	12	23	31	16	15	12	10
		-6.4	62	17	14	26	35	18	16	12	10

Generated Noise (GN)

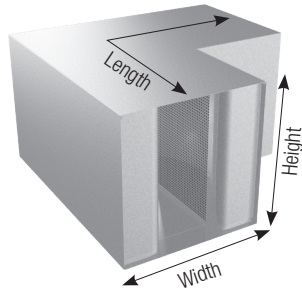
Length (mm)	Face Velocity (m/s)	Octave Band Generated Noise (dB)							
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
All Lengths	6.4	68	54	49	49	51	59	59	52
	3.8	51	36	35	39	42	43	43	32
	0	30	25	20	15	10	10	10	10
	-3.8	51	35	36	40	41	41	42	31
	-6.4	63	50	46	48	51	55	58	50

Generated Noise Correction Factors

Face Area (Sqmm)	0.05	0.09	0.19	0.37	0.74	1.49	2.97	5.95	11.89
dB	-9	-6	-3	0	3	6	9	12	15

Performance Notes:

1. Data tables are derived from test data in conformance with ASTM E477-20.
2. "+" indicates performance data for forward flow (supply) applications.
3. "-" indicates performance data for reverse flow (return) applications.
4. Dynamic Insertion Loss is limited to 55 dB due to flanking.
5. For performance data specific to a configuration not cataloged, please use Price AIO Selection Software.
6. The performance data above is based on a 600mm x 600mm component.



PERFORMANCE DATA

Width (mm): 600

Pressure Attenuation (PA) Code: F

Modules: 1

Dynamic Insertion Loss (DIL)

Length (mm)	Weight (kg)	Face Velocity (m/s)	Pressure Drop (Pa)	Octave Band Dynamic Insertion Loss (dB)							
				63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
950	29	6.4	197	6	13	26	23	12	12	8	9
		3.8	70	5	11	29	20	10	11	9	9
		0	0	5	10	30	16	9	11	9	8
		-3.8	70	8	12	22	18	14	11	10	9
		-6.4	197	8	12	22	18	15	11	10	9
1500	46	6.4	187	9	9	12	21	25	19	16	13
		3.8	67	8	8	11	22	23	17	15	13
		0	0	9	9	10	22	21	15	14	12
		-3.8	67	10	13	23	22	15	13	12	10
		-6.4	187	11	13	24	23	17	13	12	10
2100	64	6.4	177	12	13	24	30	21	19	16	13
		3.8	65	12	12	24	29	19	17	16	13
		0	0	12	12	23	26	17	16	15	12
		-3.8	65	13	15	25	28	17	16	15	12
		-6.4	177	15	15	27	30	20	16	15	12
2700	83	6.4	169	15	14	26	36	23	22	18	15
		3.8	60	16	13	26	34	20	20	18	15
		0	0	16	13	25	32	18	18	17	14
		-3.8	60	15	16	27	33	19	19	17	14
		-6.4	169	18	17	30	36	22	19	17	14

Generated Noise (GN)

Length (mm)	Face Velocity (m/s)	Octave Band Generated Noise (dB)							
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
All Lengths	6.4	82	68	60	57	59	73	71	67
	3.8	65	50	46	47	50	56	55	47
	0	30	25	20	15	10	10	10	10
	-3.8	61	47	44	46	49	52	55	46
	-6.4	73	63	55	55	59	67	70	65

Generated Noise Correction Factors

Face Area (Sqmm)	0.05	0.09	0.19	0.37	0.74	1.49	2.97	5.95	11.89
dB	-9	-6	-3	0	3	6	9	12	15

Performance Notes:

1. Data tables are derived from test data in conformance with ASTM E477-20.
2. "+" indicates performance data for forward flow (supply) applications.
3. "-" indicates performance data for reverse flow (return) applications.
4. Dynamic Insertion Loss is limited to 55 dB due to flanking.
5. For performance data specific to a configuration not cataloged, please use Price AIO Selection Software.
6. The performance data above is based on a 600mm x 600mm component.



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