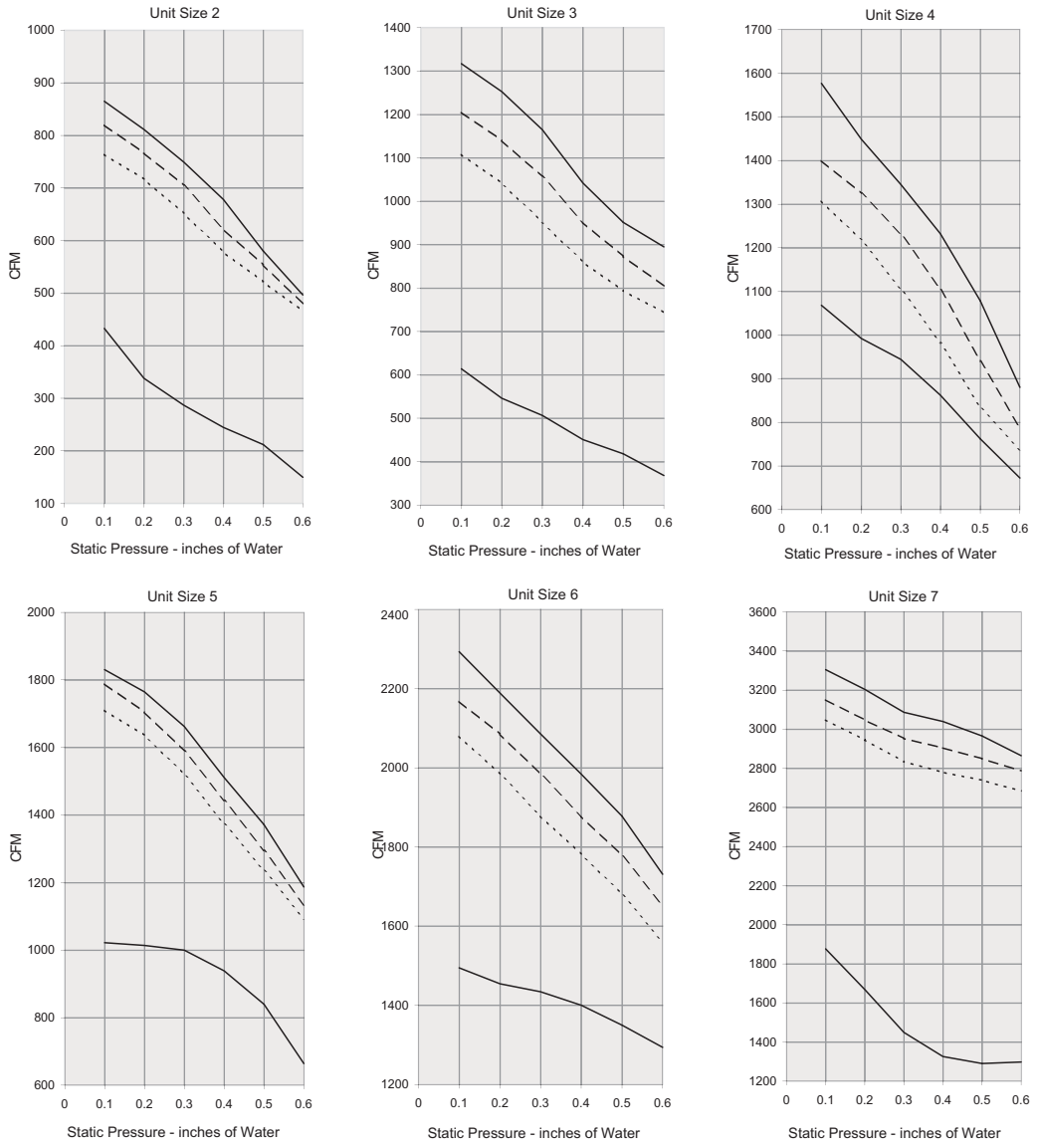
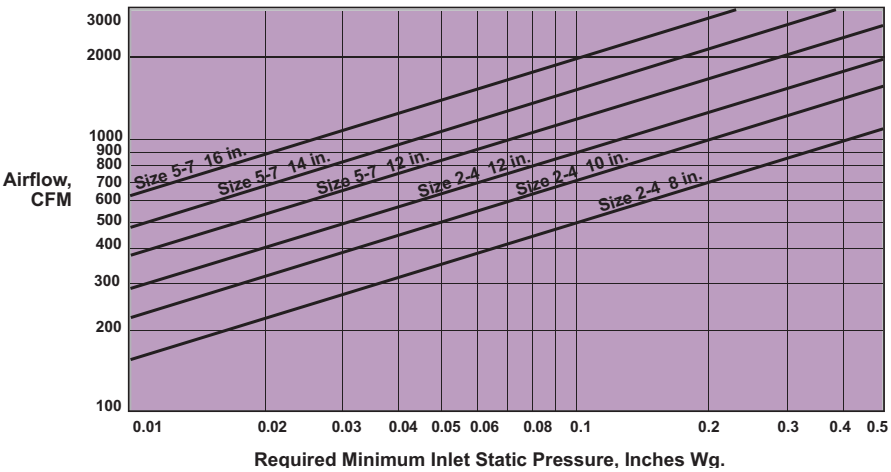
PTQS, ATQS, DTQS WITH ULTRALOC™ LINER / AIRFLOW VS. DOWNSTREAM STATIC PRESSURE



No Coil or with Electric Coil ——————
1 Row Water Coil – – – – –
2 Row Water Coil ----------

PRIMARY AIR INLET PRESSURE / PTQS, ATQS, DTQS WITH ULTRALOC™ LINER



Note: For selection procedure, See the section Engineering Guidelines and the topic 'ECM Motors - Fan Powered Terminals' for additional information.

A NOTE ON RADIATED SOUND LEVELS FOR TQS WITH ULTRALOC™ LINER

The radiated sound paths for a fan-powered unit start at the fan motor/blower assembly and the primary damper. This sound energy must either exit through the induction port or pass through the casing before reaching the plenum, ceiling tile, occupied space, and eventually the listener.

AHRI 885 was developed to provide a standardized way to accurately predict sound levels in a space resulting from noise generated in the ceiling plenum above. It is important to understand that AHRI 885 was formulated to deal with noise from a point source. Terminal units with 'soft' liners behave very much like a point source, in that noise is emitted from all external casing surfaces in a roughly equal manner. This is not true for a dual wall unit, where the radiated sound is much more directional.

With standard fiberglass and other 'soft' liners, sound is emitted from the casing in all directions with slightly more on the side that includes the induction port. Dual wall construction results in a casing with such a high transmission loss that virtually all radiated sounds exit through the induction port. This in effect concentrates and directs the sound energy across the ceiling rather than through it, resulting in lower than expected NC levels in the occupied space. Furthermore, the TQS with UltraLoc was carefully engineered to attenuate the second and third octave band frequencies for overall reduced sound levels.

Radiated sound power tests were run for all TQS with UltraLoc units in accordance with AHRI 880. The resulting sound power figures make it appear that these units are louder than TQS units with 'soft' liners, but mock-up testing has shown lower NC levels. This is due to the fact that all sound generated, regardless of directionality, is measured in a reverberant field. In a mock-up situation, the sound from the induction port is directed into plenum where it is easily attenuated. Although it is difficult to estimate the resulting NC reduction for all unit sizes, it can be as high as 6 NC.

AHRI Standard 885 calculations are based upon a 'point source' of sound energy. This type of idealized sound source would emit sound energy equally in all directions. While this is very true for single and dual duct terminals and somewhat true for fan-powered units (with other liners), it isn't true for dual wall fan-powered units. The TQS with UltraLoc liner will have lower actual sound in application than the AHRI 885 NC data shows.

PTQS, ATQS, DTQS WITH ULTRALOC™ LINER / RADIATED SOUND POWER LEVELS / FAN AND 100% PRIMARY

Unit Size	Inlet Size	cfm	Fan Only						Fan Plus 100% Primary															
			Sound Power Octave Bands						0.5" ΔPs						1.0" ΔPs						2.0" ΔPs					
			2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7
2	8	300	58	48	51	46	44	36	60	50	51	46	46	39	62	54	53	49	49	42	65	60	55	51	52	44
		400	61	51	53	50	49	42	63	54	53	50	51	45	66	58	56	53	53	46	69	64	58	55	56	49
		500	63	53	55	53	52	47	66	56	55	53	52	47	68	61	58	56	56	50	72	67	60	58	58	52
		625	66	56	57	56	56	52	68	59	57	56	56	52	71	64	60	59	59	54	75	70	62	61	61	56
		750	68	58	59	58	59	56	71	62	59	58	59	56	73	67	62	61	61	58	77	73	64	63	64	59
3	10	500	60	50	49	50	49	40	63	53	51	52	52	43	66	58	55	55	55	46	71	65	60	59	60	51
		650	63	53	52	53	53	45	66	56	54	54	55	47	69	61	57	57	58	50	73	67	62	61	62	54
		800	65	55	54	55	55	49	68	58	56	55	55	49	71	63	59	59	60	53	75	69	64	63	64	57
		1000	67	58	57	57	58	53	70	60	57	57	58	53	73	65	61	61	62	57	78	71	66	65	66	60
		1200	69	60	59	60	61	57	72	62	59	60	61	57	75	67	63	63	64	59	79	73	67	66	68	62
4	12	1000	66	59	58	58	58	52	66	61	60	60	60	54	70	63	61	61	61	55	74	66	62	62	62	57
		1100	67	60	60	60	60	54	67	62	62	62	62	56	71	64	63	62	62	57	75	67	63	63	64	58
		1200	69	62	61	61	61	56	69	62	63	63	63	58	72	65	64	64	64	59	76	68	65	64	65	60
		1300	70	63	63	62	63	58	70	63	63	62	63	58	73	66	65	65	65	61	77	69	66	66	66	62
		1400	71	64	64	64	64	60	71	64	64	64	64	60	75	67	66	66	66	62	78	70	67	67	68	63
5	12	1200	67	59	57	56	57	53	67	59	57	56	59	53	70	62	59	58	59	57	73	65	60	59	60	61
		1300	68	60	58	58	58	54	68	60	58	58	58	54	71	63	60	59	60	58	74	65	61	60	61	62
		1400	69	61	59	59	60	56	69	61	59	59	60	56	72	64	61	61	61	59	75	66	62	61	62	62
		1550	71	62	61	60	61	58	71	62	61	60	61	58	74	65	63	60	61	61	77	67	63	62	64	64
		1700	72	63	62	62	63	60	72	63	62	62	63	60	75	66	64	62	63	62	78	68	64	64	65	65
6	14	1500	69	60	57	57	58	53	69	61	59	59	60	55	71	62	59	59	60	57	72	63	59	59	61	59
		1600	70	61	58	58	60	55	70	61	60	60	61	55	72	63	60	60	62	58	73	64	60	60	62	60
		1750	71	62	60	60	61	57	71	62	61	60	61	57	73	64	61	61	63	60	74	65	61	62	63	61
		1900	73	63	61	61	63	59	73	63	61	61	63	59	75	66	63	63	65	61	76	67	63	63	65	63
		2100	74	65	63	63	65	61	74	65	63	63	65	61	76	67	63	64	66	63	77	68	64	64	67	65
7	16	1800	72	62	64	63	61	56	72	64	66	65	64	59	75	66	67	66	65	59	77	68	68	68	67	60
		2100	74	65	66	66	65	60	74	67	66	68	67	62	77	68	69	69	68	63	79	70	70	70	70	64
		2400	76	68	68	68	68	64	76	68	68	68	68	64	79	70	71	71	71	66	81	72	72	72	72	67
		2750	78	71	71	71	71	67	78	71	71	71	71	67	81	73	73	73	73	69	82	74	74	74	75	70
		3100	80	73	73	73	74	70	80	73	73	73	74	70	82	75	75	75	75	70	84	76	76	76	77	72

- Radiated sound is the noise transmitted through the unit casing and emitted from the induction port
- Min ΔPs is the difference between atmospheric pressure and the inlet static pressure with the primary damper full open and the unit fan set to match the primary flow
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10
- Only highlighted data points are AHRI Certified. See page N63 for AHRI Certified Performance Listings.

PTQS, ATQS, DTQS WITH ULTRALOC™ LINER / DISCHARGE SOUND POWER LEVELS / FAN AND 100% PRIMARY

Size	CFM	Discharge Ps	Min ΔPs	Octave Band Sound Power, Lw																									
				Fan Only							0.5"ΔPs							1.0" ΔPs							1.5" ΔPs						
				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
208	350	0.25	0.05	73	65	62	60	60	59	**28**	73	67	62	60	60	59	**28**	73	67	64	61	60	59	**28**	73	67	64	61	62	60	**28**
	400		0.06	76	67	64	63	64	63	**31**	76	69	65	65	64	63	**31**	78	69	65	65	66	64	**34**	78	69	65	65	66	64	**34**
	500		0.10	78	70	65	66	67	66	**34**	80	71	67	67	68	68	**36**	80	71	67	67	68	68	**36**	80	71	67	67	68	68	**36**
	625		0.16	80	72	67	68	69	69	**36**	82	73	68	70	71	71	**39**	82	73	68	70	71	71	**39**	82	73	68	70	71	71	**39**
	725		0.21	82	73	68	70	72	71	**36**	84	75	70	72	73	73	**39**	84	75	70	72	73	73	**39**	84	75	70	72	73	73	**39**
310	650	0.25	0.08	71	65	61	59	60	57	**25**	71	65	61	59	60	57	**25**	71	65	61	59	60	57	**25**	71	65	61	59	60	57	**25**
	750		0.11	73	67	63	62	63	60	**25**	73	67	63	62	63	60	**25**	73	67	63	62	63	60	**25**	75	69	65	63	64	62	**28**
	900		0.16	76	69	65	63	65	63	**29**	76	69	65	63	65	63	**29**	76	69	65	63	65	63	**29**	78	71	66	65	66	64	**31**
	1150		0.26	78	71	66	65	67	65	**31**	78	71	66	65	67	65	**31**	80	73	68	67	68	67	**34**	80	73	68	67	68	67	**34**
	1400		0.39	80	73	68	67	68	68	**34**	80	73	68	67	68	68	**34**	82	74	70	68	70	69	**36**	82	74	70	68	70	69	**36**
412	850	0.25	0.09	78	72	66	66	66	64	**31**	80	74	68	68	68	66	**34**	80	74	68	68	68	66	**34**	80	74	68	68	68	66	**34**
	1075		0.15	79	73	67	68	67	66	**33**	81	75	69	69	69	67	**35**	81	75	69	69	69	67	**35**	81	75	69	69	69	67	**35**
	1300		0.21	80	74	68	69	68	67	**34**	82	76	70	70	70	69	**36**	82	76	70	70	70	69	**36**	80	76	68	69	68	67	**36**
	1400		0.25	81	75	69	70	69	68	**35**	83	77	71	71	71	70	**38**	83	77	71	71	71	70	**38**	81	75	69	70	69	68	**35**
	1500		0.28	82	76	69	71	70	69	**36**	83	78	71	71	70	69	**38**	82	76	69	71	70	69	**36**	82	76	69	71	70	69	**36**
512	1000	0.25	0.07	85	69	69	67	66	65	**40**	87	69	71	67	68	65	**43**	85	69	71	67	68	65	**40**	85	71	71	67	68	65	**40**
	1200		0.10	86	70	70	69	68	66	**42**	88	70	72	69	68	66	**44**	86	70	72	69	68	66	**42**	86	72	72	69	69	66	**42**
	1500		0.16	86	71	71	70	69	67	**42**	88	71	71	71	69	69	**44**	86	71	71	71	69	69	**42**	86	73	71	71	69	69	**42**
	1650		0.19	87	72	72	71	70	69	**43**	87	72	72	73	70	71	**43**	87	72	72	73	70	71	**43**	87	72	72	73	70	71	**43**
	1800		0.23	88	73	73	72	71	70	**44**	88	73	73	74	71	72	**44**	88	73	73	74	71	72	**44**	88	73	73	74	71	72	**44**
614	1500	0.25	0.10	81	72	69	69	68	66	**35**	83	74	71	70	70	68	**38**	83	74	71	70	70	68	**38**	83	74	71	70	70	68	**38**
	1700		0.13	82	73	70	70	69	67	**36**	84	75	72	72	71	69	**39**	84	75	72	72	71	69	**39**	84	75	72	72	71	69	**39**
	2000		0.17	83	75	71	71	71	69	**38**	85	77	73	73	72	71	**40**	85	77	73	73	72	71	**40**	85	77	73	73	72	71	**40**
	2250		0.22	84	77	73	73	72	71	**39**	86	78	74	75	74	72	**42**	86	78	74	75	74	72	**42**	86	78	74	75	74	72	**42**
	2500		0.27	86	79	74	75	74	73	**42**	86	79	74	75	74	73	**42**	88	80	76	76	76	74	**44**	88	80	76	76	76	74	**44**
716	1800	0.25	0.08	83	73	70	70	70	68	**38**	85	75	72	72	72	70	**40**	85	75	72	72	72	70	**40**	83	73	70	70	70	68	**38**
	2150		0.12	85	75	72	73	72	71	**40**	85	77	74	74	74	73	**40**	85	75	72	73	72	71	**40**	85	75	72	73	72	71	**40**
	2400		0.15	86	77	74	75	75	73	**42**	86	77	74	75	75	73	**42**	86	77	74	75	75	73	**42**	86	77	74	75	75	73	**42**
	2700		0.19	87	79	76	77	77	76	**43**	87	79	76	77	77	76	**43**	87	79	76	77	77	76	**43**	87	79	76	77	77	76	**43**
	3100		0.25	89	81	78	79	79	78	**45**	89	81	78	79	79	78	**45**	89	81	78	79	79	78	**45**	89	81	78	79	79	78	**45**

- Discharge sound is the noise emitted from the unit discharge into the downstream ductwork
- Min ΔPs is the difference between atmospheric pressure and the inlet static pressure with the primary damper full open and the unit fan set to match the primary flow
- Sound power levels are in dB, ref 10^{-12} watts.
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10
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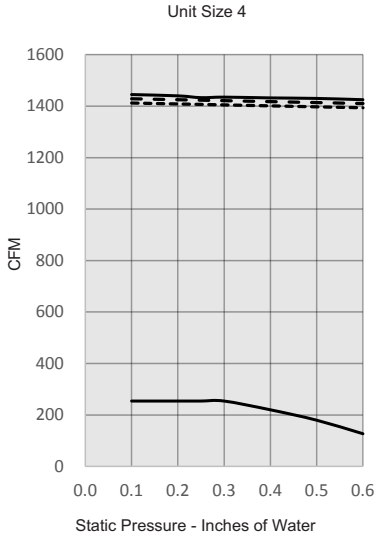
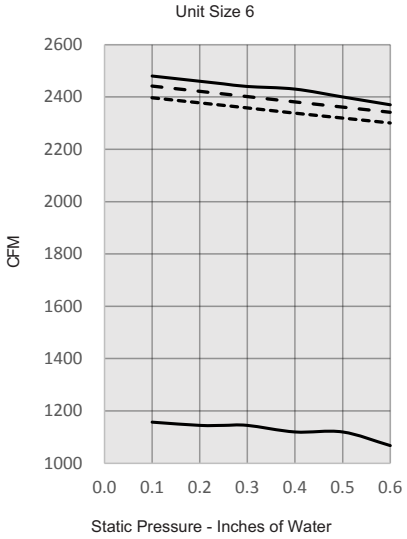
PTQS, ATQS, DTQS WITH ULTRALOC™ LINER AND ECM MOTOR / AIRFLOW VS. DOWNSTREAM STATIC PRESSURE





No Coil or with Electric Coil
1 Row Water Coil
2 Row Water Coil

ECM ELECTRICAL DATA

Unit Size	Motor HP	120V	208V	240V	277V
4	½	7.7	5.0	4.3	4.1
6	1	12.8	10.5	9.1	6.9

PTQS, ATQS, DTQS WITH ULTRALOC™ LINER AND ECM MOTOR / RADIATED SOUND POWER DATA

Unit Size	Inlet Size	cfm	Fan Only						Fan Plus 100% Primary															
			Sound Power Octave Bands						0.5" ΔPs						1.0" ΔPs						2.0" ΔPs					
			2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7
4	12	300	56	47	45	45	43	35	61	51	48	47	45	37	66	57	52	50	49	40	71	65	57	54	54	44
		575	62	53	53	52	51	45	65	56	55	52	51	45	69	61	58	56	56	49	74	68	62	60	61	52
		850	66	58	57	57	57	51	68	58	57	57	57	51	71	63	61	60	60	54	75	70	65	63	65	57
		1125	68	60	61	60	60	55	68	60	61	60	60	55	72	65	64	63	63	58	77	71	67	66	67	61
		1400	70	63	63	63	63	58	70	63	63	63	63	58	74	67	66	65	66	61	78	72	69	68	70	64
6	14	1200	61	52	51	50	51	48	63	54	53	53	54	51	65	56	54	53	54	53	68	58	54	53	55	56
		1500	65	56	55	54	56	52	67	58	57	56	58	55	69	60	58	57	58	57	71	62	58	57	59	60
		1800	69	60	58	58	60	56	69	60	58	59	60	56	72	63	61	60	62	60	74	65	61	60	62	62
		2100	72	63	61	60	63	60	72	63	61	60	63	60	74	66	63	60	65	62	77	67	64	62	65	65
		2400	74	66	64	63	66	63	74	66	64	63	66	63	77	68	65	63	66	65	79	70	66	63	68	67

- Radiated sound is the noise transmitted through the unit casing and emitted from the induction port
- Min ΔPs is the difference between atmospheric pressure and the inlet static pressure with the primary damper full open and the unit fan set to match the primary flow
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PTQS, ATQS, DTQS WITH ULTRALOC™ LINER AND ECM MOTOR / DISCHARGE SOUND POWER DATA

Size	CFM	Discharge Ps	Min ΔPs	Octave Band Sound Power, Lw																								
				Fan Only							0.5"ΔPs							1.0" ΔPs							1.5" ΔPs						
				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
412	300	0.25	0.01	69	62	57	56	56	51	**30**	69	62	57	56	56	51	**30**	69	62	57	56	56	51	**30**	69	62	57	56	56	51	**30**
	575		0.04	73	67	62	61	61	58	**35**	73	67	62	61	61	58	**35**	74	69	64	63	63	58	**37**	74	69	64	63	63	58	**37**
	850		0.25	0.09	70	65	64	65	63	**37**	76	72	67	66	66	64	**38**	77	72	67	66	67	65	**39**	77	72	67	66	67	65	**39**
	1125		0.16	76	72	67	66	67	66	**39**	78	74	69	68	69	68	**41**	79	74	70	68	69	68	**41**	79	74	70	68	69	68	**41**
	1400		0.25	77	74	69	67	69	68	**41**	80	76	71	70	71	71	**44**	80	76	71	70	71	71	**44**	80	76	71	70	71	71	**44**
614	1200	0.25	0.10	75	66	65	64	64	62	**36**	76	68	67	66	65	64	**37**	76	68	67	66	65	64	**37**	76	68	67	66	65	64	**37**
	1500		0.12	78	70	69	68	68	66	**40**	80	72	70	70	69	68	**41**	80	72	70	70	69	68	**41**	80	72	70	70	69	68	**41**
	1800		0.25	0.17	74	71	71	71	70	**43**	83	75	73	73	72	72	**45**	83	75	73	73	72	72	**45**	83	75	73	73	72	72	**45**
	2100		0.24	83	76	74	74	73	73	**46**	85	78	76	75	75	74	**47**	85	78	76	75	75	74	**47**	85	78	76	75	75	74	**47**
	2400		0.31	86	78	76	76	76	75	**48**	87	80	78	78	77	77	**50**	87	80	78	78	77	77	**50**	87	80	78	78	77	77	**50**

- Discharge sound is the noise emitted from the unit discharge into the downstream ductwork
- Min ΔPs is the difference between atmospheric pressure and the inlet static pressure with the primary damper full open and the unit fan set to match the primary flow
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
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