
APPARENT SOUND TRANSMISSION CLASS TEST REPORT NUDURA 6" CORE ICF + ½" GWB & ½" GWB on RC-1

Prepared for:

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INTRODUCTION

HGC Engineering was retained by Nudura Corporation to measure the sound insulation performance of their 6" core product in terms of Apparent Transmission Loss and Sound Transmission Class (ATL and ASTC, respectively). The product was tested with one layer of ½" gypsum wall board (GWB) affixed to one side of the insulating concrete form (ICF), and one layer of ½" GWB on resilient channels on the other side of the ICF. These measurements were conducted on July 20, 2012, in accordance with ASTM Test Standard E336-11, at a temporary test chamber erected by Nudura.

DESCRIPTION OF TEST ENVIRONMENT

The test chamber consisted of a pair of non-rectangular semi-reverberant rooms separated by a demising wall made of the Nudura 6" core product. An acoustical test signal was produced in one room (the "source" room) using an electronic source, amplifier, and loudspeakers, and the resulting sound pressure levels were measured in that room and the adjacent room (the "receiver" room). The approximate interior dimensions of the source and receiver rooms, respectively, were 11'9" x 14'6" x 8'8" high, and 11'6" x 13'6" x 9'9" high. The test partition common to both rooms was 14'9" by 8'8" high.

Aside from the demising wall, both rooms were constructed with walls and ceilings consisting of an interior layer of 5/8" thick gypsum board on resilient channels screwed to nominal 2"x6" studs, with 5/8" thick plywood exterior skin, with 4" thick fiberglass insulation in the stud cavities. The interior surfaces of the walls were taped and sealed. The door into each test chamber was an insulated-core exterior grade door with good quality seals around the sides, top and bottom, located in the wall furthest from the test wall. The source room had a raft floor consisting of two layers of ¼" thick plywood supported on nominal 2"x6" raft joists (stood on edge) with 5/8" thick resilient neoprene foam weather stripping between the edges of the 2"x6"s and the concrete floor below, to act as a vibration break. The joist cavities were filled with 4" thick

fiberglass insulation. The junction between the side walls and the wall under test was equipped with ½" thick closed cell neoprene foam weather stripping, to act as a vibration break between the side and demising walls. During testing, both rooms remained essentially empty aside from the test equipment and one operator performing the measurements. Figure 1, attached, shows a sketch of the test rooms.

DESCRIPTION OF TEST SPECIMEN

The Nudura 6" core ICF product consists of 96" wide interlocking elements comprised of nominal 2" thick expanded polystyrene (EPS) outer leaves, formed around hinged polypropylene webs on 8" centres. The webs hold the leaves nominally 6" apart and provide structural stiffness while supporting steel reinforcing rods. Normal weight (150 pcf) concrete was used, having cured for more than 28 days prior to testing.

In this test, the wall system was tested with one layer of ½" GWB on one side, and one layer of ½" GWB on resilient channels (RC-1) on the other side, with all the junctions between the test room surfaces and the demising partition finished with non-hardening caulking. The average surface density of the partition was approximately 78 psf.

DESCRIPTION OF TEST PROCEDURE

Sound levels were measured using a Norsonic Precision Sound analyser, model Nor140 (S/N 1405028). Field checks of correct calibration were made before and after the measurements using a Bruel & Kjaer acoustic calibrator (S/N 2309241). All instrumentation was within its laboratory calibration period. Six stationary measurement locations were chosen in each room, at different sampling heights, with care taken to eliminate any obvious symmetry in all three planes, while remaining more than 1 meter from the nearest room surface at all times.

Using the N140 analyser, reverberation was measured in the receiver room following the decay of a sound pressure level generated across each one-third octave band between 100 Hz and 5000 Hz, from which room absorption was calculated. Each room absorption measurement was conducted in 6 different locations for each receiver room configuration, from which an average RT60 was calculated.

Measurements to confirm the negligibility of flanking sound transmission in full accordance with Annex A1 of ASTM E336-11 were not practical for this test. Accordingly, the results have been cited as apparent values (ATL and ASTC), corresponding to minimum Field Transmission Loss (FTL) and minimum Field Sound Transmission Class (FSTC) values. However methods from Annex A2 of ASTM E366-97 (an earlier version of the standard) were employed and indicated that flanking transmission was negligible. Thus, although these test results can be considered effectively equivalent to FTL and FSTC values, they do not strictly qualify as such under the E336-11 Standard, and must therefore be termed as ATL and ASTC results.

STATEMENT OF TEST RESULTS

Test results, including calculated FTL and FSTC values are summarized in the attached test report. This partition had a sound insulation rating of FSTC-52, set by its response in the 250 Hz frequency band.

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Apparent Sound Transmission Class Test Report

Nudura 6" Core ICF
1/2" GWB on one side, 1/2" GWB on resilient channels on other

Conducted by: R.D. Stevens, MSc, PEng
R. Trinh

20-Jul-12

Item	1/3 Octave Band Centre Frequency [Hz]															
	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000
Average Source Room sound pressure level [dB]	102	106	104	100	103	105	106	107	106	105	105	108	107	108	110	111
Average Receiver Room sound pressure level [dB]	63.8	73.3	69.8	69.2	64.6	59.4	52.3	47.7	40.2	30.1	24.6	22.6	21.6	30.1	29.6	20.9
Noise Reduction [dB]	38.4	32.8	33.9	30.7	38.3	46.0	53.6	59.5	65.4	75.3	80.7	85.2	85.4	78.0	80.4	90.3
Receiver Room reverberation time [s]	1.4	1.9	2.0	2.2	2.4	2.1	1.8	1.7	1.6	1.8	1.8	1.6	1.4	1.2	1.3	1.3
Area / Absorption correction factor [dB]	4.3	5.5	5.7	6.2	6.5	6.0	5.4	4.9	4.8	5.4	5.4	4.9	4.3	3.7	3.9	3.9
Transmission Loss [dB]	42.7	38.3	39.5	36.9	44.8	52.0	59.0	64.4	70.2	80.7	86.1	90.1	89.7	81.7	84.3	94.2
95% Confidence Interval [+/- dB]	3.4	2.9	2.7	2.1	1.5	1.1	1.0	0.7	0.8	0.7	0.7	0.7	0.9	1.0	1.0	0.8
Nearest STC Curve	36	39	42	45	48	51	52	53	54	55	56	56	56	56	56	56
Delta		1	2	8	3											

*** Measured Apparent STC **52** ***
Maximum delta 8
Sum of deltas 14

Notes: Flanking paths were considered and minimized where possible; the ASTC cited here can be regarded as a lower bound on the FSTC of the partition under test.

Apparent Sound Transmission Class Test Report

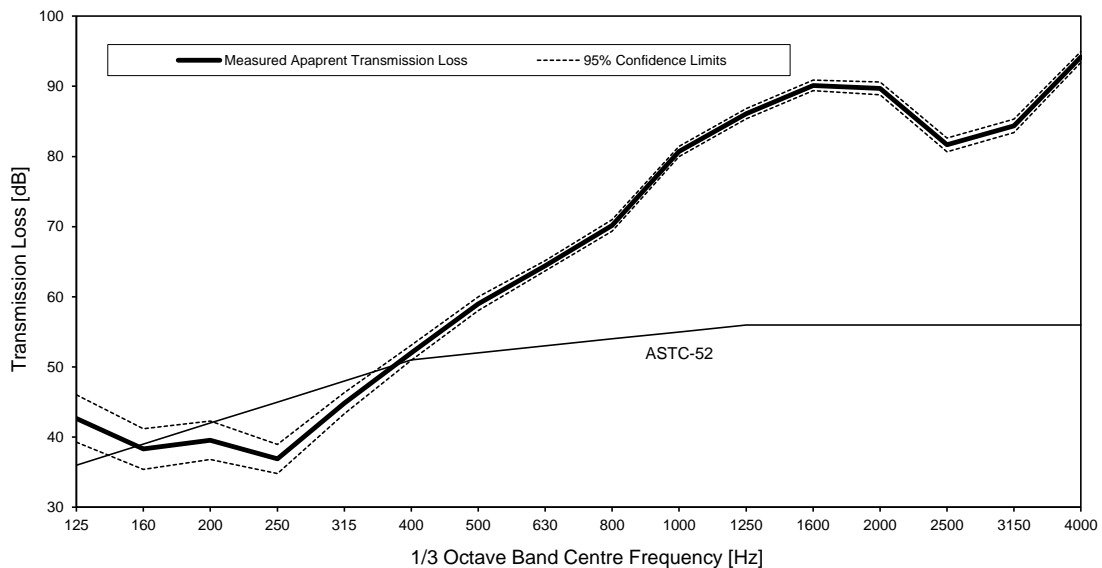


Figure 1:
Nudura ICF Test Rooms

