TECHNOTES

Higher STC Ratings Solution

While Pella offers some of the best sound rated wood windows in today's marketplace, certain projects call for higher performance levels. One of the commonly accepted solutions is to apply an acoustical panel to the window. We have tested a variety of Pella wood windows with Mon-Ray storm / acoustical panels to achieve STC ratings up to 44. The attached test reports are the results of testing by a 3rd party source. Contact information for purchasing Mon-Ray products is also included.

Please note: results were recorded in a controlled test lab environment. Actual results may vary.

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For additional information on the Mon-Ray products, please contact Greg Murtha at 1-800-544-3646

Contact information:

Greg Murtha
Mon-Ray Industries 1-800-544-3646
gmurtha@monray.com www.monray.com

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Investigative Chemistry
Non Destructive Testing
Metallurgical Analysis

Geotechnical
Failure Analysis
Materials Testing

Construction Materials
Product Evaluation
Welder Qualification

PROJECT NUMBER: 30160-07-90637-6
PAGE: 1 **of** 4
DATE: December 7, 2007

SOUND TRANSMISSION TESTING CONDUCTED ON A PELLA ARCHITECT SERIES CASEMENT WINDOW IN TANDEM WITH A MON RAY SECONDARY STORM WINDOW

Prepared for:
PELLA CORPORATION
Attn: Mr. Brian Schnebbe
102 Main Street
Pella, IA 50219

Prepared By:



Mathew N. Botz
Project Manager
Product Testing Department
(651) 659-7353

Reviewed By:



Kyle T. Hall
Sr. Engineering Technician
Product Testing Department

The test results contained in this report pertain only to the samples submitted for testing and not necessarily to all similar products.

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Stork Twin City Testing is an operating unit of Stork Materials Technology B.V., Amsterdam, The Netherlands, which is a member of the Stork group

PROJECT NUMBER: 30160-07-90637-6

DATE: December 7, 2007

Sound Transmission Class Testing (ASTM E90-04)

INTRODUCTION:

This report presents the results of sound transmission testing conducted on a Pella Architect Series Casement Window in tandem with a Mon Ray storm window. The window was submitted by Mr. Brian Schnebbe of Pella Corporation. This work was completed on December 5, 2007.

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Stork Twin City Testing Corporation has been accredited by the U.S. Department of Commerce and the National Institute of Standards and Technology (NIST, formerly NBS) under their National Voluntary Laboratory Accreditation Program (NVLAP) for conducting ASTM E90 test procedure. This report may not be used to claim product endorsement by NVLAP, NIST or any agency of the U.S. Government. Stork Twin City Testing Corporation's Lab Code Number is 200046-0.

TEST RESULTS SUMMARY:

Casement Window

			Test Results		
Test #	**Primary Glazing**	**Storm Window Description**	**STC**	**Def**	**OITC**
6	Insulated Glass Unit 1/8", 7/16" airspace, 1/8"	Mon Ray P-150 Storm Window 1/4" laminated glass Airspace of 1-5/8"	39	32	30

SPECIMEN DESCRIPTION: (Also see "Test Results")

The specimen was described as being a Pella Architect Series Casement Window in tandem with a Mon Ray storm window. The aluminum clad wood window with storm measured 29" x 47-3/4" x 5" and weighed 64.5 lbs (6.7-psf).

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PROJECT NUMBER: 30160-07-90637-6

DATE: December 7, 2007

SPECIMEN DESCRIPTION: Continued

PRIMARY WINDOW

Manufacturer : Pella Corporation

Model # : Architect Series Casement Window

Size : 29" x 47-3/4" x 5" and weighed 45 lbs (4.7-psf).

Glazing : IG Unit – 1/8" annealed glass, 7/16" airspace, 1/8" annealed glass

Specimen Description : The frame and sash were aluminum clad wood members. The sash measured 27" x 45-3/4" with a glass daylight opening of 23-1/4" x 41-3/4". The hardware consisted of a rotary operator and a single latch lock with a 2-point catch

Frame : The frame weatherstripping included a rubber bulb seal around the perimeter.

Sash : The sash weatherstripping consisted of a rubber leaf (0.50") around the sash.

STORM WINDOW

Manufacturer : Mon-Ray, Inc.

Model # : P-150

Glazing : ¼" Laminated Glass

Specimen Description : - Extruded T-6 aluminum master frame with 0.050" minimum wall thickness.

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PROJECT NUMBER: 30160-07-90637-6

DATE: December 7, 2007

TEST PROCEDURE:

Sound Transmission Test

ASTM:E90(04), "Laboratory Measurement of Airborne Sound Transmission of Building Partitions," was followed in every respect. The STC value was obtained by applying the Transmission Loss (TL) values to the STC reference contour of ASTM: E413(04), "Determination of Sound Transmission Class." The actual transmission loss at each frequency was calculated by the following equations:

$$TL = NR + 10 \log S - 10 \log A_2$$

where: TL = Transmission Loss (dB)
NR = Noise Reduction (dB)
S = Surface area common to both sides (sq. ft.)
A_2 = Sound absorption of the receiving room with the sample in place (sabins)

OITC Procedure

ASTM:E1332(03), "Determination of Outdoor-Indoor Transmission Class", was followed in every respect. Basically, the OITC was calculated by using the sound transmission loss values in the 80 to 4000 Hz range as measured in accordance with ASTM E-90(04). These transmission loss data are then used to determine the A-weighted sound level reduction of the specimen for the reference source spectrum specified in Table 1 of ASTM E1332(03). The appropriate calculations were made to determine the OITC value. The source room has a volume of 2948-ft^3 (83-m^3) and the termination room has a volume of 5825-ft^3 (165-m^3).

The temperatures and relative humidity of the termination room met the requirements of the standard during and after the test. All frequencies met the requirements for 95% confidence established by the standard.

TEST EQUIPMENT:

Manufacturer	Model	Description	S/N
Norwegian Electronics	NE830	Real Time Analyzer	11511
Brüel & Kjær	3923	Rotating Microphone Boom	815424
Norsonic (Source Rm)	1230	Pressure Condenser Microphone	26361
Brüel & Kjær (Term Rm)	4192	Pressure Condenser Microphone	2360314

REMARKS:

The test sample will be retained for a period of **15-days** and then discarded unless notified by the client.

F:\Product\MMFILES\MNB\2007 REPORTS MNB\90637-Pella-6.doc

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PROJECT NUMBER: 30160-07-90637-6

DATE: December 7, 2007

TEST RESULTS:

Filename: test #6

ASTM E90 - Laboratory Sound Transmission Class

Project Folder	Client	Product	Model #	Quantity	Comment
90637 Pella	Pella Corporation	Casement Window	Architect Series	1	with MONRAY Storm Window

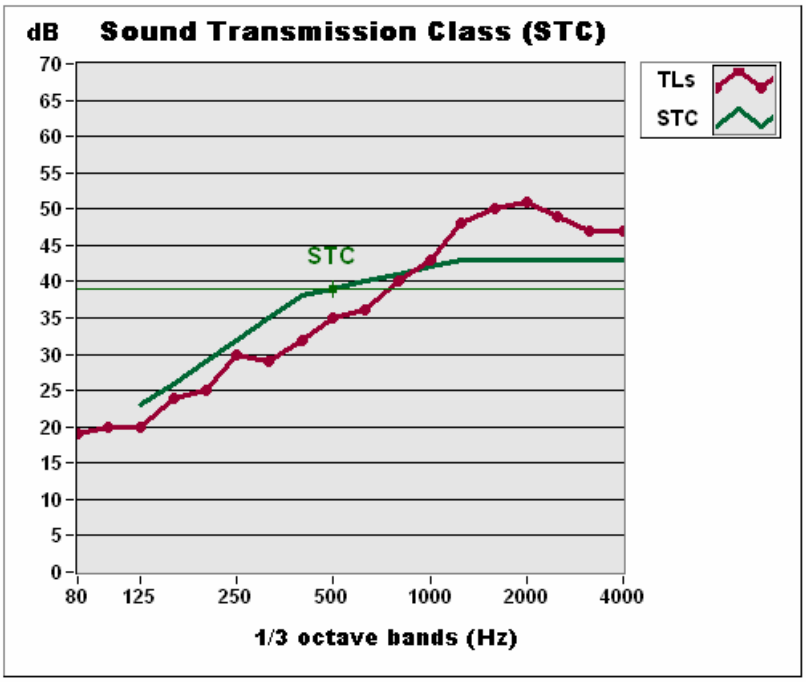
Sample Size - Wt.: 29.0 in x 47.7 in x 5" - 64 lbs

Time Stamp: Wed, Dec 05, 2007 - 9:02 AM

Sample Description: Pella Corporation: Casement Window: : Primary Glass: 1/8" clear, 7/16" airspace, 1/8" clear", Storm Window: MONRAY Storm window 1/4"laminated glass with 1-5/8" airspace :

TLs - sample TL values (dB)
95% CI - 95% Confidence Interval (dB)
def - STC deficiencies (dB)

F (Hz)	TLs	95% CI	def
80	19	2.4	-
100	20	1.5	-
125	20	1.9	3
160	24	1.9	2
200	25	0.7	4
250	30	0.7	2
315	29	0.5	6
400	32	0.4	6
500	35	0.4	4
630	36	0.4	4
800	40	0.2	1
1000	43	0.3	0
1250	48	0.2	0
1600	50	0.2	0
2000	51	0.2	0
2500	49	0.2	0
3150	47	0.3	0
4000	47	0.4	0



Temp (°C)	R.H. (%)	ATM (mbar)
20.8	56	992

STC = 39 def: 32
OITC: 30

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PROJECT NUMBER: 30160-07-90637-8
PAGE: 1 **of** 5
DATE: December 11, 2007

Investigative Chemistry | Geotechnical | Construction Materials
Non Destructive Testing | Failure Analysis | Product Evaluation
Metallurgical Analysis | Materials Testing | Welder Qualification

SOUND TRANSMISSION TESTING CONDUCTED ON A PELLA ARCHITECT SERIES CASEMENT WINDOW IN TANDEM WITH A MON RAY SECONDARY STORM WINDOW

Prepared for:
PELLA CORPORATION
Attn: Mr. Brian Schnebbe
102 Main Street
Pella, IA 50219

Prepared By:



Mathew N. Botz
Project Manager
Product Testing Department
(651) 659-7353

Reviewed By:



Kyle T. Hall
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Product Testing Department

The test results contained in this report pertain only to the samples submitted for testing and not necessarily to all similar products.

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PROJECT NUMBER: 30160-07-90637-8

DATE: December 11, 2007

Sound Transmission Class Testing (ASTM E90-04)

INTRODUCTION:

This report presents the results of sound transmission testing conducted on a Pella Architect Series Casement Window in tandem with a Mon Ray storm window. The window was submitted by Mr. Brian Schnebbe of Pella Corporation. This work was completed on December 5, 2007.

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TEST RESULTS SUMMARY:

Casement Window

Test #	Primary Glazing	Storm Window Description	Test Results		
			STC	Def	OITC
8	Insulated Glass Unit 3/16", 3/8" airspace, 1/8"	Mon Ray P-150 Storm Window 1/4" annealed glass Airspace of 1-5/8"	39	30	29

SPECIMEN DESCRIPTION: (Also see "Test Results")

The specimen was described as being a Pella Architect Series Casement Window in tandem with a Mon Ray storm window. The aluminum clad wood window with storm measured 29" x 47-3/4" x 5" and weighed 74 lbs (7.7-psf).

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PROJECT NUMBER: 30160-07-90637-8

DATE: December 11, 2007

SPECIMEN DESCRIPTION: Continued

PRIMARY WINDOW

Manufacturer : Pella Corporation

Model # : Architect Series Casement Window

Size : 29" x 47-3/4" x 5" and weighed 52 lbs (5.4-psf).

Glazing : IG Unit – 3/16" annealed glass, 3/8" airspace, 1/8" annealed glass

Specimen Description : The frame and sash were aluminum clad wood members. The sash measured 27" x 45-3/4" with a glass daylight opening of 23-1/4" x 41-3/4". The hardware consisted of a rotary operator and a single latch lock with a 2-point catch

Frame : The frame weatherstripping included a rubber bulb seal around the Perimeter.

Sash : The sash weatherstripping consisted of a rubber leaf (0.50") around the sash.

STORM WINDOW

Manufacturer : Mon-Ray, Inc.

Model # : P-150

Glazing : ¼" Annealed Glass

Specimen Description : - Extruded T-6 aluminum master frame with 0.050" minimum wall thickness.

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PROJECT NUMBER: 30160-07-90637-8

DATE: December 11, 2007

TEST PROCEDURE:

Sound Transmission Test

ASTM:E90(04), "Laboratory Measurement of Airborne Sound Transmission of Building Partitions," was followed in every respect. The STC value was obtained by applying the Transmission Loss (TL) values to the STC reference contour of ASTM: E413(04), "Determination of Sound Transmission Class." The actual transmission loss at each frequency was calculated by the following equations:

$$TL = NR + 10 \log S - 10 \log A_2$$

where: TL = Transmission Loss (dB)
NR = Noise Reduction (dB)
S = Surface area common to both sides (sq. ft.)
A_2 = Sound absorption of the receiving room with the sample in place (sabins)

OITC Procedure

ASTM:E1332(03), "Determination of Outdoor-Indoor Transmission Class", was followed in every respect. Basically, the OITC was calculated by using the sound transmission loss values in the 80 to 4000 Hz range as measured in accordance with ASTM E-90(04). These transmission loss data are then used to determine the A-weighted sound level reduction of the specimen for the reference source spectrum specified in Table 1 of ASTM E1332(03). The appropriate calculations were made to determine the OITC value. The source room has a volume of 2948-ft^3 (83-m^3) and the termination room has a volume of 5825-ft^3 (165-m^3).

The temperatures and relative humidity of the termination room met the requirements of the standard during and after the test. All frequencies met the requirements for 95% confidence established by the standard.

TEST EQUIPMENT:

Manufacturer	Model	Description	S/N
Norwegian Electronics	NE830	Real Time Analyzer	11511
Brüel & Kjær	3923	Rotating Microphone Boom	815424
Norsonic (Source Rm)	1230	Pressure Condenser Microphone	26361
Brüel & Kjær (Term Rm)	4192	Pressure Condenser Microphone	2360314

REMARKS:

The test sample will be retained for a period of **15-days** and then discarded unless notified by the client.

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PROJECT NUMBER: 30160-07-90637-8

PAGE: 5 **of** 5
DATE: December 11, 2007

TEST RESULTS:

Filename: test #8

ASTM E90 - Laboratory Sound Transmission Class

Project Folder	Client	Product	Model #	Quantity	Comment
90637 Pella	Pella Corporation	Casement Window	Architect Series	1	

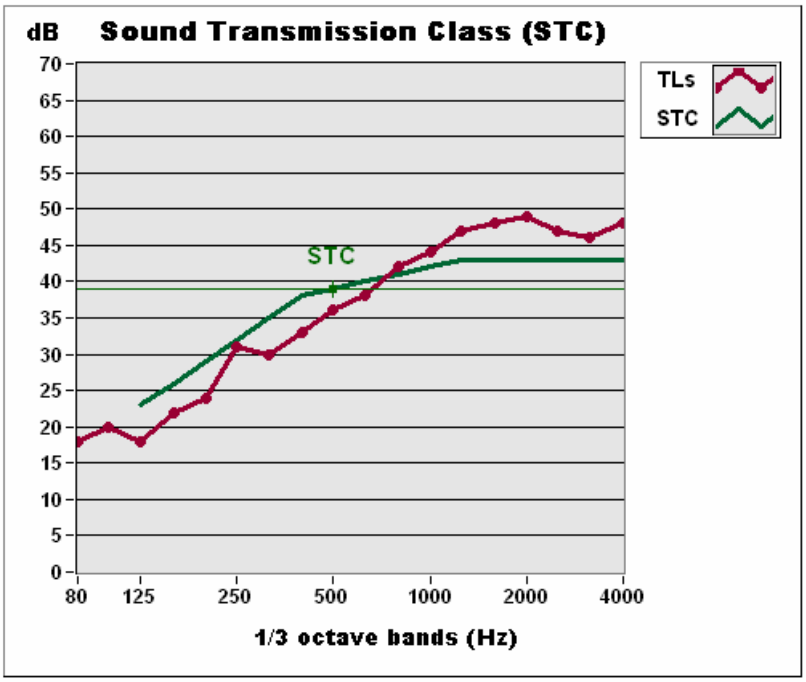
Sample Size - Wt.: 29.0 in x 47.7 in x 5" - 74 lbs

Time Stamp: Wed, Dec 05, 2007 - 10:15 AM

Sample Description:
Pella Corporation: Casement Window, :
Primary Glass: 3/16"annealed, 3/8" airspace, 1/8"annealed,
Storm Window: MONRAY Storm window - 1/4"annealed glass with 1-5/8" airspace :

TLs - sample TL values (dB)
95% CI - 95% Confidence Interval (dB)
def - STC deficiencies (dB)

F (Hz)	TLs	95% CI	def
80	18	2.4	-
100	20	1.5	-
125	18	1.9	5
160	22	1.9	4
200	24	0.7	5
250	31	0.7	1
315	30	0.5	5
400	33	0.4	5
500	36	0.4	3
630	38	0.4	2
800	42	0.2	0
1000	44	0.3	0
1250	47	0.2	0
1600	48	0.2	0
2000	49	0.2	0
2500	47	0.2	0
3150	46	0.3	0
4000	48	0.4	0



Temp (°C)	R.H. (%)	ATM (mbar)
21.4	54	992

STC = 39 def: 30
OITC: 29

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PROJECT NUMBER: 30160-07-90637-7
PAGE: 1 **of** 5
DATE: December 11, 2007

Investigative Chemistry | Geotechnical | Construction Materials
Non Destructive Testing | Failure Analysis | Product Evaluation
Metallurgical Analysis | Materials Testing | Welder Qualification

SOUND TRANSMISSION TESTING CONDUCTED ON A PELLA ARCHITECT SERIES CASEMENT WINDOW IN TANDEM WITH A MON RAY SECONDARY STORM WINDOW

Prepared for:
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PROJECT NUMBER: 30160-07-90637-7

DATE: December 11, 2007

Sound Transmission Class Testing (ASTM E90-04)

INTRODUCTION:

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TEST RESULTS SUMMARY:

Casement Window

Test #	Primary Glazing	Storm Window Description	Test Results		
			STC	Def	OITC
7	Insulated Glass Unit 3/16", 3/8" airspace, 1/8"	Mon Ray P-150 Storm Window 1/4" laminated glass Airspace of 1-5/8"	40	26	29

SPECIMEN DESCRIPTION: (Also see "Test Results")

The specimen was described as being a Pella Architect Series Casement Window in tandem with a Mon Ray storm window. The aluminum clad wood window with storm measured 29" x 47-3/4" x 5" and weighed 71.5 lbs (7.4-psf).

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PROJECT NUMBER: 30160-07-90637-7

DATE: December 11, 2007

SPECIMEN DESCRIPTION: Continued

PRIMARY WINDOW

Manufacturer : Pella Corporation

Model # : Architect Series Casement Window

Size : 29" x 47-3/4" x 5" and weighed 52 lbs (5.4-psf).

Glazing : IG Unit – 3/16" annealed glass, 3/8" airspace, 1/8" annealed glass

Specimen Description : The frame and sash were aluminum clad wood members. The sash measured 27" x 45-3/4" with a glass daylight opening of 23-1/4" x 41-3/4". The hardware consisted of a rotary operator and a single latch lock with a 2-point catch

Frame : The frame weatherstripping included a rubber bulb seal around the perimeter.

Sash : The sash weatherstripping consisted of a rubber leaf (0.50") around the sash.

STORM WINDOW

Manufacturer : Mon-Ray, Inc.

Model # : P-150

Glazing : ¼" Laminated Glass

Specimen Description : - Extruded T-6 aluminum master frame with 0.050" minimum wall thickness.

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PROJECT NUMBER: 30160-07-90637-7

DATE: December 11, 2007

TEST PROCEDURE:

Sound Transmission Test

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A_2 = Sound absorption of the receiving room with the sample in place (sabins)

OITC Procedure

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TEST EQUIPMENT:

Manufacturer	Model	Description	S/N
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Brüel & Kjær	3923	Rotating Microphone Boom	815424
Norsonic (Source Rm)	1230	Pressure Condenser Microphone	26361
Brüel & Kjær (Term Rm)	4192	Pressure Condenser Microphone	2360314

REMARKS:

The test sample will be retained for a period of **15-days** and then discarded unless notified by the client.

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PROJECT NUMBER: 30160-07-90637-7

DATE: December 11, 2007

TEST RESULTS:

Filename: test #7

ASTM E90 - Laboratory Sound Transmission Class

Project Folder	Client	Product	Model #	Quantity	Comment
90637 Pella	Pella Corporation	Casement Window	Architect Series	1	with MONRAY Storm Window

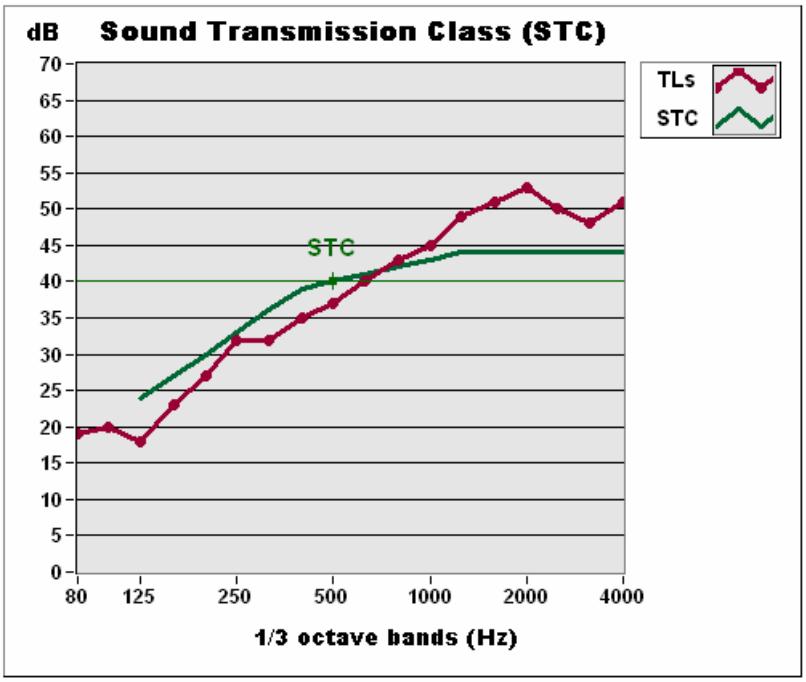
Sample Size - Wt.: 29.0 in x 47.7 in x 5" - 71 lbs

Time Stamp: Wed, Dec 05, 2007 - 9:38 AM

Sample Description: Pella Corporation: Casement Window: :
Primary Glass: 3/16"annealed, 3/8" airspace, 1/8"annealed,
Storm Window: MONRAY Storm window - 1/4"laminated glass with 1-5/8" airspace :

TLs - sample TL values (dB)
95% CI - 95% Confidence Interval (dB)
def - STC deficiencies (dB)

F (Hz)	TLs	95% CI	def
80	19	2.4	-
100	20	1.5	-
125	18	1.9	6
160	23	1.9	4
200	27	0.7	3
250	32	0.7	1
315	32	0.5	4
400	35	0.4	4
500	37	0.4	3
630	40	0.4	1
800	43	0.2	0
1000	45	0.3	0
1250	49	0.2	0
1600	51	0.2	0
2000	53	0.2	0
2500	50	0.2	0
3150	48	0.3	0
4000	51	0.4	0



Temp (°C)	R.H. (%)	ATM (mbar)
20.8	56	992

STC = 40 def: 26
OITC: 29

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PROJECT NUMBER: 30160-07-90637-9
PAGE: 1 **of** 5
DATE: January 2, 2008

Investigative Chemistry | Geotechnical | Construction Materials
Non Destructive Testing | Failure Analysis | Product Evaluation
Metallurgical Analysis | Materials Testing | Welder Qualification

SOUND TRANSMISSION TESTING CONDUCTED ON A PELLA DESIGNER SERIES CASEMENT WINDOW IN TANDEM WITH A MON RAY SECONDARY STORM WINDOW

Prepared for:
PELLA CORPORATION
Attn: Mr. Brian Schnebbe
102 Main Street
Pella, IA 50219

Prepared By:



Mathew N. Botz
Project Manager
Product Testing Department
(651) 659-7353

Reviewed By:



Kyle T. Hall
Sr. Engineering Technician
Product Testing Department

The test results contained in this report pertain only to the samples submitted for testing and not necessarily to all similar products.

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PROJECT NUMBER: 30160-07-90637-9

DATE: January 2, 2008

Sound Transmission Class Testing (ASTM E90-04)

INTRODUCTION:

This report presents the results of sound transmission testing conducted on a Pella Designer Series Casement Window in tandem with a Mon Ray storm window. The window was submitted by Mr. Brian Schnebbe of Pella Corporation. This work was completed on December 5, 2007.

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Stork Twin City Testing Corporation has been accredited by the U.S. Department of Commerce and the National Institute of Standards and Technology (NIST, formerly NBS) under their National Voluntary Laboratory Accreditation Program (NVLAP) for conducting ASTM E90 test procedure. This report may not be used to claim product endorsement by NVLAP, NIST or any agency of the U.S. Government. Stork Twin City Testing Corporation's Lab Code Number is 200046-0.

TEST RESULTS SUMMARY:

Casement Window			**Test Results**		
Test #	**Primary Glazing**	**Storm Window Description**	**STC**	**Def**	**OITC**
9	Insulated Glass Unit & Interior Storm Panel 3/16", 3/8" airspace, 1/8" 3/32" Panel with 1-3/16" airspace	Mon Ray P-150 Storm Window 1/4" laminated glass Airspace of 1-5/8"	41	31	32

SPECIMEN DESCRIPTION: (Also see "Test Results")

The specimen was described as being a Pella Designer Series Casement Window in tandem with a Mon Ray storm window. The aluminum clad wood window with storm measured 29" x 47-3/4" x 5" and weighed 84 lbs (8.8-psf).

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PROJECT NUMBER: 30160-07-90637-9

DATE: January 2, 2008

SPECIMEN DESCRIPTION: Continued

PRIMARY WINDOW

Manufacturer : Pella Corporation

Model # : Designer Series Casement Window

Size : 29" x 47-3/4" x 5" and weighed 63 lbs (6.6-psf).

Glazing : IG Unit – 3/16" annealed glass, 3/8" airspace, 1/8" annealed glass
Interior Pella Storm Window: 3/32" annealed glass with 1-3/16" airspace

Specimen Description : The frame and sash were aluminum clad wood members. The sash measured 27" x 45-3/4" with a glass daylight opening of 23-1/4" x 41-3/4". The hardware consisted of a rotary operator and a single latch lock with a 2-point catch

Frame : The frame weatherstripping included a rubber bulb seal around the Perimeter.

Sash : The sash weatherstripping consisted of a rubber leaf (0.50") around the sash.

STORM WINDOW

Manufacturer : Mon-Ray, Inc.

Model # : P-150

Glazing : ¼" Laminated Glass

Specimen Description : - Extruded T-6 aluminum master frame with 0.050" minimum wall thickness.

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PROJECT NUMBER: 30160-07-90637-9

DATE: January 2, 2008

TEST PROCEDURE:

Sound Transmission Test

ASTM:E90(04), "Laboratory Measurement of Airborne Sound Transmission of Building Partitions," was followed in every respect. The STC value was obtained by applying the Transmission Loss (TL) values to the STC reference contour of ASTM: E413(04), "Determination of Sound Transmission Class." The actual transmission loss at each frequency was calculated by the following equations:

$$TL = NR + 10 \log S - 10 \log A_2$$

where: TL = Transmission Loss (dB)
NR = Noise Reduction (dB)
S = Surface area common to both sides (sq. ft.)
A_2 = Sound absorption of the receiving room with the sample in place (sabins)

OITC Procedure

ASTM:E1332(03), "Determination of Outdoor-Indoor Transmission Class", was followed in every respect. Basically, the OITC was calculated by using the sound transmission loss values in the 80 to 4000 Hz range as measured in accordance with ASTM E-90(04). These transmission loss data are then used to determine the A-weighted sound level reduction of the specimen for the reference source spectrum specified in Table 1 of ASTM E1332(03). The appropriate calculations were made to determine the OITC value. The source room has a volume of 2948-ft^3 (83-m^3) and the termination room has a volume of 5825-ft^3 (165-m^3).

The temperatures and relative humidity of the termination room met the requirements of the standard during and after the test. All frequencies met the requirements for 95% confidence established by the standard.

TEST EQUIPMENT:

Manufacturer	Model	Description	S/N
Norwegian Electronics	NE830	Real Time Analyzer	11511
Brüel & Kjær	3923	Rotating Microphone Boom	815424
Norsonic (Source Rm)	1230	Pressure Condenser Microphone	26361
Brüel & Kjær (Term Rm)	4192	Pressure Condenser Microphone	2360314

REMARKS:

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PROJECT NUMBER: 30160-07-90637-9

PAGE: 5 **of** 5
DATE: January 2, 2008

TEST RESULTS:

Filename: test #9

ASTM E90 - Laboratory Sound Transmission Class

Project Folder	Client	Product	Model #	Quantity	Comment
90637 Pella	Pella Corporation	Casement Window	Designer Series	1	with MONRAY Storm Window

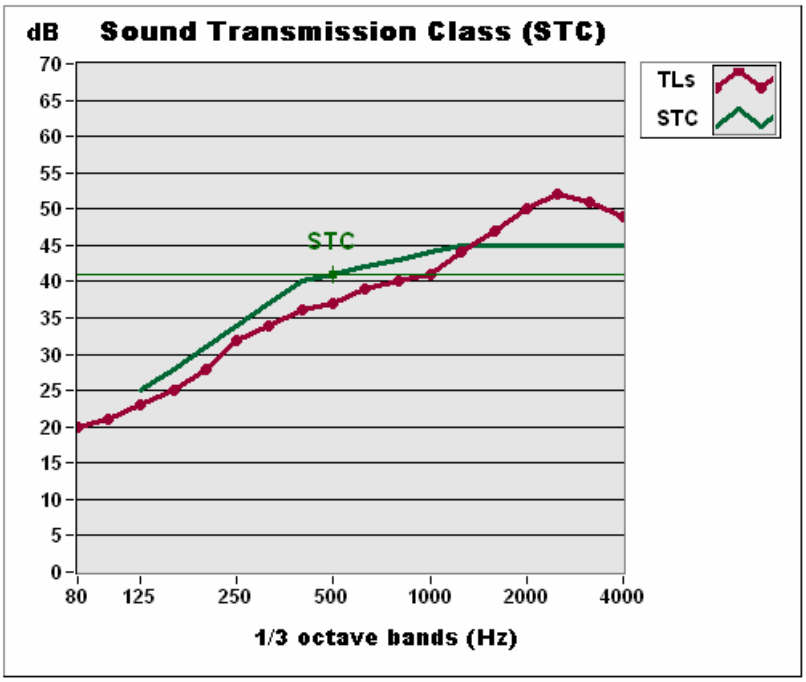
Sample Size - Wt.: 29.0 in x 47.7 in x 5" - 84 lbs

Time Stamp: Wed, Dec 05, 2007 - 10:39 AM

Sample Description:
Pella Corporation: Casement Window, (Designer Series) :
Prim. Glass: 3/16"ann., 3/8" airspace, 1/8"ann., plus additional 3/32" ann. panel at 1-3/16" airspace.
Storm Window: MONRAY Storm Window - 1/4"laminated glass with 1/4" airspace :

TLs - sample TL values (dB)
95% CI - 95% Confidence Interval (dB)
def - STC deficiencies (dB)

F (Hz)	TLs	95% CI	def
80	20	2.4	-
100	21	1.5	-
125	23	1.9	2
160	25	1.9	3
200	28	0.7	3
250	32	0.7	2
315	34	0.5	3
400	36	0.4	4
500	37	0.4	4
630	39	0.4	3
800	40	0.2	3
1000	41	0.3	3
1250	44	0.2	1
1600	47	0.2	0
2000	50	0.2	0
2500	52	0.2	0
3150	51	0.3	0
4000	49	0.4	0



Temp (°C)	R.H. (%)	ATM (mbar)
21.4	54	992

STC = 41 def: 31
OITC: 32

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PROJECT NUMBER: 30160-07-90637-10
PAGE: 1 **of** 5
DATE: December 11, 2007

SOUND TRANSMISSION TESTING CONDUCTED ON A PELLA FIXED WINDOW IN TANDEM WITH A MON RAY SECONDARY STORM WINDOW

Prepared for:
PELLA CORPORATION
Attn: Mr. Brian Schnebbe
102 Main Street
Pella, IA 50219

Prepared By:



Mathew N. Botz
Project Manager
Product Testing Department
(651) 659-7353

Reviewed By:



Kyle T. Hall
Sr. Engineering Technician
Product Testing Department

The test results contained in this report pertain only to the samples submitted for testing and not necessarily to all similar products.

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PROJECT NUMBER: 30160-07-90637-10

DATE: December 11, 2007

Sound Transmission Class Testing (ASTM E90-04)

INTRODUCTION:

This report presents the results of sound transmission testing conducted on a Pella Fixed Window in tandem with a Mon Ray storm window. The window was submitted by Mr. Brian Schnebbe of Pella Corporation. This work was completed on December 6, 2007.

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TEST RESULTS SUMMARY:

Fixed Window

			Test Results		
Test #	**Primary Glazing**	**Storm Window Description**	**STC**	**Def**	**OITC**
10	Insulated Glass Unit 1/8", 3/8" airspace, 1/8"	Mon Ray 603-Pl Storm Window 1/8" annealed glass Airspace of 1-15/16"	38	31	28

SPECIMEN DESCRIPTION: (Also see "Test Results")

The specimen was described as being a Pella Fixed Window in tandem with a Mon Ray storm window. The aluminum clad wood window with storm measured 21-3/4" x 38-1/8" x 6" and weighed 36 lbs (6.3-psf).

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PROJECT NUMBER: 30160-07-90637-10

DATE: December 11, 2007

SPECIMEN DESCRIPTION: Continued

PRIMARY WINDOW

Manufacturer : Pella Corporation

Model # : Fixed Window

Size : 21-3/4" x 38-1/8" x 6" and weighed 29.5 lbs (5.2-psf).

Glazing : IG Unit – 1/8" annealed glass, 3/8" airspace, 1/8" annealed glass

Specimen Description : The frame and sash were aluminum clad wood members. The glass daylight opening was 18" x 35".

Frame Weatherstripping : N/A

Sash Weatherstripping : N/A

STORM WINDOW

Manufacturer : Mon-Ray, Inc.

Model # : 603-PL

Glazing : 1/8" Clear Annealed, 1-15/16" from primary glazing

Specimen Description:
- Extruded T-6 tubular aluminum master frame with 0.055" minimum wall thickness.
- Removable 1-lite glass insert secured to master frame by aluminum clips fastened with non-magnetic stainless steel screws.
- Extruded T-6 aluminum insert frame
- Continuous weatherstripping running around perimeter of insert opening in master frame.
- All assembly and installation screws made of non-magnetic stainless steel.
- An adjustable extruded aluminum expander with weep holes was attached to the sill of the master frame. Weep holes left open during tests.

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PROJECT NUMBER: 30160-07-90637-10

DATE: December 11, 2007

TEST PROCEDURE:

Sound Transmission Test

ASTM:E90(04), "Laboratory Measurement of Airborne Sound Transmission of Building Partitions," was followed in every respect. The STC value was obtained by applying the Transmission Loss (TL) values to the STC reference contour of ASTM: E413(04), "Determination of Sound Transmission Class." The actual transmission loss at each frequency was calculated by the following equations:

$$TL = NR + 10 \log S - 10 \log A_2$$

where: TL = Transmission Loss (dB)
NR = Noise Reduction (dB)
S = Surface area common to both sides (sq. ft.)
A_2 = Sound absorption of the receiving room with the sample in place (sabins)

OITC Procedure

ASTM:E1332(03), "Determination of Outdoor-Indoor Transmission Class", was followed in every respect. Basically, the OITC was calculated by using the sound transmission loss values in the 80 to 4000 Hz range as measured in accordance with ASTM E-90(04). These transmission loss data are then used to determine the A-weighted sound level reduction of the specimen for the reference source spectrum specified in Table 1 of ASTM E1332(03). The appropriate calculations were made to determine the OITC value. The source room has a volume of 2948-ft^3 (83-m^3) and the termination room has a volume of 5825-ft^3 (165-m^3).

The temperatures and relative humidity of the termination room met the requirements of the standard during and after the test. All frequencies met the requirements for 95% confidence established by the standard.

TEST EQUIPMENT:

Manufacturer	Model	Description	S/N
Norwegian Electronics	NE830	Real Time Analyzer	11511
Brüel & Kjær	3923	Rotating Microphone Boom	815424
Norsonic (Source Rm)	1230	Pressure Condenser Microphone	26361
Brüel & Kjær (Term Rm)	4192	Pressure Condenser Microphone	2360314

REMARKS:

The test sample will be retained for a period of **15-days** and then discarded unless notified by the client.

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PROJECT NUMBER: 30160-07-90637-10

PAGE: 5 **of** 5
DATE: December 11, 2007

TEST RESULTS:

Filename: test #10

ASTM E90 - Laboratory Sound Transmission Class

Project Folder	Client	Product	Model #	Quantity	Comment
90637 Pella	Pella Corporation	Fixed Window		1	with MONRAY Storm Window

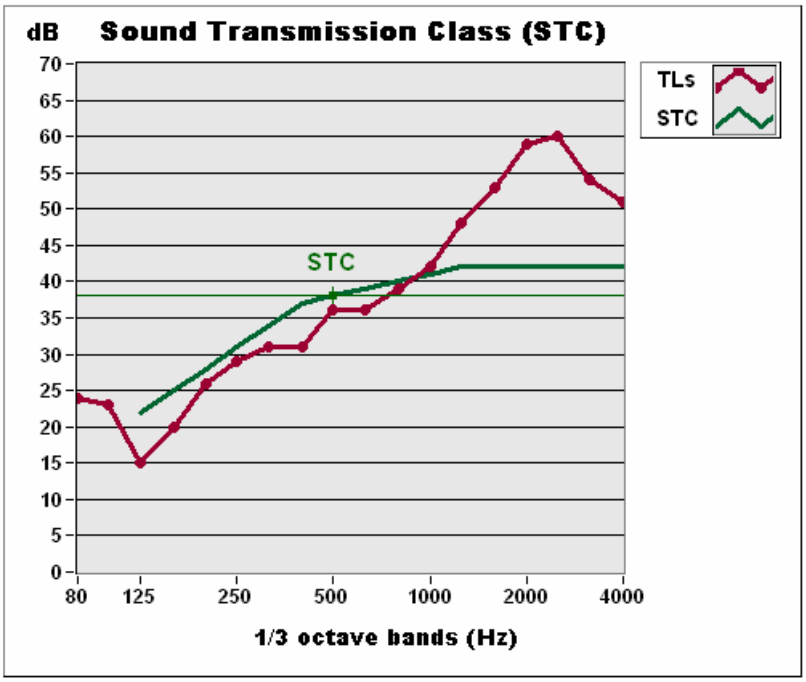
Sample Size - Wt.: 21.7 in x 38.1 in x 6" - 36 lbs

Time Stamp: Thu, Dec 06, 2007 - 9:33 AM

Sample Description: Pella Window: Fixed Window: :
Glass: 1/8"DS clear x 3/8"airspace x 1/8"DS clear x MONRAY Storm 1-15/16"airspace 1/8"DS clear: :

TLs - sample TL values (dB)
95% CI - 95% Confidence Interval (dB)
def - STC deficiencies (dB)

F (Hz)	TLs	95% CI	def
80	24	2.5	-
100	23	1.4	-
125	15	2.3	7
160	20	1.8	5
200	26	1.0	2
250	29	0.7	2
315	31	0.5	3
400	31	0.4	6
500	36	0.2	2
630	36	0.4	3
800	39	0.3	1
1000	42	0.3	0
1250	48	0.2	0
1600	53	0.2	0
2000	59	0.2	0
2500	60	0.1	0
3150	54	0.3	0
4000	51	0.5	0



Temp (°C)	R.H. (%)	ATM (mbar)
22.4	58	994

STC = 38 def: 31
OITC: 28

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PROJECT NUMBER: 30160-07-90637-12
PAGE: 1 **of** 5
DATE: December 12, 2007

SOUND TRANSMISSION TESTING CONDUCTED ON A PELLA FIXED WINDOW IN TANDEM WITH A MON RAY SECONDARY STORM WINDOW

Prepared for:
PELLA CORPORATION
Attn: Mr. Brian Schnebbe
102 Main Street
Pella, IA 50219

Prepared By:



Mathew N. Botz
Project Manager
Product Testing Department
(651) 659-7353

Reviewed By:



Kyle T. Hall
Sr. Engineering Technician
Product Testing Department

The test results contained in this report pertain only to the samples submitted for testing and not necessarily to all similar products.

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Stork Twin City Testing is an operating unit of Stork Materials Technology B.V., Amsterdam, The Netherlands, which is a member of the Stork group

PROJECT NUMBER: 30160-07-90637-12

DATE: December 12, 2007

Sound Transmission Class Testing (ASTM E90-04)

INTRODUCTION:

This report presents the results of sound transmission testing conducted on a Pella Fixed Window in tandem with a Mon Ray storm window. The window was submitted by Mr. Brian Schnebbe of Pella Corporation. This work was completed on December 6, 2007.

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TEST RESULTS SUMMARY:

Fixed Window

			Test Results		
Test #	**Primary Glazing**	**Storm Window Description**	**STC**	**Def**	**OITC**
12	Insulated Glass Unit 1/8", 3/8" airspace, 1/8"	Mon Ray 603-Pl Storm Window 3/16" annealed glass Airspace of 1-15/16"	41	23	33

SPECIMEN DESCRIPTION: (Also see "Test Results")

The specimen was described as being a Pella Fixed Window in tandem with a Mon Ray storm window. The aluminum clad wood window with storm measured 21-3/4" x 38-1/8" x 6" and weighed 40 lbs (7.0-psf).

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PROJECT NUMBER: 30160-07-90637-12

DATE: December 12, 2007

SPECIMEN DESCRIPTION: Continued

PRIMARY WINDOW

Manufacturer : Pella Corporation

Model # : Fixed Window

Size : 21-3/4" x 38-1/8" x 6" and weighed 29.5 lbs (5.2-psf).

Glazing : IG Unit – 1/8" annealed glass, 3/8" airspace, 1/8" annealed glass

Specimen Description : The frame and sash were aluminum clad wood members. The glass daylight opening was 18" x 35".

Frame Weatherstripping : N/A.

Sash Weatherstripping : N/A

STORM WINDOW

Manufacturer : Mon-Ray, Inc.

Model # : 603-PL

Glazing : 3/16" Clear Annealed, 1-15/16" from primary glazing

Specimen Description:
- Extruded T-6 tubular aluminum master frame with 0.055" minimum wall thickness.
- Removable 1-lite glass insert secured to master frame by aluminum clips fastened with non-magnetic stainless steel screws.
- Extruded T-6 aluminum insert frame
- Continuous weatherstripping running around perimeter of insert opening in master frame.
- All assembly and installation screws made of non-magnetic stainless steel.
- An adjustable extruded aluminum expander with weep holes was attached to the sill of the master frame. Weep holes left open during tests.

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PROJECT NUMBER: 30160-07-90637-12

DATE: December 12, 2007

TEST PROCEDURE:

Sound Transmission Test

ASTM:E90(04), "Laboratory Measurement of Airborne Sound Transmission of Building Partitions," was followed in every respect. The STC value was obtained by applying the Transmission Loss (TL) values to the STC reference contour of ASTM: E413(04), "Determination of Sound Transmission Class." The actual transmission loss at each frequency was calculated by the following equations:

$$TL = NR + 10 \log S - 10 \log A_2$$

where: TL = Transmission Loss (dB)
NR = Noise Reduction (dB)
S = Surface area common to both sides (sq. ft.)
A_2 = Sound absorption of the receiving room with the sample in place (sabins)

OITC Procedure

ASTM:E1332(03), "Determination of Outdoor-Indoor Transmission Class", was followed in every respect. Basically, the OITC was calculated by using the sound transmission loss values in the 80 to 4000 Hz range as measured in accordance with ASTM E-90(04). These transmission loss data are then used to determine the A-weighted sound level reduction of the specimen for the reference source spectrum specified in Table 1 of ASTM E1332(03). The appropriate calculations were made to determine the OITC value. The source room has a volume of 2948-ft^3 (83-m^3) and the termination room has a volume of 5825-ft^3 (165-m^3).

The temperatures and relative humidity of the termination room met the requirements of the standard during and after the test. All frequencies met the requirements for 95% confidence established by the standard.

TEST EQUIPMENT:

Manufacturer	Model	Description	S/N
Norwegian Electronics	NE830	Real Time Analyzer	11511
Brüel & Kjær	3923	Rotating Microphone Boom	815424
Norsonic (Source Rm)	1230	Pressure Condenser Microphone	26361
Brüel & Kjær (Term Rm)	4192	Pressure Condenser Microphone	2360314

REMARKS:

The test sample will be retained for a period of **15-days** and then discarded unless notified by the client.

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PROJECT NUMBER: 30160-07-90637-12

PAGE: 5 **of** 5
DATE: December 12, 2007

TEST RESULTS:

Filename: test #12

ASTM E90 - Laboratory Sound Transmission Class

Project Folder	Client	Product	Model #	Quantity	Comment
90637 Pella	Pella Corporation	Fixed Window		1	with MONRAY Storm Window

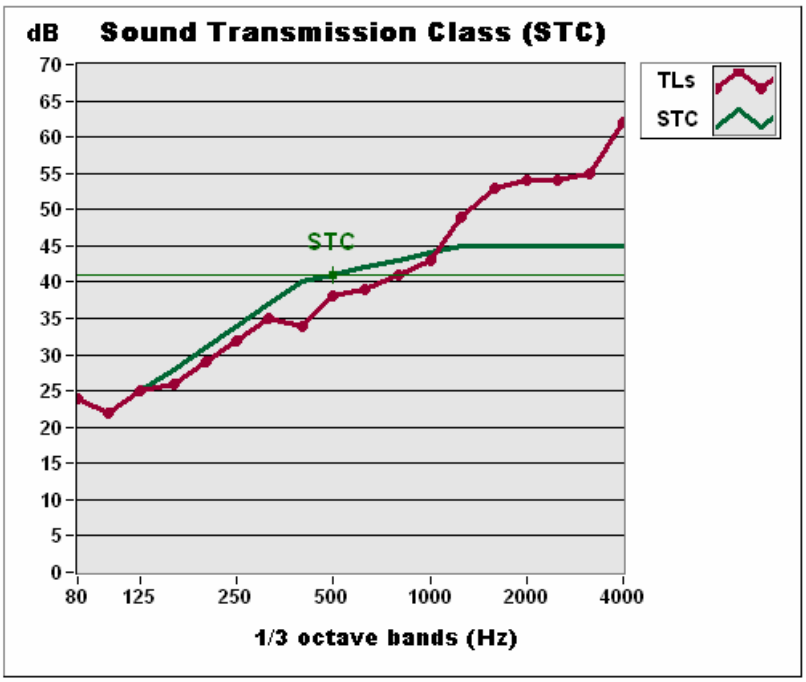
Sample Size - Wt.: 21.7 in x 38.1 in x 6" - 40 lbs

Time Stamp: Thu, Dec 06, 2007 - 10:43 AM

Sample Description: Pella Window: Fixed Window: :
Glass: 1/8"DS clear x 3/8"airspace x 1/8"DS clear, MONRAY Storm 1-15/16"airspace x 3/16"clear: :

TLs - sample TL values (dB)
95% CI - 95% Confidence Interval (dB)
def - STC deficiencies (dB)

F (Hz)	TLs	95% CI	def
80	24	2.5	-
100	22	1.4	-
125	25	2.3	0
160	26	1.8	2
200	29	1.0	2
250	32	0.7	2
315	35	0.5	2
400	34	0.4	6
500	38	0.2	3
630	39	0.4	3
800	41	0.3	2
1000	43	0.3	1
1250	49	0.2	0
1600	53	0.2	0
2000	54	0.2	0
2500	54	0.1	0
3150	55	0.3	0
4000	62	0.5	0



Temp (°C): 22.4
R.H. (%): 58
ATM (mbar): 994

STC = 41 def: 23
OITC: 33

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PROJECT NUMBER: 30160-07-90637-11
PAGE: 1 **of** 5
DATE: December 12, 2007

SOUND TRANSMISSION TESTING CONDUCTED ON A PELLA FIXED WINDOW IN TANDEM WITH A MON RAY SECONDARY STORM WINDOW

Prepared for:
PELLA CORPORATION
Attn: Mr. Brian Schnebbe
102 Main Street
Pella, IA 50219

Prepared By:



Mathew N. Botz
Project Manager
Product Testing Department
(651) 659-7353

Reviewed By:



Kyle T. Hall
Sr. Engineering Technician
Product Testing Department

The test results contained in this report pertain only to the samples submitted for testing and not necessarily to all similar products.

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PROJECT NUMBER: 30160-07-90637-11

DATE: December 12, 2007

Sound Transmission Class Testing (ASTM E90-04)

INTRODUCTION:

This report presents the results of sound transmission testing conducted on a Pella Fixed Window in tandem with a Mon Ray storm window. The window was submitted by Mr. Brian Schnebbe of Pella Corporation. This work was completed on December 6, 2007.

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Stork Twin City Testing Corporation has been accredited by the U.S. Department of Commerce and the National Institute of Standards and Technology (NIST, formerly NBS) under their National Voluntary Laboratory Accreditation Program (NVLAP) for conducting ASTM E90 test procedure. This report may not be used to claim product endorsement by NVLAP, NIST or any agency of the U.S. Government. Stork Twin City Testing Corporation's Lab Code Number is 200046-0.

TEST RESULTS SUMMARY:

Fixed Window

			Test Results		
Test #	**Primary Glazing**	**Storm Window Description**	**STC**	**Def**	**OITC**
11	Insulated Glass Unit 1/8", 3/8" airspace, 1/8"	Mon Ray 603-Pl Storm Window 1/4" annealed glass Airspace of 1-15/16"	42	26	34

SPECIMEN DESCRIPTION: (Also see "Test Results")

The specimen was described as being a Pella Fixed Window in tandem with a Mon Ray storm window. The aluminum clad wood window with storm measured 21-3/4" x 38-1/8" x 6" and weighed 42 lbs (7.4-psf).

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PROJECT NUMBER: 30160-07-90637-11

DATE: December 12, 2007

SPECIMEN DESCRIPTION: Continued

PRIMARY WINDOW

Manufacturer : Pella Corporation

Model # : Fixed Window

Size : 21-3/4" x 38-1/8" x 6" and weighed 29.5 lbs (5.2-psf).

Glazing : IG Unit – 1/8" annealed glass, 3/8" airspace, 1/8" annealed glass

Specimen Description : The frame and sash were aluminum clad wood members. The glass daylight opening was 18" x 35".

Frame Weatherstripping : N/A

Sash Weatherstripping : N/A

STORM WINDOW

Manufacturer : Mon-Ray, Inc.

Model # : 603-PL

Glazing : 1/4" Clear Annealed, 1-15/16" from primary glazing

Specimen Description:
- Extruded T-6 tubular aluminum master frame with 0.055" minimum wall thickness.
- Removable 1-lite glass insert secured to master frame by aluminum clips fastened with non-magnetic stainless steel screws.
- Extruded T-6 aluminum insert frame
- Continuous weatherstripping running around perimeter of insert opening in master frame.
- All assembly and installation screws made of non-magnetic stainless steel.
- An adjustable extruded aluminum expander with weep holes was attached to the sill of the master frame. Weep holes left open during tests.

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PROJECT NUMBER: 30160-07-90637-11

DATE: December 12, 2007

TEST PROCEDURE:

Sound Transmission Test

ASTM:E90(04), "Laboratory Measurement of Airborne Sound Transmission of Building Partitions," was followed in every respect. The STC value was obtained by applying the Transmission Loss (TL) values to the STC reference contour of ASTM: E413(04), "Determination of Sound Transmission Class." The actual transmission loss at each frequency was calculated by the following equations:

$$TL = NR + 10 \log S - 10 \log A_2$$

where: TL = Transmission Loss (dB)
NR = Noise Reduction (dB)
S = Surface area common to both sides (sq. ft.)
A_2 = Sound absorption of the receiving room with the sample in place (sabins)

OITC Procedure

ASTM:E1332(03), "Determination of Outdoor-Indoor Transmission Class", was followed in every respect. Basically, the OITC was calculated by using the sound transmission loss values in the 80 to 4000 Hz range as measured in accordance with ASTM E-90(04). These transmission loss data are then used to determine the A-weighted sound level reduction of the specimen for the reference source spectrum specified in Table 1 of ASTM E1332(03). The appropriate calculations were made to determine the OITC value. The source room has a volume of 2948-ft^3 (83-m^3) and the termination room has a volume of 5825-ft^3 (165-m^3).

The temperatures and relative humidity of the termination room met the requirements of the standard during and after the test. All frequencies met the requirements for 95% confidence established by the standard.

TEST EQUIPMENT:

Manufacturer	Model	Description	S/N
Norwegian Electronics	NE830	Real Time Analyzer	11511
Brüel & Kjær	3923	Rotating Microphone Boom	815424
Norsonic (Source Rm)	1230	Pressure Condenser Microphone	26361
Brüel & Kjær (Term Rm)	4192	Pressure Condenser Microphone	2360314

REMARKS:

The test sample will be retained for a period of **15-days** and then discarded unless notified by the client.

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PROJECT NUMBER: 30160-07-90637-11

PAGE: 5 **of** 5
DATE: December 12, 2007

TEST RESULTS:

Filename: test #11

ASTM E90 - Laboratory Sound Transmission Class

Project Folder	Client	Product	Model #	Quantity	Comment
90637 Pella	Pella Corporation	Fixed Window		1	with MONRAY Storm Window

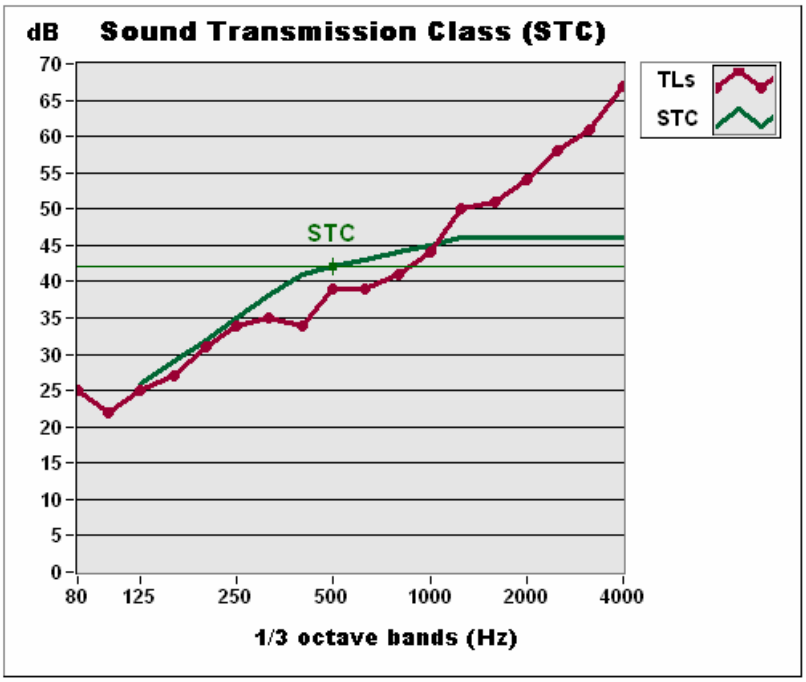
Sample Size - Wt.: 21.7 in x 38.1 in x 6" - 42 lbs

Time Stamp: Thu, Dec 06, 2007 - 10:12 AM

Sample Description:
Pella Window: Fixed Window: :
Glass: 1/8"DS clear x 3/8"airspace x 1/8"DS clear x MONRAY Storm 1-15/16"airspace x 1/4" clear: :

TLs - sample TL values (dB)
95% CI - 95% Confidence Interval (dB)
def - STC deficiencies (dB)

F (Hz)	TLs	95% CI	def
80	25	2.5	-
100	22	1.4	-
125	25	2.3	1
160	27	1.8	2
200	31	1.0	1
250	34	0.7	1
315	35	0.5	3
400	34	0.4	7
500	39	0.2	3
630	39	0.4	4
800	41	0.3	3
1000	44	0.3	1
1250	50	0.2	0
1600	51	0.2	0
2000	54	0.2	0
2500	58	0.1	0
3150	61	0.3	0
4000	67	0.5	0



Temp (°C)	R.H. (%)	ATM (mbar)
22.4	58	994

STC = 42 def: 26
OITC: 34

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