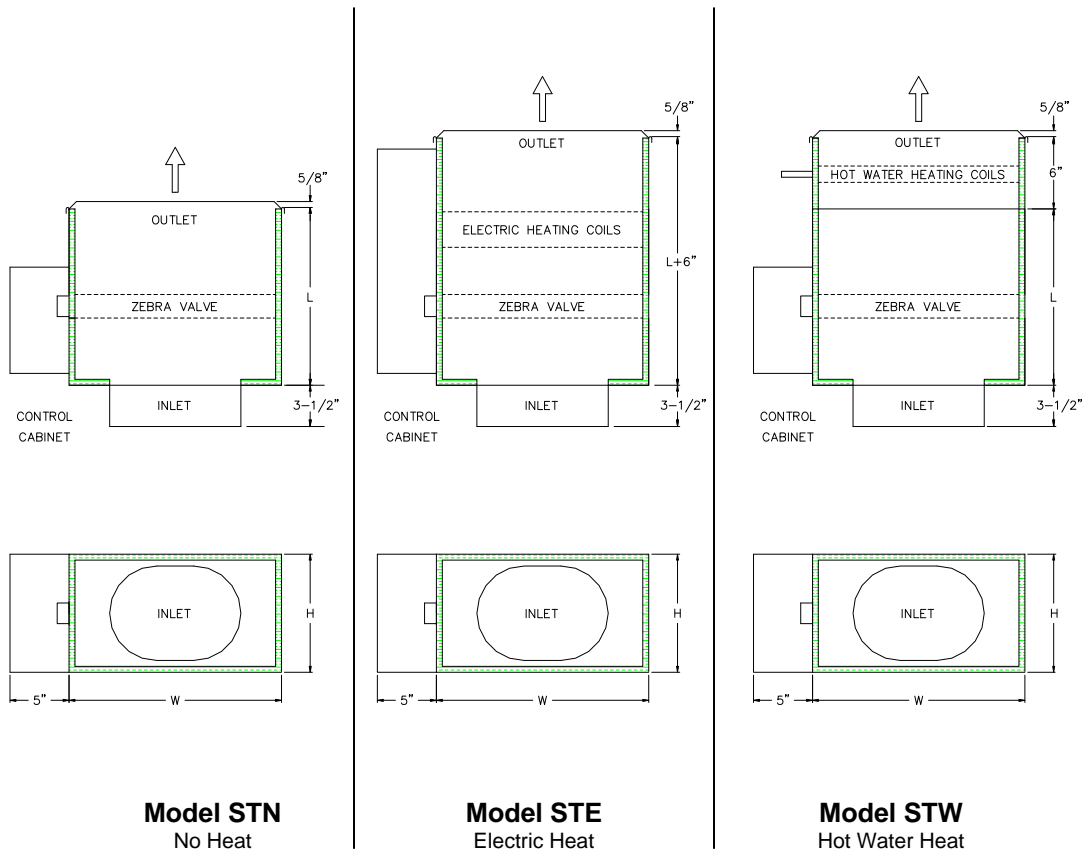


Model ST Capacity and Dimensional Data

Model Number	Inlet		Nominal CFM	Maximum CFM (Range)	Dimensions			Outlet		Weight Est. Lbs
	Size (in)	Shape (H x W)			W (in.)	H (in.)	L (in.)	Width (in.)	Height (in.)	
ST_04L	4	Round	200	100–300	8	10	15	8	10	25
ST_05L	5	Round	300	150–400	8	10	15	8	10	25
ST_06L	6	Round	500	250–700	10	10	15	10	10	26
ST_08L	8	Round	700	350–900	14	10	15	14	10	28
ST_10L	10	8 x 111/8	1000	600–1300	18	10	15	18	10	32
ST_12L(*)	12	8 x 141/4	1400	800–1800	24	10	15	24	10	35
ST_12M	12	Round	1700	1000–2200	20	15	15	20	15	36
ST_14M	14	Round	2100	1400–2700	24	15	15	24	15	38
ST_16M	16	14 x 171/8	2600	1700–3400	30	15	15	30	15	43
ST_18M	18	14 x 201/4	3300	2200–4200	36	15	15	36	15	47
ST_20M	20	14 x 237/16	4200	3000–5300	48	15	15	48	15	55

NOTES:

1. STN = No heat STE = Electric heat coil STW = Hot water coil.
2. Special controls may increase the length (L).
3. Oval-inlet dimensions shown will fit inside flex-duct with "Size" diameter.
4. (*) ST_12L is quoted as ST_11



Standard Features

STN	STE	STW
<ul style="list-style-type: none"> • Multi-port velocity sensor • 1/2" insulation • Actuator mounting plate • Controls enclosure • Single point power connection • Primary inlet connection • Slip and drive outlet connection • Patented Zebra High Precision Air Valve • Gauge 20 galvanized steel construction 	<ul style="list-style-type: none"> • Multi-port velocity sensor • 1/2" fiberglass insulation • Actuator mounting plate • Controls enclosure • Single point power connection • Electric heater • Heater relays • Safety limits • Primary inlet connection • Slip and drive outlet connection • Patented Zebra High Precision Air Valve • Gauge 20 galvanized steel construction 	<ul style="list-style-type: none"> • Multi-port velocity sensor • 1/2" insulation • Actuator mounting plate • Controls enclosure • Single point power connection • Hot water reheat coil • Primary inlet connection • Slip and drive outlet connection • Patented Zebra High Precision Air Valve • Gauge 20 galvanized steel construction

Optional accessories

Controls

- | | |
|---|---|
| <input type="checkbox"/> Floating electric actuator | <input type="checkbox"/> Electric thermostat |
| <input type="checkbox"/> Proportional electric actuator | <input type="checkbox"/> Electronic thermostat |
| <input type="checkbox"/> Pneumatic actuator | <input type="checkbox"/> Pneumatic thermostat |
| <input type="checkbox"/> Electric pressure dependent controls | <input type="checkbox"/> Factory mount and wire actuator, furnished by others |
| <input type="checkbox"/> Electronic pressure independent controls | <input type="checkbox"/> Factory mount and wire controller, furnished by others |
| <input type="checkbox"/> Transformer (indicate power voltage) | <input type="checkbox"/> Other _____ |

Construction

- | | |
|--|---|
| <input type="checkbox"/> Round outlet | <input type="checkbox"/> 1" Foam |
| <input type="checkbox"/> Flanged outlet connection | <input type="checkbox"/> Perforated metal lining |
| <input type="checkbox"/> 1/2" Fiberglass insulation | <input type="checkbox"/> Double wall |
| <input type="checkbox"/> 1" Fiberglass insulation | <input type="checkbox"/> Access panel |
| <input type="checkbox"/> 1/2" Fiberglass with foil lining insulation | <input type="checkbox"/> Right hand side controls enclosure |
| <input type="checkbox"/> 1" Fiberglass with foil lining insulation | <input type="checkbox"/> Left hand side controls enclosure |
| <input type="checkbox"/> 1/2" Foam | <input type="checkbox"/> Other _____ |

Hot Water Coil

- | | |
|--|---|
| <input type="checkbox"/> Rows _____ | <input type="checkbox"/> Circuits _____ |
| <input type="checkbox"/> Fins per inch _____ | <input type="checkbox"/> Drain plug |

Electric Data

Supply voltage (volts, phase, hertz)

- | | |
|--|--|
| <input type="checkbox"/> 120/1/60
<input type="checkbox"/> 208/1/60
<input type="checkbox"/> 240/1/60
<input type="checkbox"/> 277/1/60
<input type="checkbox"/> 480/3/60
<input type="checkbox"/> 208/3/60
<input type="checkbox"/> 240/3/60
<input type="checkbox"/> 480/3/60 | <input type="checkbox"/> Air pressure switch
<input type="checkbox"/> Fan interlock
<input type="checkbox"/> Manual reset
<input type="checkbox"/> Disconnect switch
<input type="checkbox"/> Fused disconnect switch
<input type="checkbox"/> Mercury contactor
<input type="checkbox"/> SSR relays
<input type="checkbox"/> Other _____ |
|--|--|

Electric Heat

- | | |
|--|--|
| <input type="checkbox"/> Kw _____
<input type="checkbox"/> Stages _____ | <input type="checkbox"/> SCR _____
<input type="checkbox"/> Magnetic Disconnect _____ |
|--|--|

Primary Airflow			
Cooling			Heating
Nominal	Maximum	Minimum	Maximum

Unit designation (tag) _____

Quantity _____

Job Name _____

Architect _____

Engineer _____

Contractor _____

Location _____

AIR FLOW PERFORMANCE DATA SINGLE DUCT THROTTLING UNIT

CONTROLLABILITY

Warren Quiet Plus VAV Terminal Units have lower sound levels than conventional units. Oversizing to attain acceptable sound levels is unnecessary, so selection may be based on controllability, which ensures maximum performance.

Figure 2 shows the effect of airflow rate and ΔP_s on controllability for VAV valves. The maximum operating range of a VAV valve is the physical distance (linear or rotational) in which it modulates. The Effective Operating Range is equal to the maximum operating range minus the amount the valve must close to compensate for the system static pressure at the design airflow rate. Optimum controllability is attained by selecting the smallest sized unit which meets the design airflow and sound requirements.

Effective Operating Ranges of less than 50% are not recommended for VAV terminal units.

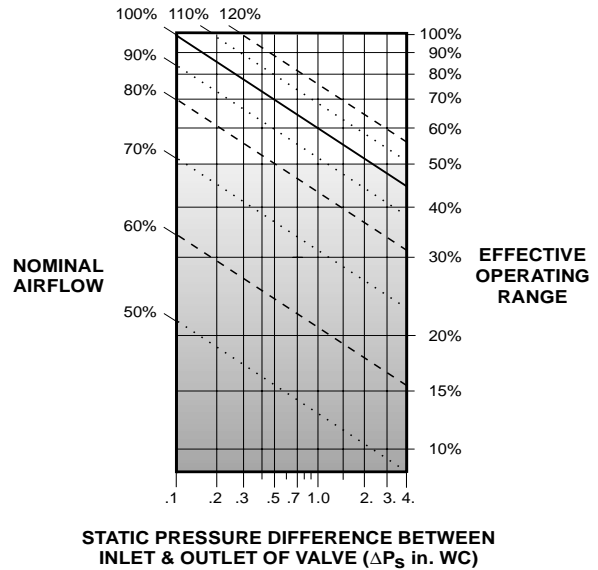


Figure 2. Controllability Graph

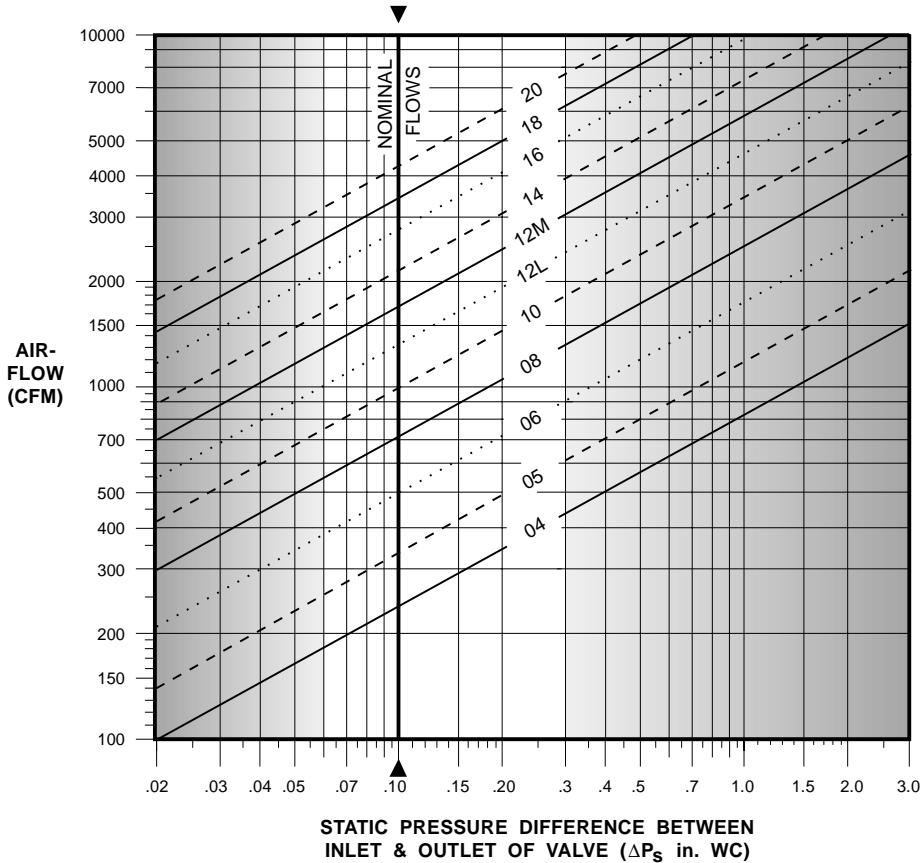


Figure 3. Warren Zebra Valve Airflow Performance Data

AIR FLOW CAPACITIES

Warren's Quiet Plus VAV Units are offered in a full range of terminal sizes to accommodate most specified airflow requirements.

Figure 3 shows airflow performance data (full open valve) for sizes 04-20 inches, given various static pressure differences between the inlet and outlet of the unit (ΔP_s).

Nominal capacities are based on a ΔP_s of 0.10 in. WC, 2000 FPM inlet velocity, 1000 FPM outlet velocity, and 100% effective operating range.

PERFORMANCE DATA
SINGLE DUCT THROTTLING UNIT

Table 2. Model ST QUICK-SELECT Sound Data, Discharge and Radiated NC Levels

Unit Size	CFM	Min ΔP_s	Min ΔP_s		0.5" ΔP_s		1.0" ΔP_s		3.0" ΔP_s	
			Dis	Rad	Dis	Rad	Dis	Rad	Dis	Rad
04L	150	.04	-	-	-	-	-	-	-	-
	200	.07	-	-	-	-	-	-	-	-
	250	.11	-	-	-	-	-	-	-	-
05L	200	.04	-	-	-	-	-	-	-	-
	300	.08	-	-	-	-	-	-	-	-
	400	.14	-	-	-	-	-	-	-	-
06L	400	.07	-	-	-	-	-	-	-	-
	500	.10	-	-	-	-	-	-	-	-
	600	.15	-	-	-	-	-	-	-	20
08L	500	.05	-	-	-	-	-	-	-	-
	700	.10	-	-	-	-	-	-	-	-
	900	.15	-	-	-	-	-	-	-	21
10L	800	.07	-	-	-	-	-	-	-	-
	1000	.10	-	-	-	-	-	-	-	-
	1200	.15	-	-	-	-	-	-	20	22
12L	1200	.08	-	-	-	-	-	-	-	-
	1400	.10	-	-	-	-	-	-	-	20
	1600	.15	-	-	-	-	-	-	-	23
12M	1300	.05	-	-	-	-	-	-	-	-
	1700	.10	-	-	-	-	-	-	-	22
	2000	.14	-	-	-	-	-	20	21	24
14M	1600	.06	-	-	-	-	-	-	-	-
	2100	.10	-	-	-	-	-	-	20	23
	2600	.15	-	20	-	21	-	22	24	26
16M	2000	.05	-	-	-	-	-	-	-	20
	2600	.08	-	-	-	-	-	-	21	24
	3200	.12	-	21	-	21	-	23	25	27
18M	2600	.06	-	-	-	-	-	-	24	22
	3300	.10	-	-	-	-	-	20	27	25
	4000	.13	-	23	-	23	-	24	28	29
20M	3400	.06	-	-	-	-	-	-	27	24
	4200	.10	-	-	-	20	22	22	30	27
	4800	.13	-	25	20	26	24	27	32	30

PERFORMANCE NOTES:

- 1) "-" indicates an NC level less than 20.
- 2) " ΔP_s " is the difference in static pressure from inlet to discharge, in. WC.
- 3) Test data obtained in accordance with ARI/ADC Test Standard 880.
- 4) Quick-Select NC levels are generated using tables and formulae in Warren's *Acoustic Applications Guide*.
- 5) Discharge NC levels are based on the following:
 - a) 10 dB room absorption
 - b) 5 feet of rectangular lined duct
 - c) 5 feet of standard flex duct
 - d) end reflection
 - e) flow division
- 6) Radiated NC levels are based on the following:
 - a) 10 dB room absorption
 - b) mineral fiber acoustical ceiling tile

PERFORMANCE DATA
SINGLE DUCT THROTTLING UNIT

Table 3. Model ST DISCHARGE Sound Power in Decibels

		Sound Power Levels, L _w , re 10 ⁻¹² Watts																												
Unit Size	CFM	Min ΔP _s	Min ΔP _s							0.5" ΔP _s							1.0" ΔP _s							3.0" ΔP _s						
			2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
04L	150	.04	36	39	39	35	33	30	-	39	45	49	49	46	45	-	40	46	50	50	49	48	-	45	50	55	57	58	58	-
	200	.07	42	45	45	42	39	36	-	44	48	54	54	51	49	-	46	50	55	55	54	52	-	49	53	58	61	62	62	-
	250	.11	48	51	51	49	45	42	-	49	51	59	59	56	53	-	52	54	60	60	59	56	-	53	56	61	65	66	66	-
05L	200	.04	31	33	32	29	25	22	-	39	43	48	45	43	41	-	39	44	48	48	47	46	-	46	48	53	55	57	57	-
	300	.08	37	41	40	37	35	32	-	43	48	52	52	49	46	-	43	48	52	52	51	49	-	47	53	56	59	60	60	-
	400	.14	44	46	47	45	41	37	-	45	52	56	55	55	52	-	46	52	57	56	56	53	-	51	55	59	63	64	64	-
06L	400	.07	40	43	43	39	37	33	-	45	49	53	52	49	46	-	45	51	55	54	54	52	-	50	54	59	61	63	63	-
	500	.10	46	49	49	47	44	40	-	49	54	58	56	54	52	-	49	54	58	58	57	56	-	52	57	62	65	66	66	-
	600	.15	50	54	54	53	49	45	-	52	58	62	59	58	57	-	54	58	63	61	59	59	-	55	59	65	68	68	68	-
08L	500	.05	35	38	38	36	33	27	-	42	45	50	49	46	45	-	45	49	54	55	54	53	-	49	53	56	60	61	61	-
	700	.10	43	46	45	43	41	37	-	46	50	55	54	51	50	-	50	53	58	59	57	56	-	52	56	60	64	65	65	-
	900	.15	50	53	53	52	47	43	-	52	56	60	59	56	55	-	53	57	61	62	61	60	-	55	59	63	67	68	68	-
10L	800	.07	40	43	44	41	36	34	-	44	48	54	53	51	49	-	49	52	56	58	57	56	-	54	58	64	66	67	67	-
	1000	.10	45	48	50	47	43	40	-	48	53	57	56	54	53	-	52	55	60	61	60	58	-	56	60	65	68	69	69	-
	1200	.15	49	52	54	52	48	46	-	52	56	61	60	58	56	-	54	58	64	65	64	62	-	58	62	67	70	71	71	20
12L	1200	.08	38	41	43	39	36	35	-	45	49	55	54	51	50	-	49	53	59	59	58	57	-	56	59	65	68	67	67	-
	1400	.10	42	45	47	44	41	39	-	47	52	57	56	53	52	-	51	54	60	60	59	58	-	57	60	66	68	68	67	-
	1600	.15	46	48	51	48	45	43	-	49	54	59	58	55	54	-	52	56	61	62	61	60	-	59	62	67	69	69	68	-
12M	1300	.05	39	41	44	39	36	36	-	46	49	56	54	51	51	-	50	53	60	59	58	58	-	57	59	66	68	67	68	-
	1700	.10	47	48	52	48	45	44	-	50	54	60	58	55	55	-	53	56	62	62	61	61	-	60	62	68	69	69	69	-
	2000	.14	52	54	59	55	52	50	-	53	58	64	62	59	57	-	56	59	64	65	64	63	-	61	64	69	72	72	71	21
14M	1600	.06	38	41	45	43	39	37	-	49	53	57	56	55	54	-	51	54	59	61	60	60	-	57	60	66	68	69	69	-
	2100	.10	45	48	52	49	46	45	-	52	56	61	60	58	57	-	54	57	64	65	64	63	-	59	63	68	70	70	70	20
	2600	.15	52	55	58	56	53	51	-	55	59	64	63	61	59	-	57	61	68	68	66	65	-	62	65	70	74	74	74	24
16M	2000	.05	40	43	46	43	40	38	-	51	54	59	58	57	55	-	52	55	60	61	61	60	-	59	63	68	70	70	70	-
	2600	.08	47	50	53	50	47	45	-	54	58	63	62	60	59	-	55	58	64	65	64	63	-	61	65	70	73	73	73	21
	3200	.12	53	56	60	57	54	52	-	56	61	66	65	64	61	-	58	62	67	68	67	65	-	64	67	72	75	76	76	25
18M	2600	.06	42	46	49	47	43	41	-	52	56	61	60	59	57	-	55	58	63	65	64	64	-	60	64	69	72	72	72	24
	3300	.10	49	52	56	54	49	48	-	56	60	65	64	63	62	-	58	61	67	68	67	66	-	63	66	72	75	75	75	27
	4000	.13	56	59	63	60	57	55	-	59	63	68	67	65	63	-	62	65	69	71	69	68	-	66	69	75	77	78	78	28
20M	3400	.06	44	47	50	48	45	44	-	54	59	63	62	61	60	-	56	59	66	67	66	65	-	62	66	72	75	75	75	27
	4200	.10	52	55	58	56	52	49	-	58	63	66	65	64	63	-	60	64	69	70	69	68	22	65	69	74	77	77	77	30
	4800	.13	57	61	65	62	58	57	-	62	66	70	69	68	66	20	64	66	72	74	71	70	24	67	71	77	79	79	79	32

PERFORMANCE NOTES:

- 1) Test data obtained in accordance with ARI/ADC Test Standard 880.
- 2) Data is raw, without any corrections for room absorption, duct attenuation, multiple diffuser splits, etc.
- 3) Sound data listed is within ARI tolerances shown in the following table:

Band	2	3	4	5	6	7
Hz	125	250	500	1000	2000	4000
dB	6	4	3	3	3	3

- 4) "ΔP_s" is the difference in static pressure from inlet to discharge, in. WC.
- 5) "-" indicates an NC level less than 20.
- 6) Discharge NC levels are based on the following:
 - a) 10 dB room absorption
 - b) 5 feet of rectangular lined duct
 - c) 5 feet of standard flex duct
 - d) end reflection
 - e) flow division

PERFORMANCE DATA
SINGLE DUCT THROTTLING UNIT

Table 4. Model ST RADIATED Sound Power in Decibels

		Sound Power Levels, L _w , re 10 ⁻¹² Watts																												
Unit Size	CFM	Min ΔP _s	Min ΔP _s							0.5" ΔP _s							1.0" ΔP _s							3.0" ΔP _s						
			2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
04L	150	.04	26	23	22	-	-	-	-	28	26	30	27	21	-	-	30	28	33	27	22	-	-	34	31	36	37	35	33	-
	200	.07	32	28	32	27	21	-	-	34	31	34	30	25	-	-	33	30	36	31	25	-	-	37	34	40	40	38	35	-
	250	.11	38	35	38	33	27	20	-	38	36	38	33	29	22	-	39	36	39	35	30	24	-	40	37	44	43	41	37	-
05L	200	.04	22	20	-	-	-	-	-	26	23	27	24	-	-	-	27	26	31	27	22	-	-	33	30	35	36	35	32	-
	300	.08	28	26	25	-	-	-	-	31	28	32	29	24	-	-	31	31	35	29	25	-	-	36	34	38	39	37	35	-
	400	.14	34	31	34	29	23	-	-	34	32	36	32	26	20	-	34	33	38	33	27	21	-	40	37	42	41	39	36	-
06L	400	.07	31	28	27	22	-	-	-	33	31	34	31	25	-	-	34	32	37	32	29	23	-	37	35	40	42	39	36	-
	500	.10	37	33	36	32	25	-	-	37	35	39	35	27	22	-	37	35	40	36	30	27	-	42	38	44	44	42	38	-
	600	.15	41	38	41	37	29	24	-	41	39	43	39	30	26	-	42	39	44	40	31	28	-	46	41	48	46	45	39	20
08L	500	.05	29	26	-	-	-	-	-	34	30	34	30	25	-	-	35	32	37	35	31	26	-	37	35	39	41	39	37	-
	700	.10	34	31	31	24	-	-	-	36	34	38	35	29	22	-	39	35	41	38	33	27	-	42	40	44	44	42	39	-
	900	.15	38	35	39	35	28	21	-	42	38	42	39	33	26	-	43	39	45	43	34	29	-	45	42	46	47	45	41	21
10L	800	.07	30	28	23	-	-	-	-	35	33	36	31	24	-	-	38	36	39	36	31	26	-	41	39	44	43	42	39	-
	1000	.10	37	36	35	27	-	-	-	39	37	39	35	27	21	-	42	39	42	39	34	29	-	44	43	46	45	43	41	-
	1200	.15	42	41	41	37	29	-	-	44	42	44	39	32	25	-	45	44	46	44	37	31	-	47	45	49	48	46	43	22
12L	1200	.08	36	32	31	-	-	-	-	36	35	37	29	22	-	-	38	36	40	37	33	28	-	44	42	46	44	42	40	-
	1400	.10	39	35	36	26	-	-	-	39	37	40	32	25	-	-	42	38	42	39	35	30	-	46	44	48	45	43	41	20
	1600	.15	42	39	40	33	22	-	-	42	39	42	35	27	21	-	45	40	44	40	36	31	-	47	45	51	47	45	43	23
12M	1300	.05	36	33	32	-	-	-	-	37	36	38	29	23	-	-	39	36	41	38	33	29	-	45	42	46	45	43	40	-
	1700	.10	43	40	41	33	23	-	-	43	40	43	36	27	22	-	46	41	44	41	36	32	-	48	45	50	48	46	43	22
	2000	.14	46	43	46	40	33	26	-	47	44	47	39	33	25	-	49	44	48	44	39	35	20	51	48	52	50	47	44	24
14M	1600	.06	37	34	30	-	-	-	-	36	35	37	31	24	-	-	40	38	41	39	34	28	-	44	43	46	45	43	41	-
	2100	.10	42	39	40	34	24	-	-	42	41	43	37	29	22	-	44	43	45	44	37	32	-	48	46	50	47	46	43	23
	2600	.15	47	46	48	44	37	27	20	47	46	49	45	37	27	21	47	46	49	47	41	34	22	51	49	53	50	48	45	26
16M	2000	.05	38	34	30	22	-	-	-	38	36	38	32	25	-	-	41	39	42	39	35	30	-	45	44	47	46	44	42	20
	2600	.08	43	41	40	36	26	-	-	44	42	44	39	30	23	-	45	43	47	44	39	33	-	49	47	52	49	46	44	24
	3200	.12	49	46	49	44	37	28	21	49	46	49	45	38	29	21	49	47	51	48	42	36	23	52	51	55	52	49	46	27
18M	2600	.06	39	36	33	26	-	-	-	41	38	40	34	27	-	-	44	41	45	43	37	32	-	46	46	49	48	46	44	22
	3300	.10	45	43	42	37	27	-	-	45	44	46	40	32	25	-	46	45	48	46	42	35	20	51	50	53	51	49	46	25
	4000	.13	51	48	51	46	38	30	23	51	48	51	47	39	30	23	52	49	52	49	45	37	24	55	53	56	54	51	49	29
20M	3400	.06	42	38	35	27	-	-	-	42	41	42	36	29	22	-	45	43	46	45	38	34	-	49	48	51	50	48	46	24
	4200	.10	47	45	45	39	29	-	-	47	46	48	43	35	26	20	49	47	50	48	43	37	22	53	52	55	53	51	48	27
	4800	.13	53	51	53	47	40	33	25	53	51	54	49	40	33	26	53	51	55	52	46	39	27	56	55	58	56	53	50	30

PERFORMANCE NOTES:

- 1) Test data obtained in accordance with ARI/ADC Test Standard 880.
- 2) Data is raw, without any corrections for room absorption, or ceiling effect.
- 3) Sound data listed is within ARI tolerances shown in the following table:

Band	2	3	4	5	6	7
Hz	125	250	500	1000	2000	4000
dB	6	4	3	3	3	3

- 4) "ΔP_s" is the difference in static pressure from inlet to discharge, in. WC.
- 5) "-" indicates an NC level less than 20.
- 6) Radiated NC levels are based on the following:
 - a) 10 dB room absorption
 - b) mineral fiber acoustical ceiling tile