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BRE Test Report

Ford Windows Ltd

Sound insulation testing of double glazed windows in accordance with BS EN ISO 10140-1:2010+A2:2014 & BS EN ISO 10140-2: 2010

Prepared for:	**Ford Windows Ltd**
Date:	18th June 2018
Report Number:	**P112200-1000 Issue 1**

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UKAS TESTING

0578

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Date 18th June 2018

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1 Introduction

BRE Acoustics was commissioned by Ford Windows Ltd to carry out airborne sound insulation measurements in the BRE horizontal transmission suite within Hall D, Building 14, BRE, Garston, Watford, Hertfordshire, WD25 9XX.

This report details the testing outlined in BRE P112200.

2 Testing details

2.1 Test dates and personnel

The measurements detailed in this report were made from by Mr G Timmins, Mr R Hinton and Mr M Coleman of BRE Acoustics during the period 24th May 2018 – 7th June 2018.

2.2 Test methods and applicable standards

Measurement of airborne and sound insulation was made in accordance with 10140-1:2010+A2:2014 and BS EN ISO 10140-2:2010. Single number quantities were calculated in accordance with BS EN ISO 717-1: 2013.

BRE Acoustics holds UKAS accreditation for the measurement of sound insulation in the field and the laboratory. The measurements were conducted using the procedures accredited by UKAS.

2.3 Test element installation

The filler wall construction was installed by Bracey and Clarke Ltd. on behalf of BRE.

The windows provided by Ford Windows Ltd. were installed by BRE

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2.4 Instrumentation

The equipment used to conduct the tests is identified in **Table 1**, below.

Equipment description	Manufacturer	Type	UKAS identification number/ serial number
Microphone Calibrator	B&K	4231	2175848
Microphone	GRAS	40AE	37071, 117036
Microphone Preamplifier	GRAS	26CA	13085, 13142
Real Time Analyser	NOR	850	8501142
Loudspeakers	B&K	4292	014005, 020005
Rotating Boom	Norsonic	212NA	10418
Rotating Boom	Norsonic	265	29412

Table 1 Equipment list

The gain of the real time analyser was adjusted to give a reading 94.0dB at 1kHz using the Bruel & Kjaer Type 4231 calibrator. All equipment is calibrated in accordance with BRE procedures, using reference equipment calibrated by a UKAS accredited laboratory.

2.5 Construction details with test numbers and sound insulation test results

Test number, construction details and weighted sound reduction index (R_w), can be seen in **Table 2**, below.

Test number	Test element	Construction details	R_w (C;C_{tr}) (dB)
L118-132	Wall	2 layers of 15mm Gyproc FireLine on each side of twin frame timber stud, with 100mm mineral wool in each frame.	65(-2;-7)
L118-136	Window	Double glazed window with a closed vent. Top pane – 1066x571 6.8mm laminate glass (clear), 18mm cavity, 4mm oak soft. Bottom pane – 1160x685 6.8mm laminate glass (clear), 18mm cavity, 4mm oak soft.	37(-1;-3)
L118-137	Window	Double glazed window with an open vent. Top pane – 1066x571 6.8mm laminate glass (clear), 18mm cavity, 4mm oak soft. Bottom pane – 1160x685 6.8mm laminate glass (clear), 18mm cavity, 4mm oak soft.	33(-1;-3)
L118-138	Window	Double glazed window. Top pane – 1066x591 10.8mm acoustic laminate glass (clear), 18mm cavity, 8.8mm acoustic soft coat. Bottom pane 1160x685 10.8mm acoustic laminate glass (clear), 18mm cavity, 8.8mm acoustic soft coat.	44(-2;-5)

Table 2 Construction details with test numbers and sound insulation test results.

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2.6 Plans

The position of the filler wall in the transmission suite aperture is indicated in **Figure 1**, in addition to the location of the window.

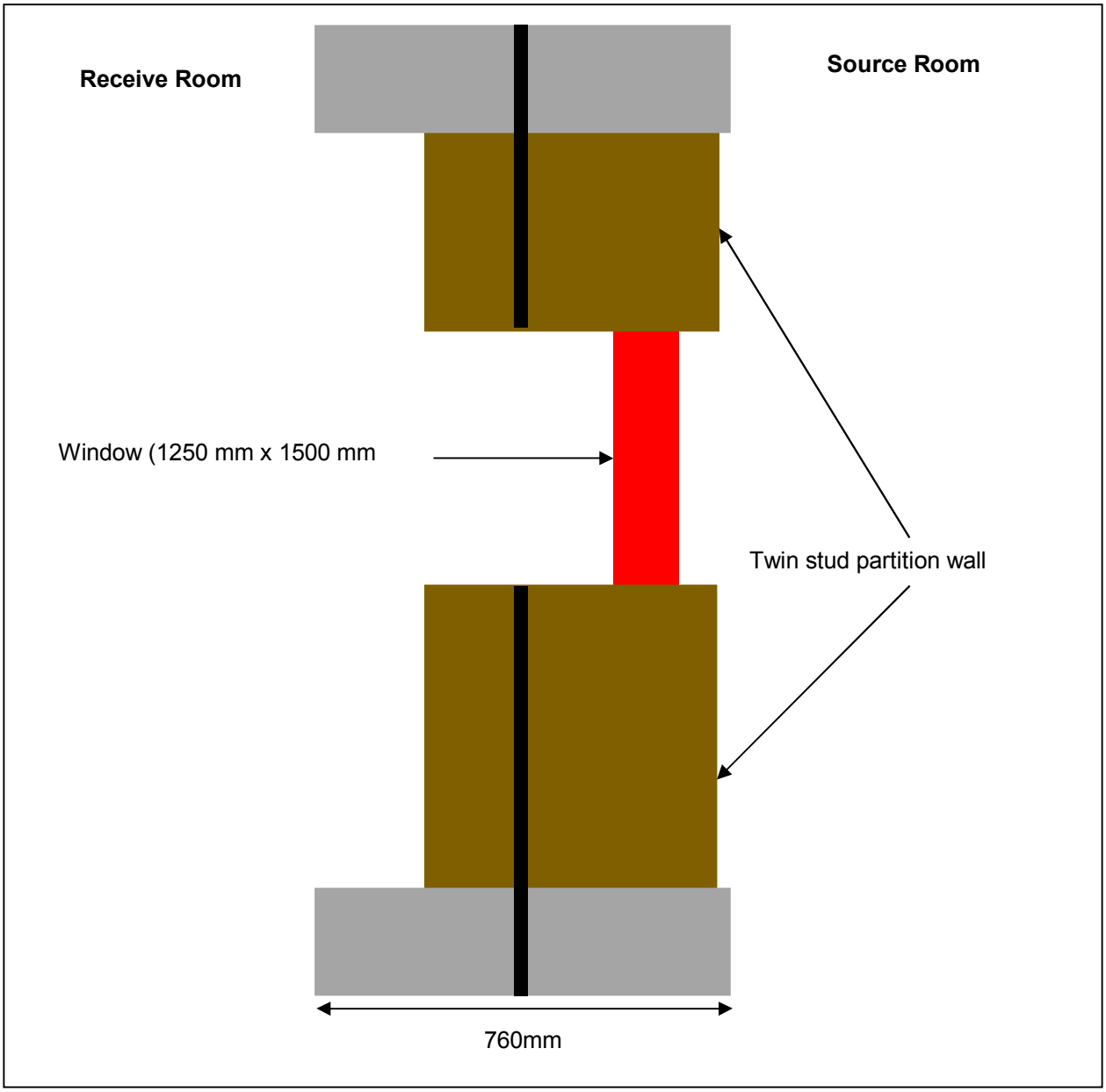
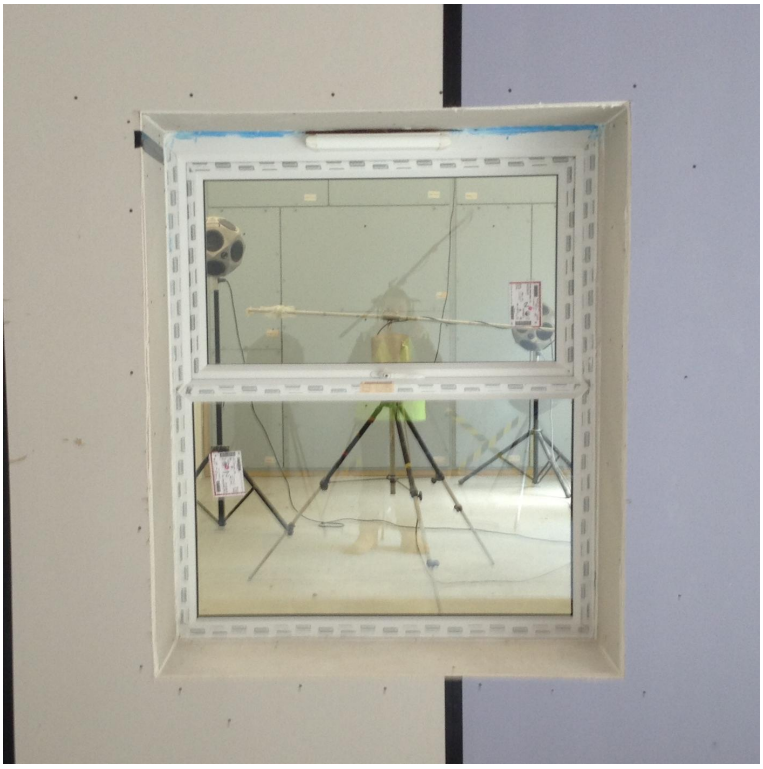


Figure 1 Section through elevation showing the position of the filler wall and window in the transmission suite aperture

2.7 Photographs



Photograph 1 Ford Windows Ltd, double glazed (6.8/18/4) window with vent installed in BRE horizontal transmission suite (source-side)



Photograph 2 Ford Windows Ltd, double glazed window (6.8/18/4) with closed vent installed in BRE horizontal transmission suite (receive-side)

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Photograph 3 Ford windows Ltd, double glazed window (10.8/18/8.8) installed in BRE horizontal transmission suite (source-side)



Photograph 4 Ford windows Ltd, double glazed window (10.8/18/8.8) installed in BRE horizontal transmission suite (receive-side)

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3 Appendices

3.1 UKAS test results sheets

Page Number	Test Number
9	L118-132
10	L118-136
11	L118-137
12	L118-138

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Level difference according to BS EN ISO 10140-2

Laboratory measurement of sound insulation of building elements

Test Laboratory: BRE Transmission Suite (Hall D)
Client: Ford Windows Ltd.

Date of test: 24/05/2018 **Test Number:** L118-132

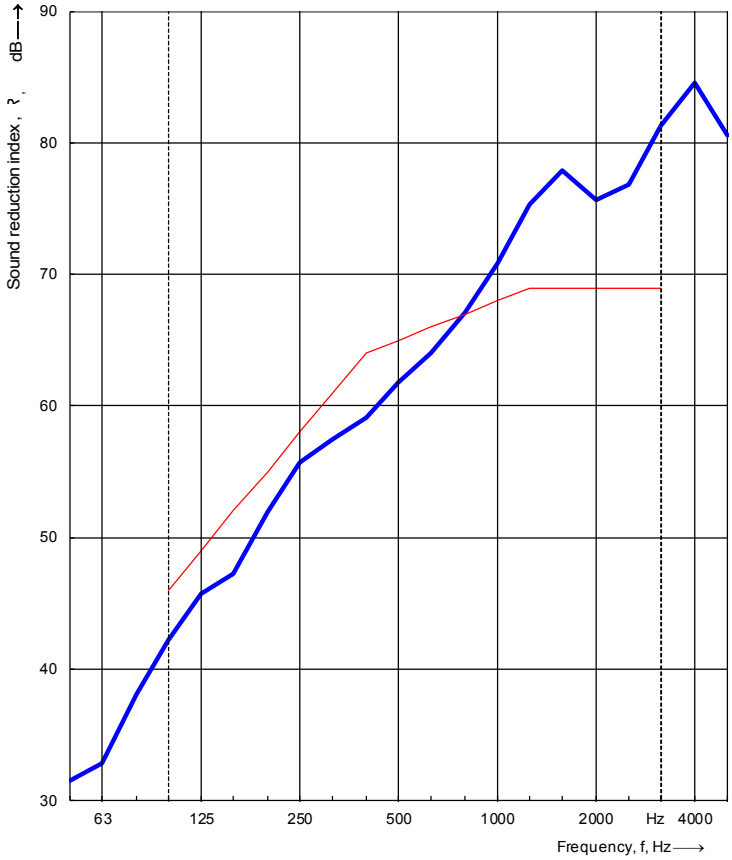
Test specimen installed by: Bracey & Clark Ltd.
Product identification: Partition wall

Description of the specimen: 2 layers of 15mm Gyproc FireLine on each side of twin frame timber stud, with 100mm mineral wool in each frame.

Static pressure:	102.3 kPa	**Area, S, of test element:**	10.8 m²
Air temperature:	18 °C	**Source room volume:**	114 m³
Relative air humidity:	52 %	**Receiving room volume:**	72 m³

Frequency *f* [Hz]	*R* 1/3 octave [dB]
50	31.5
63	32.8
80	38.1
100	42.2
125	45.7
160	47.2
200	51.9
250	55.7
315	57.5
400	59.1
500	61.8
630	64.0
800	67.1
1000	70.8
1250	75.3
1600	77.9
2000	75.6
2500	76.8
3150	81.3
4000	84.6
5000	80.6

[1] Too high



Rating according to ISO 717-1

$R_w(C;C_{tr})$ = 65 (-2 ; -7) dB

Evaluation based on laboratory measurement results obtained in one-third-octave bands by an engineering method.

$C_{50\text{-}3150}$ = -4 dB $C_{50\text{-}5000}$ = -3 dB $C_{100\text{-}5000}$ = -1 dB

$C_{tr,50\text{-}3150}$ = -14 dB $C_{tr,50\text{-}5000}$ = -14 dB $C_{tr,100\text{-}5000}$ = -7 dB

Based on the data provided in BS EN 20140-2:1993 it is estimated that the measurement uncertainty should not exceed ±1 dB for the single-number quantity (Rw) and should not exceed the values in Table A1 of BS EN 20140-2:1993 for the data in the individual third octaves (R)

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Level difference according to BS EN ISO 10140-2

Laboratory measurement of sound insulation of building elements

Test Laboratory: BRE Transmission Suite (Hall D)
Client: Ford Windows Ltd.

Date of test: 06/06/2018 **Test Number:** L118-136

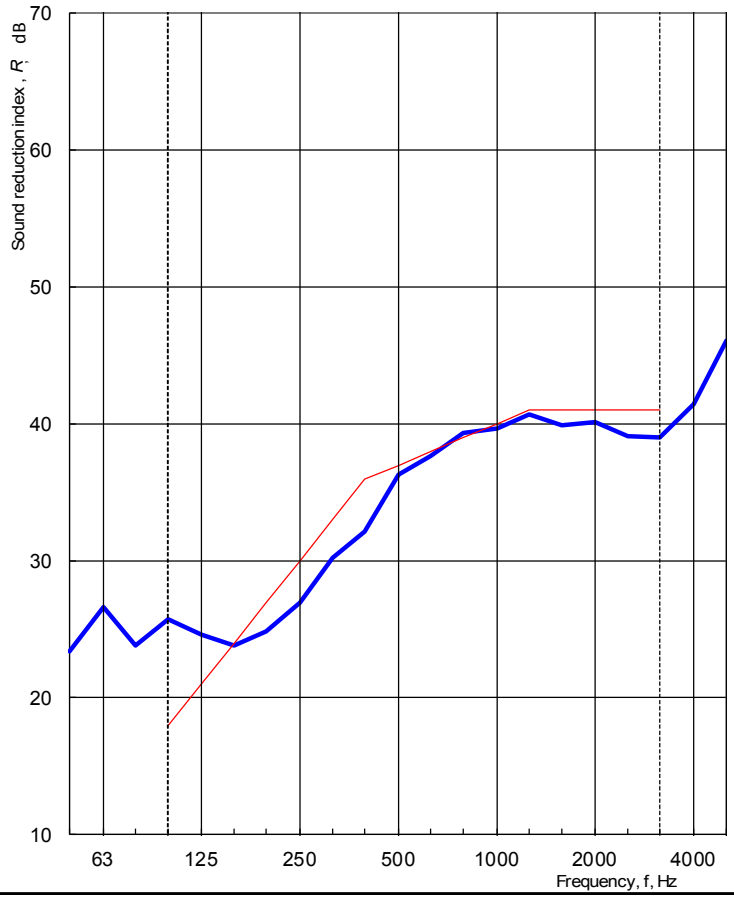
Test specimen installed by: BRE
Product identification: Window unit

Description of the specimen: Double glazed window with a closed vent.
Top pane – 1066x571 6.8mm laminate glass (clear), 18mm cavity, 4mm oak soft.
Bottom pane – 1160x685 6.8mm laminate glass (clear), 18mm cavity, 4mm oak soft.

Static pressure:	102.3 kPa	Area, S, of test elemen	1.9 m²
Air temperature:	18 °C	Source room volume:	114 m³
Relative air humidity:	52 %	Receiving room volume	72 m³
Mass per unit area:	kg/m²		

Frequency *f* [Hz]	*R* 1/3 octave [dB]
50	23.4
63	26.6
80	23.8
100	25.7
125	24.6
160	23.8
200	24.8
250	27.0
315	30.2
400	32.1
500	36.3
630	37.7
800	39.3
1000	39.7
1250	40.7
1600	39.9
2000	40.1
2500	39.1
3150	39.0
4000	41.5
5000	46.1

[2] Minimum values



Rating according to ISO 717-1
$R_w(C;C_{tr})$ = 37 (-1 ; -3) dB
Evaluation based on laboratory measurement results obtained in one-third-octave bands by an engineering method.

$C_{50\text{-}3150}$ = -1 dB $C_{50\text{-}5000}$ = 0 dB $C_{100\text{-}5000}$ = 0 dB
$C_{tr,50\text{-}3150}$ = -4 dB $C_{tr,50\text{-}5000}$ = -4 dB $C_{tr,100\text{-}5000}$ = -3 dB

Based on the data provided in BS EN 20140-2:1993 it is estimated that the measurement uncertainty should not exceed ±1 dB for the single-number quantity (Rw) and should not exceed the values in Table A1 of BS EN 20140-2:1993 for the data in the individual third octaves (R)

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Level difference according to BS EN ISO 10140-2

Laboratory measurement of sound insulation of building elements

Test Laboratory: BRE Transmission Suite (Hall D)
Client: Ford Windows Ltd.

Date of test: 06/06/2018 **Test Number:** L118-137

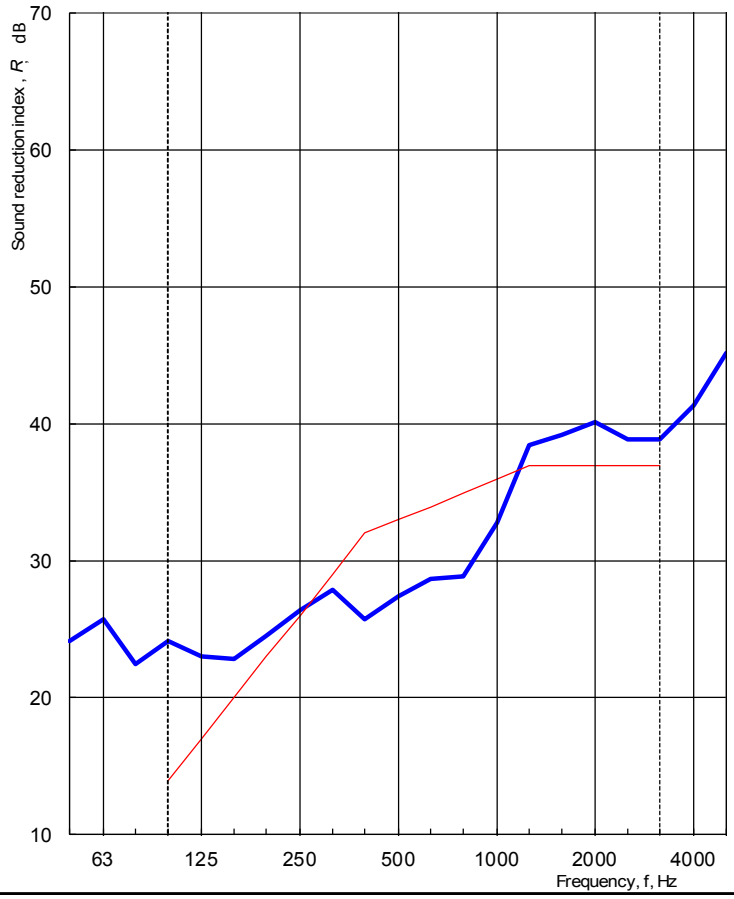
Test specimen installed by: BRE
Product identification: Window unit

Description of the specimen: Double glazed window with an open vent.
Top pane – 1066x571 6.8mm laminate glass (clear), 18mm cavity, 4mm oak soft.
Bottom pane – 1160x685 6.8mm laminate glass (clear), 18mm cavity, 4mm oak soft.

Static pressure:	102.3 kPa	Area, S, of test elemen	1.9 m²
Air temperature:	18 °C	Source room volume:	114 m³
Relative air humidity:	52 %	Receiving room volume	72 m³
Mass per unit area:	kg/m²		

Frequency *f* [Hz]	*R* 1/3 octave [dB]
50	24.2
63	25.7
80	22.5
100	24.2
125	23.0
160	22.8
200	24.5
250	26.4
315	27.9
400	25.7
500	27.4
630	28.7
800	28.9
1000	32.8
1250	38.4
1600	39.2
2000	40.1
2500	38.9
3150	38.9
4000	41.4
5000	45.2

[2] Minimum values



Rating according to ISO 717-1
$R_w(C;C_{tr})$ = 33 (-1 ; -3) dB

Evaluation based on laboratory measurement results obtained in one-third-octave bands by an engineering method.

$C_{50\text{-}3150}$ = -1 dB $C_{50\text{-}5000}$ = 0 dB $C_{100\text{-}5000}$ = 0 dB
$C_{tr,50\text{-}3150}$ = -3 dB $C_{tr,50\text{-}5000}$ = -3 dB $C_{tr,100\text{-}5000}$ = -3 dB

Based on the data provided in BS EN 20140-2:1993 it is estimated that the measurement uncertainty should not exceed ±1 dB for the single-number quantity (Rw) and should not exceed the values in Table A1 of BS EN 20140-2:1993 for the data in the individual third octaves (R)

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Level difference according to BS EN ISO 10140-2

Laboratory measurement of sound insulation of building elements

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Test Laboratory: BRE Transmission Suite (Hall D)
Client: Ford Windows Ltd.
Date of test: 06/06/2018 **Test Number:** L118-138

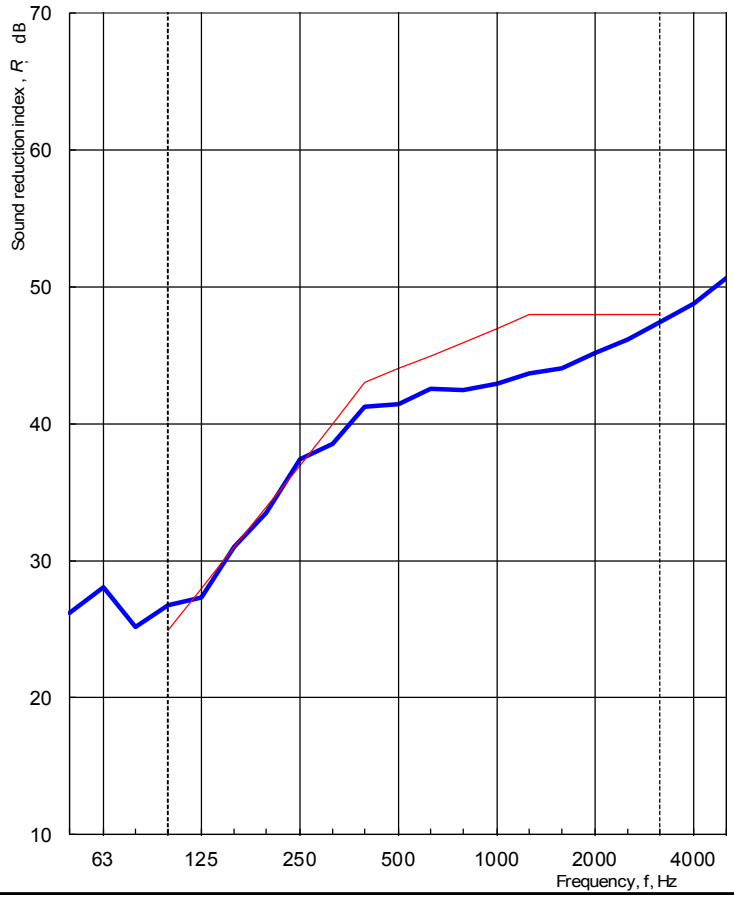
Test specimen installed by: BRE
Product identification: Window unit

Description of the specimen: Double glazed window.
Top pane – 1066x591 10.8mm acoustic laminate glass (clear), 18mm cavity, 8.8mm soft coat.
Bottom pane 1160x685 10.8mm Acoustic laminate glass (clear),18mm cavity,8.8mm soft coat.

Static pressure:	102.3 kPa	Area, S, of test elemen	1.9 m²
Air temperature:	18 °C	Source room volume:	114 m³
Relative air humidity:	52 %	Receiving room volume	72 m³
Mass per unit area:	kg/m²		

Frequency *f* [Hz]	*R* 1/3 octave [dB]
50	26.2
63	28.1
80	25.2
100	26.8
125	27.3
160	31.0
200	33.5
250	37.4
315	38.6
400	41.3
500	41.5
630	42.6
800	42.5
1000	42.9
1250	43.7
1600	44.0
2000	45.2
2500	46.2
3150	47.4
4000	48.8
5000	50.7

[2] Minimum values



Rating according to ISO 717-1
$R_w(C;C_{tr})$ = 44 (-2 ; -5) dB
Evaluation based on laboratory measurement results obtained in one-third-octave bands by an engineering method.

$C_{50\text{-}3150}$ = -2 dB $C_{50\text{-}5000}$ = -1 dB $C_{100\text{-}5000}$ = -1 dB
$C_{tr,50\text{-}3150}$ = -6 dB $C_{tr,50\text{-}5000}$ = -6 dB $C_{tr,100\text{-}5000}$ = -5 dB

Based on the data provided in BS EN 20140-2:1993 it is estimated that the measurement uncertainty should not exceed ±1 dB for the single-number quantity (Rw) and should not exceed the values in Table A1 of BS EN 20140-2:1993 for the data in the individual third octaves (R)

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