

TECH TIP # 9

Sound Control with Spray Polyurethane Foam

Sound Control Definitions

The definition from the ASHRAE (American Society of Heating, Refrigeration and Air Conditioning Engineers) Handbook is that sound from a source is transmitted via a path to a receiver. The two principal path types are airborne transmission and structural-borne transmission.

Strategies to Control Sound with Spray Foam

Strategies to reduce thermal transfer (increase energy efficiency) and reduce air infiltration are identical to reducing airborne sound transmission. Spray polyurethane foam systems such as ENERTITE[®], and WALLTITE[®] are by definition air infiltration barrier materials (in accordance with ASTM E2178 and E283) and will stop airborne noise.

The closed-cell rigidity of WALLTITE also inhibits structural-borne sound transmission. The primary source of sound transmission is structural sound transfer, and as defined again from the ASHRAE Handbook, “room to room sound transmission occurs when surfaces vibrate”. Lightweight structures with little damping, radiate more sound than a more “...massive structure with greater damping”.

WALLTITE has the greatest ability to stop the vibration of wall elements, while ENERTITE open-cell foam also fills the cavity, providing more sound absorption capacity while creating a continuous mass wall; therefore, all BASF spray foam products reduce structural-borne transmission of sound.

The following is a chart of the sound absorption coefficients of BASF open- and closed-cell foam systems, as determined in accordance with ASTM C423:

Closed-cell Thickness	Frequency	125	250	350	500	1000	2000	4000	NRC
1/4"	S/ab	0.1	0.21	0.21	0.26	0.17	0.63	0.65	0.31
1/2"	S/ab	0.1	0.25	0.29	0.45	0.84	0.97	0.87	0.63
1"	S/ab	0.2	0.49	0.62	0.81	0.91	0.98	0.97	0.80
Open-cell Thickness	Frequency	200	400	500	800	1000	2000	4000	NRC
3.5"	Hz	0.08	0.41	0.53	0.74	0.72	0.70	0.74	0.55

The table below provides the STC (Sound Transmission Coefficient) and IIC (Impact Insulation Class) of various wall and floor/ceiling tested assemblies. The higher the values are, the better the acoustical performance of the assembly.

	Assembly		BASF's Foam	STC	IIC
	Description	Reference Design			
Exterior Walls (7/16" OSB & 5/8" gypsum) (studs at 16" o.c.)	2x4 studs - 3.5" ocSPF		ENERTITE Series	33	N/A
	2x6 studs - 5.5" ocSPF		ENERTITE Series	34	N/A
	2x6 studs - 3.0" ccSPF		WALLTITE Series*	33	N/A
	2x6 studs - 2.5" ccSPF & 3.5" batt		WALLTITE Series*	36	N/A
Partition Walls (studs at 16" o.c.)	2 layers of 5/8" Type X gypsum 2x4 studs - 3.5" ocSPF 1 in. air space 2x4 studs - no insulation 2 layers of 5/8" Type X gypsum	UL Design V324 UL Design V342 UL Design V352	ENERTITE Series	57	N/A
	5/8" Type X gypsum 2x4 studs - 3.5" ocSPF 5/8" Type X gypsum	UL Design U305	ENERTITE Series	34	N/A
Floors / Ceilings (trusses at 24" o.c.)	Click-lock VLT Acoustical Pad 23/32" OSB subfloor 18" OWT - 3.5" ocSPF Resilient channel 5/8" gypsum	UL Design L528	ENERTITE Series	57	50
	Click-lock VLT 1-1/4" gypsum concrete Acousti-Mat 23/32" OSB subfloor 18" OWT - 3.5" ocSPF Resilient channel 5/8" gypsum	UL Design L521	ENERTITE Series	59	55

*These are typical STC values of closed cell spray foam within the defined assemblies.