Acoustical Surfaces, Inc.
We Identify and S.T.O.P. Your Noise Problems
Sound Transmission Obscuring Products
Soundproofing, Acoustics, Noise & Vibration Control Specialists

Acoustical Surfaces, Inc.

SOUNDPROOFING, ACOUSTICS, NOISE & VIBRATION CONTROL SPECIALISTS
123 Columbia Court North • Suite 201 • Chaska, MN 55318
(952) 448-5300 • Fax (952) 448-2613 • (800) 448-0121
Email: sales@acousticalsurfaces.com
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ACOUSTIC MEASURES, INC.
CONSULTANTS IN ARCHITECTURAL ACOUSTICS

INTRODUCTION

On April 23, 2009, Acoustic Measures, Inc. conducted Field Impact Insulation Class (FIIC) and Field Sound Transmission Class (FSTC) measurements at the Jade Ocean Condominium in Sunny Isles, FL. This report provides the results of the FIIC tests to assess impact noise on tile floors and FSTC tests for floor/ceiling assemblies conducted in the units. The FIIC tests were conducted in compliance with **ASTM E 492-04** *(Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine)*, **ASTM E 1007-04** *(Standard Test Method for Field Measurement of Tapping Machine Impact Sound Transmission Through Floor-Ceiling Assemblies and Associated Support Structures)* and **ASTM E-989-06** *(Standard Classification for Determination of Impact Insulation Class (IIC))*. The FSTC tests were conducted in compliance with **ASTM E 90-04** (*Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements*) and **ASTM E 336-07** *(Standard Test Method for Field Measurement of Airborne Sound Transmission in Buildings)*.

MEASUREMENT EQUIPMENT

A CESVA tapping machine (model MI005) was used as the noise source for the FIIC measurements and an iPod was used to generate the source signal for the FSTC measurements.

The room parameter measurements were done using two Meyer Sound UPJ loudspeakers as the sound source, a Bruel & Kjaer model 2250 sound level meter/analyzer (Type 1) as the measurement microphone and omni directional receiver, a Sony PCM-D50 Linear PCM Recorder, an Apple iPod, a Tascam US-144 USB 2.0 Audio/Midi Interface.

All sound pressure measurements were obtained using a non-weighted decibel scale at 1/3 octave band divisions. The instrument used was a Bruel & Kjaer model 2250 sound level meter/analyzer (Type 1). The unit was factory calibrated on 2 February 2009 and then field calibrated using a Bruel & Kjaer model 4231 calibrator before the field measurements were taken.

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TESTING ENVIRONMENT

FIIC Measurements

Receiving Room: Unit 3505 on the 35th floor
Room Description:
- **Ceiling:** Finished with skim coat
- **Walls:** Finished with painted GWB
- **Floor:** Post-tensioned concrete slab (no finish material installed at time of measurement)

Source Room: Unit 3605 on the 36th floor
Room Description:
- **Ceiling:** Finished with skim coat
- **Walls:** Finished with painted GWB
- **Floor:** Tile

Floor/Ceiling Construction:
The floor/ceiling construction consisted of a finished layer of ½" thick tile on, 1-½" thick mortar bed on, Acoustik 3/8" recycled rubber on, 8" post-tensioned concrete slab with a skim coat on the underside of the slab as the ceiling finish.

Temperature: 78° F

FSTC Measurements

Receiving Room: Unit 3505 on the 35th floor
Room Description:
- **Ceiling:** Finished with skim coat
- **Walls:** Finished with painted GWB
- **Floor:** Post-tensioned concrete slab (no finish material installed at time of measurement)

Source Room: Unit 3605 on the 36th floor
Room Description:
- **Ceiling:** Finished with skim coat
- **Walls:** Finished with painted GWB
- **Floor:** Tile

Floor/Ceiling Construction:
The floor/ceiling construction consisted of a finished layer of ½" thick tile on, 1-½" thick mortar bed on, Acoustik 3/8" recycled rubber on, 8" post-tensioned concrete slab with a skim coat on the underside of the slab as the ceiling finish.

Temperature: 78° F

4490 SW LONG BAY DRIVE, PALM CITY, FLORIDA 34990
772-286-8351/PHONE, 561-658-6142/FAX, AA26000667
JADE OCEAN CONDO FIIC/FSTC MEASUREMENTS,
SUNNY ISLES, FL - V2
5 MAY 2009

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CONSULTANTS IN ARCHITECTURAL ACOUSTICS

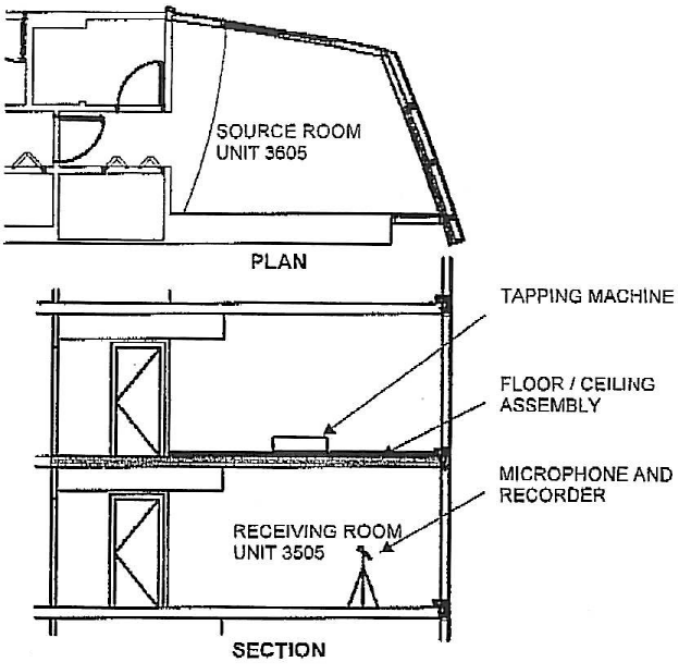
Receiving/Source Room
Floor Area Dimension:

- Width: 3'-6"
- Depth: 7'-2"
- Height: 7'-7"

- Width: 12'-6"
- Depth: 17'-2"
- Height: 9'-2"

Volume: 2089 ft^3 (59.15 m^3)

SOURCE ROOM (UNIT 3605) /
RECEIVING ROOM (UNIT 3505)



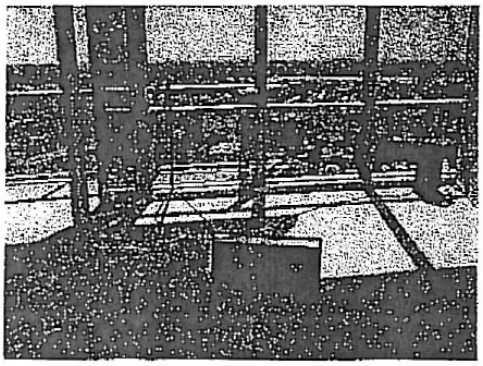


Fig 1 – Example of measurement equipment setup

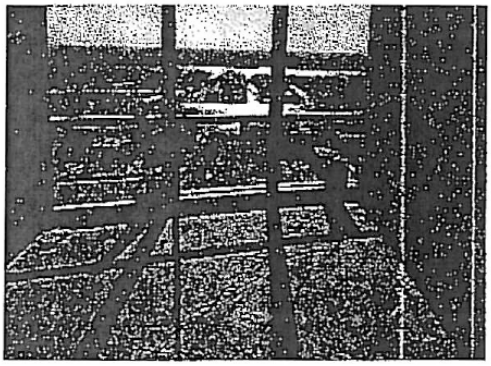


Fig 2 – Example of measurement equipment setup

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PROCEDURE

The CESVA tapping machine was used as the noise source for the FIIC measurements. The tapping machine was placed in four positions in the source room and the sound level was measured at 5 receiver positions at a height of 3.9 ft in the receiving room in accordance to ASTM 492-04. The machine was checked for hammer height fall amounts prior to the test session.

The sound source signal generated for the FSTC calculations was pink noise with a sampling rate of 44.1 kHz and at 1/3 octave bandwidth divisions. Two loudspeakers were placed in the corners of the source room to represent the noise source. Receiver positions at a height of 3.9 ft. were measured at 5 positions within the source room and receiving room. The sound source signal was fed through the loudspeaker source positions and measured at each receiver position in both the source room and receiving room in order to calculate the FSTC.

The average decay of sound was measured for the source room and receiving room separately. The sound signal generated for the room decay calculations was a logarithmic sweep with a sampling rate of 44.1 kHz and a bandwidth octave of 1. Two loudspeakers were placed in the corners of the source room to represent the noise source. Receiver positions at a height of 3.9 ft. were measured at 5 positions within the source room. The sound signal was fed through the loudspeaker source positions and measured at each receiver position in order to calculate the average decay of sound. The same setup and calculations were also done for the receiving room.

In order to get an Idea of the existing background noise levels within the source room and receiving room, the 1/3 octave band sound pressure levels from 16 Hz – 8 kHz was measured in 3 positions within each space.

RESULTS AND CONCLUSIONS

The results of the FIIC and FSTC measurements are as follows:

FIIC = 54
FSTC = 55

Note: Please see charts and graphs at the end of the measurement report for further information.

Sincerely,

Edward Dugger, AIA, ASA NCAC

4490 SW LONG BAY DRIVE, PALM CITY, FLORIDA 34990
772-286-8351/PHONE, 561-658-6142/FAX, AA26000667
JADE OCEAN CONDO FIIC/FSTC MEASUREMENTS,
SUNNY ISLES, FL - V2
5 MAY 2009

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We Identify and S.T.O.P. Your Noise Problem

Jade Ocean Condo 36th Floor Unit D, Sunny Isles, FL

1-May-09

Edward Dugger + Associates, Consultants in Architectural Acoustics

ED+A: 9256

FSTC Measurement

Source Room - Unit 3608

Frequency	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k
SL1	97	94	96	89	94	93	92	92	93	93	91	92	88	85	82	82
SL2	97	95	93	85	94	92	91	92	93	93	91	91	89	85	82	82
SL3	98	96	94	93	93	92	92	94	94	92	91	91	88	86	82	82
SL4	94	95	93	87	93	92	92	93	94	93	91	91	89	85	82	82
SL5	96	95	94	87	93	92	91	90	92	91	91	91	89	86	81	82
SL Avg	97	95	94	88	94	92	92	92	93	92	91	91	89	85	82	82

Receiving Room - Unit 3608

Frequency	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k
RL1	55	58	53	50	53	52	48	47	48	42	41	40	38	38	36	35
RL2	56	58	52	53	52	51	48	45	46	39	35	35	31	27	23	22
RL3	55	56	51	50	51	51	46	45	47	40	37	36	36	30	28	24
RL4	53	59	52	52	51	57	48	48	47	39	35	34	30	27	22	18
RL5	58	55	52	50	51	50	47	45	48	38	35	33	30	26	21	18
RL Avg	55	57	52	51	52	53	47	46	47	40	37	37	35	33	30	28
Ambient	41	47	45	39	36	36	35	32	30	30	26	26	26	25	25	13
Adj. RL Avg	55	57	51	51	52	53	47	46	47	39	37	37	34	32	30	28

Noise Reduction

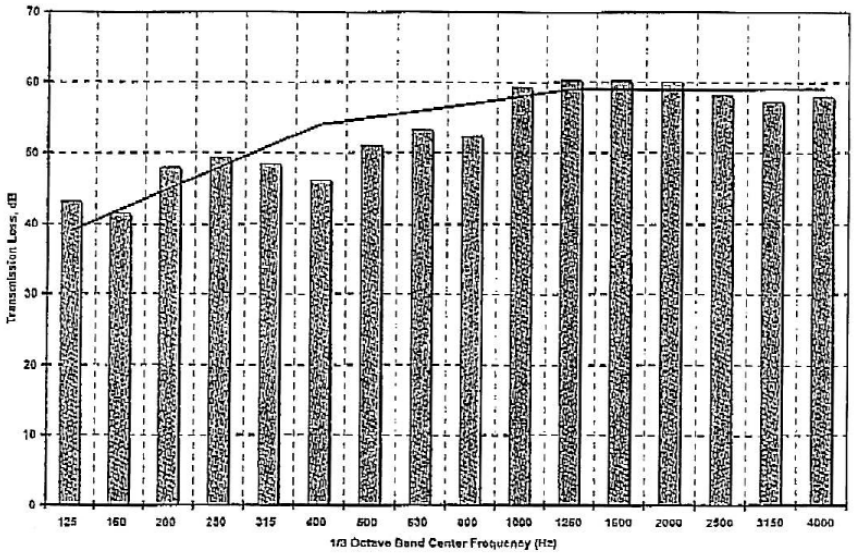
Frequency	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k
SLavg-RLavg	40	38	43	44	42	39	44	47	46	55	54	54	55	53	52	53
FTL	43	41	46	49	48	45	51	53	52	59	60	60	60	58	57	58

1/3 Octave Band	STC Curve	STC Template	Deficiencies
125	43	39	0
160	41	42	1
200	46	45	0
250	49	48	0
315	46	51	3
400	48	54	6
500	51	55	4
630	53	56	3
800	52	57	5
1000	58	58	0
1250	60	59	0
1600	60	59	0
2000	60	59	0
2500	58	59	1
3150	57	59	2
4000	58	59	1
	Sum of Deficiencies:		26

FSTC = 55

Source Rm: Unit 3605
Receive: Unit 3505
Test No Ref: ASTM E 90-04, E 336-07, E 2235-04

Field Sound Transmission Class (FSTC) Measurement



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1-May-09

Edward Dugger + Associates, Consultants in Architectural Acoustics

ED+A: 9256

FIIC Measurement

Receiving Room - Unit 3505

Frequency	100	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k	2k	2.5k	3.15k
P1 - RL1	48	57	58	63	61	63	66	64	61	59	55	52	50	47	45	43
P1 - RL2	47	57	57	59	63	65	65	64	61	59	55	52	51	48	45	43
P1 - RL3	48	56	58	62	67	65	67	65	61	59	55	52	50	48	45	44
P1 - RL4	45	53	59	60	61	64	66	65	60	58	55	52	51	47	44	42
P1 - RL5	47	58	61	61	64	68	66	64	61	57	55	51	50	47	44	41
Avg SPL - Position 1	47	57	59	61	64	65	67	64	61	58	55	52	50	47	45	43
P2 - RL1	47	58	50	60	64	65	66	64	60	57	55	52	50	47	44	41
P2 - RL2	50	60	58	62	67	65	67	66	60	58	54	51	50	47	45	42
P2 - RL3	47	55	58	58	62	64	66	64	60	57	55	51	50	47	43	41
P2 - RL4	47	60	60	60	63	64	67	64	59	57	54	51	50	46	44	41
P2 - RL5	50	59	58	63	63	66	66	65	61	59	56	51	50	48	44	42
Avg SPL - Position 2	48	58	58	61	64	64	67	64	60	58	55	51	50	47	44	42
P3 - RL1	44	58	57	63	60	63	65	63	59	55	52	48	47	44	42	40
P3 - RL2	48	58	60	61	62	66	66	61	59	56	52	49	47	45	41	43
P3 - RL3	49	56	59	65	65	66	66	65	58	54	51	49	47	45	42	40
P3 - RL4	46	55	60	63	64	65	67	63	59	54	51	48	47	44	41	39
P3 - RL5	45	58	58	62	60	64	67	64	58	53	51	48	47	44	41	40
Avg SPL - Position 3	47	57	59	63	63	65	67	63	59	55	51	49	47	44	41	41
P4 - RL1	48	58	58	61	66	66	70	64	63	57	53	51	49	47	44	42
P4 - RL2	48	57	58	61	64	65	66	66	61	58	54	51	49	47	44	42
P4 - RL3	46	58	61	59	68	67	69	65	62	57	53	51	49	47	45	44
P4 - RL4	48	57	56	58	65	65	67	65	62	57	54	51	49	47	44	42
P4 - RL5	49	58	60	59	63	66	68	66	61	57	52	50	48	46	43	42
Avg SPL - Position 4	48	58	59	60	65	66	68	65	62	57	53	51	49	47	44	43
Avg SPL - Position 5	48	58	59	61	64	65	67	65	61	57	54	51	49	47	44	42
Ambient	41	47	45	39	38	36	35	32	30	30	28	26	26	25	23	17
RL - Amb.	7	11	14	22	26	29	32	33	30	27	26	26	24	22	21	25
Adjustment for Background	47	58	59	61	64	65	67	65	61	57	54	51	49	47	44	42
Metric Sabins	14.3	9.2	7.1	8.2	4.8	4.5	4.8	4.8	5.4	5.4	5.6	5.8	6.2	6.8	7.4	7.4
SPL norm	49	57	57	59	61	62	64	61	58	54	51	48	47	45	42	41

1/3 Octave Band	Normalized Noise Level	IIC Template	Deficiencies
100	49	56	0
125	57	58	0
160	57	58	0
200	59	58	1
250	61	58	3
315	62	58	4
400	64	57	7
500	61	56	5
630	58	55	3
800	54	54	0
1000	51	53	0
1250	48	50	0
1600	47	47	0
2000	45	44	1
2500	42	41	1
3150	41	38	3
		Sum of Deficiencies:	28

FIIC = 54

Source Rm: Unit 3605
Receive Rm: Unit 3505
Test No Ref: ASTM E 1007-04, E 492-04, E 989-06

Field Impact Insulation Class (FIIC) Measurement