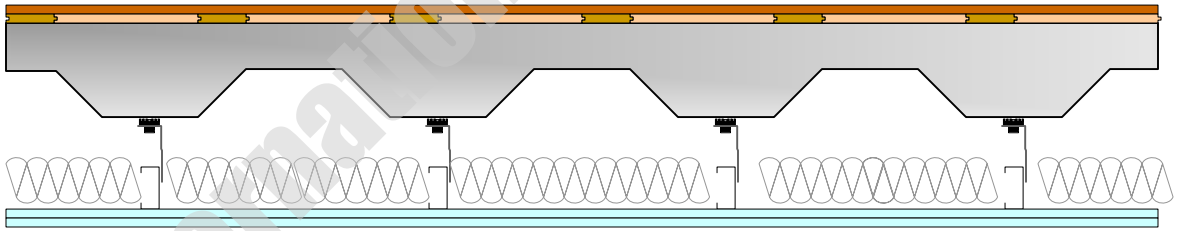
RSIC ACOUSTIC ASSEMBLY

NOISE CONTROL WALL ASSEMBLY

PAC INTERNATIONAL Inc.
Toll Free 866-774-2100 • Telephone 503-649-7700

DIRECT FIX TO STEEL AND CONCRETE

SD-CON SSA 05-001 FIIC 65 FSTC 69

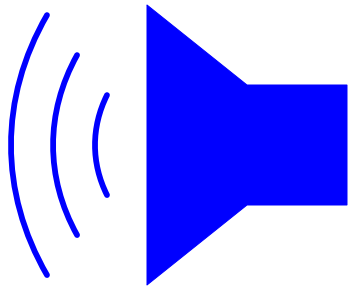


CONSTRUCTION

- 3/4" HARDWOOD
- 1" SOUND EATER
- 3" CONCRETE
- 3” 16 GA STEEL DECK
- RSIC-DC04
- STEEL FRAMED DROPPED CEILING
- 2 LAYERS 5/8" GYPSUM

Contact SSA Acoustics (206) 839-0819 for detailed test data.

NON COMBUSTIBLE



FIIC 65 FSTC 69

SSA Acoustics
STEWART • AIT ALLAOUA • PERKINS

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Seattle, WA 98107
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January 21, 2005

Seattle, WA 98104

Re: Results of FIIC and FSTC Measurements

This letter presents the results of the Field Impact Insulation Class (FIIC) and Field Sound Transmission Class (FSTC) Tests conducted at
The measurements were conducted on January 20, 2005. The noise criteria, measurement methodology and results of the tests are presented in the following report.

1) Seattle Building Code Section 1206 – Sound Transmission Control

The Seattle Building Code requires that Group R, Division 1 occupancies "provide airborne sound insulation for walls, and both airborne and impact sound insulation for floor-ceiling assemblies."

Section 1206.3 Impact Sound Insulation requires that all floor-ceiling assemblies meet an impact insulation class (IIC) of 50, and FIIC of 45. In the field, the City of Seattle requires a 45 FIIC (Field Impact Isolation Class).

The standards stated in the Seattle Building Code are bare minimums and are not adequate for achieving acoustical privacy in multi-family dwellings. It has been our experience that IIC ratings below 50 are subject to complaints, and we consider ratings below 45 unacceptable.

2) Federal Housing Administration (FHA) Recommended Criteria

One of the most comprehensive guidelines established can be obtained from the **US Department of Housing and Urban Development (HUD)** in the **A Guide to Airborne, Impact, and Structure Borne Noise Control in Multifamily Dwellings.** Descriptive definitions of three grades of acoustic environments are given in order to ascribe criteria suitable to the wide range of urban developments, geographic locations, economic conditions and other factors involved in the areas of concern of the FHA. Constructions, which meet the criteria, will provide good sound insulation and satisfy most of the occupants in the buildings, which fit the conditions of each grade.

The recommended criteria for Airborne and Impact Sound Insulation between dwelling units are defined in three grades of category. IIC and STC ratings for floor/ceiling assemblies between a living room and a living room are presented in Table 2 below.

Table 1
IIC and STC Requirements

Partition separating dwellings		Grade I		Grade II		Grade III	
Room 1	Room 2	STC	IIC	STC	IIC	STC	IIC
Bedroom	Bedroom	55	55	52	52	48	48
Living room	Living room	55	55	52	52	48	48

The location and quality level if these condominiums should meet a minimum of **Grade I**.

3) FIELD IMPACT INSULATION CLASS (FIIC) TEST

a) Measurement Methodology

The equipment used for the measurements included a Scantek tapping machine and Larson-Davis Laboratories (LDL) 2900 real-time spectrum analyzer. The FIIC measurements were conducted by placing the tapping machine on the test specimen and measuring the resulting sound levels in the receiving room below. The measured sound levels were then adjusted based on the room absorption.

The methods and procedures used for the tests were conducted in accordance to the provisions and requirements of ASTM Procedure E1007-97 for Standard Test Method of Tapping Machine Impact Sound Transmission Through Floor-Ceiling Assemblies and Associated Support Structures. Additional measurements were conducted in the receiving room to determine the ambient noise levels to ensure that extraneous noise sources are not affecting the measurements.

b) Measurement Result

The FIIC measurements were conducted between the first and second floor units in the northwest corner of the building. The flooring assemblies had the following construction:

Wood Floor:

- ¾" hardwood
- 1" Sound Eater
- 3" Concrete Metal Deck
- RSIC-DC04 supporting framed steel stud ceiling
- 2 layers of 5/8" gypsum
- 3-1/2" glass fiber insulation

Carpet Floor:

- Carpet and pad
- 3" Concrete Metal Deck
- RSIC-DC04 supporting framed steel stud ceiling
- 2 layers of 5/8" gypsum
- 3-1/2" glass fiber insulation

The result of the measurement is shown in Table 1 below. The corresponding FIIC contour is shown in the attached figure.

Table 1
FIIC Floor/ Ceiling Assembly

Source Room/ Floor Material	Receiving Room	FIIC
Unit Living Room / Wood Flooring	Living Room	65
Bedroom / Carpet Flooring	Bed Room	85

As shown in Table 1 above, the wood floor/ceiling assembly has an IIC rating of 65, and the carpet assembly has a rating of 85. Both are above City of Seattle and FHA Grade I requirements.

4) FIELD SOUND TRANSMISSION CLASS (FSTC) TESTS

a) Measurement Methodology

The STC tests were conducted using a JBL amplified loudspeaker, Audio Technology Incorporated (ATI) NG-1 Noise Generator, and a Larson-Davis Laboratories (LDL) 2900 real-time analyzer.

The methods and procedures used for the tests were conducted in accordance to the provisions and requirements of ASTM Procedure E336-97 for Airborne Sound Insulation in Buildings. The FSTC measurements were conducted by measuring the difference between the average sound pressure levels (SPL) in the source room and in the receiving room at one-third octave band frequencies. The sound source used in the source room was a JBL loudspeaker that was driven to very high levels to ensure that the signal levels in the receiving room is far above the background noise to meet ASTM's requirements.

The average sound levels in the receiving room were measured using a moving microphone and a real time analyzer. Ambient noise levels were measured to ensure that the observations were not affected by unwanted extraneous noises.

b) Measurement Results

The tested assemblies consisted of the floor/ceiling between the first and second floor units in the northwest corner of the building and the wall between the bedrooms of the northwest and adjacent units on the first floor. The results of the measurements are shown in the Table 1 below. The corresponding FSTC contours are shown in the attached figures.

Table 2
FSTC Ratings

Source Room	Receiving Room	Partition	FSTC
Living Room	Living Room	Floor/Ceiling	69
Bedroom	Bedroom	Wall	64

According to table 2, the wall and the floor/ceiling assemblies are above both City of Seattle and FHA Grade I requirements.

Please feel free to call with any questions.

Sincerely yours,
SSA Acoustics LLP

Reported By:

Alan Burt
Acoustical Consultant

Reviewed by:

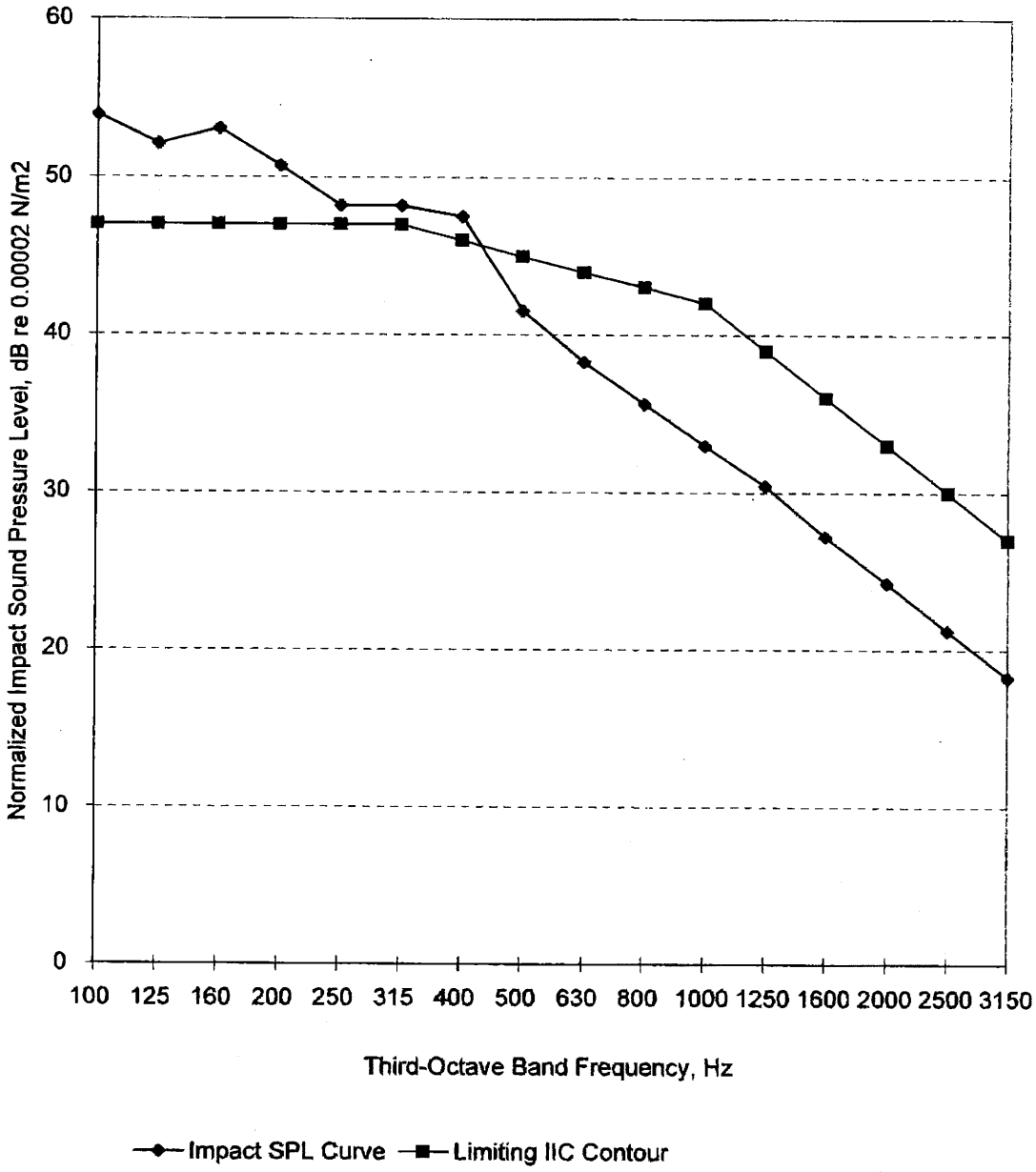
William Stewart
Senior Acoustical Consultant

Cc: George Kropinski, Admiralty Development Corp

FIIC

Source: Living Room, Wood Floor
Receiver: Living Room

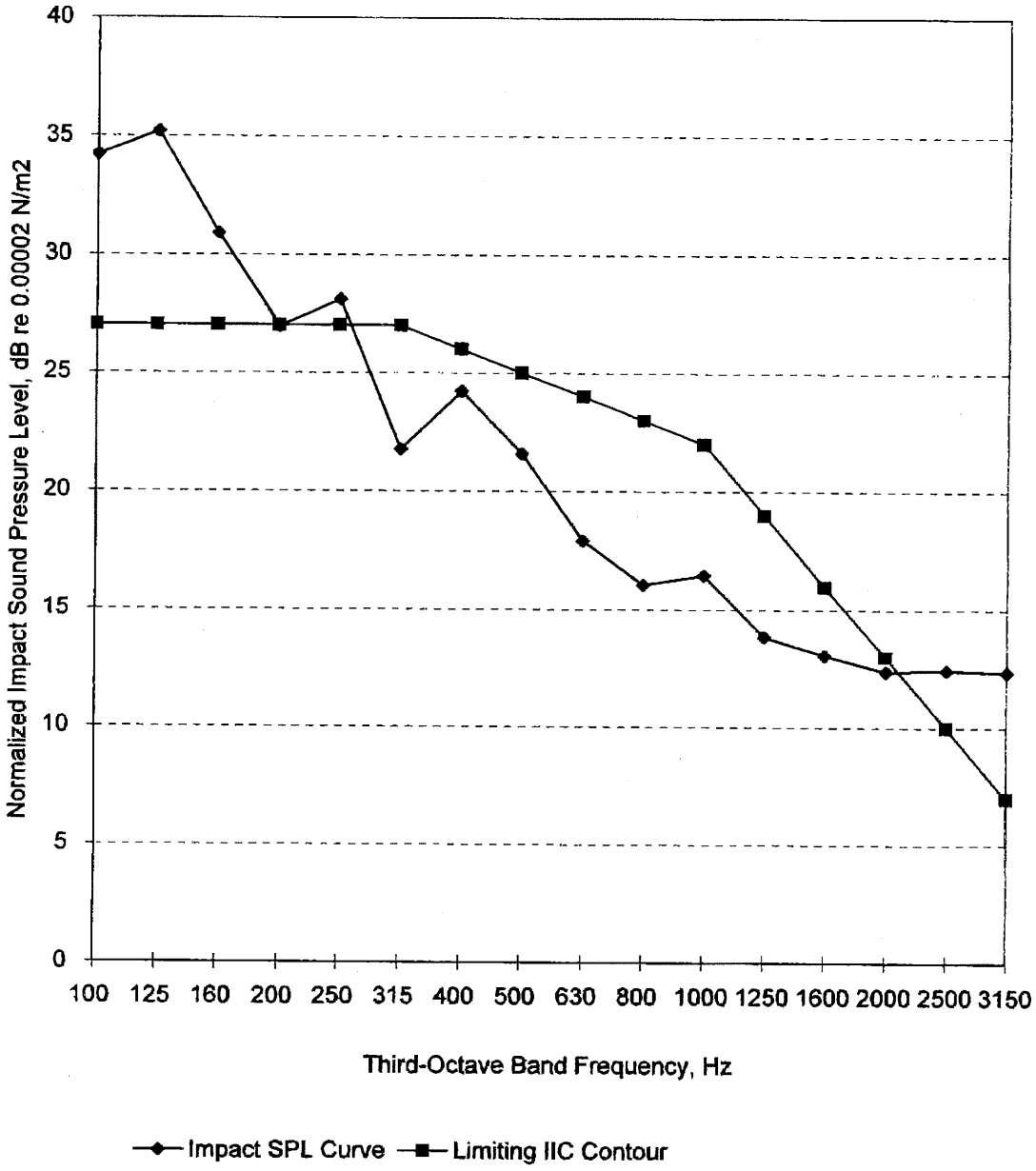
FIIC: 65



FIIC

Source: Bedroom, Carpetted Floor
Receiver: Bedroom

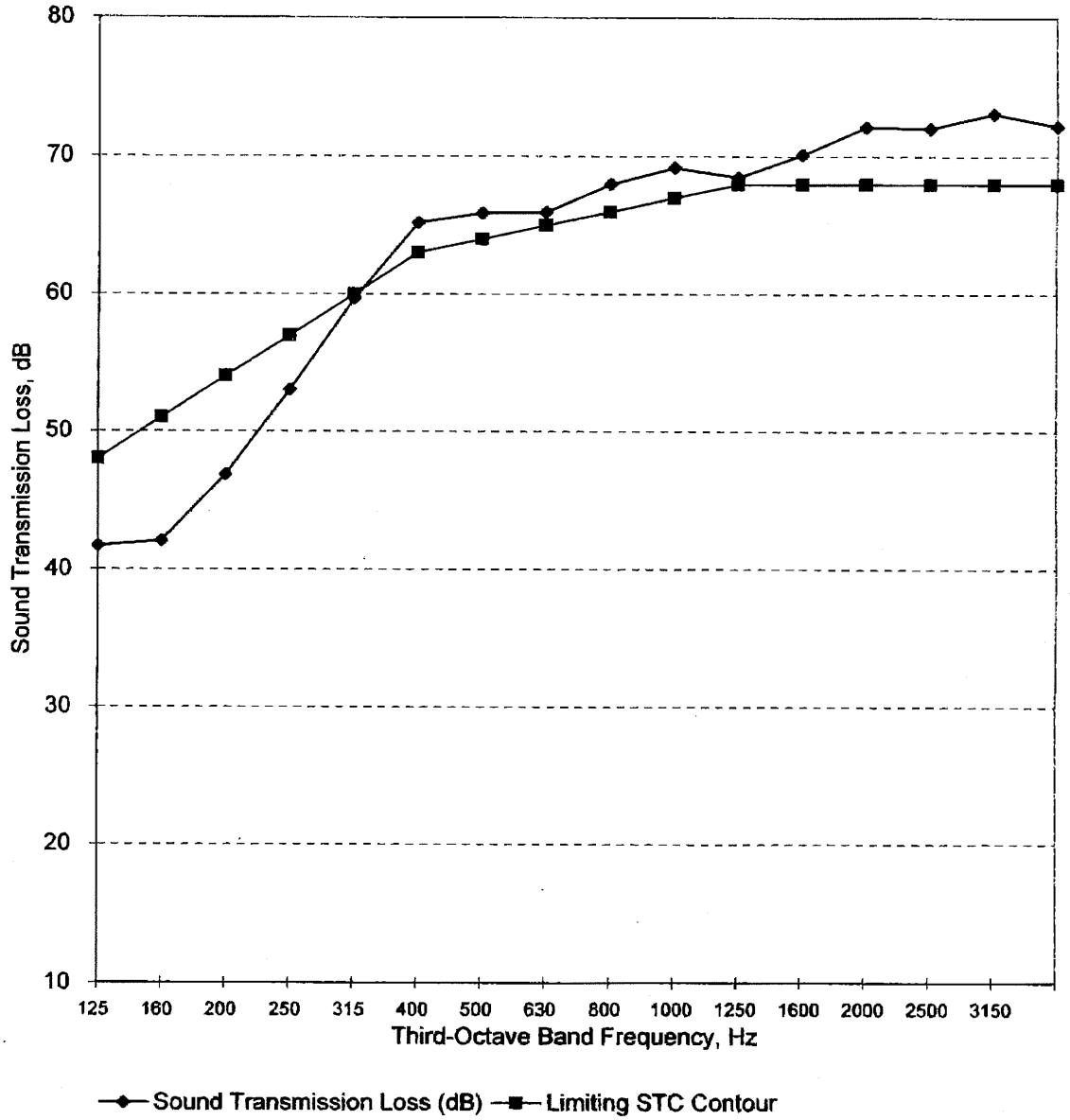
FIIC: 85



FSTC Wall

Source: Bedroom
Receiver: Bedroom
Partition: Wall

STC: 64



FSTC Floor/Ceiling

Source: Living Room
Receiver: Living Room
Partition: Floor/Ceiling

STC: 69