SUPERIOR PRODUCTS
INTERNATIONAL II, INC.

SUPER THERM®

NOW A PROVEN "SOUND PROOFING BARRIER"

SUPER THERM® provides a heat barrier to provide a comfortable environment and reduce energy consumption, and SUPER THERM® now offers sound reduction and deadening for apartments, office buildings, schools, industrial buildings, railway facilities, and much more.

SOUND TESTING BY VTEC LABORATORIES:

STC Testing for SUPER THERM® conducted by VTEC Laboratories on November 22, 2005, is attached.

Most sound that the human ear can detect is reflected in the mid range frequencies Hz. SUPER THERM® works best in these frequencies for use on walls of apartments, hospitals, office buildings, etc. The low frequency is a fog horn which is not the normal range of sound.

The overall rating at the bottom of each page is gauged by the performance on the low frequency and this dictates the rating although this frequency is not normally what you hear in a building. Midrange sound vibration or frequencies are the main frequencies of sound.

Looking at the frequencies and knowing how SUPER THERM® works at the midrange frequencies, SUPER THERM® performs into the range of sound deadening required by building codes. Above 40 rating is good with the 50 rating as the desired.

SOUND TESTING BY HOT-COLD AIR & FIRE CONTROL:

Sound Testing for SUPER THERM® conducted by Hot-Cold Air & Fire Control (Pat Saulson, PhD.) is attached.

INTERIOR WALLS

Coated with two coats of SUPER THERM® provided sound insulation as shown in Table 1 of the testing materials.

Sound was reduced an average of 50.2% by using SUPER THERM® on the interior walls of a house.

EXTERIOR WALLS

SUPER THERM® is being tested now for sound insulation on the exterior walls. Preliminary tests show a 23% sound reduction.

10835 W. 78th Street ● Shawnee, Kansas 66214 ● Phone: 913-962-4848; Fax: 913-962-6767
Website: www.spicoatings.com Email: sales@spicoatings.com

STC TESTING
FOR
SUPERIOR PRODUCTS INTERNATIONAL II
ON
SINGLE WALL EXTERIOR COATED
VTEC #100-2251-1
TESTED: NOVEMBER 22, 2005

December 9, 2005

Client: Superior Products International II
10835 W. 78th Street
Shawnee, KS 66214

Attn: J.E. Pritchett

Subject: Measure sound transmission loss per ASTM E90, “Standard Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.”

Determine sound transmission class per ASTM E413, “Standard Classification for Determination of Sound Transmission Class.”

DISCLAIMER:

This is a factual report of the results obtained from the laboratory test of sample products. The results may be applied only to the products tested and should not be construed as applicable to other similar products of the manufacturer. The report is not a recommendation or disapprobation by VTEC Laboratories Inc., of the material tested. While this report may be used for obtaining product acceptance, it may not be used in advertising.

NOTICE:

VTEC Laboratories Inc., will not be liable for any loss or damage resulting from the use of the data in this report, in excess of the invoice. This report pertains to the sample tested only. Such report shall not be interpreted to be a warranty, either expressed or implied as to the suitability or fitness of said sample for such uses or applications, as the party contracting for the report may apply such sample.

I. INTRODUCTION

The sound transmission loss of a partition in a specified frequency band is the ratio, expressed on the decibel scale, of the airborne sound power incident on the partition to the sound power transmitted by the partition and radiated on the other side. The ratio of two like quantities proportional to power of energy is expressed on the decibel (dB) scale by multiplying its common logarithm by ten.

II. TEST METHOD

The measurements were made in accordance with ASTM E90, “Standard Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.” The sound transmission class, STC, was determined in accordance with ASTM E413, “Standard Classification for Determination of Sound Transmission Class.”

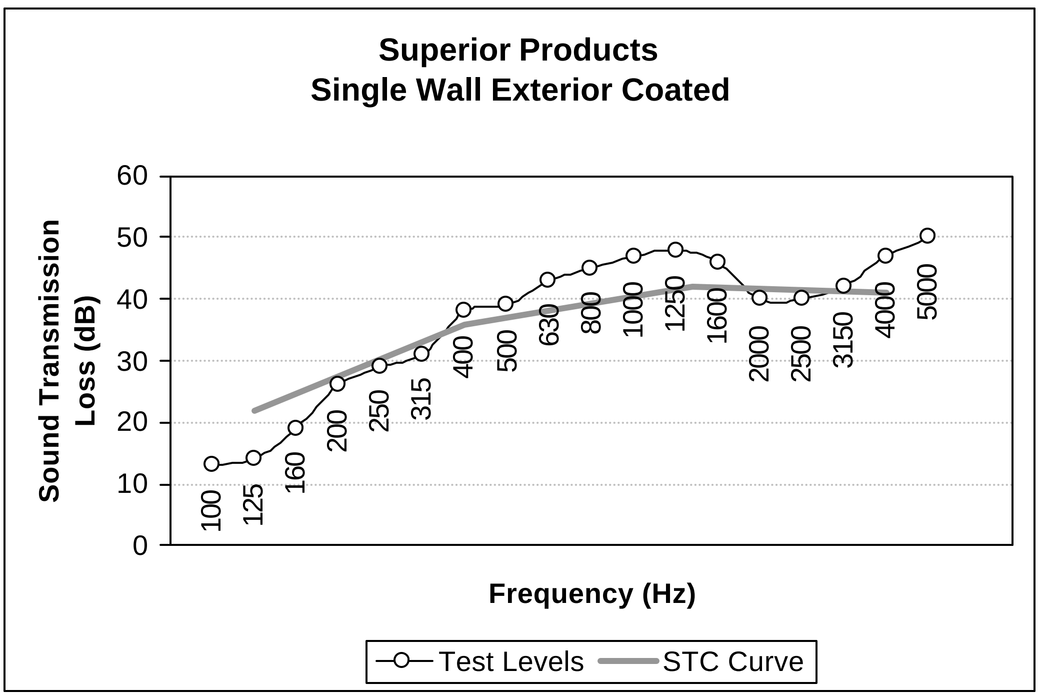
III. TEST SPECIMEN

The test specimen was a sheetrock and steel stud wall 8’ by 8’ by 5-7/8” thick, consisting of 3-1/2” “Supertherm” Batch 081805B coated steel studs, with 5/8” thick sheet rock on both sides. The sheetrock toward the source room was coated with Supertherm Batch 081805B. The wall was installed for testing in an 8’ by 8’ test opening between the source room and the receiving room. After the walls were installed, the crack around the perimeter of the wall and the crack between the sheet rock panels were sealed with “Duxseal”. The wall was submitted for testing by VTEC Laboratories Inc., and was identified as “Test Wall no. 1, Single Wall Exterior Coated”. The weight of the specimen was 297 pounds. The test area was 64 square feet.

IV. RESULTS

Frequency (Hz)	TL	Deficiencies	Frequency (Hz)	TL	Deficiencies
100	13		800	45	0
125	14	-8	1000	47	0
160	19	-6	1250	48	0
200	26	-2	1600	46	0
250	29	-2	2000	40	-2
315	31	-3	2500	40	-2
400	38	0	3150	42	0
500	39	0	4000	47	0
630	43	0	5000	50	

Sound Transmissin Class, STC: 38



Neil Schultz
Executive Director

Amirudin Rahim
Technical Director

STC TESTING
FOR
SUPERIOR PRODUCTS
ON
EXTERIOR AND INTERIOR WALLS
BOTH COATED ON EXTERIOR SIDE
VTEC #100-2251-2
TESTED: NOVEMBER 22, 2005

December 9, 2005

Client: Superior Products
10835 W. 78^{th} Street
Shawnee, KS 66214

Attn: J.E. Pritchett

Subject: Measure sound transmission loss per ASTM E90, “Standard Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.”

Determine sound transmission class per ASTM E413, “Standard Classification for Determination of Sound Transmission Class.”

DISCLAIMER:

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NOTICE:

I. INTRODUCTION

The sound transmission loss of a partition in a specified frequency band is the ratio, expressed on the decibel scale, of the airborne sound power incident on the partition to the sound power transmitted by the partition and radiated on the other side. The ratio of two like quantities proportional to power of energy is expressed on the decibel (dB) scale by multiplying its common logarithm by ten.

II. TEST METHOD

The measurements were made in accordance with ASTM E90, “Standard Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.” The sound transmission class, STC, was determined in accordance with ASTM E413, “Standard Classification for Determination of Sound Transmission Class.”

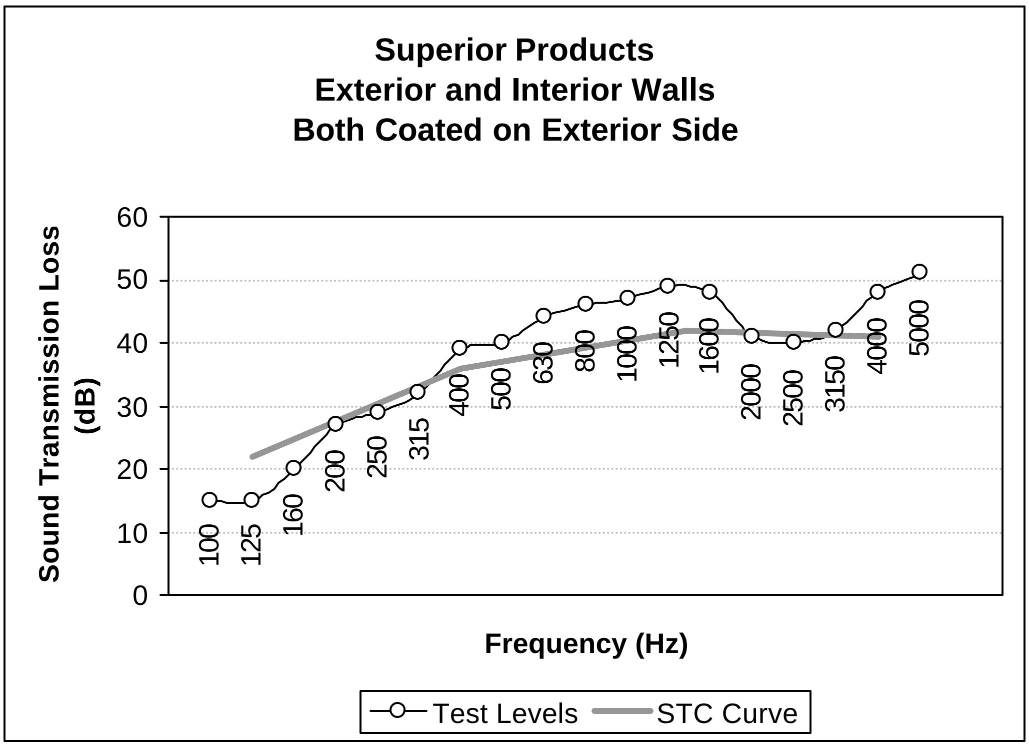
III. TEST SPECIMEN

The test specimen was a sheetrock and steel stud wall 8’ by 8’ by 5-7/8” thick, consisting of 3-1/2” thick “Supertherm” coated steel studs, with 5/8” thick sheet rock on the exterior side. The sheetrock on both sides of the wall were coated with Supertherm. The wall was installed for testing in an 8’ by 8’ test opening between the source room and the receiving room. After the walls were installed, the crack around the perimeter of the wall and the crack between the sheet rock panels were sealed with “Duxseal”. The wall was submitted for testing by VTEC Laboratories Inc., and was identified as “Test Wall no. 2, Exterior and Interior Walls Coated on exterior side”. The weight of the specimen was 301 pounds. The test area was 64 square feet.

IV. RESULTS

Frequency (Hz)	TL	Deficiencies	Frequency (Hz)	TL	Deficiencies
100	15		800	46	0
125	15	-8	1000	47	0
160	20	-6	1250	49	0
200	27	-2	1600	48	0
250	29	-3	2000	41	-2
315	32	-3	2500	40	-3
400	39	0	3150	42	-1
500	40	0	4000	48	0
630	44	0	5000	51	

Sound Transmissin Class, STC: 39



Neil Schultz
Executive Director

Amirudin Rahim
Technical Director

STC TESTING
FOR
SUPERIOR PRODUCTS
ON
EXTERIOR AND INTERIOR WALLS
BOTH COATED BOTH SIDES
VTEC #100-2251-3
TESTED: NOVEMBER 22, 2005

December 9, 2005

Client: Superior Products
10835 W. 78th Street
Shawnee, KS 66214

Attn: J.E. Pritchett

Subject: Measure sound transmission loss per ASTM E90, “Standard Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.”

Determine sound transmission class per ASTM E413, “Standard Classification for Determination of Sound Transmission Class.”

DISCLAIMER:

This is a factual report of the results obtained from the laboratory test of sample products. The results may be applied only to the products tested and should not be construed as applicable to other similar products of the manufacturer. The report is not a recommendation or disapprobation by VTEC Laboratories Inc., of the material tested. While this report may be used for obtaining product acceptance, it may not be used in advertising.

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I. INTRODUCTION

The sound transmission loss of a partition in a specified frequency band is the ratio, expressed on the decibel scale, of the airborne sound power incident on the partition to the sound power transmitted by the partition and radiated on the other side. The ratio of two like quantities proportional to power of energy is expressed on the decibel (dB) scale by multiplying its common logarithm by ten.

II. TEST METHOD

The measurements were made in accordance with ASTM E90, “Standard Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.” The sound transmission class, STC, was determined in accordance with ASTM E413, “Standard Classification for Determination of Sound Transmission Class.”

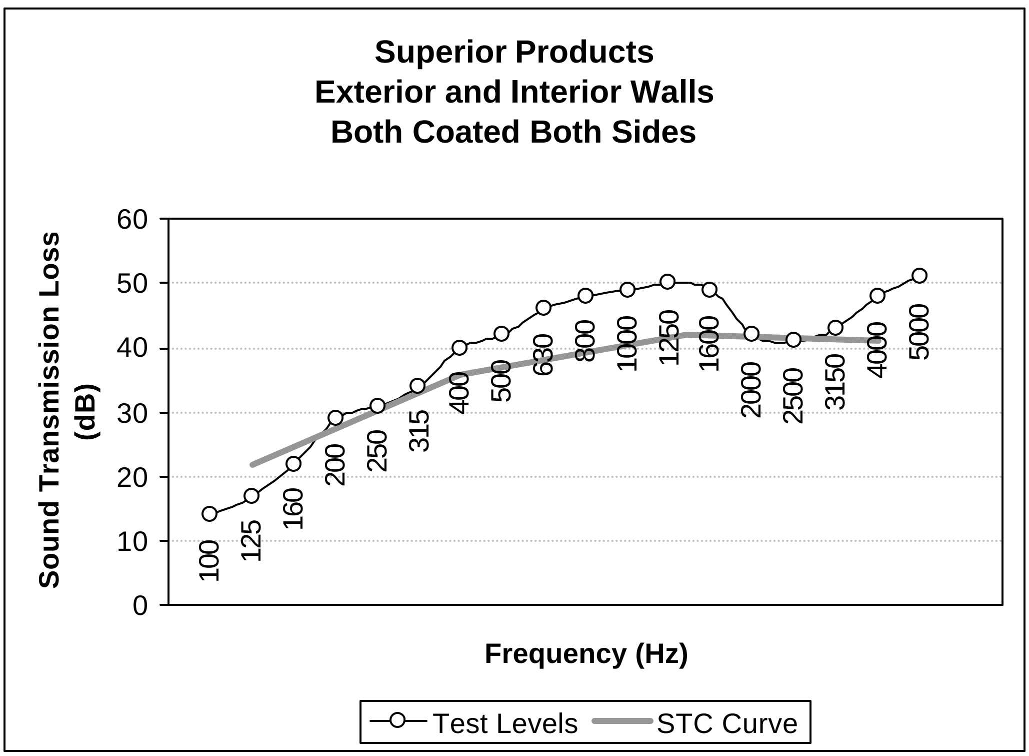
III. TEST SPECIMEN

The test specimen was a sheetrock and steel stud wall 8′ by 8′ by 5-7/8″ thick, consisting of 3-1/2″ thick “Supertherm” coated steel studs, with 5/8″ thick sheet rock on both sides. The sheetrock on both sides of the wall were coated with Supertherm. The wall was installed for testing in an 8′ by 8′ test opening between the source room and the receiving room. After the walls were installed, the crack around the perimeter of the wall and the crack between the sheet rock panels were sealed with “Duxseal”. The wall was submitted for testing by VTEC Laboratories Inc., and was identified as “Test Wall no. 3, Exterior and Interior Walls Coated on both sides”. The weight of the specimen was 309 pounds. The test area was 64 square feet.

IV. RESULTS

Frequency (Hz)	TL	Deficiencies	Frequency (Hz)	TL	Deficiencies
100	14		800	48	0
125	17	-8	1000	49	0
160	22	-6	1250	50	0
200	29	-2	1600	49	0
250	31	-3	2000	42	-3
315	34	-3	2500	41	-4
400	40	0	3150	43	-2
500	42	0	4000	48	0
630	46	0	5000	51	

Sound Transmissin Class, STC:	41



Neil Schultz
Executive Director

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Technical Director

Hot-Cold
Air
& FIRE CONTROL

Super Therm was developed as a ceramic coating insulation. In collaboration with the National Aeronautics and Space Administration's Technology Utilization Office, J.E. Pritchett created a water-based paint composed of four ceramic compounds embedded in a foundation of four resins.

Two reflective ceramics act to deflect radiant heat and reduce surface heat build up. A third ceramic stops hot/cold conduction by providing a microscopic dead air space between the surface and substrate. In the foundation, two acrylic resins provide elasticity, adhesion, and water resistance. A third urethane resin creates a moisture and ultraviolet barrier. The last polymer additive ensures a slow dry time to prevent cracking as well as add a silky finish. This resin/ceramic combination has been shown to reflect both heat and fire, withstand elements for 30 to 40 years, endure 180 degree temperature, bend without cracking, and resist water and ultraviolet light.

It was suggested by the founders of Hot-Cold Air and Fire Control, that Super Therm might also show acoustical insulation properties. In this first preliminary series of tests, a bedroom wall was painted with two coats of Super Therm. Sound level comparisons from an outside air-conditioning unit were made between adjacent untreated bathroom wall and a Super Therm painted bedroom wall. Sound meters were placed on the inside of each wall approximately four feet apart, separated by an interior wall. Both meters were located approximately six feet from the outside air-conditioning unit.

In the first series of tests, run for five days, monitors were programmed for five-hour periods from 1 am to 6 am, a time when the internal noise level was assumed to be the lowest. The noises coming through the outside walls of the house were assumed to be predominantly from the air-conditioning unit cycling on and off and any ambient nocturnal sounds. A second test series was preformed in which the monitors were programmed for 24 hour periods, for four consecutive days when the house was empty.

The wall was painted on May 20th and sound reports were tracked beginning on May 28th, seven days after application (since Super Therm requires a seven-day cure time). The sound meters used were designed for comparative purposes, using microphone impulses set on an arbitrary linear scale beginning at zero. Average sound levels for each day for the treated and untreated walls are contrasted in Table 1: Comparison of acoustical insulation ability between a Super Therm treated wall and an untreated wall.

Table 1: Comparison of acountical insulation ability between a Super Therm treated wall and untreated wall

Day	Time Period	Super Therm Wall (value range)	mean	Untreated Wall (value range)	mean	% Variance
5/28	5 hours	(19-20)	19.3	(23-25)	23.9	24%
5/31	5 hours	(16-18)	16.9	(21-22)	21.2	25%
6/1	5 hours	(13-16)	15.0	(19-25)	20.8	39%
6/2	5 hours	(10-17)	13.4	(19·21)	19.7	47%
6/3	5 hours	(9-13)	10.1	(19-20)	19.2	90%
6/10	24 hours	(10-24)	11.5	(16-]7)	16.3	42%
6/11	24 hours	(9-10)	10.2	(16)	16.0	57%
6/12	24 hours	(9-11)	10.0	(15-17)	16.0	60%
6/13	24 hours	(9-10)	9.4	(15-16)	15.8	68%

Results indicate that Super Therm does have acoustical insulation ability. Percent variances of effectiveness between test periods may be the result of noise generated within the house. Since Super Therm is reflective by design, any noise occurring in the bedroom would be reflected within the room and transmitted to the microphone. This would result in a few excessively high readings in the 5 or 24-hour periods (most notably, the reading of 17 on 6/2, 13 on 6/13, and 24 on 6/10). High outlyers were not noted for the untreated bathroom wall, all means fell close to the value ranges.

Since Super Therm reflects sound, a better application for acountical insulation would be to apply the ceramic to the exterior wall of the house so sound generated outside would be reflected away from the house, never penetrating the interior wall.

In an attempt to measure the ability of Super Therm to reflect and contain sound within a room, a third series of tests is presently underway, in which the sound monitors are set up on the outside wall of the house and sound from a stereo is generated within the bedroom and bathroom. Results from the first two preliminary tests run on this design are presented in Table 2: Comparison of acountical reflective ability between a Super Therm treated wall and untreated wall.

HOW SUPER THERM® REDUCES SOUND TRANSMISSION BY UP TO 68%

Conventional thinking about sound reduction (or dampening) is geared toward the absorption of sound waves into a mass of material having a very low density. Most materials designed and used for sound dampening require thickness, and their performance is similar to fiberglass insulation or foam rubber. When this material is new, clean, and dry, it performs well in laboratory tests.

In the real world it ages, gets soiled, and allows moisture (in the form of humidity) to be absorbed. These three factors result in increasing the density of the material. Higher density materials tend to vibrate and allow sound waves to be carried through them. In the same manner, fiberglass insulation absorbs heat and allows it to pass through, the use of traditional dampening materials allow sound waves to pass through.

Its time to shift the paradigm about sound dampening!

SUPER THERM® is a water-based coating that was originally designed to block heat waves from penetrating into a surface. Its performance is consistent in dealing with how heat and sound waves travel and is not affected by age, moisture, or surface dirt. The four light-weight ceramic compounds contained in SUPER THERM® are designed to form a crystalline structure. This crystalline structure has very little density and is reflective in nature, so it is resistant to absorb sound or heat.

Quite simply, SUPER THERM® dampens sound waves before they are allowed to travel to the more dense material coated. If sound waves cannot cause the substrate to vibrate, the sound cannot continue.

SUPER THERM® dampens sound waves. It blocks sound by interrupting the vibration continuance. The essence is to stop sound waves from loading into a substrate which cause vibration. By virtue of the lack of density, SUPER THERM® will stop up to 68% of sound transmission.

SOME TYPICAL STC RATINGS

2 × 4 on 16" or 24" centers, 3/8-5/8 inch wallboard, rock wool or fiberglass batting	STC 30 to 42
Same as above with plaster instead of wallboard	STC 40 to 54
Staggered stud 2 × 4's on 2 × 6 plate, 2 sheets of 5/8 inch plasterboard on each side, 2" fiberglass inside	STC 51

Caveats

The STC system is useful for comparing different ways of building a partition, but it is not a guarantee of a certain level of isolation. It tends to give too much credit to materials which absorb high frequencies, such as sheetrock, and too little to materials and forms of construction which absorb the lower frequencies.

In practice, the STC of the laboratory sample represents the optimum condition, and is rarely achieved in actual construction. The difference between the actual or Field STC (FSTC) and the laboratory STC is a result of leaks and flanking paths, in other words, sound entering a wall in a common assembly is also entering the floor, traveling through the floor and breaking out in the adjoining space, by-passing the wall. A similar effect is found if sound is allowed to enter air return plenum spaces above or below walls. The degree to which these flanking paths are disconnected will determine how closely the field test results approach the laboratory results.

STC -Lab	Field STC	Subjective description of effectiveness
26-30	20-22	Most sentences clearly understood
30-35	25-27	Many phrases and some sentences understood without straining to hear
35-40	30-32	Individual words and occasional phrases clearly heard and understood
42-45	35-37	Medium loud speech clearly audible, occasional words understood
47-50	40-42	Loud speech audible, music easily heard
52-55	45-47	Loud speech audible by straining to hear; music normally can be heard and may be disturbing
57-60	50-52	Loud speech essentially inaudible; music can be heard faintly but bass notes disturbing
62-65	55	Music heard faintly, bass notes "thump"; power woodworking equipment clearly audible
70	60	Music still heard very faintly if played loud.
75+	65+	Effectively blocks most air-borne noise sources

Table 1: Subjective interpretation of effects of STC as measured (assumes normal quiet background level - NC 35)

Note: The actual effect perceived effect of STC depends on the background noise levels, room volumes, surface areas, sound absorption values and spectral content of the sound source.

WHAT IS STC?

The actual behavior of two partitions with the same STC rating can be dramatically different, as the STC is weighted in favor of the part of the sound spectrum that represents the human voice. In practice, one of the most annoying transmitted sounds between dwelling units tends to be the bass in music, a part of the sound spectrum far removed from the voice range. So, an eight inch concrete block wall rated at STC 50, that can block 20 dB more sound in some bass frequencies would be a better choice than an STC 50 drywall partition for an application where music or mechanical noise will be a problem.

Changes in the National Building Code 1990, now require that partitions separating dwelling units meet an STC 50 requirement, and the building code provides sample ratings for several types of wall constructions. Unfortunately, test ratings of the same wall section vary from test to test, and in field situations, walls cannot be expected to perform as well as the test sample in laboratory conditions. This drop in performance can leave the builder liable for additional construction to bring up the performance of the wall if the tenants obtain field test results from the dwelling units that confirm a reduced STC.

For example, a wall section listed by the NBC 1990 as meeting the STC 50 requirement has staggered 2 x 4 wood studs on a 2 x 6 plate with batt insulation filling the cavity and a single layer of drywall either side. In laboratory tests, the STC rating of that particular wall section varies from STC 47 to STC 51. In field tests, the wall might get only about STC 46, even with caulking at the plates. Any cracks in the wall or holes for electrical or mechanical servicing will further reduce the actual field result, leaving the builder responsible for upgrades. Rigid connections between wall surfaces can also seriously degrade the wall performance. The higher the target STC, the more critical are the sealing and structural isolation requirements. The builder's best options for getting a satisfactory STC result are to specify partitions with a laboratory rating of STC 54 or better. If in doubt at an early stage in the construction, testing can be done to rate the construction and upgrades recommended before costly finishing is in place.