X-VENTISO by earthcore

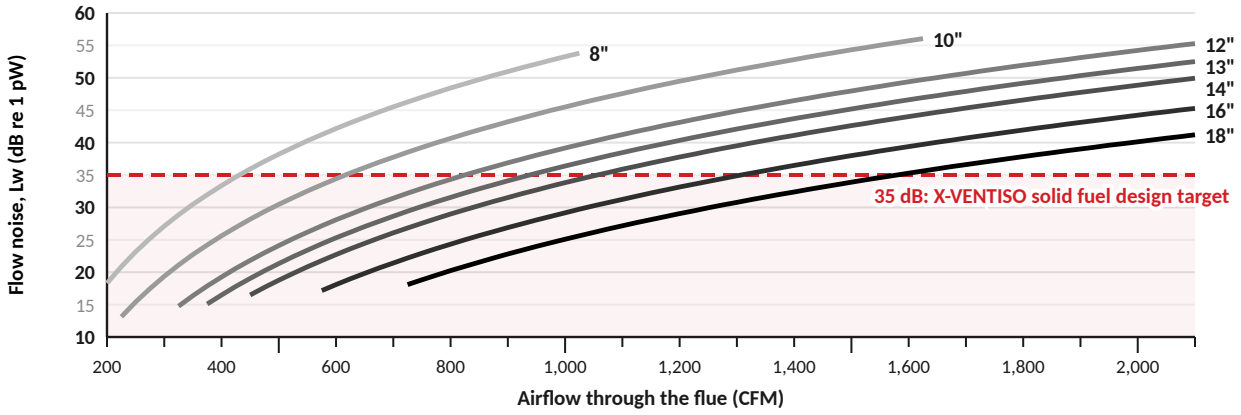
DESIGN REFERENCE · SOLID FUEL SYSTEMS

FLUE VELOCITY AND FLOW NOISE

X-VENTISO design target for solid fuel: flue flow noise at or below 35 dB

Solid fuel systems are designed to keep flue flow noise at or below 35 dB, below the draft inducer itself. Example: 600 CFM through a 14" flue instead of a 10" flue moves at about half the velocity (560 vs. 1,100 FPM) and makes about 12 dB less flow noise (11.7 dB before rounding). Every 10 dB less is heard as roughly half as loud.

FLOW NOISE BY AIRFLOW AND ROUND FLUE SIZE



REFERENCE TABLE · EACH CELL: FLOW NOISE, Lw (dB) / VELOCITY (FPM)

CFM	6"	8"	10"	12"	13"	14"	16"	18"	20"
250	**33** 1,273	23 716	15 458	—	—	—	—	—	—
400	43 2,037	**33** 1,146	26 733	19 509	16 434	—	—	—	—
600	—	42 1,719	**34** 1,100	28 764	25 651	23 561	18 430	—	—
800	—	48 2,292	41 1,467	**34** 1,019	32 868	29 748	24 573	20 453	—
900	—	51 2,578	43 1,650	37 1,146	**34** 976	32 842	27 645	23 509	19 413
1,000	—	53 2,865	46 1,833	39 1,273	36 1,085	**34** 935	29 716	25 566	21 458
1,250	—	—	50 2,292	44 1,592	41 1,356	39 1,169	**34** 895	30 707	26 573
1,500	—	—	54 2,750	48 1,910	45 1,627	43 1,403	38 1,074	**34** 849	30 688
1,800	—	—	—	52 2,292	49 1,953	47 1,684	42 1,289	38 1,019	**34** 825
Max CFM at 35 dB	**270**	**430**	**615**	**825**	**940**	**1,055**	**1,310**	**1,580**	**1,870**

Max CFM at 35 dB: the most airflow each flue size carries at or below the design target. **Red:** the smallest flue in each row at or below the 35 dB design target. Larger flues are quieter still. Round flue, inside diameter; 13" matches Earthcore Eco-Steel all-fuel pipe. — : below 400 FPM or above 3,000 FPM, outside the range shown. Other shapes: use the inside area.

WHY 35 dB ON SOLID FUEL

At a typical commissioning setting (38 V), XV Series draft inducers tested at 42 to 51 dB sound power (see the XV Series Sound Data Sheet). A flue sized to 35 dB keeps flow noise well below the draft inducer, so it adds almost nothing to the total. Flue silencers are not used on solid fuel: creosote and soot would foul the absorber.

Scope: air noise generated by flow through a straight run of flue, as sound power, for comparing flue sizes during design. It does not include draft inducer noise, fittings, the termination, or hot flue gas, and it is not a room sound level.

Method: empirical straight-duct flow noise correlation, $L_W = 10 + 50 \log_{10}(v) + 10 \log_{10}(A)$, v in m/s, A in m^2. Calculated values, not measurements.