RIVERBANK ACOUSTICAL LABORATORIES

1512 S. BATAVIA AVENUE
GENEVA, ILLINOIS 60134

Alion Science and Technology

630/232-0104
FOUNDED 1918 BY
WALLACE CLEMENT SABINE

TEST REPORT

FOR: CEMCO - California Expanded Metal Products Co.
Industry, CA

Impact Sound Transmission Test
RAL™-IN07-009

ON: 1 Inch Thick USG LEVELROCK™ Brand CSD Floor Underlayment on USG LEVELROCK™ SRM-25 Sound Mat on CEMCO Sure-Span® C-Joist with USG DWSS Suspension System Ceiling, Single Layer 5/8 Inch USG SHEETROCK® FIRECODE "C" Core Type X Gypsum Board

CONDUCTED: 31 May 2007

TEST METHOD

The measurements reported below were made with all facilities and procedures in explicit conformity with the ASTM Designations E492-04 and E989-06, as well as other pertinent standards. Riverbank Acoustical Laboratories has been accredited by the U.S. Department of Commerce, National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP) for this test procedure (NVLAP Lab Code: 100227-0). A description of the measuring technique is available separately.

DESCRIPTION OF THE SPECIMEN

The test specimen was designated by the client as 1 Inch Thick USG LEVELROCK™ Brand CSD Floor Underlayment on USG LEVELROCK™ SRM-25 Sound Mat on CEMCO Sure-Span® C-Joist with USG DWSS Suspension System Ceiling, single layer 5/8 inch USG SHEETROCK® FIRECODE "C" Core Type X gypsum board. The overall dimensions of the specimen as measured were 4.27 m (168 in.) wide by 6.10 m (240 in.) high and nominally 356 mm (14 in.) thick. The specimen was constructed directly in the laboratory's 4.27 m (14 ft) by 6.10 m (20 ft) test opening and was sealed on the periphery (both sides) with a dense mastic. Prior to installation, a 38 mm (1.5 in.) high by 6.4 mm (0.25 in.) thick styrofoam sill sealer was adhered to the test room walls with acoustical sealant. The sealer is part of the mounting used to isolate the floor system from the test room walls.

The description of the specimen was as follows: From the top down, the floor consisted of 25 mm (1 in.) thick lightweight gypsum concrete over a 6 mm (0.25 in.) thick sound isolation material. Prior to installation over the corrugated steel deck, the flutes of the deck were first filled to provide a level surface over which the sound isolation material could be applied. The dimensions of the corrugated steel deck were 14 mm (0.563 in.) thick. This was attached to 235 mm (9.25 in.) deep steel joists with an insulated ceiling cavity and gypsum board ceiling attached

to a drywall suspension grid. A more detailed description of the test assembly appears in the following sections.

Lightweight Gypsum Concrete and Sound Mat

The floor consisted of USG LEVELROCK® Brand CSD Floor Underlayment System gypsum concrete over USG LEVELROCK™ SRM-25 sound mat. The gypsum concrete was poured directly onto the isolation material and allowed to cure in excess of 28 days. The gypsum concrete (designed for minimum compressive strength of 3500 psi) measured a nominal 25 mm (1 in.) thick and had an average density of 2,154 kg/m³ (134.5 pcf) calculated from poured samples. The total weight of the gypsum concrete floor as calculated was 1,423 kg (3,138 lbs). Prior to pouring of the floor, a layer of 6 mm (0.25 in.) thick USG LEVELROCK™ SRM-25 sound mat was loose laid over the corrugated steel deck which had the troughs prefilled with LEVELROCK® Floor Underlayment CSD. The mat consisted of a plastic cross hatch matrix with risers on 32 mm (1.25 in.) centers and a water resistant facer. Duct tape was applied to all joints. Total weight of the mat was 38.6 kg (85 lbs).

Steel Subfloor Assembly

The floor joists consisted of 16 gauge (measured as 0.057 in.) thick 235 mm (9.25 in.) CEMCO Sure-Span® steel C-joist spaced 610 mm (24 in.) on center starting nominally 305 mm (12 in.) either side of the room centerline and spanning the 4.27 m (14 ft) dimension of the room. The joists rested on a 2 x 6 plate running the 6.10 m (240 in.) length of the room on each side with 16 gauge (measured as 0.57 in.) rim track and solid blocking located at the perimeter and near the mid-point along the centerline of the span respectively. Additionally, the joists were braced and held in place using Sure-Bridging, Sure-Firm corner clips, SSRT clips and 9 ¼" x 1 ¾" 16 gauge un-punched joist for solid blocking as diagramed on the drawing retained on file. The weight of the steel framing was 248 kg (546 lbs.). Five full pieces of corrugated 0.6" form deck 22 gauge (measured as 0.032 in.) G60 steel deck at 14 mm (0.5625 in.) deep, 762 mm (30 in.) wide steel form deck and one partial width piece were attached to the top of the joists using 19 mm (0.75 in.) hex head screws at nominally 305 mm (12 in.) on center. The weight of the steel deck was 181 kg (400 lbs.).

Insulation

The cavities between the joists contained a layer of 159 mm (6.25 in.) thick by 610 mm (24 in.) wide unfaced fiberglass batt insulation. The fiberglass batts were placed at the bottom flange of the joists. The weight of the insulation was 28.8 kg (63.5 lbs).

Ceiling Assembly

The ceiling assembly consisted of USG DWSS drywall suspension grid hung below the joists. The main tees were perpendicular to the joists and located at 1.22 m (48 in.), either side of the room centerline. The main tees were suspended from the joists by hanger wires spaced 1.22 m (48 in.) along the length of the main tee (every other joist). The top bulb of the main tee was spaced 12.7 mm (0.5 in.) below the bottom flange of the joist. The cross channels were placed at 406 mm (16 in.) on center. Additional runs were added at 203 mm (8 in.) on both sides of continuous board butt joints. A single layer of 16 mm (5/8 in.) USG SHEETROCK® Brand FIRECODE "C" Core Type X gypsum wallboard panels was screw attached to the DWSS grid with the long dimension perpendicular to the cross channels (perpendicular to joists). The screws were 32 mm (1.25 in.) Type S at 203 mm (8 in.) on center. The joints and screw heads were sealed with USG all purpose joint compound. The weight of the channels, gypsum board, and joint compound was 281 kg (620 lbs). The perimeter of the completed test assembly was sealed with a dense mastic.

The weight of the specimen as measured was 2,264 kg (4,991 lbs.), an average of 86.9 kg/m^2 (17.8 lbs/ft^2). The transmission area used in the calculations was 26 m^2 (280 ft^2). The source and receiving room temperatures at the time of the test were 22±2°C (72±2°F) and 56±2% relative humidity. The source and receive reverberation room volumes were 135 m^3 (4,766 ft^3) and 87 m^3 (3,073 ft^3), respectively.

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TEST RESULTS

Sound pressure levels at 1/3 octave intervals, normalized to 10 square meters, are given in tabular form. The impact insulation class, IIC, was computed in accordance with ASTM E989-89 and ASTM E492-04.

FREQ.	Ln	C.L.	DEV	FREQ.	Ln	C.L.	DEV
100	60	0.72	2	800	55	0.30	1
125	56	0.91		1000	53	0.27	
160	59	0.49	1	1250	51	0.22	1
200	58	0.80		1600	49	0.20	2
250	58	0.60		2000	50	0.28	6
315	58	0.62		2500	48	0.42	7
400	56	0.52		3150	41	0.55	3
500	56	0.54		4000	33	0.59	
630	56	0.37	1	5000	25	0.66	

IIC=54

ABBREVIATION INDEX

FREQ. = FREQUENCY, HERTZ, (cps)
Ln = NORMALIZED IMPACT SOUND PRESSURE LEVEL, dB
C.L. = UNCERTAINTY IN dB, FOR A 95% CONFIDENCE LIMIT
DEV. = DEVIATION, dB > IIC CONTOUR (SUM OF DEV = 24)
IIC = IMPACT INSULATION CLASS
* = INDICATES A CORRECTION HAS BEEN APPLIED TO DATA DUE TO BACKGROUND NOISE LEVELS

Tested by _____ Approved by _____

Marc Sciaky
Experimentalist

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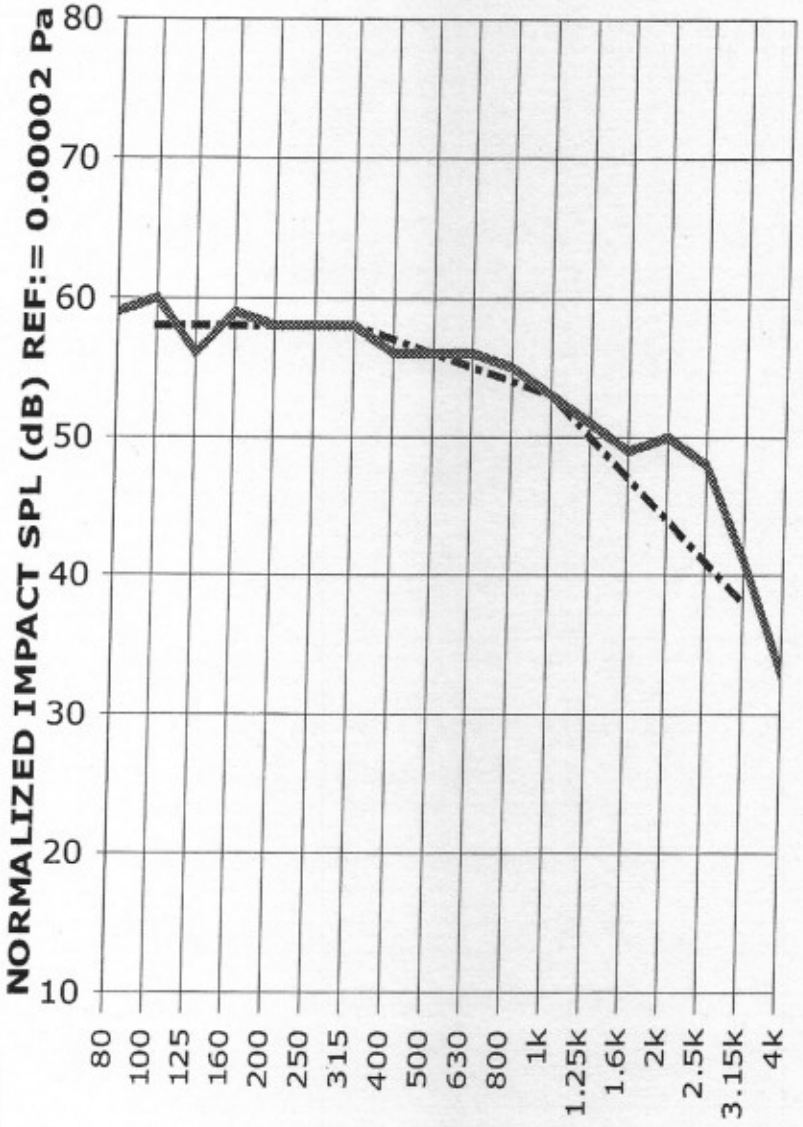
IMPACT SOUND TRANSMISSION REPORT
RAL - IN07-009



IIC = 54

IMPACT SOUND PRESSURE LEVEL

IMPACT INSULATION CLASS CONTOUR