

Model KSQ

VAV Terminal

Flexibility

- KSQ terminals are available in a wide array of control packages using electronic analog or factory-installed direct digital (DDC) controls.
- KSQ units can be provided with an integral sound attenuator for ultra-quiet performance
- Model KSQ is available using 25mm thick matte-faced insulation as a standard.
- Optionally 25mm thick Closed cell (fiber-less) insulation and a double wall construction using a full metal liner is also available.
- Numerous other optional features are available

Performance

- KMC model KSQ terminal ratings are AHRI Certified and all units are tested in accordance with AHRI Standard 880.
- The lack of intruding fasteners, tabs or other obstructions in the air stream results in very quiet sound performance and low internal pressure losses. All units incorporate full 90° rotation round dampers (except the size 24 x16) for precise control of the airflow.
- All units are available with pressure independent controls for precise control of the airflow. All units with these controls are factory calibrated for minimum and maximum airflow settings prior to shipment and are easily field adjusted.

Air Velocity Sensor

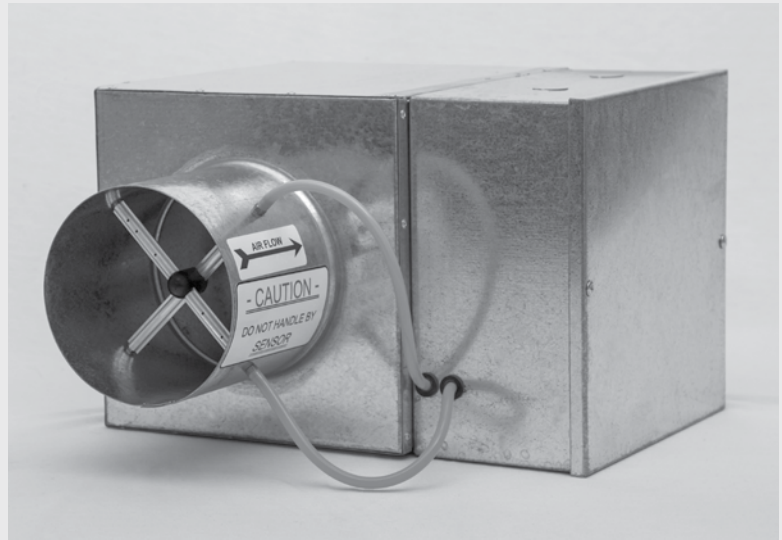
The air velocity sensor is used to measure air velocity / air volume in HVAC systems. The KMC Air velocity sensor operates and measures the total and static pressure components of airflow.

Amplification

The unique shape of the measuring profile creates a linear amplification (of at least 2.5x Pdyn) making accurate measurements from as low as 1,0 m/s air velocity possible. This means higher control pressure signals sent to the controller at much lower flow rates. This results in very stable flow control, even with high turn-down ratios

Low Pressure Drop & Sound

The sleek, aerodynamic unique shape creates a linear amplified signal and very little pressure drop for quiet operation and accurate control.



FloXact sensor in primary air Inlet

Ease of Installation and Reliability

KSQ terminals are compact and utilize inlet collars over 125mm in length to allow easy attachment of rigid or flexible duct. The airflow sensor is recessed over 50mm into the air valve providing protection from damage. The discharge end of the terminal has slip and drive connections for easy attachment of downstream duct work.

KMC's KSQ Single Duct terminals are constructed with zinc-coated steel for long life. The unit casings are assembled with a mechanical lock construction that insures a tight seam to minimize air leakage.

Casings are internally lined with a wide variety of insulation and treatment options that conform to NFPA and UL requirements. The leaving edge of the insulation is protected from erosion by return bends on the discharge end of the unit casing.

The damper blade is made of gasket material sandwiched between two round steel plates. The round damper blade in the air valve is affixed to the shaft using through-the-shaft machine applied rivets. The die-cast metal shaft rotates in self-lubricating bearings for easy turning and long operating life. The damper's flexible gasket seats tightly on the cylinder's internal bead for tight closure. A damper position indicator is located on the end of the damper shaft.

Construction

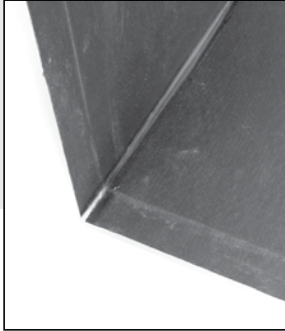
- The Air velocity sensor is manufactured from Extruded aluminium profiles for durability.
- Multi point averaging
- 2% accuracy starting from 1,0 m/s air velocity
- Strengthen measurement signal with at least 2.5x.
- Rounded apertures make the velocity sensor insensitive to skew or turbulent inflow to 30° in all directions relative to the profile axis.
- The units can be supplied with factory-setting with the calibrated analog or digital controllers

Product Selection Check List

- Select Unit size based on desired performance characteristics.
- Select inlet size based on design Airflow requirements.
- Select actuator control orientation.
- Select Insulation Requirement.
- Select Control Requirement.

Air Terminal Casing Treatments

KMC's complete line of casing treatments and insulation systems provide performance solutions to meet any design requirement. We only use insulating materials that meet industry standard classifications for fire, erosion, water vapor sorption, and microbiological resistance.



25mm Matte Face- Black Cloth Faced Insulation.

Features:

- Faced with black, strong durable, wovenglass fabric.
- Thermal conductivities 0.031 w/mk @ 25° C
- Air erosion rating >46m/s as per U481
- Fire classification

Fiber-Less Insulation

Features:

- Closed cell insulation – no glass fibers
- 12 mm/25mm Elastomeric Engineered Foam Insulation
- Thermal conductivities 0.031 w/mk @ 25° C
- Density: 140-180 kg/m³



Dual-Wall Casing Treatment

Features:

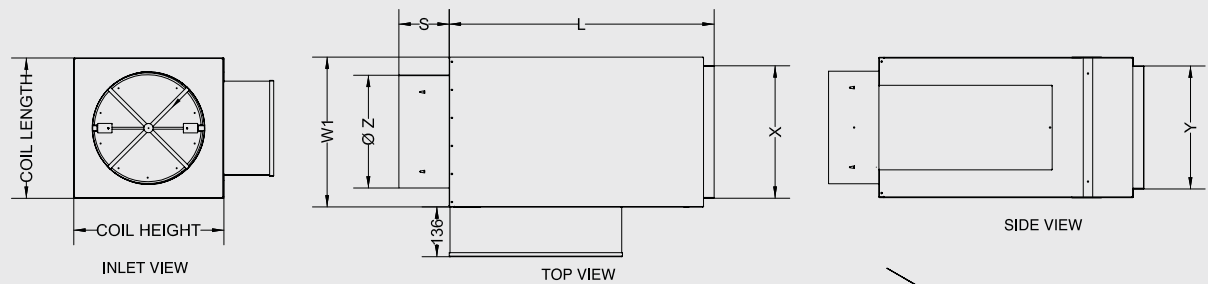
- Puncture-proof sheet metal interior skin
- Isolates glass fibers from the air stream
- 25mm fiberglass insulation between the walls
- Thermal conductivities 0.031 w/mk @ 25° C
- Density: 48 kg/m³

Model KSQ

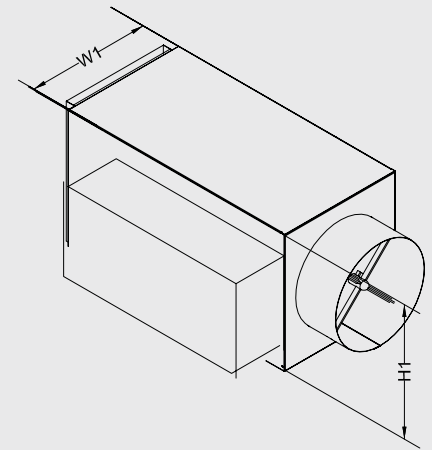
VAV Terminal

Dimensional Data

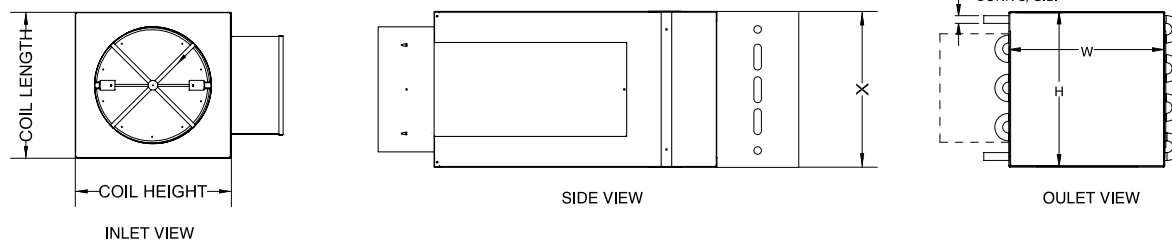
KSQ units



VAV										
Model	Flow (max)		Ø Z	W1	H1	X	Y	L	S	Wt.
	CFM	CMH	mm	mm	mm	mm	mm	mm	mm	kg
KSQ-5	350	595	127	254	254	197	197	318	136	4.0
KSQ-6	500	850	152	254	254	197	197	318	136	4.0
KSQ-7	675	1147.5	178	305	254	248	197	318	136	5.0
KSQ-8	900	1530	203	305	254	248	197	318	136	5.0
KSQ-9	1100	1870	229	356	318	299	261	368	136	7.0
KSQ-10	1400	2380	254	356	318	299	261	368	136	7.0
KSQ-12	2000	3400	305	406	381	350	324	470	136	8.5
KSQ-14	3000	5100	356	508	445	451	388	470	136	10.5
KSQ-16	4100	6970	406.5	610	445	553	388	470	136	13.0
KSQ-24 x 16	7000	11900	610 X 406.5	965	457	940	432	762	138	36.0



KSQ units with hot water heating coil



Model	Flow (max)		Outlet Size		1 Row			2 Row			4 Row		
	CFM	CMH	W (mm)	H (mm)	L (mm)	Conn. OD mm	Wt. (kg)	L (mm)	Conn. OD mm	Wt. (kg)	L (mm)	Conn. OD mm	Wt. (kg)
KSQ-5	350	595	254	254	413	12.7	6.4	440	12.7	7.3	494	22.2	9.5
KSQ-6	500	850	254	254	413	12.7	6.4	440	12.7	7.3	494	22.2	9.5
KSQ-7	675	1147.5	305	254	413	12.7	7.7	440	12.7	9.1	494	22.2	11.3
KSQ-8	900	1530	305	254	413	12.7	7.7	440	12.7	9.1	494	22.2	11.3
KSQ-9	1100	1870	356	318	464	12.7	10.0	491	12.7	11.8	545	22.2	15.4
KSQ-10	1400	2380	356	318	464	12.7	10.0	491	12.7	11.8	545	22.2	15.4
KSQ-12	2000	3400	406	381	565	22.2	12.7	592	12.7	15.4	646	22.2	19.5
KSQ-14	3000	5100	508	445	565	22.2	15.9	592	22.2	19.5	646	22.2	25.9
KSQ-16	4100	6970	610	445	565	22.2	19.1	592	22.2	22.7	646	22.2	29.9
KSQ-24 x 16	7000	11900	965	457	889	22.2	45.8	889	22.2	50.8	914	28.6	61.3

Table 2: Air Flow ranges

Type	Direct Digital Controller			
Model	Airflow (Min.)		Airflow (Max.)	
	CMH	CFM	CMH	CFM
KSQ-5	85	50	426	251
KSQ-6	138	81	695	409
KSQ-7	180	106	907	534
KSQ-8	255	150	1286	757
KSQ-9	323	190	1627	958
KSQ-10	398	234	2006	1181
KSQ-12	530	312	2672	1573
KSQ-14	727	428	3661	2155
KSQ-16	990	583	4991	2938
KSQ-24 x 16	1870	1101	9428	5550

Notes

1. Minimum and maximum values shown are Cu.Mtr / H (CMH) & Cu.Ft. /min. (CFM)
2. Minimum and maximum airflow with pressure independent controls based on the following.
Flow sensor signal :
Direct Digital Controllers : 8 Pa (0.03" WG) - 190 Pa (0.76" WG)
3. Settings below the minimum are not recommended for accurate control when using pressure independent controls. Minimum airflow for pressure dependent applications is 0 cfm.
4. Pressure independent controls may be set for 0 cfm, at or above the minimum airflow show in table 4, but not between.
5. Direct Digital Controllers are factory programmed.
6. Airflow rates above maximum shown are available. Contact your KMC representative for application assistance.

Table 3: AHRI Certified Ratings – Model KSQ Units

Model	Inlet size (mm)	Primary Airflow rate		Minimum Operating Pressure in H ₂ O	Radiated sound power level,db by Octava band @1.5" WG						Discharge sound power level, db by Octave band @1.5" WG					
		CFM	CMH		125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
KSQ-5	125	250	425	0.18	63	56	50	46	44	36	72	68	61	59	56	53
KSQ-6	150	400	680	0.10	64	56	49	44	38	31	74	71	65	59	56	53
KSQ-7	175	550	935	0.10	64	64	59	53	48	42	72	74	65	62	59	57
KSQ-8	200	700	1190	0.01	62	60	54	47	45	43	75	74	67	65	62	58
KSQ-9	225	900	1530	0.01	62	60	54	49	48	43	75	74	65	63	62	58
KSQ-10	250	1100	1870	0.01	64	59	51	46	38	30	80	73	66	63	60	57
KSQ-12	300	1600	2720	0.01	65	61	54	50	49	43	76	73	67	65	63	59
KSQ-14	350	2100	3570	0.01	66	61	54	50	49	44	75	72	67	65	64	62
KSQ-16	400	2800	4760	0.01	67	65	56	50	44	36	81	73	69	67	63	61
KSQ-24 x 16	600 x 400	5300	9010	0.01	79	72	66	61	57	49	81	79	74	73	72	69

Notes

1. All sound data are measured in accordance with industry standard AHRI-880
2. Sound power levels are in decibels, re 10-12 watts
3. Discharge Lw includes end reflection loss per AHRI requirement



Selection

When selecting KSQ single duct variable air volume terminals, several factors must be considered to make the proper selection including:

- Air Flow and Air Pressure Drop
- Sound
- Heating (if required)
- Controls

Air Flow and Air Pressure Drop

All KSQ units can operate over a wide range of airflow. The minimum airflow shown for each unit is the lowest airflow at which the airflow sensor can generate an adequately strong signal for the pressure independent controls to operate properly. The maximum airflow shown for each unit is based on the industry practice of limiting the inlet air velocity to reasonable levels.

The units selected should be sized where the design airflow is between the maximum and minimum airflows shown in table 4. Referring to table 6 if 2378 CMH (1400 CFM) is the maximum design airflow, a unit with a 300mm inlet can be selected with an air pressure drop of 0.01 inches (2.5pa) w.g.

Sound Performance

Tables 7 thru 11 indicate the sound power levels of each unit at varying air flow rates and inlet static pressures. Disregarding other factors and/or equipment that could contribute to the noise in the occupied space, these ratings along with the acoustical environment

in which the unit operates, will determine the perceived noise level.

Noise generated within the terminal and emitted through the discharge air (discharge sound) will be attenuated by any duct work downstream of the terminal. The noise emitted through the casing of the terminal (radiated sound) will be attenuated by the room's ceiling. Depending upon the application, either the radiated or discharge noise level will be the relative higher and determine the perceived noise level in the occupied space. The occupied space itself will provide further attenuation depending on the acoustical characteristics of the walls, floors and internal furnishings.

All manufacturers must make certain assumptions on the acoustical environment of the application and then apply these assumptions to the unit's sound power ratings to determine the resultant sound pressures and perceived noise level in the occupied space. While the ARI sound power ratings have been certified and can be accurately compared from one manufacturer to another, the NC values predicted will be dependent upon the acoustical assumptions made.

When selecting terminals, check the attenuation assumptions before comparing cataloged NC values. KMC uses the ARI Standard 885, Appendix E attenuation assumptions for determining the anticipated noise levels. The attenuation assumptions in this standard are outlined in Table-2.

Table 4: ARI-885 Attenuation Table

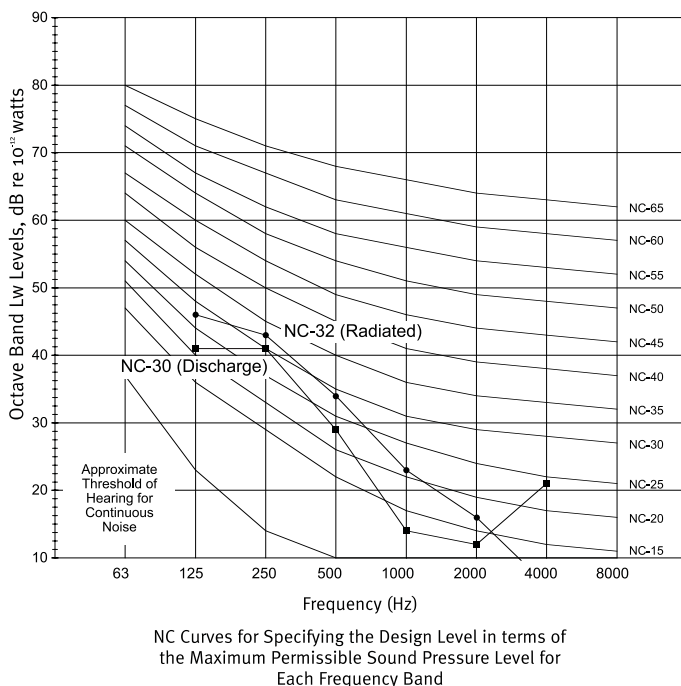
Octave Band							
	2	3	4	5	6	7	
Radiated	2	1	0	0	0	0	Environmental Effect
All Sizes	16	18	20	26	31	36	Type II Mineral Fiber
	18	19	20	26	31	36	Total dB Reduction
Octave Band							
	2	3	5	4	6	7	
Discharge	2	1	0	0	0	0	Environmental Effect
Sizes 5-7	2	4	20	10	20	14	5ft., Duct Lining (12x12)
(300 - 700)	9	5	0	2	0	0	End Reflection
	6	10	20	18	21	12	5 ft., 8in. Flex Duct
	5	6	8	7	9	10	Room Effect
	3	3	3	3	3	3	Sound Power Division
	27	29	51	40	53	39	Total dB Reduction
Octave Band							
	2	3	4	5	6	7	
Discharge	2	1	0	0	0	0	Environmental Effect
Sizes 8-24 x 16	2	3	9	18	17	12	5ft., Duct Lining (12x12)
>700)	9	5	2	0	0	0	End Reflection
	6	10	18	20	21	12	5 ft., 8in. Flex Duct
	5	6	7	8	9	10	Room Effect
	5	5	5	5	5	5	Sound Power Division
	29	30	41	51	52	39	Total dB Reduction

Sound Performance

The noise level desired in any given space is a function of the activity for which the space is intended. Typical NC design values for various applications are:

Table 3: Typical NC Design Values	
Hotel Rooms	25 - 35
Offices and conference rooms	25 - 35
Open Offices	30 - 40
Classrooms	35 - 40 (Max)
Churches	25 - 35
Hospital Wards	30 - 40
Gymnasiums	40 - 45
Libraries	30 - 40

The NC curves are intended to reflect a human's perceived noise comfort. Plotting the anticipated sound pressure by octave band and determining the tangent NC curve reached throughout all octave bands (using the acoustical assumptions) will indicate the NC value anticipated.



Radiated Lw - 1400 CFM @ 2.0" w.g. Inlet Ps								
	63	125	250	500	1000	2000	4000	8000
Lw Data	----	64	62	54	49	47	42	----
Attenuation	----	18	19	20	26	31	36	----
Plotted Data	----	46	43	34	23	16	6	----
NC	----	27	32	29	21	17	----	----

Discharge Lw - 1400 CFM @ 2.0" w.g. Inlet Ps								
	63	125	250	500	1000	2000	4000	8000
Lw Data	----	70	71	70	65	64	60	----
Attenuation	----	29	30	41	51	52	39	----
Plotted Data	----	41	41	29	14	12	21	----
NC	----	21	30	24	----	----	24	----

Notes:
Size 12 KSQ
Radiated sound in the 250hz (third octave) is the Controlling Band

Heating (if Required)

Hot water heat

Select the hot water coil that provides at least as much heating output as required (based on the design conditions).

Using our example of a 300 mm (12") size unit, if the design heating airflow is 1360 CMH (800 CFM) for the heating coil selection, the heating capacity desired is 8.5 kW (29 MBH), the entering water temperature is 82.3°C (180 ° F) and the entering air temperature is 12.7°C (55 ° F), using Table 14 would indicate that a 1 row coil supplied with 0.25 LPS (4 GPM) of hot water would be required.

The air pressure loss for the heating coil selected at the maximum design airflow for the terminal (2380 CMH i.e 1400 CFM) must be added to the KSQ terminal's air pressure drop. The heating coil air pressure drops are also shown in Table 6. In our example, the air pressure drop across the coil is 60 Pa (0.24 inches w.g). This would be added to the terminal's air pressure drop of 2.5 Pa (0.01 inches w.g) at the design maximum airflow of 2380 CMH (1400 CFM) , which results in a

Total air pressure drop of 62.5 (0.25 inches w.g).

Electric Heat

The wattage of electric heat needed is determined by dividing the heating required in Mbh by 3.414, which results in the KW of heating required.

Using our example, it would require 8.5 KW of electric heat to provide the 29 Mbh heating capacity. Using table 25, the electric coil with 8.5 KW would be selected. Electric heat can be staged or modulated.

Note that the electric coil has an air proving switch, which requires a minimum of .07 inch w.g. Total pressure entering the coil to prove airflow.

Also note that it's prudent to check the air temperature leaving the heating coil at the design airflow. Using the previous example, the resulting leaving air temperature would be approximately 32°C (89°F), which would generally provide a comfortable environment and proper air distribution.

Control Sequences

A wide array of control sequences are available as standard on KMC's KSQ single duct variable air volume terminals.

Table 4: Airflow Ranges (FloXact™ Sensor)

Type	Direct Digital Controller			
Model	Airflow (Min.)		Airflow (Max.)	
	CMH	CFM	CMH	CFM
KSQ-5	85	50	426	251
KSQ-6	138	81	695	409
KSQ-7	180	106	907	534
KSQ-8	255	150	1286	757
KSQ-9	323	190	1627	958
KSQ-10	398	234	2006	1181
KSQ-12	530	312	2672	1573
KSQ-14	727	428	3661	2155
KSQ-16	990	583	4991	2938
KSQ-24 x 16	1870	1101	9428	5550

Notes

- Minimum and maximum values shown are Cu.Mtr / H (CMH) & Cu.Ft. /min. (CFM)
- Minimum and maximum airflow with pressure independent controls based on the following.
Flow sensor signal :
Direct Digital Controllers : 8 Pa (0.03" WG) - 190 Pa (0.76" WG)
- Settings below the minimum are not recommended for accurate control when using pressure independent controls. Minimum airflow for pressure dependent applications is 0 cfm.
- Pressure independent controls may be set for 0 CFM, at or above the minimum airflow show in table 4, but not between.
- Direct Digital Controllers are factory programmed.
- Airflow rates above maximum shown are available. Contact your KMC representative for application assistance.

Table 5: Airflow vs. FloXact™ Sensor Signal

SENSOR		INLET SIZE									
		5	6	7	8	9	10	12	14	16	24 x 16
ΔP		125	150	175	200	225	250	300	350	400	600 x 400
Pa	Inch. w.g	AIR FLOW (CMH)									
7	0.03	85	138	180	255	323	398	530	727	990	1870
10	0.04	97	160	207	294	374	460	612	839	1143	2161
15	0.06	119	195	255	360	457	562	749	1028	1400	2645
25	0.1	155	251	330	465	589	727	968	1327	1807	3416
50	0.2	217	357	465	659	834	1028	1369	1875	2557	4830
75	0.3	267	437	569	807	1021	1259	1677	2297	3133	5915
100	0.4	309	505	657	931	1179	1454	1937	2653	3617	6831
125	0.5	345	564	736	1041	1318	1609	2164	2966	4043	7638
149	0.6	377	617	805	1142	1446	1780	2371	3248	4429	8366
174	0.7	408	666	870	1232	1561	1923	2562	3510	4784	9036
199	0.8	437	712	929	1317	1668	2056	2738	3751	5115	9661
224	0.9	462	756	987	1398	1770	2181	2905	3979	5424	10247
249 (K)	1 (K)	488	797	1040	1473	1865	2298	3061	4194	5718	10801
374	1.5	598	975	1274	1804	2285	2815	3749	5137	7002	13228
Inlet Area	(sq.Mtr)	0.012	0.188	0.258	0.338	0.532	0.769	1.05	1.05	1.38	2.67
	(sq. ft)	0.130	0.188	0.258	0.338	0.532	0.769	1.05	1.05	1.38	2.67

Aiflow Calculations

Air Flow Sensors

Sensor ΔP= (CMH/K)²

CMH = K (ΔP)^{0.5}

Example: For a 300 mm (12") inlet unit with a sensor ΔP signal of 149 Pa (0.60 inches w.g) the airflow is calculated to be 2371 CMH.

CMH = K (ΔP)^{0.5}= 3061 (0.6)^{0.5} = 2371 ; For a 300mm (12") inlet unit with 2371 CMH.

the sensor ΔP signal is calculated to be 0.60 inches w.g. ΔP= (CMH/K)² = (2371/3061)² = 0.60" w.g.

Table 5A: K Factor for FloXact™ Sensor

	CMH									
Inlet Size (mm)	125	150	175	200	225	250	300	350	400	600 x 400
K Factor	488	797	1040	1473	1865	2298	3061	4194	5718	10801
Area (Sq.mtr)	0.012	0.017	0.024	0.031	0.040	0.049	0.071	0.098	0.128	0.248

Notes: K factors shown in 1.0 ΔP row

Table 6: Static Pressure Drop Data

MODEL NAME	AIRFLOW		MIN ΔPS							
			KSQ & A		1- row		2- row		4 - row	
	CMH	CFM	Pa	inches w.g.	Pa	inches w.g.	Pa	inches w.g.	Pa	inches w.g.
KSQ-5	212	125	12.5	0.05	6.2	0.025	7.5	0.03	16.2	0.065
	297	175	24.9	0.10	10.0	0.04	16.2	0.065	28.6	0.115
	425	250	37.4	0.15	12.5	0.05	27.4	0.110	52.3	0.210
	510	300	52.3	0.21	17.4	0.07	37.4	0.150	72.2	0.290
	595	350	64.7	0.26	24.9	0.100	47.3	0.190	94.6	0.380
KSQ-6	340	200	2.5	0.01	10.0	0.040	17.4	0.070	34.9	0.140
	425	250	5.0	0.02	12.5	0.050	27.4	0.110	52.3	0.210
	510	300	7.5	0.03	17.4	0.070	37.4	0.150	72.2	0.290
	595	350	10.0	0.04	24.9	0.100	47.3	0.190	94.6	0.380
	680	400	12.5	0.05	29.9	0.120	59.8	0.240	119.5	0.480
KSQ-7	849	500	14.9	0.06	44.8	0.180	89.6	0.360	174.3	0.700
	425	250	2.5	0.01	10.0	0.040	19.9	0.080	38.6	0.155
	510	300	5.0	0.02	12.5	0.050	27.4	0.110	52.3	0.210
	680	400	5.0	0.02	22.4	0.090	42.3	0.170	87.2	0.350
	849	500	7.5	0.03	32.4	0.130	64.7	0.260	129.5	0.520
KSQ-8	1019	600	12.5	0.05	44.8	0.180	89.6	0.360	179.3	0.720
	1147	675	14.9	0.06	54.8	0.220	109.6	0.440	216.6	0.870
	595	350	2.5	0.01	17.4	0.070	34.9	0.140	69.7	0.280
	807	475	5.0	0.02	29.9	0.120	59.8	0.240	99.6	0.400
	1019	600	5.0	0.02	44.8	0.180	89.6	0.360	179.3	0.720
KSQ-9	1189	700	7.5	0.03	59.8	0.240	117.0	0.470	234.1	0.940
	1359	800	10.0	0.04	74.7	0.300	149.4	0.600	298.8	1.200
	1529	900	10.0	0.04	92.1	0.370	184.3	0.740	368.5	1.480
	764	450	2.5	0.01	14.9	0.060	29.9	0.120	62.3	0.250
	892	525	5.0	0.02	18.7	0.075	37.4	0.150	74.7	0.300
KSQ-10	1019	600	5.0	0.02	23.7	0.095	49.8	0.200	97.1	0.390
	1189	700	7.5	0.03	29.9	0.120	62.3	0.250	122.0	0.490
	1529	900	10.0	0.04	47.3	0.190	94.6	0.380	186.8	0.750
	1869	1100	12.5	0.05	64.7	0.260	129.5	0.520	261.5	1.050
	934	550	2.5	0.01	19.9	0.080	39.8	0.160	79.7	0.320
KSQ-12	1147	675	2.5	0.01	27.4	0.110	57.3	0.230	112.1	0.450
	1359	800	2.5	0.01	37.4	0.150	77.2	0.310	151.9	0.610
	1699	1000	2.5	0.01	57.3	0.230	114.5	0.460	224.1	0.900
	2039	1200	2.5	0.01	77.2	0.310	156.9	0.630	313.7	1.260
	2378	1400	2.5	0.01	104.6	0.420	211.7	0.850	423.3	1.700
KSQ-14	1359	800	2.5	0.01	22.4	0.090	42.3	0.170	87.2	0.350
	1699	1000	2.5	0.01	32.4	0.130	64.7	0.260	129.5	0.520
	2039	1200	2.5	0.01	44.8	0.180	89.6	0.360	179.3	0.720
	2378	1400	2.5	0.01	59.8	0.240	117.0	0.470	234.1	0.940
	2888	1700	2.5	0.01	83.4	0.335	166.8	0.670	333.7	1.340
KSQ-16	3398	2000	2.5	0.01	112.1	0.450	296.3	1.190	443.2	1.780
	1784	1050	2.5	0.01	18.7	0.075	37.4	0.150	74.7	0.300
	2378	1400	2.5	0.01	29.9	0.120	59.8	0.240	119.5	0.480
	3058	1800	2.5	0.01	47.3	0.190	94.6	0.380	189.2	0.760
	3737	2200	2.5	0.01	67.2	0.270	132.0	0.530	268.9	1.080
KSQ-24 x 16	4417	2600	2.5	0.01	89.6	0.360	181.8	0.730	361.1	1.450
	5096	3000	2.5	0.01	117.0	0.470	231.6	0.930	463.1	1.860
	2378	1400	2.5	0.01	21.2	0.085	44.8	0.180	87.2	0.350
	3228	1900	2.5	0.01	39.8	0.160	74.7	0.300	149.4	0.600
	4077	2400	2.5	0.01	57.3	0.230	114.5	0.460	226.6	0.910
KSQ-24 x 16	4926	2900	2.5	0.01	79.7	0.320	159.4	0.640	318.7	1.280
	5946	3500	2.5	0.01	109.6	0.440	221.6	0.890	443.2	1.780
	6965	4100	2.5	0.01	146.9	0.590	293.8	1.180	587.6	2.360
	5096	3000	2.5	0.01	37.4	0.150	74.7	0.300	149.4	0.600
	6795	4000	2.5	0.01	62.3	0.250	124.5	0.500	249.0	1.000
KSQ-24 x 16	8494	5000	2.5	0.01	92.9	0.373	186.8	0.750	368.5	1.480
	10193	6000	2.5	0.01	127.0	0.510	255.2	1.025	512.2	2.057
	11891	7000	2.5	0.01	169.3	0.68	336.2	1.350	674.8	2.710

Notes

1. Air Pressure drops shown for the hot water coils must be added to the terminal Air pressure drop.
2. Air pressure drop is the difference in the static pressure from the terminal Inlet and discharge with the damper in the fully open position.

Table 7: Radiated Sound Power Data (dB) - KSQ units

	AIRFLOW		125 Pa (0.5") ΔPs							250 Pa (1.0") ΔPs							500 Pa (2.0") ΔPs							750 Pa (3.0") ΔPs						
			Sound Power Levels, dB							Sound Power Levels, dB							Sound Power Levels, dB							Sound Power Levels, dB						
	CMH	CFM	Octave Band							Octave Band							Octave Band							Octave Band						
			2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7				
KSQ-5	212	125	46	41	33	30	37	24	51	43	39	34	33	27	50	46	43	39	38	33	50	47	44	42	42	37				
	297	175	49	44	35	31	38	25	52	48	41	37	35	28	54	51	47	42	40	34	54	52	49	45	44	38				
	425	250	52	47	39	33	30	26	55	51	44	38	36	29	58	56	50	45	43	35	58	58	53	48	46	39				
	510	300	53	49	41	35	32	27	56	53	46	40	37	30	60	57	52	46	44	36	60	60	55	50	48	40				
	595	350	54	50	44	37	34	32	58	55	48	41	39	34	62	58	54	47	45	38	62	61	58	51	49	41				
KSQ-6	340	200	49	42	35	29	28	27	52	47	40	34	34	31	52	49	46	39	40	37	53	50	48	42	43	40				
	425	250	50	43	36	30	30	28	53	48	41	35	35	32	55	53	48	41	41	38	55	53	51	44	44	41				
	510	300	51	44	37	31	31	29	54	49	42	36	36	33	57	55	49	42	42	39	57	56	53	46	45	42				
	595	350	52	45	39	32	32	30	55	50	43	37	37	34	58	56	50	43	43	40	59	59	55	48	46	43				
	680	400	53	46	41	34	33	31	56	51	44	38	38	35	60	57	51	44	44	41	60	61	56	49	47	44				
KSQ-7	849	500	56	50	45	38	37	35	58	53	48	40	40	38	62	58	53	46	45	42	63	62	57	50	49	45				
	425	250	50	46	38	33	30	26	52	51	44	39	36	31	52	52	48	43	41	36	52	53	49	46	44	41				
	510	300	51	47	39	35	31	27	53	55	46	40	37	32	53	55	50	45	43	38	54	56	52	48	45	42				
	680	400	52	48	40	36	33	28	56	56	48	42	39	33	56	62	54	49	45	40	57	61	56	51	48	43				
	849	500	55	49	42	38	34	30	57	57	49	43	40	34	59	65	58	52	47	41	59	66	60	55	50	45				
KSQ-8	1019	600	58	50	45	40	36	31	60	58	50	44	41	35	61	66	59	53	48	42	61	69	63	58	52	46				
	1147	675	59	51	47	42	38	32	61	59	51	45	42	36	64	67	60	54	49	43	63	70	65	60	53	47				
	595	350	49	44	36	31	29	29	53	50	43	38	36	34	54	55	50	45	43	40	55	55	52	48	47	44				
	807	475	50	45	37	33	32	30	54	51	44	39	37	35	56	60	51	46	44	41	57	60	56	51	48	44				
	1019	600	51	46	39	35	33	31	55	52	45	40	38	36	58	61	52	47	45	41	59	64	58	52	49	45				
KSQ-9	1189	700	53	47	41	37	36	32	56	53	46	41	39	37	60	62	53	48	45	42	60	65	59	53	50	46				
	1359	800	54	49	44	40	38	33	57	54	47	43	41	38	61	63	54	49	46	43	62	66	60	54	50	47				
	1529	900	56	50	47	43	40	35	59	55	49	45	43	39	63	64	55	50	47	44	63	67	61	55	51	47				
	764	450	47	44	37	33	31	26	51	52	43	38	36	31	55	58	51	45	43	38	57	63	55	49	47	42				
	892	525	48	45	38	34	32	27	52	53	44	39	37	32	57	59	52	46	44	39	58	66	57	50	48	43				
KSQ-10	1019	600	49	46	39	35	33	28	53	54	45	40	38	33	58	60	53	47	45	40	59	67	58	51	49	44				
	1189	700	53	49	41	36	34	29	54	55	46	41	39	34	59	61	54	48	46	41	60	68	59	52	50	45				
	1529	900	55	54	45	39	36	31	55	56	48	43	40	35	60	62	55	49	47	42	61	69	60	53	51	46				
	1869	1100	56	55	48	42	38	33	56	57	50	44	41	36	61	63	56	50	48	44	63	70	61	54	52	47				
	934	550	49	43	38	34	33	28	52	51	43	40	39	35	54	57	50	46	45	40	55	61	53	51	48	43				
KSQ-12	1147	675	50	44	40	36	34	29	53	52	44	41	40	36	56	58	51	47	46	41	56	62	54	51	49	44				
	1359	800	51	46	41	37	35	30	54	53	45	42	41	37	57	59	52	48	47	42	58	63	55	52	50	45				
	1699	1000	52	48	44	39	37	31	55	54	47	43	42	38	59	60	53	49	48	43	60	64	56	53	51	46				
	2039	1200	55	51	46	41	39	34	57	55	49	45	43	39	61	61	54	50	49	44	62	65	57	53	52	47				
	2378	1400	57	53	49	44	41	36	59	56	52	48	46	40	63	62	55	51	50	45	65	66	58	54	53	48				
KSQ-14	1359	800	51	44	37	34	33	27	56	50	43	39	39	33	60	59	51	46	44	39	60	60	57	50	48	43				
	1699	1000	52	45	38	35	34	29	57	51	44	40	40	34	62	60	52	47	45	40	62	62	58	51	49	44				
	2039	1200	53	47	40	37	35	30	58	52	45	41	41	35	63	61	53	48	46	41	64	63	59	52	50	45				
	2378	1400	54	48	42	39	36	31	59	53	46	43	42	36	64	62	54	49	47	42	66	64	59	53	51	46				
	2888	1700	56	51	45	42	39	32	60	55	48	45	43	37	65	63	55	50	48	43	68	65	60	54	52	47				
KSQ-16	3398	2000	58	53	49	45	42	35	62	57	51	47	45	38	67	64	56	51	49	44	69	66	60	55	53	48				
	1784	1050	51	44	36	35	34	30	57	52	42	39	39	36	61	60	51	47	45	42	61	63	55	50	49	45				
	2378	1400	52	45	39	36	36	31	58	53	43	40	40	37	63	61	52	48	46	43	64	64	56	51	50	46				
	3058	1800	54	48	41	38	37	32	59	54	45	43	42	38	64	62	53	49	47	44	66	65	57	52	51	47				
	3737	2200	56	51	45	41	39	35	60	55	47	44	44	39	65	63	54	50	49	45	67	66	58	53	52	48				
KSQ-24 x 16	4417	2600	59	54	48	44	42	37	62	57	50	46	45	41	66	64	55	51	50	46	69	67	59	54	53	49				
	5096	3000	61	56	51	47	45	40	64	59	53	49	47	43	68	64	56	52	52	47	70	68	60	55	54	50				
	2378	1400	50	45	38	36	37	32	57	53	44	41	40	37	61	61	51	48	46	42	63	64	55	51	50	46				
	3228	1900	52	47	40	38	38	33	58	54	45	42	41	38	64	62	52	49	47	43	65	64	56	52	51	47				
	4077	2400	55	50	43	41	40	36	60	55	46	45	44	39	65	63	53	50	48	44	67	65	47	53	52	48				
KSQ-24 x 16	4926	2900	58	52	45	43	41	38	62	57	48	46	46	41	67	64	54	51	50	46	69	67	58	54	53	49				
	5946	3500	61	55	48	45	43	40	64	59	51	48	47	42	68	65	55	52	51	47	70	68	59	55	54	50				
	6965	4100	64	58	52	48	45	42	66	61	54	50	49	44	69	66	56	53	52	48	71	69	60	56	55	51				
	5096	3000	61	54	49	44	40	35	65	57	52	48	44	38	71	64	58	53	50	44	73	68	63	57	53	48				
	6795	4000	66	59	55	48	44	38	69	62	56	51	46	41	74	67	60	55	51	45	76	70	64	58	54	49				
KSQ-24 x 16	8494	5000	70	63	59	53	48	41	73	65	60	54	51	45	77	69	63	58	53	47										

Table 8: Discharge Sound Power Data (dB) - KSQ units.

Foil Faced Insulation - 25mm (1") Thk.

MODEL NAME	AIRFLOW		125 Pa (0.5") ΔPs						250 Pa (1.0") ΔPs						500 Pa (2.0") ΔPs						750 Pa (3.0") ΔPs					
			Sound Power Levels, dB						Sound Power Levels, dB						Sound Power Levels, dB						Sound Power Levels, dB					
	CMH	CFM	Octave Band						Octave Band						Octave Band						Octave Band					
			2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7
KSQ-5	212	125	57	53	45	42	40	38	60	56	52	49	48	48	60	61	57	56	55	57	59	61	59	57	59	60
	297	175	59	57	48	44	42	39	62	60	53	51	49	49	65	66	60	57	55	57	64	68	64	60	60	61
	425	250	62	59	51	48	45	42	65	63	56	53	50	50	69	68	62	58	56	58	69	72	66	61	60	62
	510	300	63	60	53	49	47	44	66	65	58	54	51	51	71	69	63	59	56	58	72	72	67	62	60	63
	595	350	64	61	55	53	49	47	69	66	60	56	53	53	72	70	65	59	56	60	74	72	68	63	60	63
KSQ-6	340	200	59	56	48	48	45	41	64	63	55	54	52	51	65	68	62	59	58	58	64	67	64	63	60	61
	425	250	60	59	50	49	46	42	65	65	56	55	53	52	68	71	63	60	59	59	68	73	68	64	61	62
	510	300	61	61	51	50	46	43	66	67	57	56	54	53	69	72	64	61	60	60	70	75	69	65	62	63
	595	350	63	62	52	51	47	44	67	68	58	57	55	53	71	73	65	62	60	60	72	76	70	66	63	64
	680	400	65	64	56	53	47	46	68	69	60	58	55	54	72	74	66	63	60	60	73	77	71	67	64	64
KSQ-7	849	500	68	66	59	58	49	49	71	70	63	60	55	54	75	76	68	64	61	61	76	79	72	68	66	65
	425	250	59	52	46	46	43	42	62	60	54	51	50	51	64	64	63	58	56	57	65	67	63	62	60	62
	510	300	60	56	48	47	44	45	64	62	55	52	50	53	67	66	63	59	58	58	67	68	65	63	61	63
	680	400	61	59	50	49	45	46	65	65	56	54	50	54	69	70	64	60	59	59	70	71	67	64	62	66
	849	500	62	61	53	51	47	49	66	66	57	55	52	55	70	72	65	61	59	60	72	74	69	65	62	66
KSQ-8	1019	600	64	62	57	55	48	50	67	67	60	58	53	56	72	73	66	63	59	61	74	76	70	67	63	66
	1147	675	67	64	60	58	49	51	69	68	63	60	54	57	73	74	67	64	59	62	75	77	71	68	64	66
	595	350	61	56	48	49	47	45	65	64	56	55	53	52	67	70	65	63	60	59	68	73	68	67	64	63
	807	475	62	57	50	50	48	47	67	65	57	56	54	53	71	71	65	63	61	60	72	75	70	68	65	64
	1019	600	63	60	52	52	49	48	68	66	58	57	55	54	72	74	65	63	62	61	73	78	71	69	66	66
KSQ-9	1189	700	64	62	55	54	51	50	69	67	59	58	56	55	73	75	66	64	62	62	74	79	72	69	66	66
	1359	800	66	64	57	57	52	51	70	68	61	60	57	56	74	76	67	65	63	62	76	80	73	70	67	66
	1529	900	68	65	61	59	53	52	71	69	63	61	58	57	75	77	68	66	63	62	77	81	74	71	68	66
	764	450	58	54	48	47	46	44	64	62	55	53	52	53	67	71	63	62	60	60	69	70	69	66	64	65
	892	525	59	56	49	49	47	45	65	63	56	54	53	54	69	71	64	62	60	61	71	72	69	67	64	66
KSQ-10	1019	600	60	57	50	50	48	46	66	64	57	55	54	55	71	72	64	62	61	62	72	74	70	68	65	66
	1189	700	61	58	51	51	49	47	67	65	58	56	55	55	72	72	64	62	61	62	73	75	70	68	65	66
	1529	900	62	60	54	52	50	48	68	66	59	57	56	56	73	73	65	62	62	62	75	76	71	69	66	67
	1869	1100	66	63	59	58	51	49	68	67	62	59	57	56	74	74	66	65	63	64	77	78	72	69	67	69
	934	550	56	57	50	50	49	46	62	64	59	56	55	55	67	74	67	67	64	62	68	76	72	69	68	67
KSQ-12	1147	675	58	59	51	51	59	47	63	65	60	57	56	56	69	74	68	66	64	63	70	77	72	70	68	68
	1359	800	60	60	53	52	51	48	64	66	62	58	57	57	70	74	68	66	65	64	71	78	73	71	69	68
	1699	1000	61	63	55	55	52	49	65	67	62	60	58	57	71	74	68	66	65	64	73	78	73	71	69	68
	2039	1200	63	66	58	57	53	50	66	69	63	61	59	58	72	75	69	67	66	65	74	79	73	71	70	69
	2378	1400	65	67	61	59	55	53	67	70	65	62	60	58	73	76	70	68	66	65	75	80	74	72	70	70
KSQ-14	1359	800	59	56	51	52	49	48	65	62	59	57	55	56	73	72	68	65	66	64	74	75	73	70	67	68
	1699	1000	60	57	53	53	50	48	66	63	60	58	56	57	75	73	69	65	66	64	75	76	73	70	68	68
	2039	1200	61	58	55	54	51	49	67	66	61	59	57	57	76	74	70	65	66	64	76	77	74	70	69	69
	2378	1400	62	60	56	55	53	50	69	67	62	60	58	58	77	75	71	66	67	65	77	78	74	70	70	69
	2888	1700	65	62	60	56	54	52	71	68	65	62	59	59	78	76	72	68	68	66	78	79	74	71	71	70
KSQ-16	3398	2000	67	64	63	58	56	53	72	70	66	63	60	60	78	75	73	69	69	66	79	80	75	73	72	71
	1784	1050	59	54	52	53	51	48	67	63	60	57	56	57	72	71	67	65	64	64	74	74	72	69	67	69
	2378	1400	61	56	54	54	52	49	68	64	61	58	57	58	73	72	68	66	65	65	75	75	73	70	68	70
	3058	1800	64	59	56	55	53	59	69	65	62	59	58	59	74	73	69	67	66	65	76	76	74	71	69	70
	3737	2200	67	63	60	57	54	53	70	66	65	60	59	60	76	74	70	68	67	67	77	77	75	72	70	71
KSQ-16	4417	2600	70	66	63	59	56	55	71	67	67	61	60	61	77	73	71	69	68	68	78	78	76	73	71	72
	5096	3000	72	68	66	62	58	57	74	70	69	63	62	62	78	74	72	70	69	69	80	79	77	74	72	70
	2378	1400	59	53	51	52	59	48	65	61	58	57	56	59	72	69	67	63	63	65	73	74	71	68	67	70
	3228	1900	61	55	54	53	51	50	67	62	60	58	58	60	73	70	68	64	64	66	75	75	73	69	68	70
	4077	2400	64	58	56	54	53	51	68	64	61	59	59	61	74	71	69	65	65	66	77	76	74	70	69	71
KSQ-16	4926	2900	67	61	59	56	54	52	71	65	63	61	60	62	76	72	70	66	66	67	79	77	74	70	70	72
	5946	3500	71	64	63	59	56	55	74	68	66	62	61	63	78	73	71	67	66	68	81	78	75	71	70	73
	6965	4100	73	67	69	61	59	58	76	70	70	64	62	64	80	75	73	69	68	69	82	79	76	72	71	73

Notes

1. All sound data are measured in accordance with industry standard ARI-880.
2. Sound power levels are in decibels, re 10-12 watts.

Model KSQ

VAV Terminal

Table 9: Discharge Sound Power Data (dB) - KSQ units.
Dual Wall Metal Liner

MODEL NAME	AIRFLOW		125 Pa (0.5") ΔPs							250 Pa (1.0") ΔPs							500 Pa (2.0") ΔPs							750 Pa (3.0") ΔPs								
			Sound Power Levels, dB							Sound Power Levels, dB							Sound Power Levels, dB							Sound Power Levels, dB								
	CMH	CFM	Octave Band							Octave Band							Octave Band							Octave Band								
			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	3	4	5	6	7
KSQ-5	212	125	57	52	45	42	40	36	59	56	56	47	46	45	59	57	53	53	55	53	59	58	56	56	59	59						
	297	175	59	56	48	45	42	39	62	60	60	51	48	46	64	64	58	55	55	54	64	64	60	59	69	59						
	425	250	62	59	52	49	46	43	65	63	63	53	50	48	69	67	61	58	56	55	69	69	64	60	60	60						
	510	300	63	60	53	51	49	45	66	65	65	55	51	49	71	69	63	59	56	56	72	71	66	62	60	61						
	595	350	64	61	56	54	54	51	69	66	66	56	54	53	72	70	65	61	58	59	74	72	68	64	61	62						
KSQ-6	340	200	59	56	48	47	44	41	63	63	6	53	51	48	64	63	60	59	58	55	64	64	61	62	61	59						
	425	250	60	58	59	49	46	42	65	65	56	54	52	49	68	68	63	60	59	56	68	68	64	64	62	60						
	510	300	61	60	52	51	47	43	66	67	57	56	54	50	69	71	64	61	60	57	70	72	67	65	63	61						
	595	350	63	62	53	53	49	45	67	68	58	57	55	51	71	72	65	62	61	58	72	75	69	66	64	62						
	680	400	65	64	56	55	50	47	68	69	60	59	56	53	72	73	66	64	62	59	73	77	71	67	65	63						
KSQ-7	849	500	68	66	60	59	54	52	71	70	63	62	58	55	75	76	68	66	63	60	76	79	72	69	66	64						
	425	250	59	55	47	45	42	39	63	60	54	51	50	49	64	63	61	58	57	57	65	63	62	62	62	62						
	510	300	60	56	48	46	44	41	64	62	55	52	51	51	67	66	62	59	58	58	67	66	64	63	62	63						
	680	400	61	59	50	49	46	44	65	65	56	54	52	53	69	70	64	60	59	59	70	71	67	64	63	64						
	849	500	62	61	54	52	48	48	66	66	57	56	53	54	70	72	65	62	59	60	72	74	69	66	63	65						
KSQ-8	1019	600	64	62	58	55	59	49	67	67	60	58	54	55	72	73	66	63	60	60	74	76	70	67	63	65						
	1147	675	67	64	61	58	52	50	69	68	63	61	56	56	73	74	67	64	60	61	75	77	71	68	63	66						
	595	350	61	56	48	48	45	41	66	64	56	55	53	50	67	69	63	63	61	58	68	69	67	67	66	63						
	807	475	62	57	50	50	48	44	67	65	57	56	54	51	71	71	64	63	62	59	72	74	69	68	66	64						
	1019	600	63	60	53	52	50	47	68	66	58	57	55	53	72	74	65	63	62	60	73	78	71	68	67	65						
KSQ-9	1189	700	64	62	56	55	52	49	69	67	59	59	57	54	73	75	66	64	62	60	74	79	72	69	67	65						
	1359	800	66	64	59	57	54	50	70	68	61	69	58	55	74	76	67	65	63	61	76	80	73	70	67	65						
	1529	900	68	65	62	59	56	52	71	69	63	62	59	57	75	77	68	66	64	62	77	81	74	71	67	66						
	764	450	58	53	49	49	48	44	65	62	55	53	53	51	68	68	61	58	58	58	69	69	66	64	63	63						
	892	525	59	55	50	50	49	45	66	63	56	54	54	52	69	70	62	59	59	59	71	71	67	64	63	63						
KSQ-10	1019	600	60	56	51	51	50	46	67	64	57	55	55	53	71	71	63	60	60	60	72	72	68	65	64	64						
	1189	700	61	57	52	52	51	47	68	65	58	57	56	55	72	72	64	61	61	60	73	75	69	66	64	65						
	1529	900	62	60	54	54	52	48	68	66	59	58	57	56	73	73	65	62	62	62	75	76	70	67	65	66						
	1869	1100	66	63	59	59	53	51	69	67	62	61	58	57	74	74	66	65	64	63	77	78	71	67	67	67						
	934	550	56	56	51	51	50	46	63	64	59	56	56	53	67	71	65	62	62	60	68	75	69	67	67	65						
KSQ-12	1147	675	58	58	53	53	51	45	64	65	60	57	57	54	69	72	66	63	63	61	70	76	70	67	67	65						
	1359	800	60	60	54	54	52	47	65	66	62	59	58	55	70	73	67	64	64	62	71	77	71	68	68	66						
	1699	1000	61	63	56	56	53	50	66	67	62	60	59	57	71	74	68	65	64	62	73	78	72	69	68	67						
	2039	1200	63	65	59	58	55	52	67	69	63	62	61	58	72	75	69	66	66	64	74	79	73	70	69	68						
	2378	1400	65	67	62	61	57	54	68	70	65	64	62	59	73	76	70	68	67	65	75	80	73	71	70	68						
KSQ-14	1359	800	59	55	51	52	51	45	66	62	59	57	56	53	72	70	68	62	63	59	73	73	70	68	68	67						
	1699	1000	60	56	52	52	53	46	68	63	60	58	57	54	73	71	69	63	64	60	75	74	71	69	69	68						
	2039	1200	61	57	54	54	52	47	70	66	61	59	58	55	74	72	70	64	65	61	76	76	72	70	70	69						
	2378	1400	62	61	58	56	55	48	69	67	62	60	59	57	75	73	71	65	66	62	77	77	73	70	71	69						
	2888	1700	65	64	61	59	57	50	70	68	65	61	60	58	76	75	72	66	67	63	78	78	74	71	72	70						
KSQ-16	3398	2000	67	66	64	61	59	55	70	70	66	64	61	59	77	75	73	67	68	64	79	79	75	72	72	70						
	1784	1050	59	54	51	53	54	47	68	63	60	57	58	56	71	69	67	66	63	62	72	73	70	68	68	67						
	2378	1400	61	57	56	56	55	50	69	64	61	59	59	57	72	70	68	67	64	63	75	74	71	70	69	69						
	3058	1800	64	60	57	57	56	52	71	65	62	60	60	59	73	72	69	68	65	64	76	75	72	71	70	69						
	3737	2200	67	62	59	58	57	54	72	66	65	61	61	61	75	73	69	69	66	65	77	76	73	72	71	71						
KSQ-18	4417	2600	70	63	63	60	59	56	74	67	67	63	62	62	76	74	70	70	67	66	78	77	74	73	72	72						
	5096	3000	72	65	66	63	62	58	75	70	69	64	63	63	78	75	71	71	68	67	80	78	75	74	73	73						
	2378	1400	59	53	51	52	52	48	66	61	58	57	57	56	72	69	67	64	64	63	74	73	70	68	68	68						
	3228	1900	61	55	54	54	51	67	62	60	59	59	57	57	73	70	68	65	65	64	75	74	72	69	69	68						
	4077	2400	64	59	56	55	55	52	69	64	61	60	60	58	74	71	69	66	66	65	77	75	73	70	70	69						
KSQ-20	4926	2900	67	62	59	57	56	53	71	65	63	61	61	59	76	63	70	67	67	66	797											

Tab Table 12: Hot Water Heating Coil Performance - Inlet Sizes 125 ,150mm (05", 06")

	Water Flow (LPS)	Water PD (kPa)		AIR FLOW CMH								
				85	170	255	340	425	510	595	680	765
125 , 150 mm (5",6") KSQ , 1 Row	0.03	0.6	kW	1.1	1.6	2.0	2.3	2.5	2.7	2.9	3.0	3.1
	0.06	1.8		1.1	1.8	2.2	2.6	2.9	3.2	3.4	3.6	3.8
	0.13	5.7		1.1	1.8	2.3	2.8	3.2	3.5	3.8	4.0	4.3
	0.19	11.7		1.2	1.9	2.4	2.9	3.3	3.6	3.9	4.2	4.5
	0.25	19.4		1.2	1.9	2.4	2.9	3.3	3.7	4.0	4.3	4.6
125 , 150 mm (5",6") KSQ , 2 Row	0.06	0.9	kW	1.6	2.6	3.4	4.0	4.5	4.9	5.2	5.5	5.8
	0.13	3.3		1.6	2.8	3.7	4.4	5.0	5.6	6.1	6.5	6.9
	0.19	7.2		1.7	2.8	3.8	4.6	5.3	5.9	6.4	6.9	7.4
	0.25	12.3		1.7	2.9	3.9	4.7	5.4	6.0	6.6	7.1	7.6
	0.32	18.5		1.7	2.9	3.9	4.7	5.5	6.2	6.7	7.3	7.8
125 , 150 mm (5",6") KSQ , 4 Row	0.19	1.5	kW	2.0	3.7	5.2	6.4	7.5	8.5	9.4	10.2	10.9
	0.25	2.4		2.0	3.8	5.3	6.6	7.7	8.8	9.8	10.6	11.4
	0.32	3.9		2.0	3.8	5.3	6.7	7.9	9.0	10.0	10.9	11.7
	0.38	5.4		2.0	3.8	5.4	6.7	8.0	9.1	10.1	11.1	12.0
	0.44	7.2		2.1	3.8	5.4	6.8	8.1	9.2	10.3	11.3	12.2

Table 13: Hot Water Heating Coil Performance - Inlet Sizes 175 ,200mm (07", 08")

	Water Flow (LPS)	Water PD (kPa)		AIR FLOW CMH								
				170	340	510	680	850	1019	1189	1359	1529
175 , 200 mm (7",8") KSQ , 1 Row	0.03	0.6	kW	1.7	2.4	2.9	3.3	3.5	3.8	3.9	4.1	4.2
	0.06	1.8		1.8	2.8	3.4	3.9	4.3	4.7	5.0	5.2	5.4
	0.13	6.3		1.9	3.0	3.8	4.4	4.9	5.3	5.7	6.1	6.4
	0.19	12.6		2.0	3.1	3.9	4.6	5.1	5.6	6.0	6.4	6.8
	0.25	20.9		2.0	3.1	4.0	4.7	5.3	5.8	6.2	6.7	7.0
175 , 200 mm (7",8") KSQ , 2 Row	0.06	0.9	kW	2.8	4.2	5.2	6.0	6.6	7.0	7.4	7.7	8.0
	0.13	3.3		2.9	4.7	6.0	7.0	7.8	8.5	9.1	9.7	10.1
	0.19	7.2		3.0	4.9	6.3	7.4	8.4	9.2	9.9	10.6	11.2
	0.25	12.6		3.0	5.0	6.4	7.7	8.7	9.6	10.4	11.1	11.7
	0.32	19.1		3.0	5.0	6.6	7.8	8.9	9.8	10.7	11.5	12.1
175 , 200 mm (7",8") KSQ , 4 Row	0.13	0.6	kW	3.8	6.4	8.4	10.0	11.3	12.3	13.2	13.9	14.6
	0.19	1.5		3.8	6.7	9.0	10.8	12.3	13.6	14.7	15.7	16.6
	0.25	2.7		3.8	6.8	9.2	11.2	12.9	14.4	15.6	16.8	17.8
	0.38	5.7		3.9	7.0	9.5	11.7	13.6	15.2	16.7	18.0	19.2
	0.50	9.6		3.9	7.1	9.7	12.0	13.9	15.7	17.3	18.7	20.0

Table 14: Hot Water Heating Coil Performance - Inlet Sizes 225 ,250mm (09", 10")

	Water Flow (LPS)	Water PD (kPa)		AIR FLOW CMH								
				510	722	934	1147	1359	1572	1784	1996	2209
225 , 250 mm (9",10") KSQ , 1 Row	0.03	0.6	kW	3.4	3.9	4.3	4.6	4.8	5.0	5.2	5.3	5.4
	0.06	2.4		4.0	4.7	5.3	5.8	6.2	6.5	6.9	7.1	7.4
	0.13	8.1		4.4	5.3	6.1	6.7	7.2	7.7	8.1	8.6	8.9
	0.19	16.7		4.5	5.5	6.4	7.1	7.7	8.2	8.7	9.2	9.6
	0.25	27.8		4.6	5.6	6.5	7.3	7.9	8.5	9.1	9.5	10.0
225 , 250 mm (9",10") KSQ , 2 Row	0.06	1.2	kW	6.0	7.1	7.9	8.6	9.1	9.5	9.9	10.2	10.5
	0.13	3.9		6.8	8.3	9.5	10.5	11.4	12.1	12.8	13.4	13.9
	0.19	8.4		7.1	8.8	10.2	11.4	12.4	13.3	14.1	14.9	15.5
	0.25	14.6		7.3	9.1	10.6	11.9	13.0	14.0	14.9	15.7	16.5
	0.32	22.1		7.4	9.3	10.8	12.2	13.4	14.5	15.4	16.3	17.1
225 , 250 mm (9",10") KSQ , 4 Row	0.13	0.9	kW	9.3	11.7	13.5	14.9	16.1	17.1	18.0	18.8	19.4
	0.25	3.3		10.1	13.0	15.4	17.5	19.3	20.8	22.2	23.5	24.6
	0.38	6.9		10.3	13.4	16.1	18.5	20.5	22.4	24.1	25.6	27.0
	0.50	11.7		10.5	13.7	16.5	19.0	21.2	23.3	25.1	26.8	28.3
	0.63	17.3		10.5	13.9	16.8	19.4	21.7	23.8	25.8	27.5	28.3

Note : all selections based on 82.3°C (180 °F) EWT and 12.7 Deg.C (55 °F) EAT (69.4 °C ΔT). For other ΔT's adjust capacities by the following factors:-

ΔT	36	42	47	53	58	64	69	75	81	86	92
Factor	0.51	0.59	0.67	0.75	0.83	0.92	1.00	1.08	1.17	1.25	1.33

Table 15: Hot Water Heating Coil Performance - Inlet Sizes 300 mm (12")

	Water Flow (LPS)	Water PD (kPa)		AIR FLOW CMH								
				680	1019	1359	1699	2039	2379	2718	3058	3398
300mm, (12") KSQ 1 Row	0.06	0.3	kW	4.7	5.5	6.1	6.6	6.9	7.2	7.5	7.7	7.9
	0.13	0.9		5.4	6.6	7.5	8.2	8.8	9.3	9.8	10.2	10.5
	0.19	1.5		5.7	7.1	8.1	9.0	9.7	10.4	10.9	11.4	11.9
	0.25	2.7		5.9	7.3	8.5	9.5	10.3	11.0	11.6	12.2	12.7
	0.32	4.2		6.0	7.5	8.8	9.8	10.7	11.4	12.1	12.7	13.3
300mm, (12") KSQ 2 Row	0.06	1.2	kW	7.7	9.2	10.2	11.0	11.5	12.0	12.4	12.7	13.0
	0.13	4.8		8.9	11.2	12.9	14.2	15.3	16.3	17.1	17.7	18.3
	0.19	9.9		9.4	12.0	14.0	15.7	17.1	18.3	19.4	20.3	21.1
	0.25	16.7		9.7	12.5	14.7	16.6	18.1	19.5	20.7	21.8	22.8
	0.32	25.4		9.8	12.7	15.1	17.1	18.8	20.3	21.7	22.9	23.9
300mm, (12") KSQ 4 Row	0.13	1.2	kW	12.2	15.5	17.9	19.7	21.1	22.3	23.2	24.0	24.7
	0.25	3.9		13.3	17.7	21.3	24.1	26.6	28.7	30.4	32.0	33.4
	0.38	8.1		13.7	18.6	22.6	26.0	28.9	31.5	33.7	35.7	37.6
	0.50	13.7		13.9	19.0	23.3	27.0	30.2	33.1	35.6	37.9	40.0
	0.63	20.9		14.1	19.3	23.7	27.6	31.0	34.1	36.8	39.3	41.6

Table 16: Hot Water Heating Coil Performance - Inlet Sizes 350 mm (14")

	Water Flow (LPS)	Water PD (kPa)		AIR FLOW CMH								
				850	1359	1869	2379	2888	3398	3908	4417	4927
350mm, (14") KSQ 1 Row	0.13	0.9	kW	7.0	8.8	10.2	11.2	12.0	12.7	13.3	13.9	14.3
	0.19	1.8		7.5	9.6	11.2	12.5	13.5	14.4	15.1	15.8	16.4
	0.25	3.3		7.7	10.0	11.7	13.2	14.4	15.4	16.3	17.1	17.8
	0.32	4.8		7.9	10.3	12.1	13.7	14.9	16.1	17.1	17.9	18.7
	0.38	6.9		8.0	10.5	12.4	14.0	15.4	16.6	17.6	18.5	19.4
350mm, (14") KSQ 2 Row	0.13	1.5	kW	11.1	14.2	16.3	18.0	19.2	20.3	21.1	21.8	22.5
	0.19	3.3		11.9	15.6	18.3	20.5	22.2	23.7	24.9	26.0	26.9
	0.25	5.4		12.3	16.4	19.5	22.0	24.0	25.8	27.3	28.6	29.8
	0.38	11.4		12.7	17.3	20.8	23.7	26.2	28.3	30.1	31.8	33.3
	0.50	19.1		13.0	17.7	21.5	24.6	27.4	29.7	31.8	33.7	35.4
350mm, (14") KSQ 4 Row	0.25	3.0	kW	16.8	23.2	28.0	31.8	34.8	37.3	39.4	41.2	42.7
	0.38	6.3		17.4	24.6	30.3	35.0	38.9	42.3	45.1	47.6	49.8
	0.50	10.5		17.7	25.3	31.6	36.8	41.2	45.1	48.5	51.5	54.1
	0.63	15.8		17.9	25.8	32.3	37.9	42.7	46.9	50.7	54.0	57.0
	0.76	22.1		18.0	26.1	32.9	38.7	43.7	48.2	52.2	55.8	59.1

Table 17: Hot Water Heating Coil Performance - Inlet Sizes 400 mm (16")

	Water Flow (LPS)	Water PD (kPa)		AIR FLOW CMH								
				1019	1741	2464	3186	3908	4630	5352	6074	6796
400mm, (16") KSQ 1 Row	0.13	0.9	kW	28.3	36.5	42.1	46.3	49.6	52.3	54.6	56.5	58.2
	0.19	2.1		30.2	39.9	46.8	52.1	56.4	60.0	63.1	65.8	68.2
	0.25	3.6		31.3	41.8	49.6	55.7	60.7	64.9	68.5	71.7	74.6
	0.32	5.1		32.0	43.1	51.4	58.1	63.5	68.2	72.3	75.9	79.1
	0.38	7.2		32.5	44.1	52.8	59.8	65.6	70.7	75.1	79.0	82.5
400mm, (16") KSQ 2 Row	0.13	1.8	kW	44.3	57.6	66.2	72.4	77	80.6	83.5	86.0	88.0
	0.19	3.6		47.8	64.4	75.9	84.5	91.2	96.7	101.3	105.2	108.6
	0.25	6.0		49.7	68.2	81.6	91.9	100.2	107.1	112.9	118.0	122.4
	0.38	12.3		51.8	72.5	88.1	100.6	110.9	119.6	127.2	133.8	139.7
	0.50	20.6		52.8	74.8	91.8	105.5	117	126.9	135.6	143.2	150.2
400mm, (16") KSQ 4 Row	0.25	3.3	kW	68.0	96.6	116.7	131.5	142.8	151.8	159.2	165.3	170.5
	0.38	6.6		70.7	103.8	128.6	148.0	163.7	176.7	187.6	197.0	205.1
	0.50	11.4		72.1	107.5	135.1	157.4	175.9	191.5	204.9	216.6	226.9
	0.63	17.0		73.0	109.8	139.3	163.4	183.8	201.3	216.5	230.0	241.9
	0.76	23.6		73.5	111.4	142.1	167.6	189.4	208.3	224.9	239.6	252.8

Note : all selections based on 82.3°C (180 °F) EWT and 12.7 Deg.C (55 °F) EAT (69.4 °C ΔT). For other ΔT's adjust capacities by the following factors:-

ΔT	36	42	47	53	58	64	69	75	81	86	92
Factor	0.51	0.59	0.67	0.75	0.83	0.92	1.00	1.08	1.17	1.25	1.33

Table 18: Hot Water Heating Coil Performance - Inlet Sizes 300 mm (12")

	Water Flow (LPS)	Water PD (kPa)		AIR FLOW CMH								
				1699	2973	4248	5522	6796	8070	9345	10619	11893
600 x 400 mm, (24" x 16") KSQ 1 Row	0.13	3.3	kW	13.0	16.6	18.9	20.6	21.8	22.8	23.6	24.3	24.9
	0.19	7.2		14.1	18.6	21.6	23.9	25.7	27.2	28.4	29.4	30.4
	0.25	12.0		14.7	19.7	23.2	25.9	28.1	29.9	31.4	32.8	34.0
	0.32	17.6		15.1	20.5	24.3	27.3	29.8	31.8	33.6	35.2	36.5
	0.38	24.5		15.4	21.0	25.1	28.3	31.	33.3	35.2	36.9	38.4
600 x 400 mm, (24" x 16") KSQ 2 Row	0.13	1.2	kW	18.8	23.4	25.9	27.6	77	29.6	30.3	30.8	31.3
	0.19	2.4		21.1	27.5	31.5	34.3	91.2	37.9	39.2	40.3	41.1
	0.25	3.9		22.4	30.0	35.1	38.7	100.2	43.7	45.6	47.1	48.4
	0.38	8.1		23.8	33.0	39.4	44.3	110.9	51.3	54.0	56.3	58.3
	0.50	13.5		24.6	34.6	41.9	47.6	117	56.1	59.3	62.2	64.7
600 x 400 mm, (24" x 16") KSQ 4 Row	0.13	1.8	kW	25.5	30.8	33.1	34.3	142.8	35.5	35.9	36.1	36.2
	0.19	3.9		29.3	38.3	43.2	46.1	163.7	49.3	50.3	51.0	51.6
	0.25	6.3		31.2	42.8	49.8	54.3	175.9	60.0	61.8	63.2	64.3
	0.38	13.2		33.2	47.9	57.9	65.1	183.8	74.8	78.2	81.0	83.4
	0.50	21.8		34.2	50.6	62.4	71.5	189.4	84.3	89.0	93.0	96.4

Note : all selections based on 82.3°C (180 °F) EWT and 12.7 Deg.C (55 °F) EAT (69.4 °C ΔT). For other ΔT's adjust capacities by the following factors:-

ΔT	36	42	47	53	58	64	69	75	81	86	92
Factor	0.51	0.59	0.67	0.75	0.83	0.92	1.00	1.08	1.17	1.25	1.33

Reheat Coil Definitions

CMH = Cubic Meter / Hour
 LPS = Liters / Sec
 EAT = Entering Air Temperature , °C
 LAT = Leaving Air Temperature , °C
 ΔTA = Differential Air Temperature, °C = LAT - EAT
 EWT = Entering Water Temperature °C
 LWT = Leaving Water Temperature , °C
 ΔTw = Differential Water Temperature, °C = LWT - EWT
 kW = Kilowatt
 1 kW = 3412 BTU /Hr

Water Coil Calculation

KW = CMH x 1.204 x ΔTA / 3,600
 ΔTA = kW x2990 / CMH
 ΔTw = kW / (LPS x 4.187)

Sizing Reheat Coils :

1. Knowing the heating load of the space (kW), room set point, and the air flow rate (CMH) during heating (based on minimum ventilation rates,max recommended discharge temp. for best ADPI, etc) determine the supply air temperature required to satisfy the load :

Supply Air temperature = (kW X2990 /CMH) + Room Temp. set point

2. The supply Air temperature in to the space is the required Leaving Air Temperature from the coil (assuming no duct heat loss). Applying energy transfer equations for electric or Hot water coils determines performance characteristics required to select coil :

Hot Water / Electric Heater coils = CMH x 1.204 x ΔTA / 3,600

Notes :

1. All sound data are measured in accordance with industry standard AHRI-880
2. Sound power levels are in decibels, re10⁻¹² watts
3. Discharge Lw includes end reflection loss per AHRI requirements

*In the interest of product development, KMC reserves the right to make changes without notice.

Model KSQ

VAV Terminal

KSQ Terminal

MODEL

KSQ - Basic Assembly

INLET SIZE

- 125mm (5"Ø)
- 150mm (6"Ø)
- 175mm (7"Ø)
- 200mm (8"Ø)
- 225mm (9"Ø)
- 250mm (10"Ø)
- 300mm (12"Ø)
- 350mm (14"Ø)
- 400mm (16"Ø)
- 600mm x 400mm (24"x16")

CASING CONSTRUCTION

- Galvanized Steel
- 304 Stainless Steel
- 316 Stainless Steel
- Aluminium
- 22 Gauge (0.8mm) Standard
- 20 Gauge (1.0mm)

CASING TREATMENTS

- 25 (1") Foil Faced Insulation
- 25 (1") Matt Faced Insulation
- 25 (1") Fiber-Less Insulation
- Dual Wall

CONTROL SYSTEM

- Electric Control
- Control strategies available for all applications

CONTROL SIDE

- Right Side
- Left Side

ELECTRIC COILS

- 240 Volts
- 415 Volts

- 1Phase
- 3 Phase

- 1 Step
- 2 Step
- 3 Step
- Modulating

- Door Interlocking Disconnect Switch, Non - Fused
- Power Fusing
- Primary Fused Transformer

ELECTRIC CONTROLS

- Control Transformer
- Low Voltage Control Disconnect Switch.
- Low Voltage Fuse & Fuse Block
- Low Voltage Disconnect Switch
- Low Voltage Power-Fusing
- 24 VAC Actuator



Typical Specification

Furnish and install KMC's KSQ Single Duct Variable Air Volume Terminals, KSQA Single Duct Variable Air Volume Terminals with integral sound attenuator, or KSQE Single Duct Variable Air Volume Terminals with integral electric heating coil as shown on the plans. The performance of all Single Duct Terminals shall be Rated in accordance to ARI standard 880. Discharge and radiated sound power levels shall not exceed the values as shown on the terminal unit schedule.

Casing Construction:

The unit casing shall be fabricated from zinc coated steel and use mechanical locking seams to form a leak resistant assembly. Any sealant used in the unit's construction must be approved for duct use and conform to NFPA 90A. Leakage through the Air Terminal casing shall be less than 1% of the maximum rated air flow @ 750 Pa (3" w.g) static pressure. The terminal discharge connection shall be Slip & Drive type integral to the casing.

The casing shall be:

- 0.8mm (22G) (standard), and 1.0 mm (20 G)

The casing shall be provided with:

- Standard control enclosure
- Custom sized control enclosure
- Hinged front cover for control enclosure

Insulation and Treatment:

The unit casing shall be internally lined with:

- 25mm (1") thick aluminum foil-faced glass fiber insulation. The edges of the insulation shall be sealed with aluminum tape. The insulation shall conform to NFPA 90A, UL 181, and ASTM C665.
- 25mm (1") thick Matte faced insulation. The edges of the insulation shall be sealed with aluminum tape. The insulation shall conform to NFPA 90A, UL 181, and ASTM C665
- 25mm (1") thick (fiber-less) smooth skin surface closed cell foam insulation. The insulation shall conform to NFPA 255 and UL 181.
- No Insulation

Air Valve:

The damper assembly shall consist of a round blade that requires nominal 90-degree rotation from fully opened to fully closed positions on sizes 125 (5") through 16. The damper blade shall be mechanically attached to the die-cast metal damper shaft with through the shaft machine-applied rivets. The low leakage damper shall be constructed of a gasket material sandwiched between two 22-gauge zinc coated steel plates. Leakage through the damper shall be less than 1% of the maximum rated airflow at 750 Pa (3" w.g) static pressure. The damper gasket material is securely fastened between the two damper plates using machine applied rivets. The damper assembly shall rotate freely in Metal bearings. Damper position shall be indicated on the end of the shaft on the outside of the casing. Inlet connection and damper on size 600 x 400 (24 x 16) shall be rectangular.

Airflow Sensor:

A multi-point airflow sensor (FloXact-X™) of the multi-point averaging type shall be located in the terminal inlet. The airflow sensor shall be designed to have unique shape and creates a linear amplified signal with a low noise level and pressure drop. The sensor shall amplify (at least 2.5x Pdyn) the velocity pressure signal and provide feedback of actual flow to the controller to have stable measuring signal from 0.8 m/s Air velocity

Electronic analog controls:

The electronic analog controls shall be suitable for a 24-volt control system. The electronic actuator shall be mounted at factory (either KMC's standard actuators or furnished by Customer) to move the damper from fully open to fully closed positions. The actuator shall be directly coupled to the damper shaft with no linkages.

- The electronic pressure independent controller shall control flow within +/- 5% of the design airflow regardless of changes in system static pressure.

The controller shall reset the flow as required by the thermostat. The maximum and minimum airflow set points shall be set at the factory. The electronic actuator and controller shall be combined in a single compact housing.

The terminal shall also be provided with:

- Transformer to step down incoming line voltage to 24 volts (standard on KSQE units with electric heating coils)
- Service disconnect switch for 24 volt controls (pilot duty)
- Line voltage fusing and fuse block

The wall thermostat shall be furnished by KMC for installation by the temperature control contractor. Flow adjustments shall be made at the wall thermostat utilizing a digital voltmeter.

It shall be the responsibility of the temperature control contractor to coordinate these requirements with manufacturer (KMC).

Hot Water Coils:

Where shown on the plans, hot water heating coils shall be provided and mounted by the terminal manufacturer (KMC). The hot water coils shall be mounted at the discharge of the terminal unit, and the coil shall have a Slip & Drive type connection for attachment to the downstream ductwork.

Coils shall be 12.7mm (1/2") OD copper tubing mechanically expanded in aluminum fins. Coils shall be leak tested with dry nitrogen to 28 Bar (400 psi) with a minimum burst pressure of 175 Bar (2500 psi) . The performance of all hot water coils shall be rated in accordance with ARI standard 410. Refer to the terminal schedule on the plans for capacities and performance requirements. The water control valves shall be furnished and installed by others and not by the terminal manufacturer (KMC).

DDC Controls:

Terminal manufacturer (KMC) shall mount DDC controls provided by others. All mounting hardware should be provided by the DDC control supplier. It shall be the responsibility of the DDC supplier to coordinate and provide job specific wiring diagrams to the terminal manufacturer (KMC).

Electric Heating Coils:

KMC's KSQE units shall have the electric resistance type heating coils and coil controls. The electric coils shall be located a sufficient distance downstream of the primary air damper to prevent hot spots and nuisance tripping. The heating elements shall be installed as an integral part of the terminal unit. All terminals with electric heat shall include high grade nickel-chrome elements, a transformer, air proving switch, primary disc type automatic reset hi-limit (standard), secondary hi-limit manual reset cutout(optional), magnetic contractors and/or PE switches per step, grounding terminal, and circuit fusing on heaters exceeding 48 amps. Coil control enclosure panel and frame shall be constructed from galvanized steel. A wiring diagram shall be permanently affixed to the coil control enclosure panel. Refer to the terminal schedule on the plans for capacity and performance requirements.

- In Electronic analog control systems, the terminal manufacturer (KMC) shall interconnect the electronic controls with the electric coil for proper staging of heat. Power connection for the coil and associated flow controls shall be made at a single point. The coils shall also be provided with:
- Door interlocking disconnect switch – non-fused (Optional)
- Power-fusing (Fuses and fuse blocks)
- SSR proportional modulating controller
- Transformer