

# Technical Report



INVESTOR IN PEOPLE

**Report Number** C/08/5L/20428/R02

**Date** 20 February 2009

## **Project**

**The Laboratory Determination of  
Airborne Sound Transmission,  
Of Various Door Sets**

## **Prepared for**

**Moralt Tischplatten GmbH & Co. KG  
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## **By**

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## 1.0 Summary

Tests have been done in SRL's Laboratory at Holbrook House, Sudbury, Suffolk, to determine the sound reduction index of various door sets in accordance with BS EN ISO 140-3:1995.

From these measurements the required results have been derived and are presented in both tabular and graphic form in Appendix 3.

The results are given in 1/3rd octave bands over the frequency range 50Hz to 10KHz, which is beyond that required by the test standard. Measurements outside the standard frequency range are not UKAS accredited.



.....  
**George Thomson**  
Project Engineer



.....  
**Trevor Hickman**  
Executive Consultant  
Deputy Technical Manager

For and on behalf of  
Sound Research Laboratories Ltd



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## 2.0 Details of Measurements

### 2.1 Location

Sound Research Laboratories Ltd  
Holbrook House  
Little Waldingfield  
Sudbury  
Suffolk  
CO10 0TH

### 2.2 Test Dates

27 to 31 October 2008

### 2.3 Instrumentation and Apparatus Used

Make	Description	Type
E D I	Microphone Multiplexer Microphone Power Supply Unit	
Norwegian Electronics	Real Time Analyser Rotating Microphone Boom	830 231
Brüel & Kjaer	12mm Condenser Microphones Windshields Pre Amplifiers Microphone Calibrator Omnipower Sound Source	4166 UA0237 2639, 2669C 4231 4296
Larson Davis	12mm Condenser Microphone	2560
SRL	Power Amplifiers	
Celestion	Loudspeakers	100w
Douglas Curtis	Rotating Microphone Boom	
Thermo Hygro	Temperature & Humidity Probe	
TOA	Graphic Equalizer Power Amplifier	E-1231 DPA-800

## 2.4 References

BS EN ISO 140-3:1995	Laboratory measurement of airborne sound insulation of building elements
BS EN ISO 717-1:1997	Rating of sound insulation in buildings and of building elements. Airborne Sound Insulation.

## 2.5 Personnel Present

I Stalker	Norsound Ltd
T Palmer	Doortech 2000
A Gardner	N/A
D Heslop	Norsound Ltd

## 3.0 Description of Test

### 3.1 Description of Sample

Various door sets.

See Appendix 4 for individual test details and Appendix 5 for drawings. When cross referencing the detail in Appendices 4 and 5 with the SRL datasheets use the SRL Test Number.

Door frame fixed to test aperture and sealed at perimeter with mineral wool and mastic.

Sampling plan: Enough for test only

Sample condition: New

Details supplied by Norsound Ltd

Sample installed by Norsound Ltd

### 3.2 Sample Delivery date

22 October 2008

### 3.3 Test Procedures

The sample was mounted/located and tested in accordance with the relevant standard. The method and procedure is described in Appendix 1. The measurement uncertainty is given in Appendix 2.



## 4.0 Results

The results of the measurements and subsequent analysis are given in Appendix 3 and summarised in Appendix 4.

————— *End of Text* —————

## Appendix 1

### Test Procedure

#### Measurement of Sound Transmission in accordance with BS EN ISO 140-3 : 1995 - TP15

In the laboratory, airborne sound transmission is determined from the difference in sound pressure levels measured across a test sample installed between two reverberant rooms. The difference in measured sound pressure levels is corrected for the amount of absorption in the receiving room. The test is done under conditions which restrict the transmission of sound by paths other than directly through the sample. The source sound field is randomly incident on the sample.

The test sample is located and sealed in an aperture within the brick dividing wall between the two rectangular reverberant (i.e. acoustically "live") room, both of which are constructed from 215mm brick with reinforced concrete floors and roofs. The brick wall has dimensions of 4.8m wide x 3.1m high and 550mm nominal thickness and forms the whole of the common area between the two rooms.

One of the rooms is used as the receiving room and has a volume of 300 cubic metres. It is isolated from the surrounding structure and the adjoining room by the use of resilient mountings and seals ensuring good acoustic isolation. The adjoining source room has a volume of 115 cubic metres.

Broad band noise is produced in the source room from an electronic generator, power amplifier and loudspeaker. The resulting sound pressure levels in both rooms are sampled using a microphone mounted on an oscillating boom and connected to a real time analyser. The signal is filtered into one third octave band widths, integrated and averaged. The value obtained at each frequency is known as the average sound pressure level for either the source or the receiving room. The change in level across the test sample is termed the sound pressure level difference, i.e.

$$D = L_1 - L_2$$

where

D is the equivalent Sound Pressure level difference in dB

L<sub>1</sub> is the equivalent Sound Pressure level in the source room in dB

L<sub>2</sub> is the equivalent Sound Pressure level in the receiving room in dB

The Sound Reduction Index (R) also known by the American terminology Sound Transmission Loss, is defined as the number of decibels by which sound energy

randomly incident on the test sample, is reduced in transmitting through it and is given by the formula:

$$R = D + 10 \log_{10} \frac{S}{A} \dots \dots \text{in decibels}$$

where

S is the area of the sample

A is the total absorption in the receiving room

***both dimensions being in consistent units***

The Sound Reduction Index is an expression of the laboratory sound transmission performance of a particular element or construction. It is a function of the mass, thickness, sealing method of mounting etc. and is independent of the overall area of the sample.

However, when an example of this construction is installed on site, the sound insulation obtained will depend upon its surface area, as well as the absorption in the receiving room. The larger the area the greater the sound energy transmitted. Also, the overall sound insulation is affected by the sound transmission through other building elements, some of which may have an inferior performance to the sample tested. In practice, therefore, the potential sound reduction index of a construction is not fully realised on site. Furthermore, the sound reduction index of a particular sample of that construction can only be measured accurately in a laboratory, because only under such controlled conditions can the sound transmission path be limited to the sample under test.

$R_w$  is a single figure rating of sound insulation and is calculated in accordance with the relevant section of BS EN ISO 717-1:1997.

## Appendix 2

### Measurement Uncertainty BS EN ISO 140-3:1995 - TP15

The following values of uncertainty are based on a standard uncertainty multiplied by a coverage factor of  $k = 2$ , which provides a level of confidence of approximately 95%.

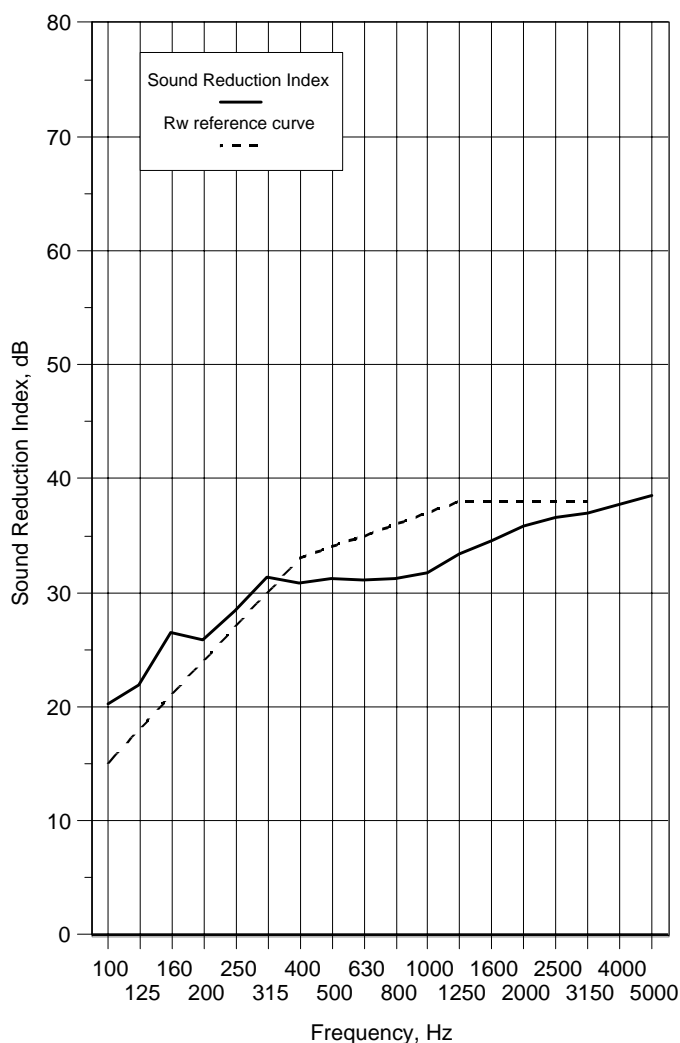
Frequency, Hz	Uncertainty, $\pm$ dB
100	2.6
125	2.4
160	2.1
200	2.1
250	1.5
315	1.5
400	1.2
500	1.2
800	1.0
1000	1.0
1250	1.0
1600	1.0
2000	1.0
2500	1.0
3150	1.0

## Appendix 3 - Test Data

## Data Sheet 1

<b>Test Number :</b>	17	<b>Air temperature:</b>	11.5 °C
<b>Client:</b>	Moralt Tischerplatten	<b>Air humidity:</b>	53 %
<b>Test Date:</b>	28/10/2008	<b>Receiving room volume:</b>	300 m3
<b>Sample height:</b>	2.11 m	<b>Source room volume:</b>	115 m3
<b>Sample width:</b>	1 m	<b>Sample weight:</b>	24.2 kg/m2
<b>Product Identification:</b>	44mm Moralt Firecore Door fully caulked		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	17.9	17.3
63+	17.6	
80+	16.6	
100	20.2	22.2
125	21.9	
160	26.5	
200	25.9	28.0
250	28.4	
315	31.4	
400	30.9	31.1
500	31.3	
630	31.1	
800	31.2	32.1
1000	31.8	
1250	33.4	
1600	34.6	35.6
2000	35.9	
2500	36.6	
3150	37.0	37.7
4000	37.7	
5000	38.5	
6300+	39.7	41.1
8000+	40.3	
10000+	44.9 *	
Average 100-3150	30.5	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **34 (-1;-3)** dB

Notes : \* designates measurement corrected for background

# designates limit of measurement due to background

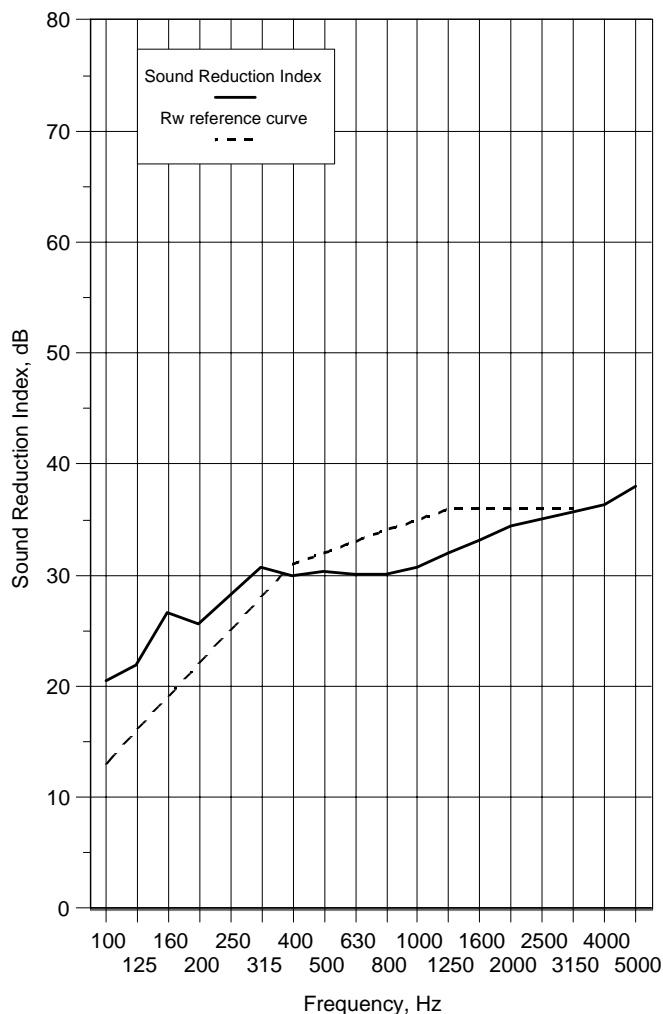
+ designates frequency beyond standard and not UKAS accredited

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## Data Sheet 2

<b>Test Number :</b>	18	<b>Air temperature:</b>	11.5 °C
<b>Client:</b>	Moralt Tischerplatten	<b>Air humidity:</b>	53 %
<b>Test Date:</b>	28/10/2008	<b>Receiving room volume:</b>	300 m3
<b>Sample height:</b>	2.11 m	<b>Source room volume:</b>	115 m3
<b>Sample width:</b>	1 m	<b>Sample weight:</b>	24.2 kg/m2
<b>Product</b>			
<b>Identification:</b>	44mm Moralt Firecore Door		
	Head & Jambs 710 seals		
	Threshold 810 seal		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	18.6	18.9
63+	18.6	
80+	19.3	
100	20.5	22.3
125	21.9	
160	26.7	
200	25.6	27.7
250	28.2	
315	30.7	
400	30.0	30.2
500	30.4	
630	30.1	
800	30.1	30.9
1000	30.7	
1250	32.0	
1600	33.1	34.1
2000	34.4	
2500	35.1	
3150	35.7	36.6
4000	36.4	
5000	38.0	
6300+	39.3	40.5
8000+	39.7	
10000+	43.7	
Average 100-3150	29.7	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **32 ( 0;-2)** dB

Notes : \* designates measurement corrected for background

# designates limit of measurement due to background

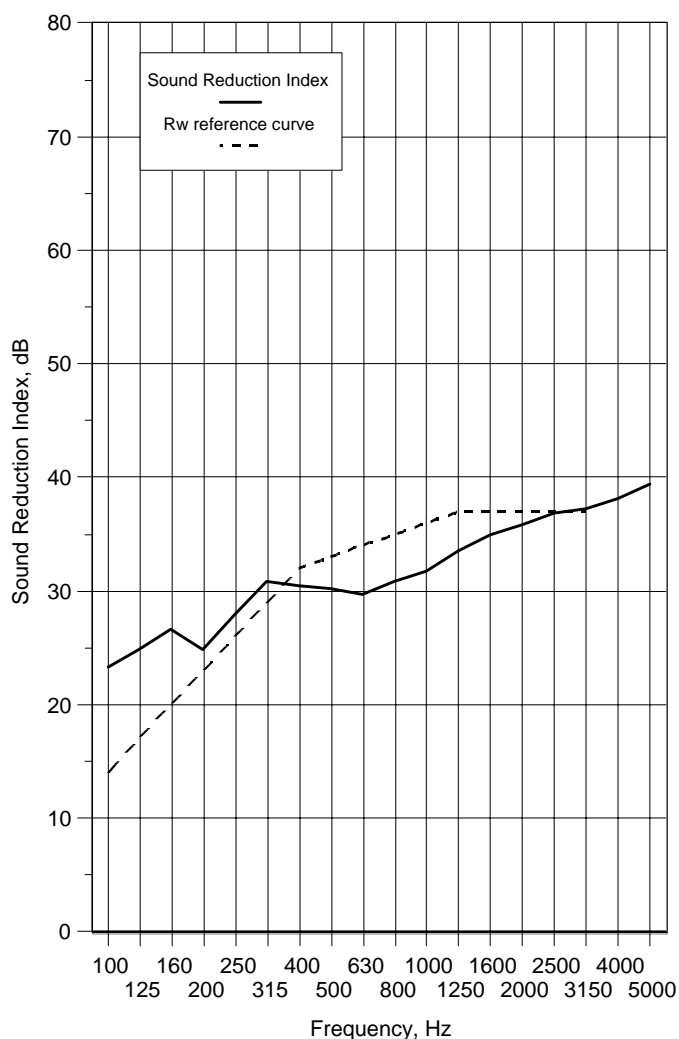
+ designates frequency beyond standard and not UKAS accredited

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## Data Sheet 3

<b>Test Number :</b>	19	<b>Air temperature:</b>	11.2 °C
<b>Client:</b>	Moralt Tischerplatten	<b>Air humidity:</b>	52 %
<b>Test Date:</b>	28/10/2008	<b>Receiving room volume:</b>	300 m3
<b>Sample height:</b>	2.11 m	<b>Source room volume:</b>	115 m3
<b>Sample width:</b>	1 m	<b>Sample weight:</b>	24.5 kg/m2
<b>Product Identification:</b>			
44mm Moralt Firecore Door with cut out panel filled with same material as door			
Head & Jambes 710 seals			
Threshold 810 seal			

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	27.8	25.4
63+	23.8	
80+	25.6	
100	23.3	24.7
125	24.8	
160	26.7	
200	24.9	27.2
250	27.9	
315	30.9	
400	30.5	30.1
500	30.2	
630	29.7	
800	30.8	31.9
1000	31.7	
1250	33.6	
1600	35.0	35.9
2000	35.9	
2500	36.9	
3150	37.3	38.2
4000	38.1	
5000	39.4	
6300+	40.0	41.5
8000+	41.1	
10000+	44.5 *	
Average 100-3150	30.6	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **33 ( 0;-2) dB**

Notes : \* designates measurement corrected for background

# designates limit of measurement due to background

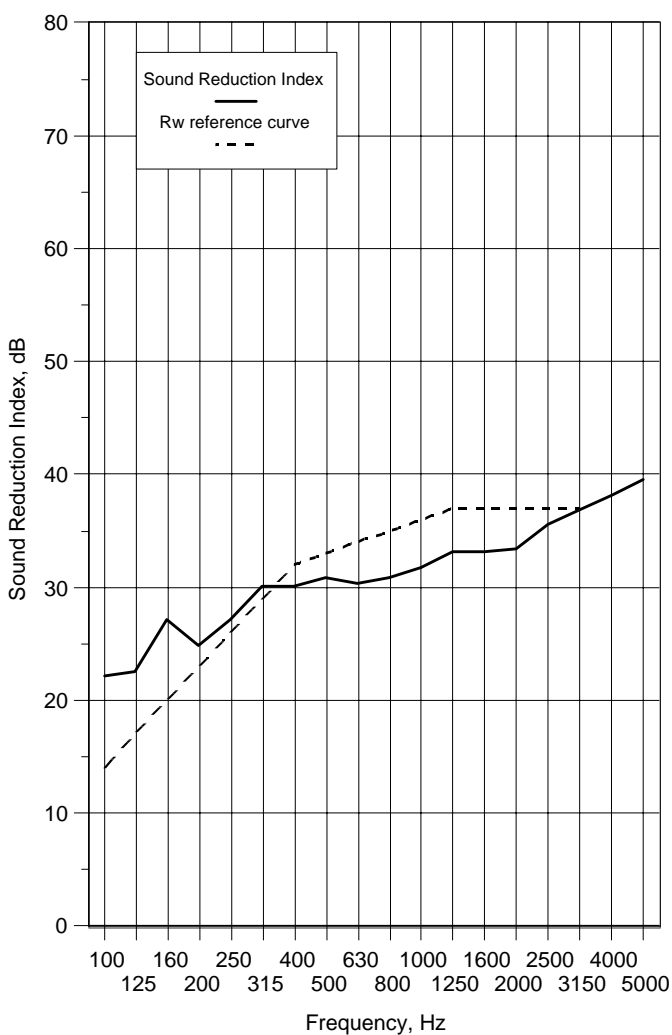
+ designates frequency beyond standard and not UKAS accredited

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## Data Sheet 4

<b>Test Number :</b>	20	<b>Air temperature:</b>	11.3 °C
<b>Client:</b>	Moralt Tischerplatten	<b>Air humidity:</b>	51 %
<b>Test Date:</b>	28/10/2008	<b>Receiving room volume:</b>	300 m <sup>3</sup>
<b>Sample height:</b>	2.11 m	<b>Source room volume:</b>	115 m <sup>3</sup>
<b>Sample width:</b>	1 m	<b>Sample weight:</b>	23.9 kg/m <sup>2</sup>
<b>Product</b>			
<b>Identification:</b>	44mm Moralt Firecore Door with cut out panel filled with 6mm Pyroshield glass Head & Jambs 710 seals Threshold 810 seal		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	25.5	
63+	21.6	22.7
80+	21.9	
100	22.2	
125	22.6	23.5
160	27.2	
200	24.8	
250	27.1	26.8
315	30.1	
400	30.1	
500	30.8	30.4
630	30.4	
800	30.8	
1000	31.7	31.8
1250	33.2	
1600	33.1	
2000	33.4	33.9
2500	35.6	
3150	36.9	
4000	38.2	38.1
5000	39.6	
6300+	40.5	
8000+	41.5	41.8
10000+	44.3	*
Average 100-3150	30.0	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **33 (-1;-2)** dB

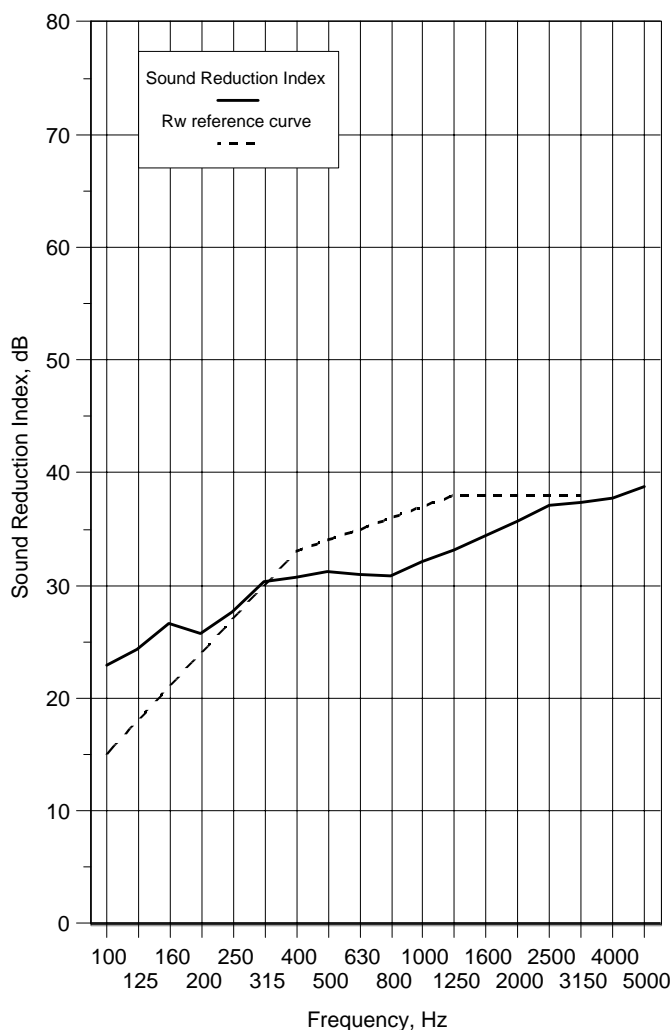
Notes : \* designates measurement corrected for background  
# designates limit of measurement due to background  
+ designates frequency beyond standard and not UKAS accredited

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## Data Sheet 5

<b>Test Number :</b>	21	<b>Air temperature:</b>	°C
<b>Client:</b>	Moralt Tischerplatten	<b>Air humidity:</b>	%
<b>Test Date:</b>	28/10/2008	<b>Receiving room volume:</b>	300 m3
<b>Sample height:</b>	2.11 m	<b>Source room volume:</b>	115 m3
<b>Sample width:</b>	1 m	<b>Sample weight:</b>	25.7 kg/m2
<b>Product Identification:</b>	44mm Moralt Firecore Door with cut out panel filled with 10mm Pyrodur glass Head & Jambes 710 seals Threshold 810 seal		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	25.4	22.4
63+	23.3	
80+	20.2	
100	22.9	24.4
125	24.4	
160	26.7	27.6
200	25.8	
250	27.7	
315	30.4	31.0
400	30.7	
500	31.3	
630	31.0	31.9
800	30.8	
1000	32.1	
1250	33.1	35.6
1600	34.4	
2000	35.7	
2500	37.1	37.9
3150	37.4	
4000	37.7	
5000	38.8	41.4
6300+	39.7	
8000+	41.3	
10000+	44.6 *	
Average 100-3150	30.7	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **34 (-1;-3)** dB

Notes : \* designates measurement corrected for background

# designates limit of measurement due to background

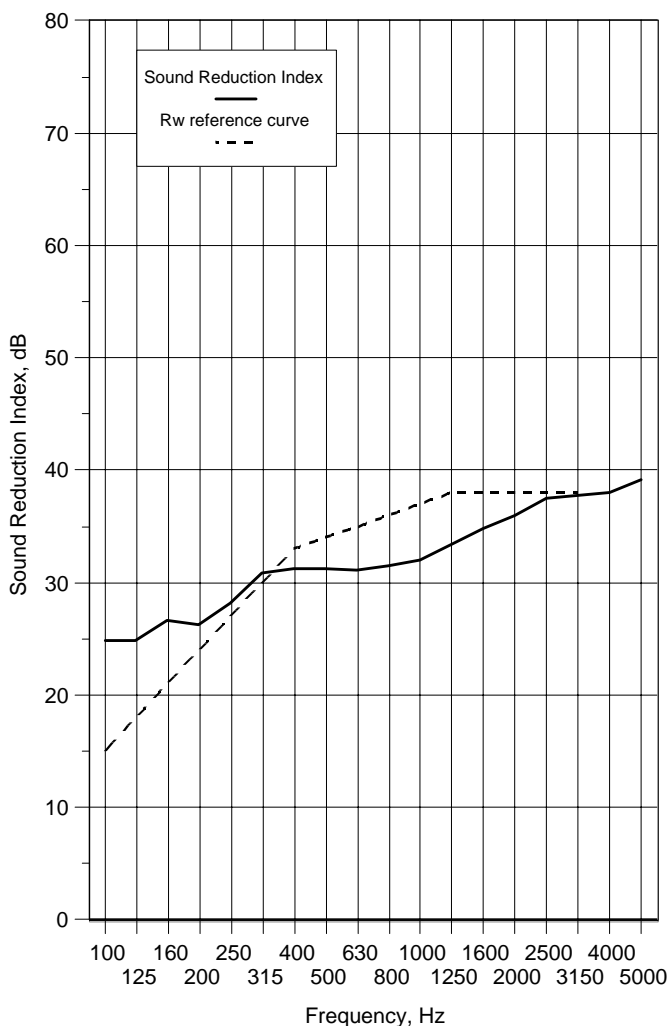
+ designates frequency beyond standard and not UKAS accredited

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## Data Sheet 6

<b>Test Number :</b>	22	<b>Air temperature:</b>	11.3 °C
<b>Client:</b>	Moralt Tischerplatten	<b>Air humidity:</b>	52 %
<b>Test Date:</b>	28/10/2008	<b>Receiving room volume:</b>	300 m3
<b>Sample height:</b>	2.11 m	<b>Source room volume:</b>	115 m3
<b>Sample width:</b>	1 m	<b>Sample weight:</b>	28.2 kg/m2
<b>Product</b>			
<b>Identification:</b>	44mm Moralt Firecore Door with cut out panel filled with 15mm Pyrostop glass Head & Jambs 710 seals Threshold 810 seal		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	26.9	22.4
63+	23.1	
80+	19.9	
100	24.8	25.4
125	24.8	
160	26.7	
200	26.3	28.1
250	28.2	
315	30.8	
400	31.2	31.2
500	31.3	
630	31.1	
800	31.5	32.2
1000	32.0	
1250	33.4	
1600	34.8	35.9
2000	36.0	
2500	37.5	
3150	37.7	38.2
4000	38.0	
5000	39.2	
6300+	40.2	41.9
8000+	41.6	
10000+	45.3 *	
Average 100-3150	31.1	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **34 (-1;-2)** dB

Notes : \* designates measurement corrected for background

# designates limit of measurement due to background

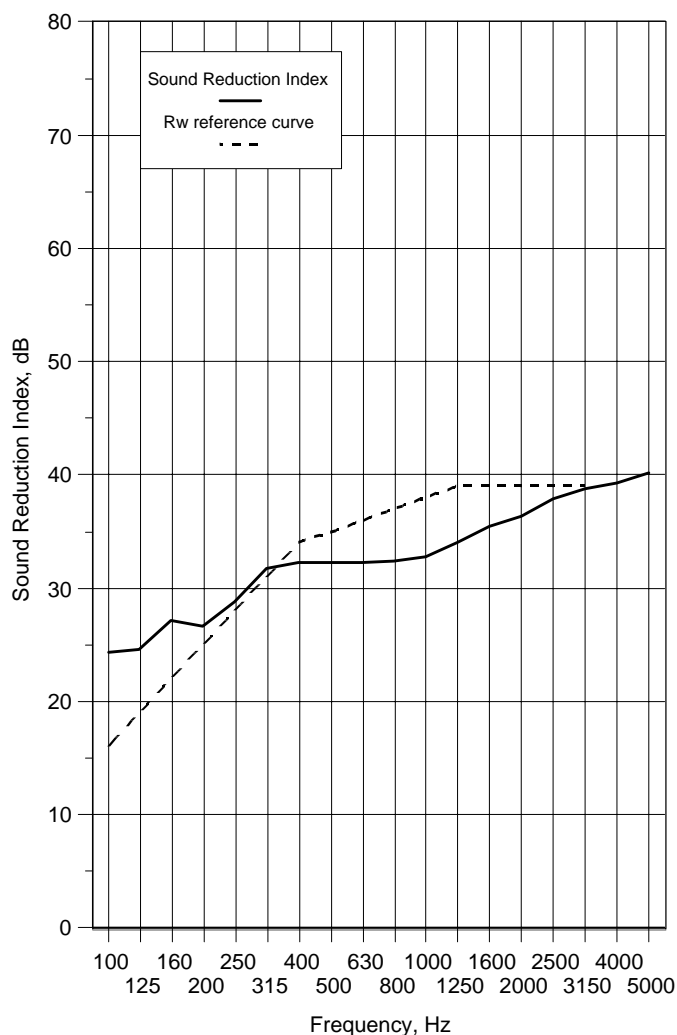
+ designates frequency beyond standard and not UKAS accredited

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## Data Sheet 7

<b>Test Number :</b>	23	<b>Air temperature:</b>	11.2 °C
<b>Client:</b>	Moralt Tischerplatten	<b>Air humidity:</b>	53 %
<b>Test Date:</b>	28/10/2008	<b>Receiving room volume:</b>	300 m3
<b>Sample height:</b>	2.11 m	<b>Source room volume:</b>	115 m3
<b>Sample width:</b>	1 m	<b>Sample weight:</b>	28.2 kg/m2
<b>Product Identification:</b>	44mm Moralt Firecore Door with cut out panel filled with 15mm Pyrostop glass Head & Jambes 710 seals Threshold 810 and 650 seals		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	27.9	22.4
63+	23.2	
80+	19.6	
100	24.3	25.2
125	24.6	
160	27.1	
200	26.6	28.6
250	28.8	
315	31.7	
400	32.3	32.3
500	32.3	
630	32.3	
800	32.4	33.0
1000	32.8	
1250	34.1	
1600	35.4	36.5
2000	36.4	
2500	37.9	
3150	38.8	39.4
4000	39.3	
5000	40.2	
6300+	40.7	42.4
8000+	42.1	
10000+	46.0 *	
Average 100-3150	31.7	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **35 (-1;-3)** dB

Notes : \* designates measurement corrected for background

# designates limit of measurement due to background

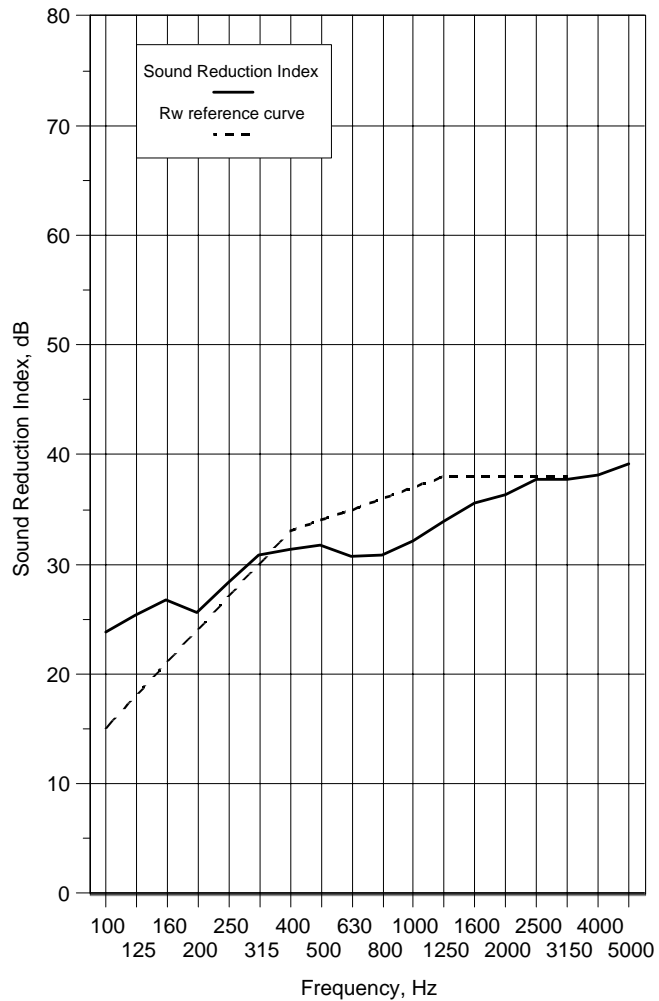
+ designates frequency beyond standard and not UKAS accredited

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## Data Sheet 8

<b>Test Number :</b>	24	<b>Air temperature:</b>	11.2 °C
<b>Client:</b>	Moralt Tischerplatten	<b>Air humidity:</b>	53 %
<b>Test Date:</b>	28/10/2008	<b>Receiving room volume:</b>	300 m3
<b>Sample height:</b>	2.11 m	<b>Source room volume:</b>	115 m3
<b>Sample width:</b>	1 m	<b>Sample weight:</b>	29.8 kg/m2
<b>Product Identification:</b>	44mm Moralt Firecore Door with cut out panel filled with 16.8mm Optilam-Phon glass Head & Jambs 710 seals Threshold 810 seal		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	28.5	22.6
63+	25.0	
80+	19.2	
100	23.8	25.2
125	25.4	
160	26.8	
200	25.6	27.7
250	28.3	
315	30.8	
400	31.4	31.3
500	31.7	
630	30.7	
800	30.9	32.1
1000	32.1	
1250	33.9	
1600	35.6	36.5
2000	36.4	
2500	37.8	
3150	37.8	38.3
4000	38.1	
5000	39.2	
6300+	39.9	41.6
8000+	41.3	
10000+	44.8 *	
Average 100-3150	31.2	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **34 (-1;-3) dB**

Notes : \* designates measurement corrected for background

# designates limit of measurement due to background

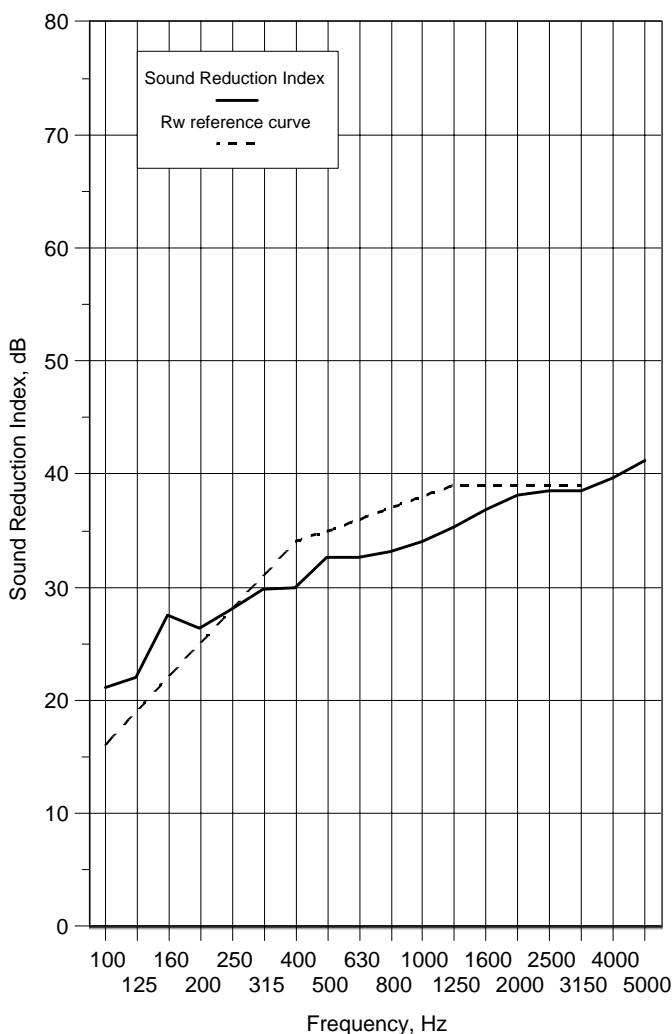
+ designates frequency beyond standard and not UKAS accredited

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## Data Sheet 9

<b>Test Number :</b>	33	<b>Air temperature:</b>	10.9 °C
<b>Client:</b>	Moralt Tischerplatten	<b>Air humidity:</b>	46 %
<b>Test Date:</b>	29/10/2008	<b>Receiving room volume:</b>	300 m3
<b>Sample height:</b>	2.11 m	<b>Source room volume:</b>	115 m3
<b>Sample width:</b>	1 m	<b>Sample weight:</b>	29.7 kg/m2
<b>Product</b>			
<b>Identification:</b>	54mm Moralt Firecore door fully caulked		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	18.9	17.6
63+	17.1	
80+	17.0	
100	21.1	22.8
125	22.1	
160	27.5	
200	26.4	27.9
250	28.1	
315	29.8	
400	30.0	31.6
500	32.6	
630	32.7	
800	33.2	34.1
1000	34.1	
1250	35.3	
1600	36.9	37.8
2000	38.1	
2500	38.5	
3150	38.5	39.7
4000	39.7	
5000	41.2	
6300+	40.9	42.4
8000+	42.0	
10000+	45.8 *	
Average 100-3150	31.6	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **35 (-1;-3)** dB

Notes : \* designates measurement corrected for background

# designates limit of measurement due to background

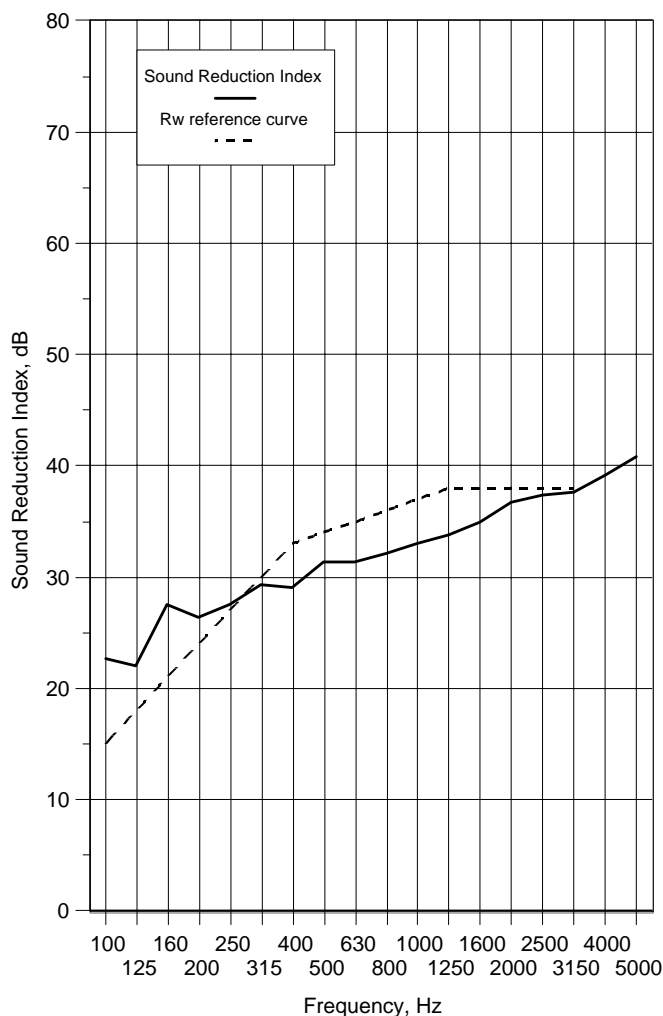
+ designates frequency beyond standard and not UKAS accredited

v.1.6

## Data Sheet 10

<b>Test Number :</b>	34	<b>Air temperature:</b>	10.9 °C
<b>Client:</b>	Moralt Tischerplatten	<b>Air humidity:</b>	47 %
<b>Test Date:</b>	29/10/2008	<b>Receiving room volume:</b>	300 m3
<b>Sample height:</b>	2.11 m	<b>Source room volume:</b>	115 m3
<b>Sample width:</b>	1 m	<b>Sample weight:</b>	29.7 kg/m2
<b>Product</b>			
<b>Identification:</b>	54mm Moralt Firecore door		
	Head & Jambes 710 seals		
	Threshold 810 seals		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	15.8	17.1
63+	17.9	
80+	17.8	
100	22.7	23.5
125	22.0	
160	27.5	27.6
200	26.4	
250	27.6	
315	29.3	30.5
400	29.1	
500	31.4	
630	31.4	33.0
800	32.2	
1000	33.0	
1250	33.8	36.2
1600	34.9	
2000	36.7	
2500	37.4	39.0
3150	37.6	
4000	39.2	
5000	40.8	42.2
6300+	40.6	
8000+	41.9	
10000+	45.6 *	
Average 100-3150	30.8	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **34 (-1;-3)** dB

Notes :\* designates measurement corrected for background

# designates limit of measurement due to background

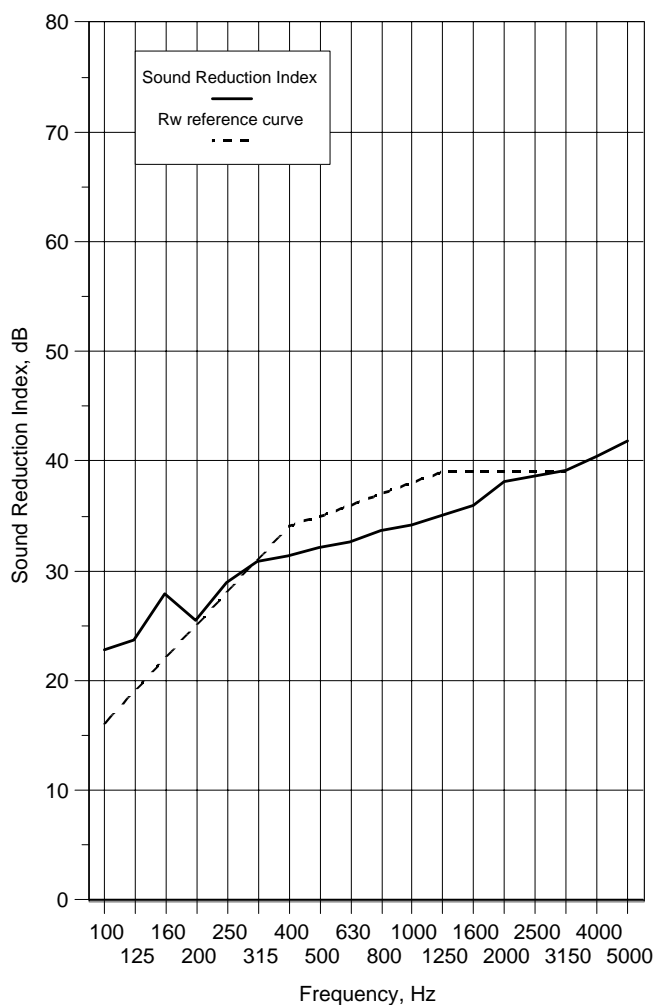
+ designates frequency beyond standard and not UKAS accredited

v1.6

## Data Sheet 11

<b>Test Number :</b>	35	<b>Air temperature:</b>	10.8 °C
<b>Client:</b>	Moralt Tischerplatten	<b>Air humidity:</b>	47 %
<b>Test Date:</b>	29/10/2008	<b>Receiving room volume:</b>	300 m3
<b>Sample height:</b>	2.11 m	<b>Source room volume:</b>	115 m3
<b>Sample width:</b>	1 m	<b>Sample weight:</b>	29.7 kg/m2
<b>Product Identification:</b>	54mm Moralt Firecore door with cut out section filled with same material as door Head & Jambes 710 seals Threshold 810 seals		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	24.2	22.4
63+	22.1	
80+	21.4	
100	22.8	24.3
125	23.7	
160	27.9	
200	25.5	27.8
250	28.9	
315	30.9	
400	31.4	32.1
500	32.2	
630	32.7	
800	33.7	34.3
1000	34.2	
1250	35.1	
1600	36.0	37.4
2000	38.2	
2500	38.6	
3150	39.2	40.4
4000	40.5	
5000	41.9	
6300+	42.4	42.8
8000+	41.7	
10000+	44.9 *	
Average 100-3150	31.9	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **35 (-1;-3)** dB

Notes : \* designates measurement corrected for background

# designates limit of measurement due to background

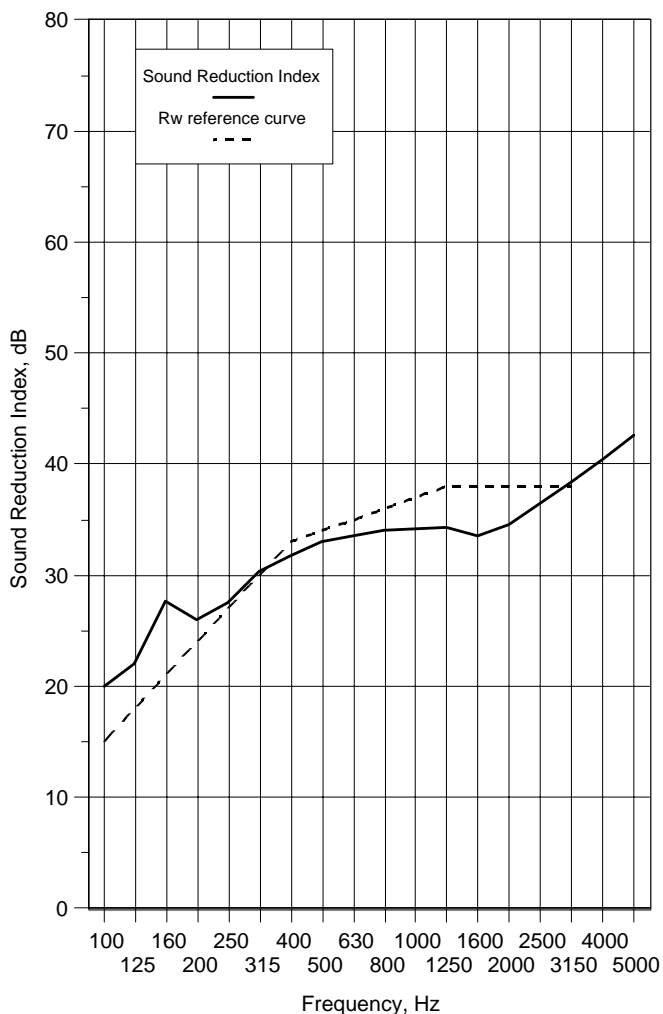
+ designates frequency beyond standard and not UKAS accredited

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## Data Sheet 12

<b>Test Number :</b>	36	<b>Air temperature:</b>	10.9 °C
<b>Client:</b>	Moralt Tischerplatten	<b>Air humidity:</b>	47 %
<b>Test Date:</b>	29/10/2008	<b>Receiving room volume:</b>	300 m3
<b>Sample height:</b>	2.11 m	<b>Source room volume:</b>	115 m3
<b>Sample width:</b>	1 m	<b>Sample weight:</b>	27.8 kg/m2
<b>Product</b>			
<b>Identification:</b>	54mm Moralt Firecore door with cut out section filled with 6mm Pyroshield glass Head & Jambs 710 seals Threshold 810 seals		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	23.5	20.2
63+	22.1	
80+	17.5	
100	20.0	22.2
125	22.1	
160	27.7	
200	26.0	27.6
250	27.6	
315	30.3	
400	31.7	32.7
500	33.0	
630	33.5	
800	34.0	34.2
1000	34.2	
1250	34.3	
1600	33.6	34.7
2000	34.6	
2500	36.5	
3150	38.4	40.1
4000	40.5	
5000	42.6	
6300+	43.6	44.1
8000+	43.1	
10000+	46.2 *	
Average 100-3150	31.1	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **34 (0;-2)** dB

Notes :\* designates measurement corrected for background

# designates limit of measurement due to background

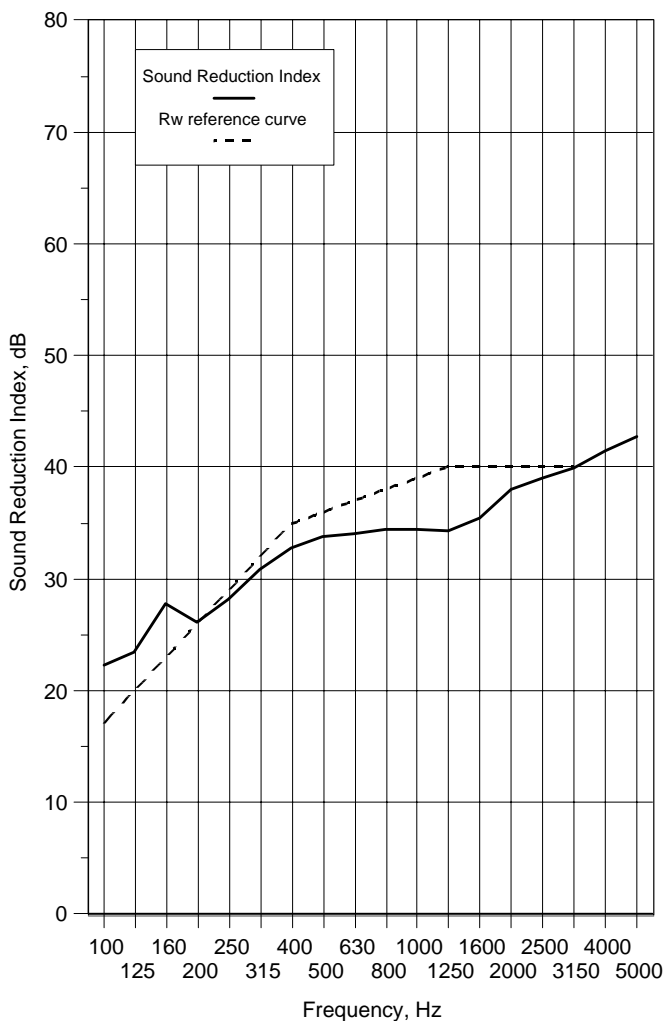
+ designates frequency beyond standard and not UKAS accredited

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## Data Sheet 13

<b>Test Number :</b>	37	<b>Air temperature:</b>	10.9 °C
<b>Client:</b>	Moralt Tischplatten	<b>Air humidity:</b>	47 %
<b>Test Date:</b>	29/10/2008	<b>Receiving room volume:</b>	300 m3
<b>Sample height:</b>	2.11 m	<b>Source room volume:</b>	115 m3
<b>Sample width:</b>	1 m	<b>Sample weight:</b>	29.6 kg/m2
<b>Product</b>			
<b>Identification:</b>	54mm Moralt Firecore door with cut out section filled with 10mm Pyrodur glass Head & Jambs 710 seals Threshold 810 seals		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	24.7	21.0
63+	22.6	
80+	18.3	
100	22.3	24.0
125	23.5	
160	27.8	
200	26.1	28.0
250	28.2	
315	30.9	
400	32.8	33.5
500	33.8	
630	34.1	
800	34.4	34.4
1000	34.5	
1250	34.3	
1600	35.4	37.2
2000	38.0	
2500	39.1	
3150	39.9	41.2
4000	41.5	
5000	42.7	
6300+	43.5	44.0
8000+	43.0	
10000+	46.0 *	
Average 100-3150	32.2	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **36 (-1;-3) dB**

Notes : \* designates measurement corrected for background

# designates limit of measurement due to background

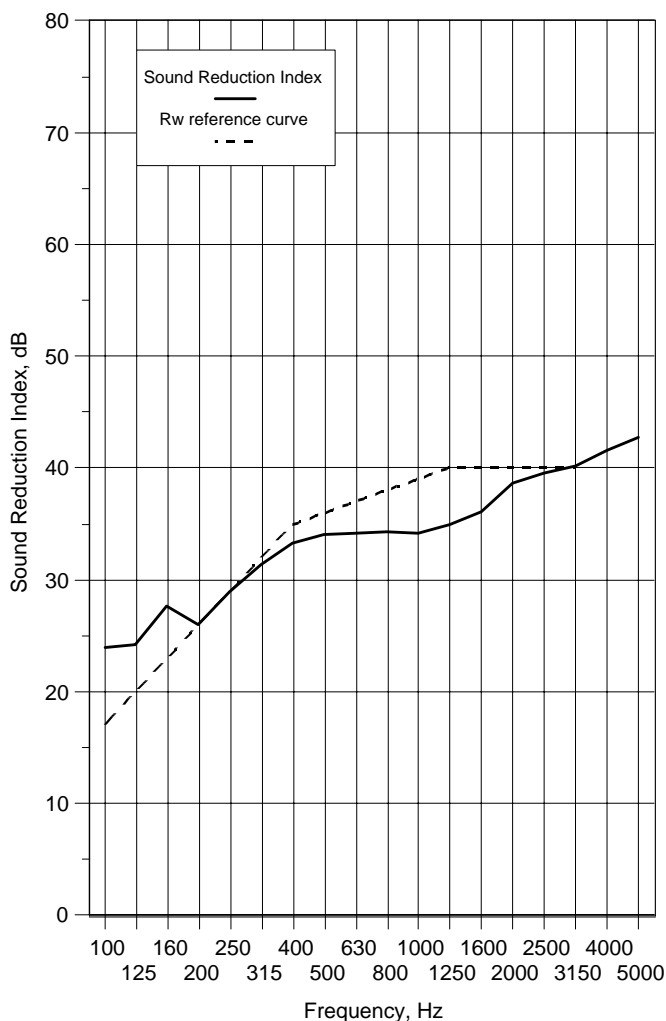
+ designates frequency beyond standard and not UKAS accredited

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## Data Sheet 14

<b>Test Number :</b>	38	<b>Air temperature:</b>	11 °C
<b>Client:</b>	Moralt Tischerplatten	<b>Air humidity:</b>	48 %
<b>Test Date:</b>	29/10/2008	<b>Receiving room volume:</b>	300 m3
<b>Sample height:</b>	2.11 m	<b>Source room volume:</b>	115 m3
<b>Sample width:</b>	1 m	<b>Sample weight:</b>	32.1 kg/m2
<b>Product</b>			
<b>Identification:</b>	54mm Moralt Firecore door with cut out section filled with 15mm Pyrostop glass Head & Jamb's 710 seals Threshold 810 seals		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	26.5	22.5
63+	23.2	
80+	20.1	
100	24.0	25.0
125	24.2	
160	27.7	
200	26.0	28.2
250	28.9	
315	31.4	
400	33.3	33.8
500	34.1	
630	34.2	
800	34.3	34.4
1000	34.2	
1250	34.9	
1600	36.1	37.9
2000	38.7	
2500	39.5	
3150	40.2	41.4
4000	41.6	
5000	42.8	
6300+	43.3	43.8
8000+	42.9	
10000+	45.6 *	
Average 100-3150	32.6	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr)= **36 (-1;-3) dB**

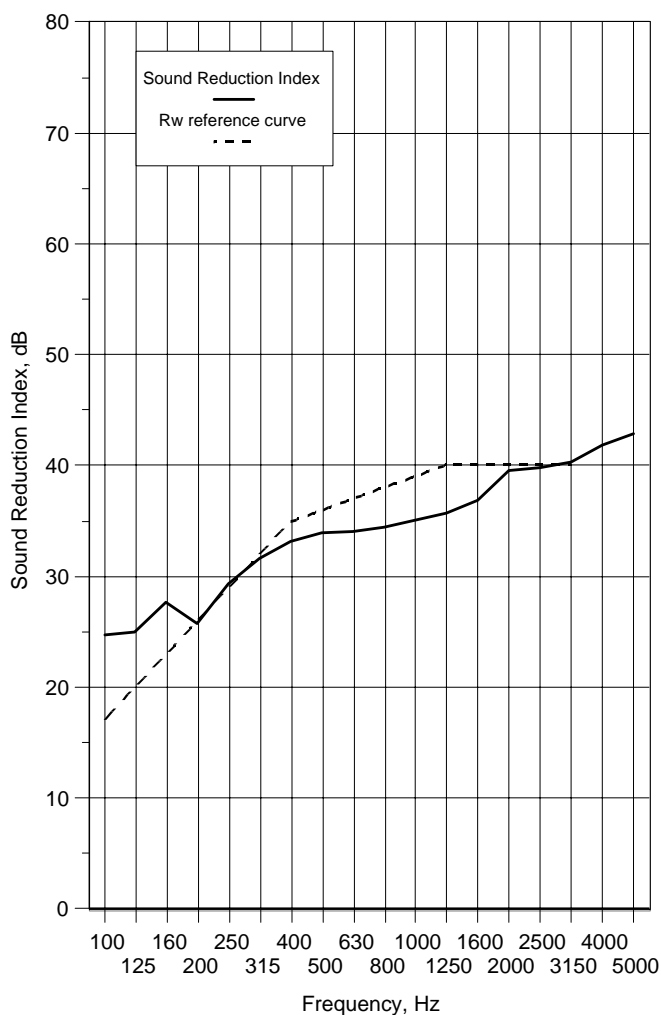
Notes : \* designates measurement corrected for background  
 # designates limit of measurement due to background  
 + designates frequency beyond standard and not UKAS accredited

v1.6

## Data Sheet 15

<b>Test Number :</b>	39	<b>Air temperature:</b>	°C
<b>Client:</b>	Moralt Tischerplatten	<b>Air humidity:</b>	%
<b>Test Date:</b>	29/10/2008	<b>Receiving room volume:</b>	300 m <sup>3</sup>
<b>Sample height:</b>	2.11 m	<b>Source room volume:</b>	115 m <sup>3</sup>
<b>Sample width:</b>	1 m	<b>Sample weight:</b>	32.4 kg/m <sup>2</sup>
<b>Product</b>			
<b>Identification:</b>	54mm Moralt Firecore door with cut out section filled with 16.8mm Optilan-Phon glass. Head & Jambs 710 seals Threshold 810 seal		

Freq f Hz	Sound Reduction Index, dB	
	1/3 Oct	1/1 Oct
50+	26.3	23.0
63+	23.5	
80+	20.8	
100	24.7	25.6
125	25.0	
160	27.7	
200	25.8	28.3
250	29.3	
315	31.6	
400	33.1	33.7
500	33.9	
630	34.1	
800	34.5	35.1
1000	35.1	
1250	35.7	
1600	36.9	38.5
2000	39.5	
2500	39.8	
3150	40.3	41.6
4000	41.8	
5000	42.9	
6300+	43.4	43.8
8000+	42.9	
10000+	45.8 *	
Average 100-3150	32.9	



Rating according to BS EN ISO 717-1:1997

Rw(C;Ctr) = **36 (-1;-3)** dB

Notes : \* designates measurement corrected for background

# designates limit of measurement due to background

+ designates frequency beyond standard and not UKAS accredited

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## Appendix 4 - Test Details

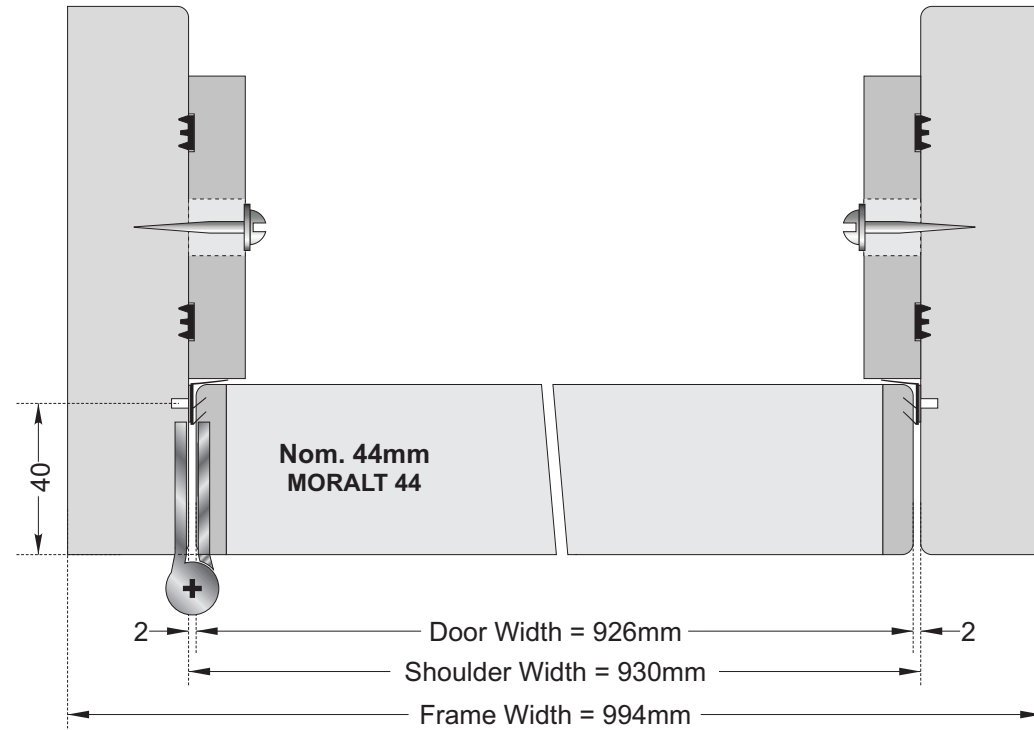
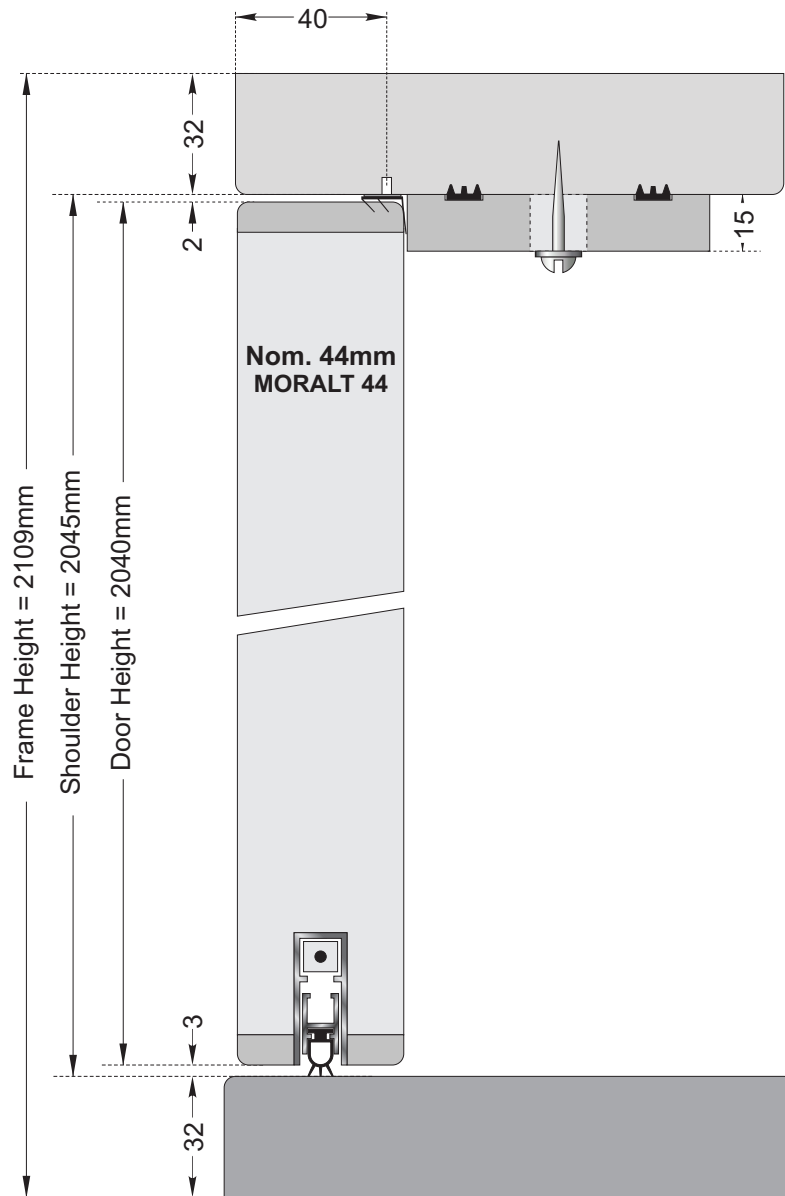
## MORALT Firecore 44

NORSOUND Test Ref.	SRL Test No.	Dwg. Ref	Door Configuration	Door Type	Height	Width	Tcks.	Head	Hanging Jamb	Closing Jamb	Threshold	Meeting Stiles	GLAZING	Fully Caulked	Measured Performance Rw.	% Efficiency	NOTES	
<b>MORALT Firecore 44</b>																		
19	17	Sk/AHP/260908/T018	Single leaf	MORALT Firecore 44	2040	926	44	FULLY CAULKED						NIL	YES	Rw.34dB	Reference	Fully caulked test to establish potential maximum performance. Door fitted with flush panel to Moralt 44 construction to establish reference performance.
20	18	Sk/AHP/260908/T018	Single leaf	MORALT Firecore 44	2040	926	44	NORSOUND 710	NORSOUND 710	NORSOUND 710	NORSOUND 810	n/a	NIL	NO	Rw.32dB		Door wt. 45.75kgs = 24.22kgs./m2.	
21	19	Sk/AHP/260908/T019	Single leaf	MORALT Firecore 44	2040	926	44	NORSOUND 710	NORSOUND 710	NORSOUND 710	NORSOUND 810	n/a	Reference Panel	NO	Rw.33dB		Moralt 44 door with aperture cut and lined to receive glazing. Glazing aperture fitted with reference panel to same construction as the door to compare with Test 20	
22	20	Sk/AHP/260908/T020	Single leaf	MORALT Firecore 44	2040	926	44	NORSOUND 710	NORSOUND 710	NORSOUND 710	NORSOUND 810	n/a	6mm Pyroshield glass	NO	Rw.33dB		Glazing Reference Panel replaced with Glazing panel 1 = 6mm Pyroshield. Clear glass area = 25% of door area.	
23	21	Sk/AHP/260908/T021	Single leaf	MORALT Firecore 44	2040	926	44	NORSOUND 710	NORSOUND 710	NORSOUND 710	NORSOUND 810	n/a	10mm Pyrodur glass	NO	Rw.34dB		Glazing Panel 1 replaced with Glazing panel 2 = 10mm Pyrodur. Clear glass area = 25% of door area.	
24	22	Sk/AHP/260908/T022	Single leaf	MORALT Firecore 44	2040	926	44	NORSOUND 710	NORSOUND 710	NORSOUND 710	NORSOUND 810	n/a	15mm Pyrostop glass	NO	Rw.34dB		Glazing Panel 2 replaced with Glazing panel 3 = 15mm Pyrostop. Clear glass area = 25% of door area.	
24a	23	Sk/AHP/260908/T022a	Single leaf	MORALT Firecore 44	2040	926	44	NORSOUND 710	NORSOUND 710	NORSOUND 710	NORSOUND 810 + 650 Threshold	n/a	15mm Pyrostop glass	NO	Rw.35dB		Glazing Panel 2 replaced with Glazing panel 3 = 15mm Pyrostop. Clear glass area = 25% of door area.	
25	24	Sk/AHP/260908/T023	Single leaf	MORALT Firecore 44	2040	926	44	NORSOUND 710	NORSOUND 710	NORSOUND 710	NORSOUND 810	n/a	16.8mm Optilam-Phon glass	NO	Rw.34dB		Glazing Panel 3 replaced with Glazing panel 4 = 16.8mm Optilam-Phon. Clear glass area = 25% of door area.	

## MORALT Firecore 54

Norsound Test Ref.	SRL Test No.	Dwg. Ref	Door Configuration	Door Type	Height	Width	Tcks.	Head	Hanging Jamb	Closing Jamb	Threshold	Meeting Stiles	GLAZING	Fully Caulked	Measured Performance Rw.	% Efficiency	NOTES	
<b>MORALT Firecore 54</b>																		
53	33	Sk/AHP/260908/T050	Single leaf	<b>MORALT Firecore 54</b>	2040	926	54	FULLY CAULKED						NIL	YES	Rw.35dB	Reference	Fully caulked test to establish potential maximum performance. Door fitted with flush panel to Moralt 54 construction to establish reference performance.
54	34	Sk/AHP/260908/T050	Single leaf	<b>MORALT Firecore 54</b>	2040	926	54	NORSOUND 710	NORSOUND 710	NORSOUND 710	NORSOUND 810	n/a	NIL	NO	Rw.34dB		Door weight 56.2kgs. = 29.7kgs/m2	
56	35	Sk/AHP/260908/T052	Single leaf	<b>MORALT Firecore 54</b>	2040	926	54	NORSOUND 710	NORSOUND 710	NORSOUND 710	NORSOUND 810	n/a	Reference Panel	NO	Rw.35dB		Moralt 54 door with aperture cut and lined to receive glazing. Glazing aperture fitted with reference panel to same construction as the door to compare with Test 36	
57	36	Sk/AHP/260908/T053	Single leaf	<b>MORALT Firecore 54</b>	2040	926	54	NORSOUND 710	NORSOUND 710	NORSOUND 710	NORSOUND 810	n/a	6mm Pyroshield glass	NO	Rw.34dB		Glazing Reference Panel replaced with Glazing panel 1 = 6mm Pyroshield. Clear glass area = 25% of door area.	
58	37	Sk/AHP/260908/T054	Single leaf	<b>MORALT Firecore 54</b>	2040	926	54	NORSOUND 710	NORSOUND 710	NORSOUND 710	NORSOUND 810	n/a	10mm Pyrodur glass	NO	Rw.36dB		Glazing Panel 1 replaced with Glazing panel 2 = 10mm Pyrodur. Clear glass area = 25% of door area.	
59	38	Sk/AHP/260908/T055	Single leaf	<b>MORALT Firecore 54</b>	2040	926	54	NORSOUND 710	NORSOUND 710	NORSOUND 710	NORSOUND 810	n/a	15mm Pyrostop glass	NO	Rw.36dB		Glazing Panel 2 replaced with Glazing panel 3 = 15mm Pyrostop. Clear glass area = 25% of door area.	
60	39	Sk/AHP/260908/T056	Single leaf	<b>MORALT Firecore 54</b>	2040	926	54	NORSOUND 710	NORSOUND 710	NORSOUND 710	NORSOUND 810	n/a	16.8mm Optilam-Ph on glass	NO	Rw.36dB		Glazing Panel 3 replaced with Glazing panel 4 = 16.8mm Optilam-Phon. Clear glass area = 25% of door area.	

## Appendix 5 - Drawings

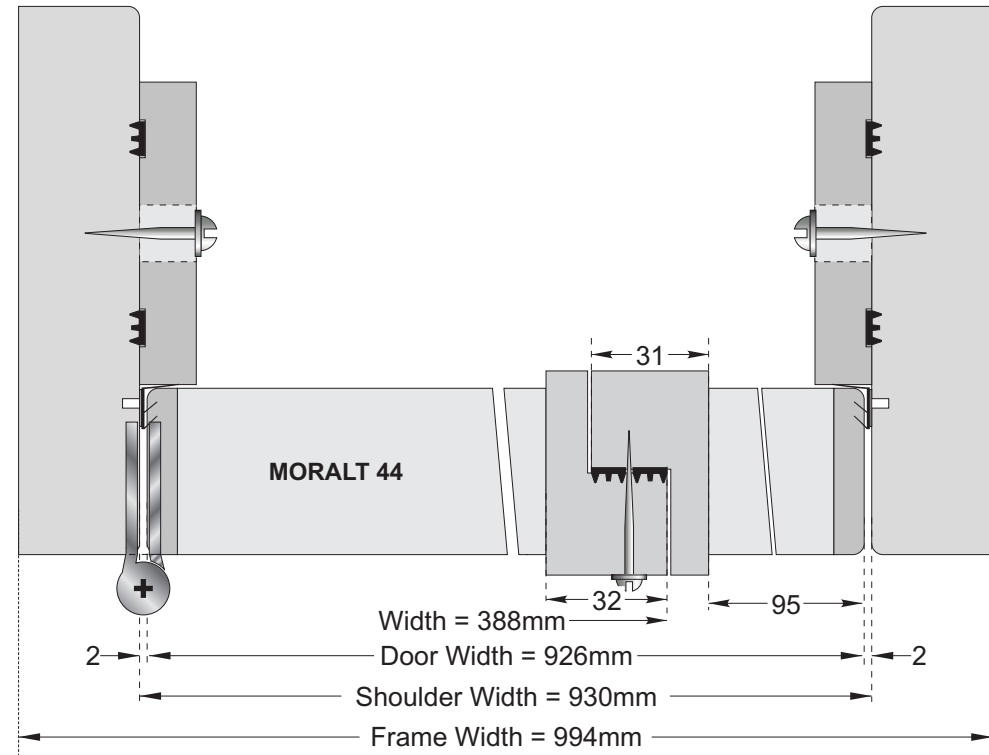
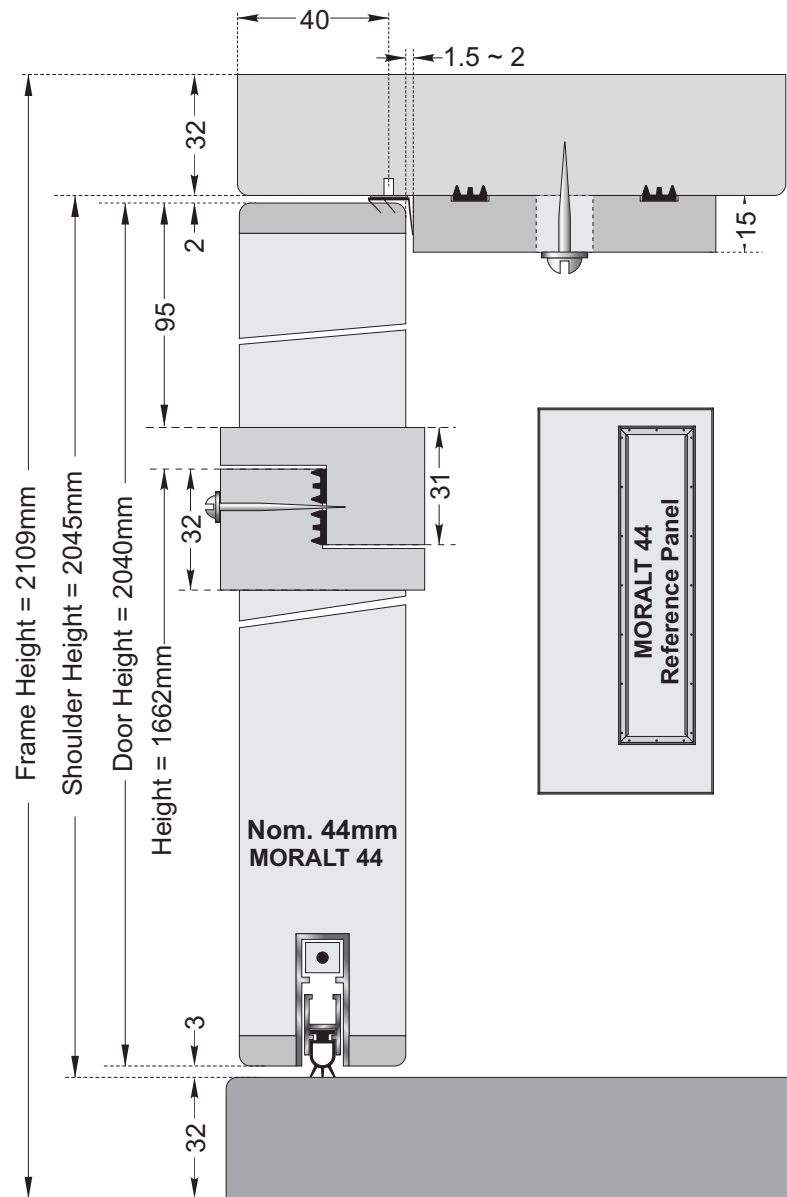


**TEST 19:** Fully caulked to establish maximum potential performance for the doorset. **SRL Test 17 = Rw.34dB**

**TEST 20:** NORSOUND 710 to Head & Jambs. NORSOUND 810 to Threshold. **SRL Test 18 = Rw.32dB**

<b>Dwg. Ref:</b>	Sk/AHP/260908/T018		
<b>TITLE</b>	NORSOUND Acoustic Tests Reference Tests 19 & 20 <b>MORALT 44</b>		
<b>Scale</b>	1 : 2	<b>Date</b>	26/9/08
<b>Revisions</b>			

Tony Palmer  
Spartech 2000

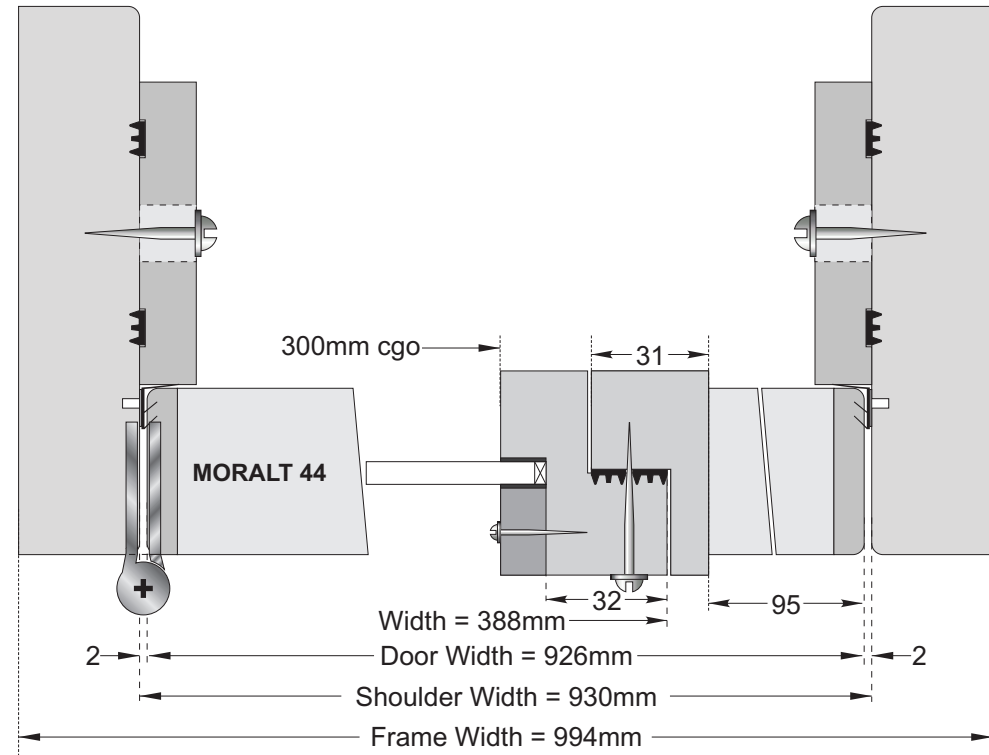
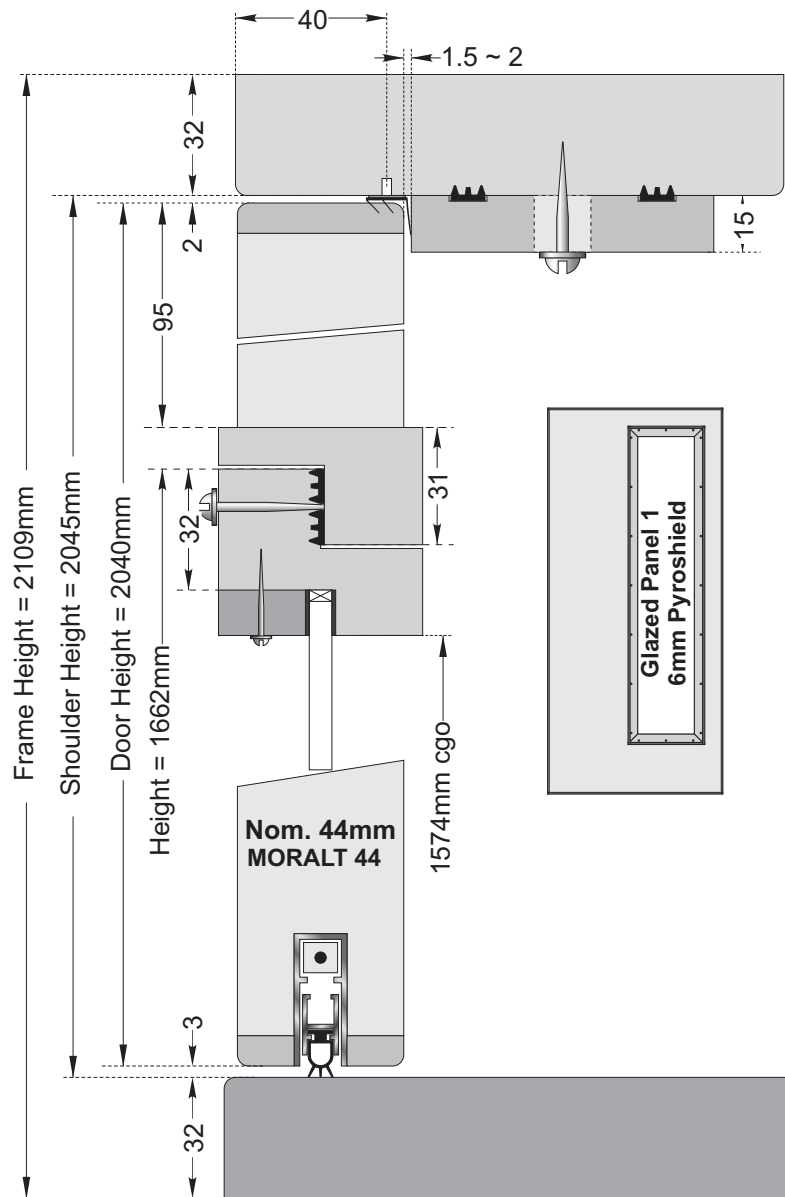


**TEST 21:** NORSEAL 710 to Head & Jambs & NORSEAL 810 to Threshold.  
**SRL Test 19 = Rw.33dB**

*Test with reference panel for comparisons with Test 20*

<b>Dwg. Ref:</b>	Sk/AHP/260908/T019		
<b>TITLE</b>	NORSEAL Acoustic Tests Test 21 <b>MORALT 44</b>		
<b>Scale</b>	1 : 2	<b>Date</b>	26/9/08
<b>Revisions</b>			

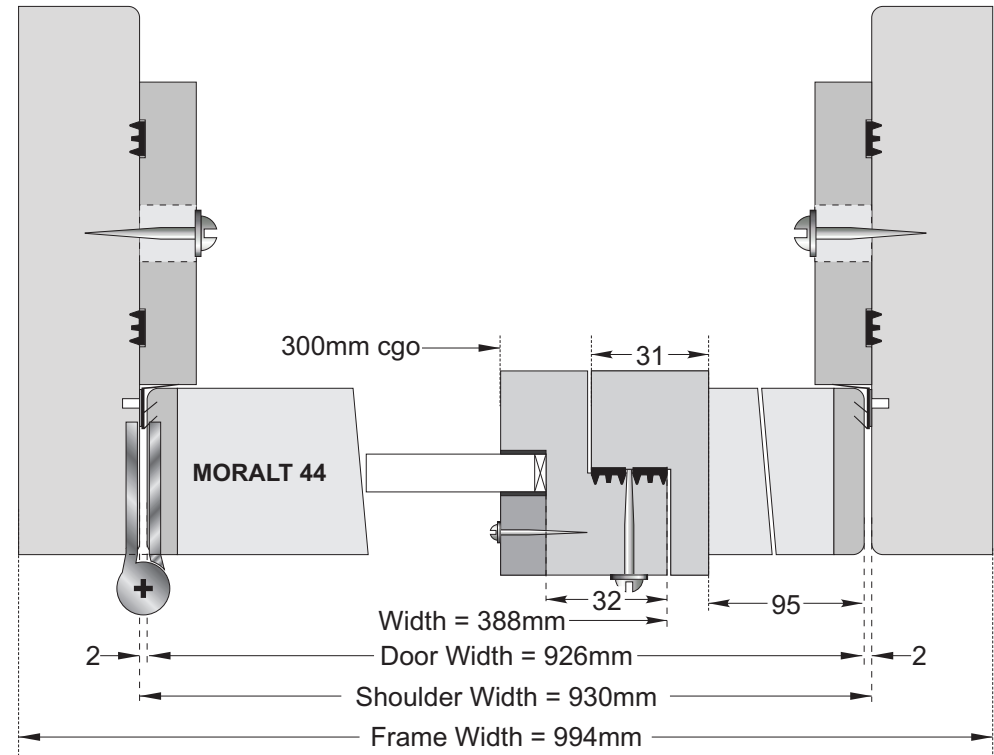
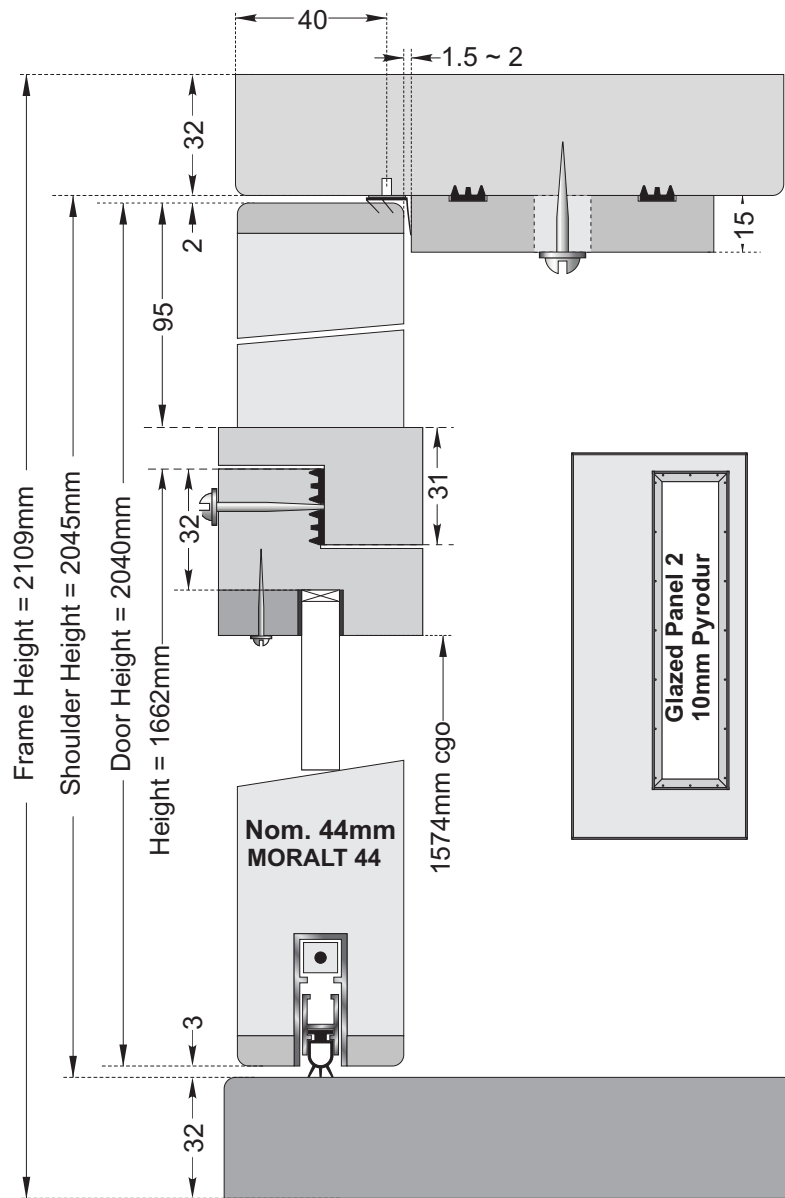
Tony Palmer  
Doortech 2000



**TEST 22:** NOR SOUND 710 to Head & Jambs & NOR SOUND 810 to Threshold.  
6mm Pilkington Pyroshield glass. **SRL Test 20 = Rw.33dB**

<b>Dwg. Ref:</b>	Sk/AHP/260908/T020		
<b>TITLE</b>	NORSEAL Acoustic Tests Test 22 <b>MORALT 44</b>		
<b>Scale</b>	1 : 2	<b>Date</b>	26/9/08
<b>Revisions</b>			

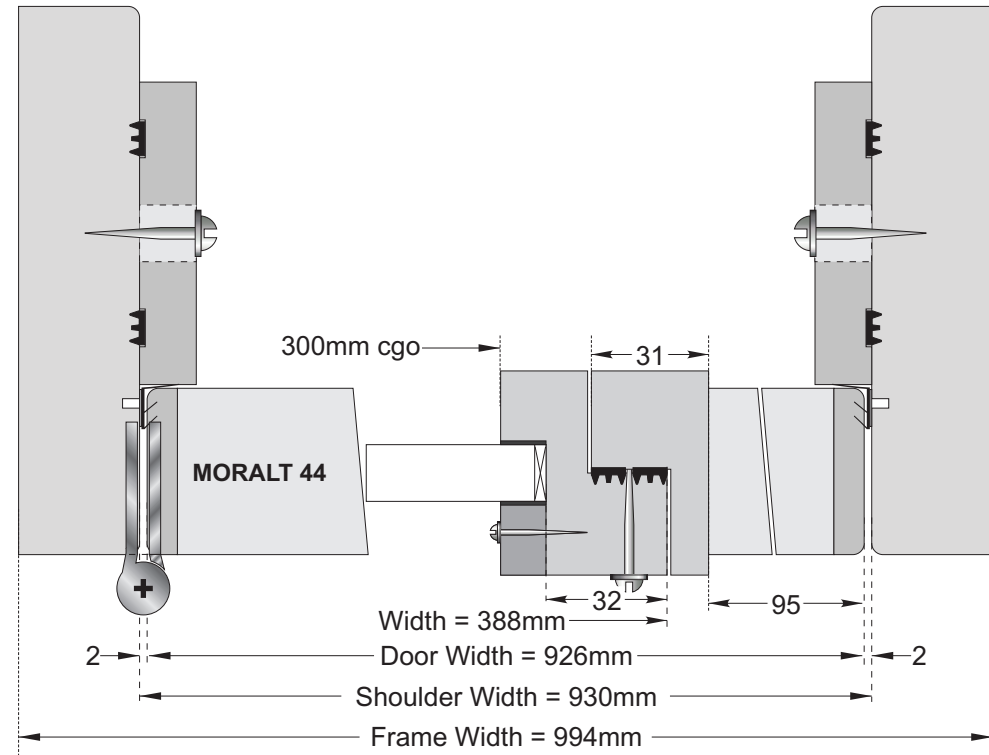
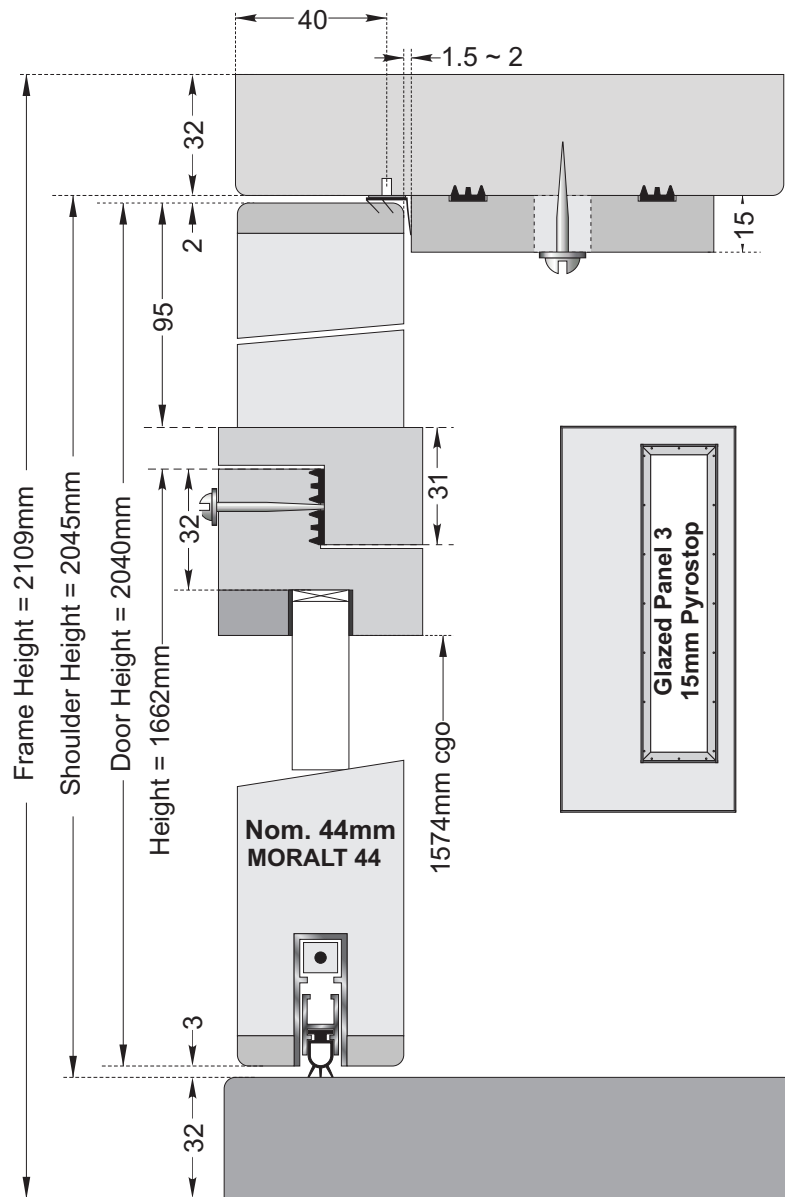
Tony Palmer  
Doortech 2000



**TEST 23:** NOR SOUND 710 to Head & Jambs & NOR SOUND 810 to Threshold.  
10mm Pilkington Pyrodur glass. **SRL Test 21 = Rw.34dB**

<b>Dwg. Ref:</b>	Sk/AHP/260908/T021		
<b>TITLE</b>	NORSEAL Acoustic Tests Test 23 <b>MORALT 44</b>		
<b>Scale</b>	1 : 2	<b>Date</b>	26/9/08
<b>Revisions</b>			

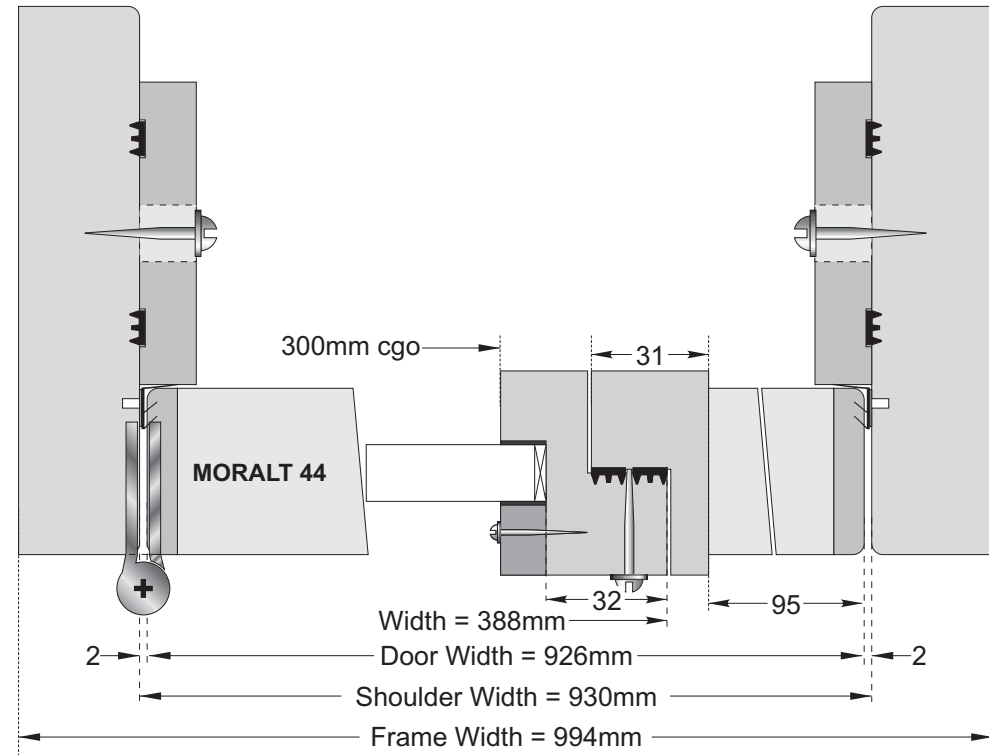
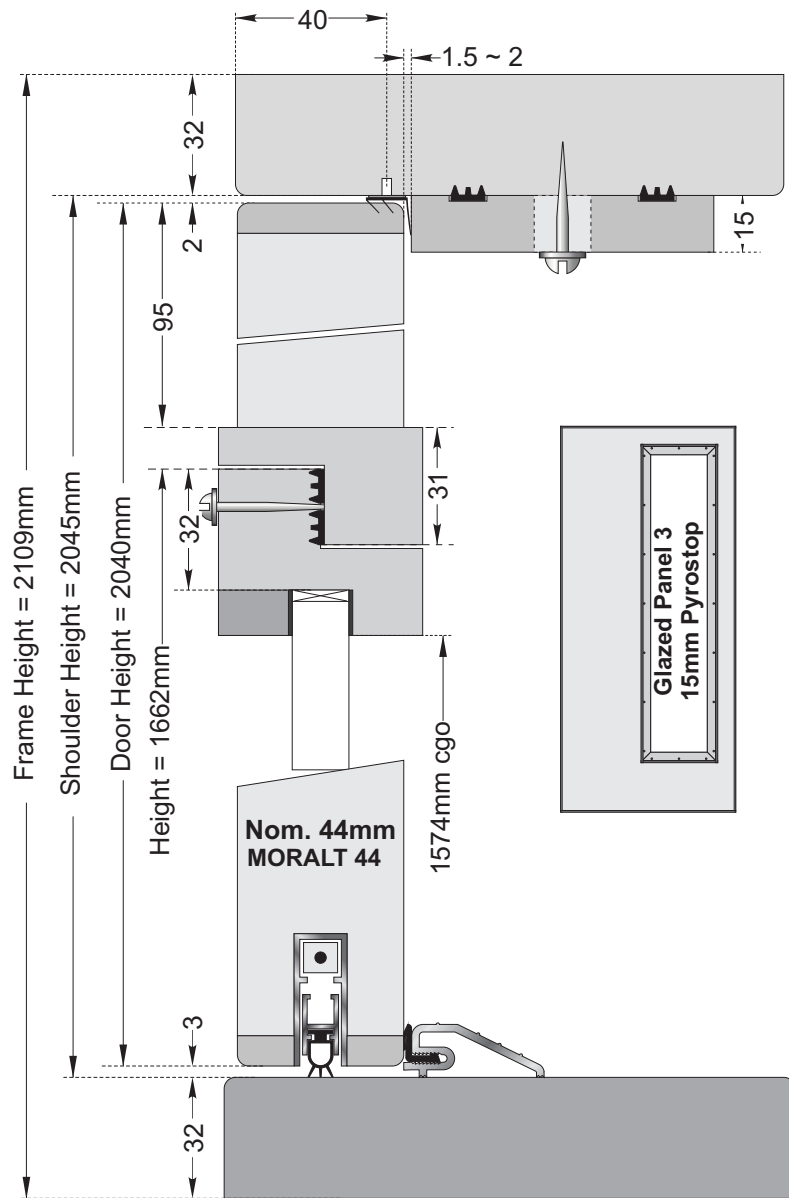
Tony Palmer  
Doortech 2000



**TEST 24:** NOR SOUND 710 to Head & Jambs & NOR SOUND 810 to Threshold.  
15mm Pilkington Pyrostop glass. **SRL Test 22 = Rw.34dB**

<b>Dwg. Ref:</b>	Sk/AHP/260908/T022		
<b>TITLE</b>	NORSEAL Acoustic Tests Test 24 <b>MORALT 44</b>		
<b>Scale</b>	1 : 2	<b>Date</b>	26/9/08
<b>Revisions</b>			

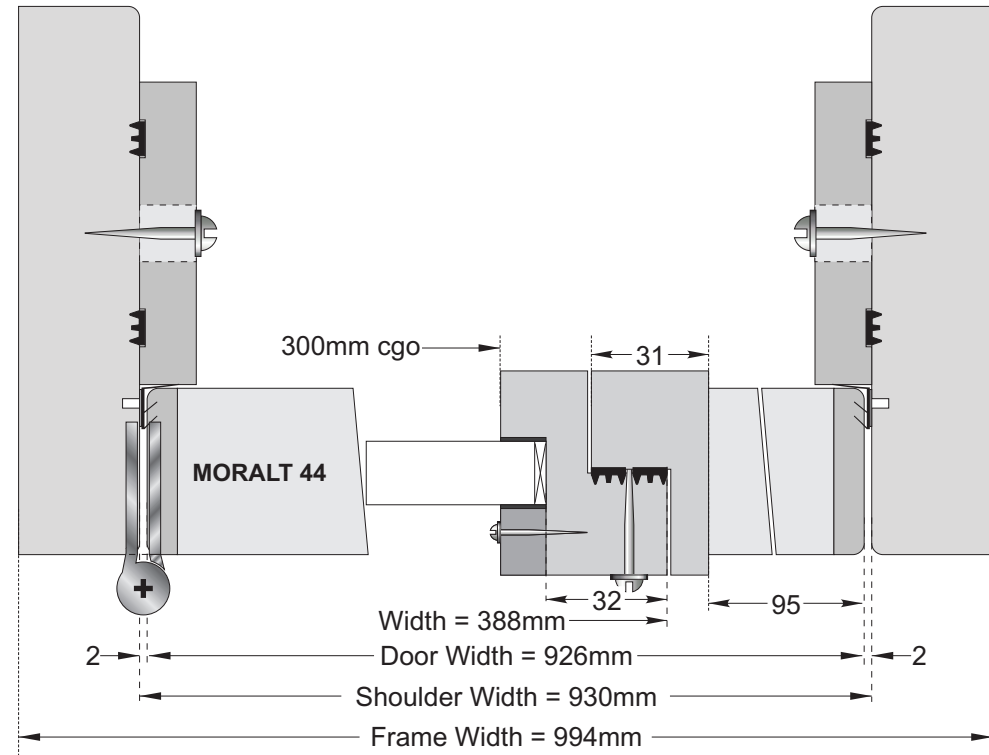
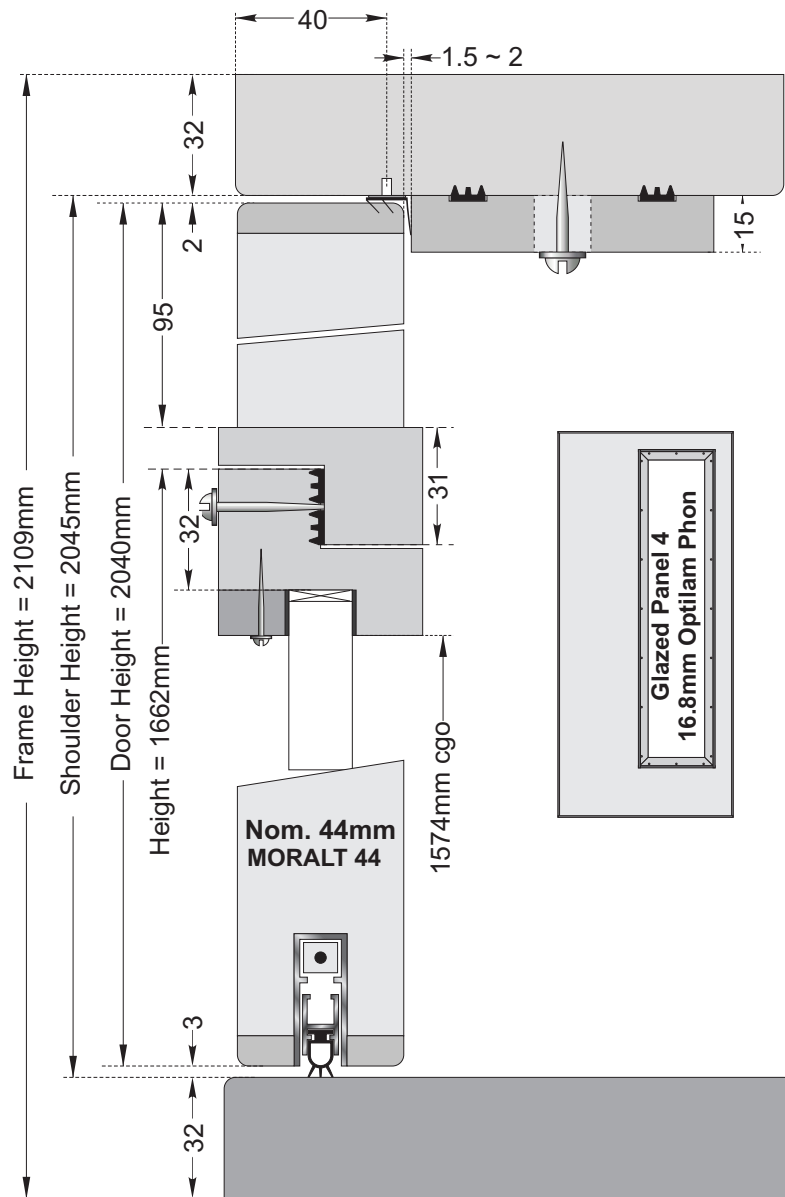
Tony Palmer  
Doortech 2000



**TEST 24a:** NORSOUND 710 to Head & Jambes & NORSOUND 810 to Threshold.  
NORSOUND 650 Threshold strip with seal added.  
15mm Pilkington Pyrostop glass. **SRL Test 23 = Rw.35dB**

<b>Dwg. Ref:</b>	Sk/AHP/260908/T022a		
<b>TITLE</b>	NORSEAL Acoustic Tests Test 24a <b>MORALT 44</b>		
<b>Scale</b>	1 : 2	<b>Date</b>	26/9/08
<b>Revisions</b>			

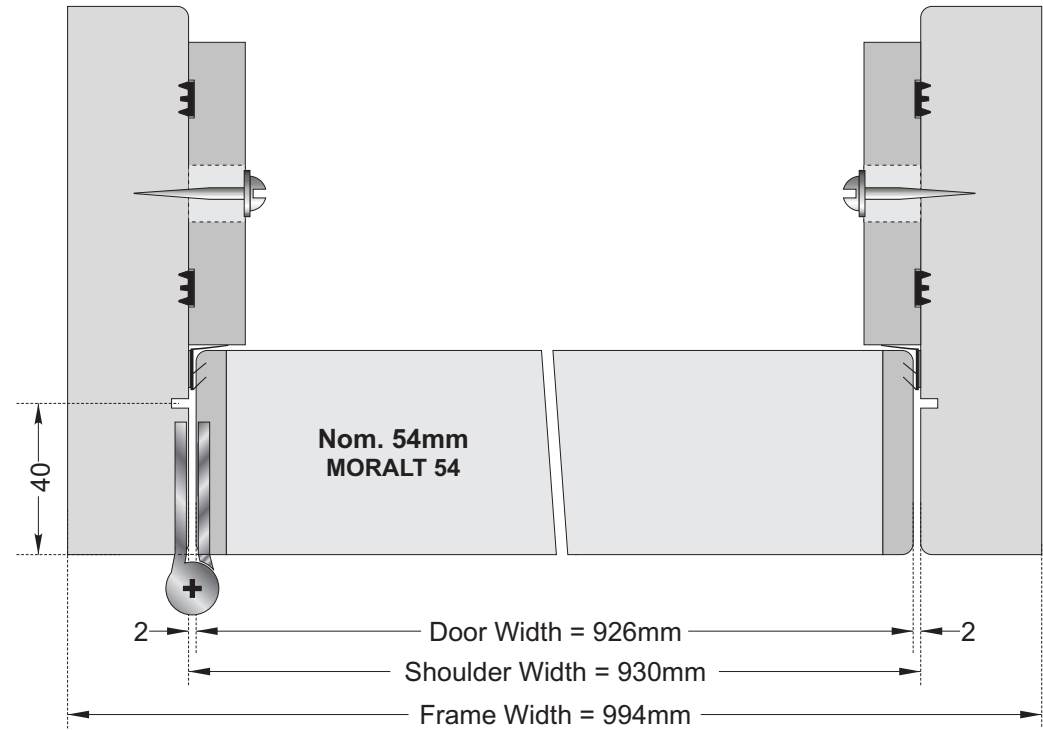
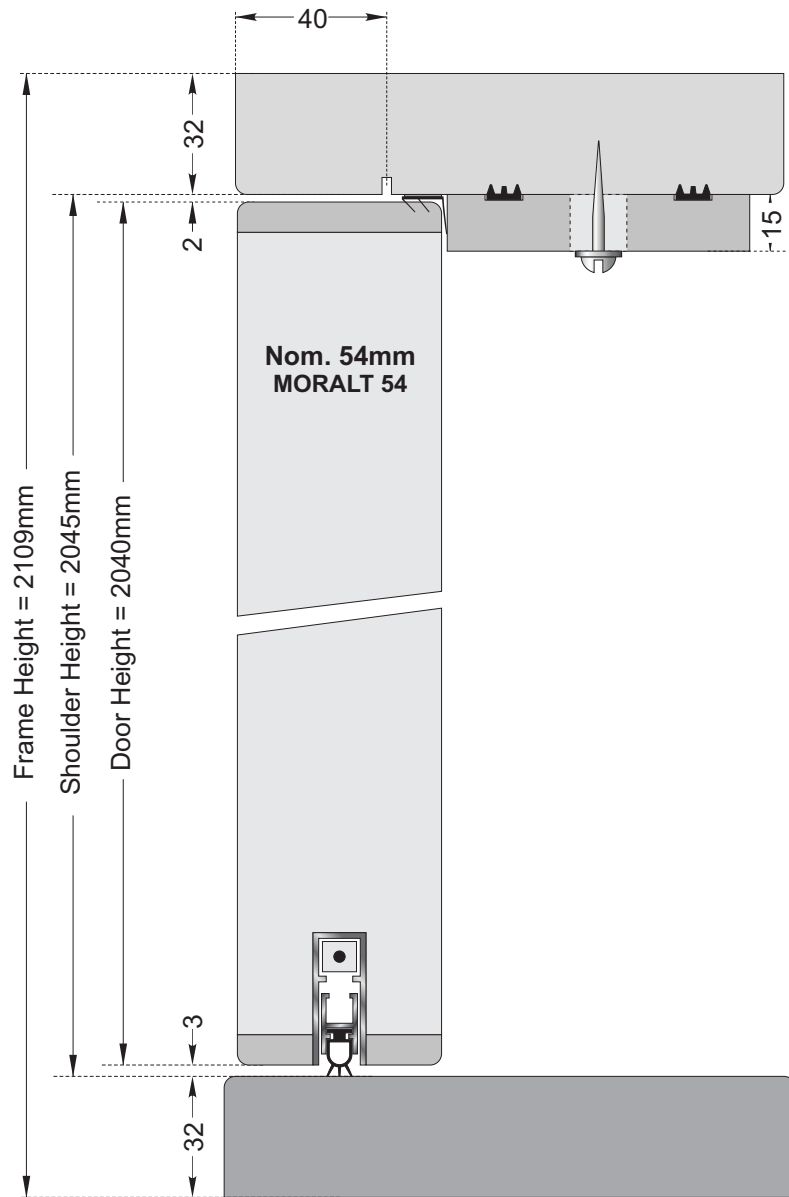
Tony Palmer  
Doortech 2000



**TEST 25:** NOR SOUND 710 to Head & Jambs & NOR SOUND 810 to Threshold.  
16.8mm Pilkington Optilam Phon glass. **SRL Test 24 = Rw.34dB**

<b>Dwg. Ref:</b>	Sk/AHP/260908/T023		
<b>TITLE</b>	NORSEAL Acoustic Tests Test 25 <b>MORALT 44</b>		
<b>Scale</b>	1 : 2	<b>Date</b>	26/9/08
<b>Revisions</b>			

Tony Palmer  
Doortech 2000

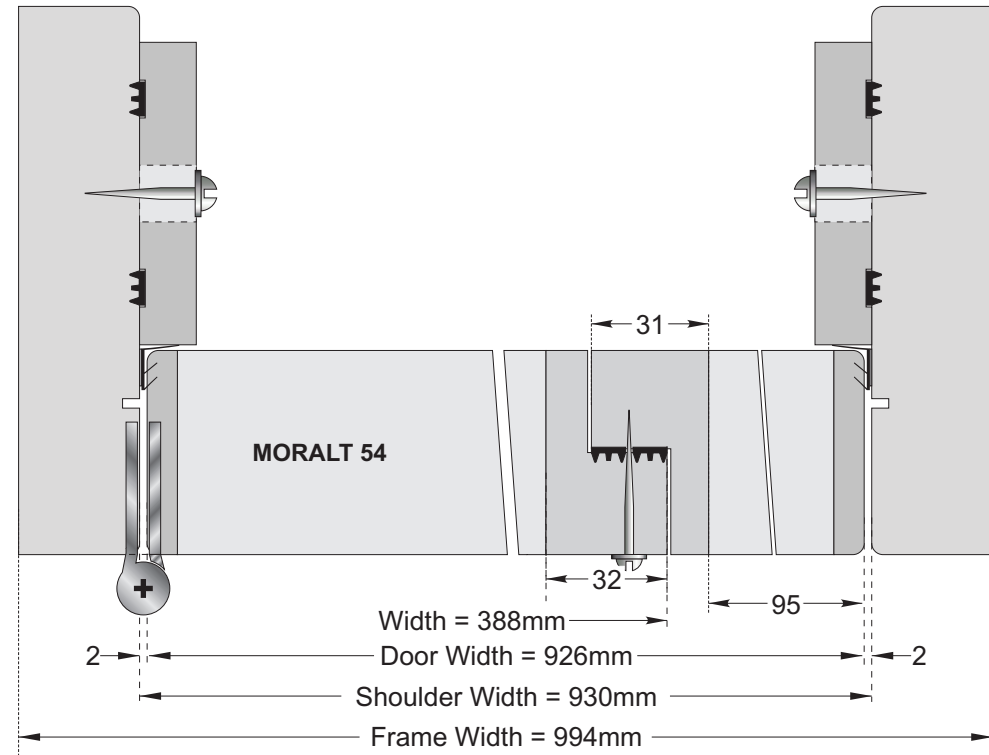
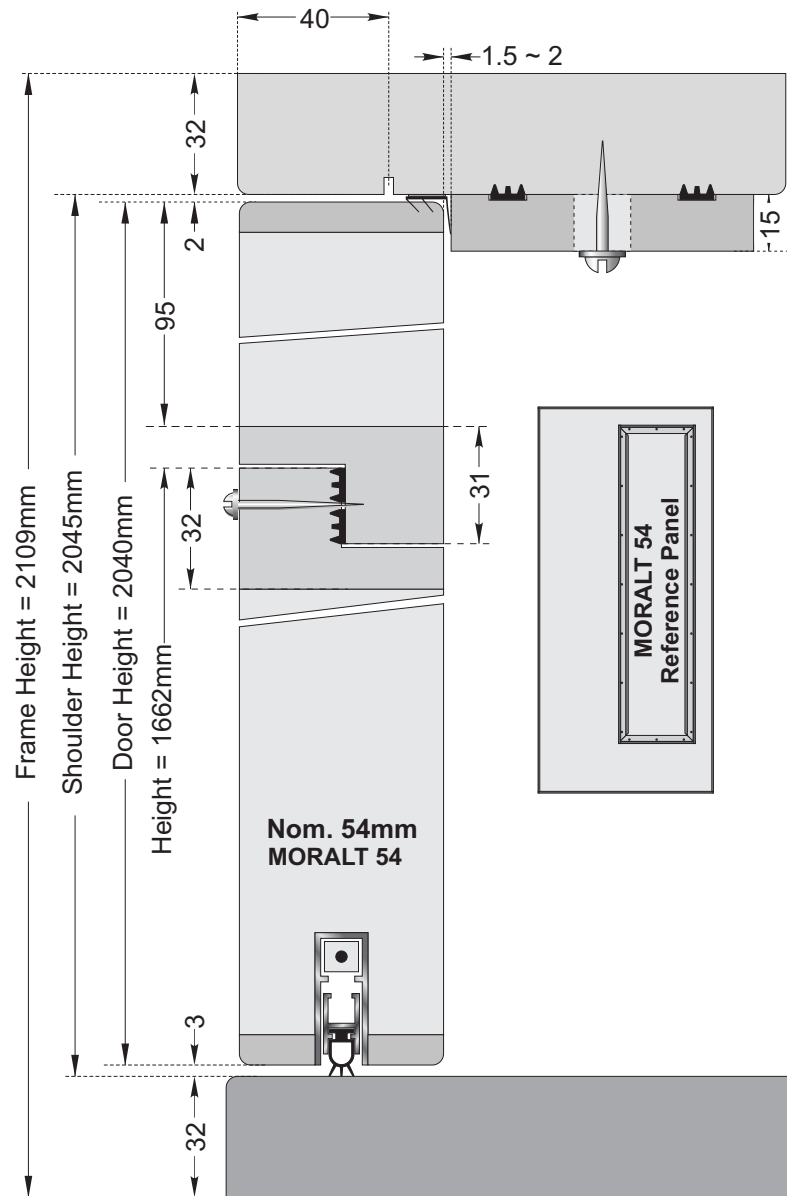


**TEST 53:** Fully caulked to establish maximum potential performance for the doorset. **SRL Test 33 = Rw.35dB**

**TEST 54:** NORSOUND 710 to Head & Jambs. NORSOUND 810 to Threshold. **SRL Test 34 = Rw.34dB**

<b>Dwg. Ref:</b>	Sk/AHP/260908/T050		
<b>TITLE</b>	NORSOUND Acoustic Tests Reference Tests 53 & 54 <b>MORALT 54</b>		
<b>Scale</b>	1 : 2	<b>Date</b>	26/9/08
<b>Revisions</b>			

Tony Palmer  
Invented 2000

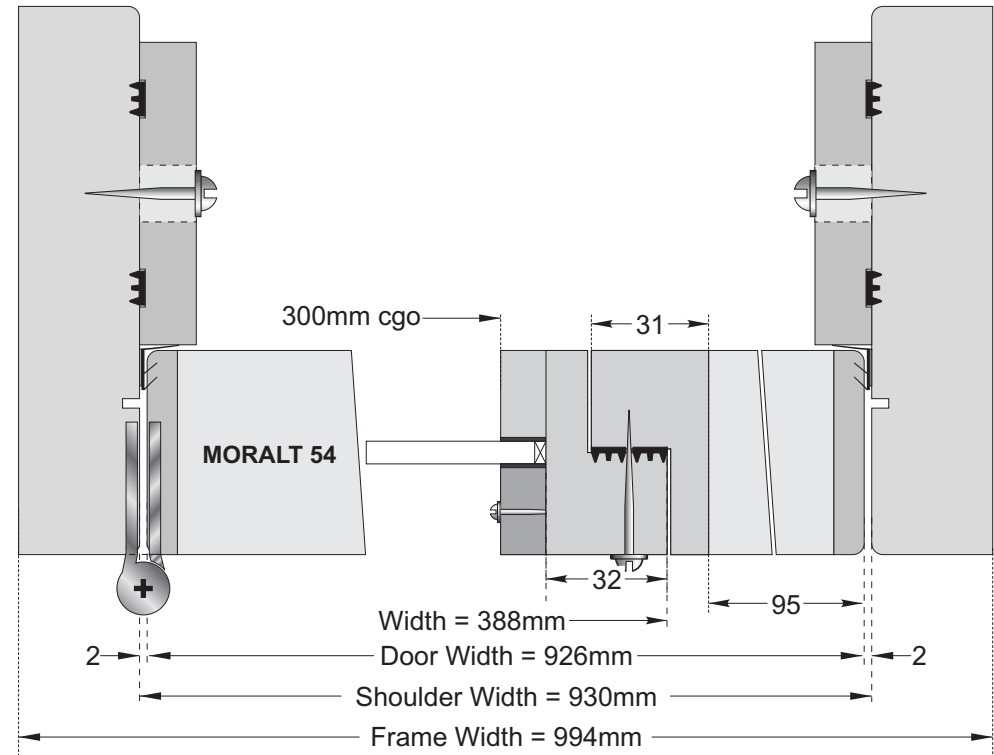
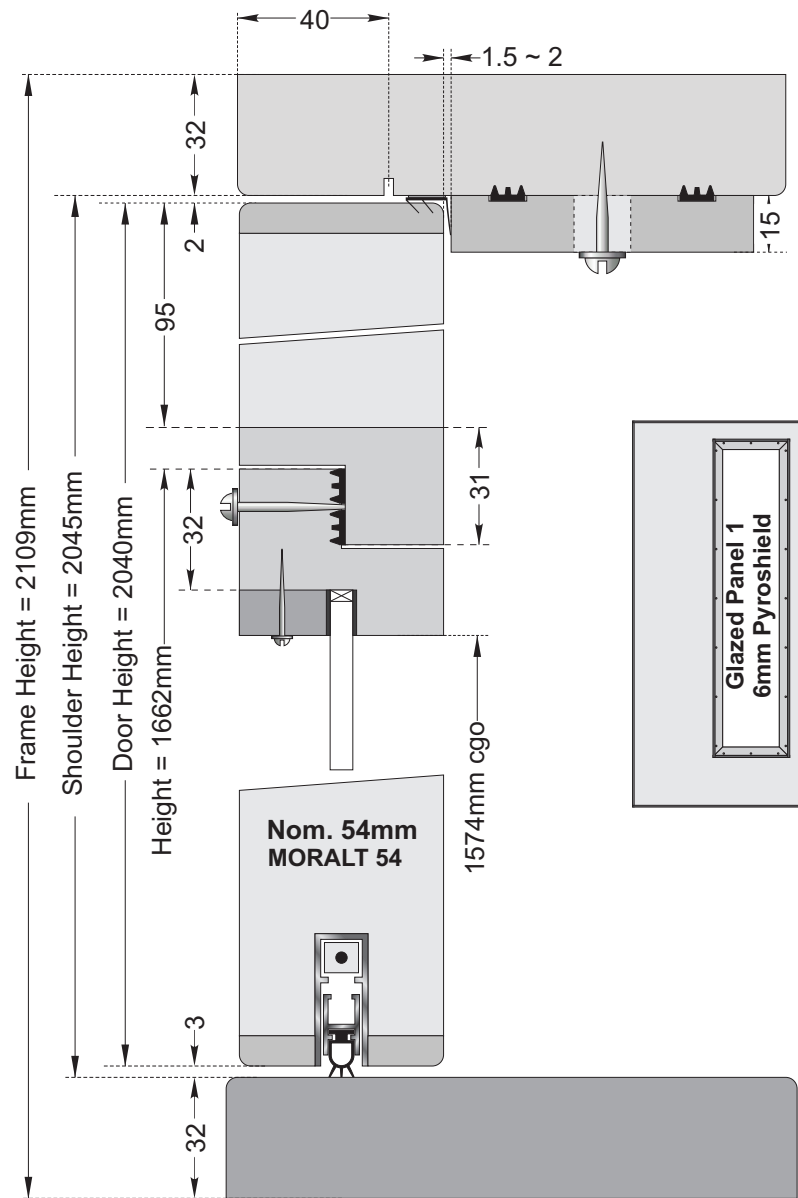


**TEST 56:** NORSOUND 710 to Head & Jambes & NORSOUND 810 to Threshold.  
**SRL Test 35 = Rw.35dB**

*Test with reference panel for comparisons with Test 54*

<b>Dwg. Ref:</b>	Sk/AHP/260908/T052		
<b>TITLE</b>	NORSEAL Acoustic Tests Test 56 <b>MORALT 54</b>		
<b>Scale</b>	1 : 2	<b>Date</b>	26/9/08
<b>Revisions</b>			

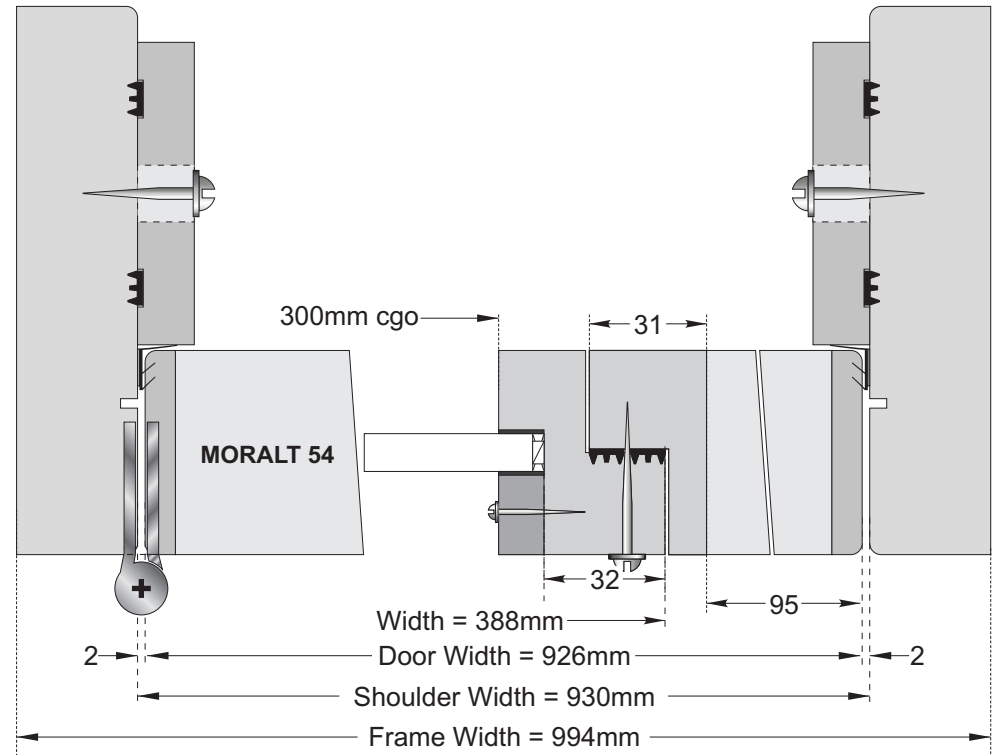
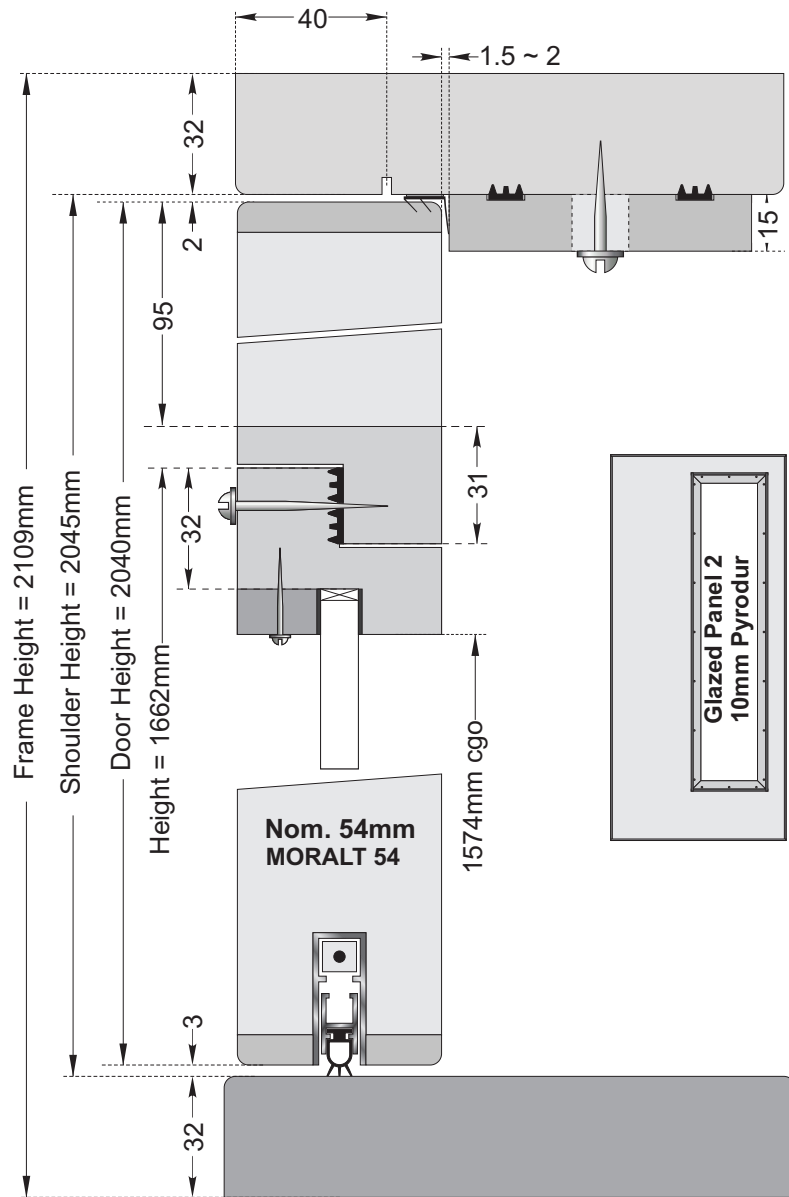
Tony Palmer  
Doortech, 2000



**TEST 57:** NOR SOUND 710 to Head & Jambs & NOR SOUND 810 to Threshold.  
6mm Pilkington Pyroshield glass. **SRL Test 36 = Rw.34dB**

<b>Dwg. Ref:</b>	Sk/AHP/260908/T053		
<b>TITLE</b>	NORSEAL Acoustic Tests Test 57 <b>MORALT 54</b>		
<b>Scale</b>	1 : 2	<b>Date</b>	26/9/08
<b>Revisions</b>			

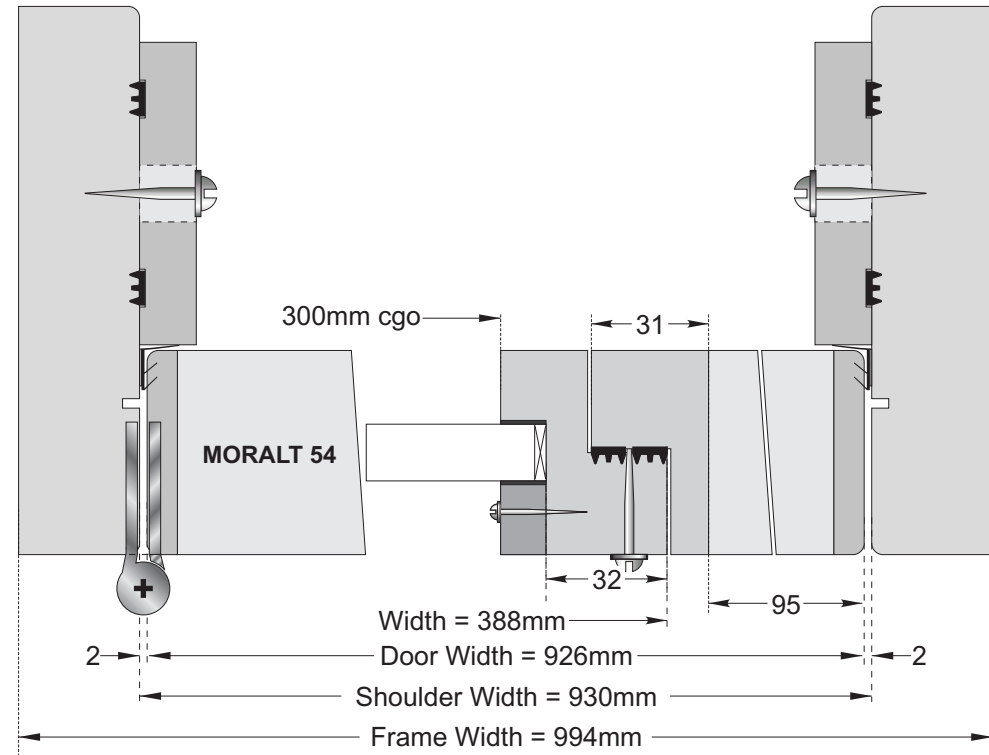
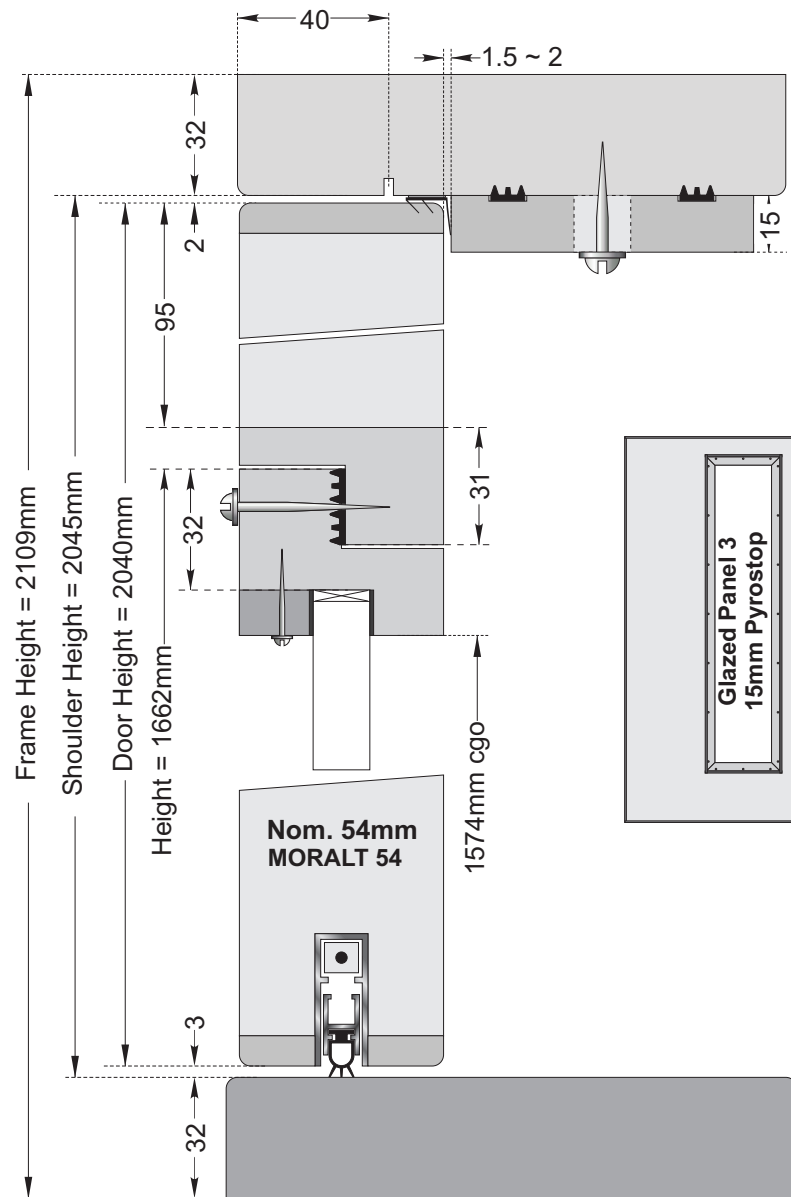
Tony Palmer  
Doortech 2000



**TEST 58:** NOR SOUND 710 to Head & Jambs & NOR SOUND 810 to Threshold.  
10mm Pilkington Pyrodur glass. **SRL Test 37 = Rw.36dB**

<b>Dwg. Ref:</b>	Sk/AHP/260908/T054		
<b>TITLE</b>	NORSEAL Acoustic Tests Test 58 <b>MORALT 54</b>		
<b>Scale</b>	1 : 2	<b>Date</b>	26/9/08
<b>Revisions</b>			

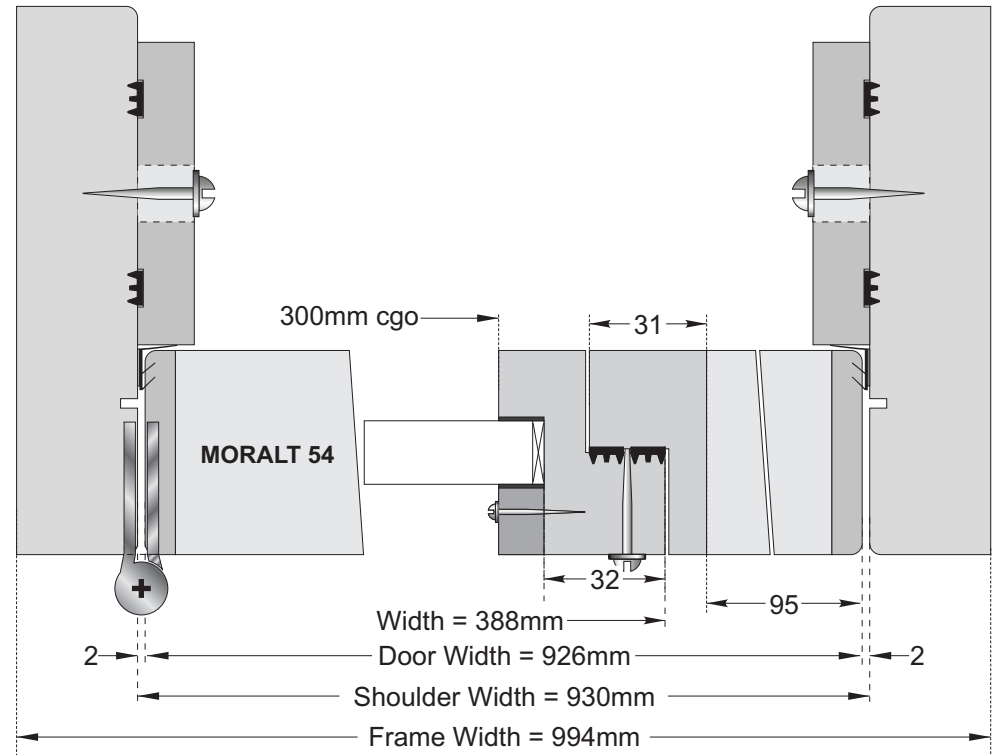
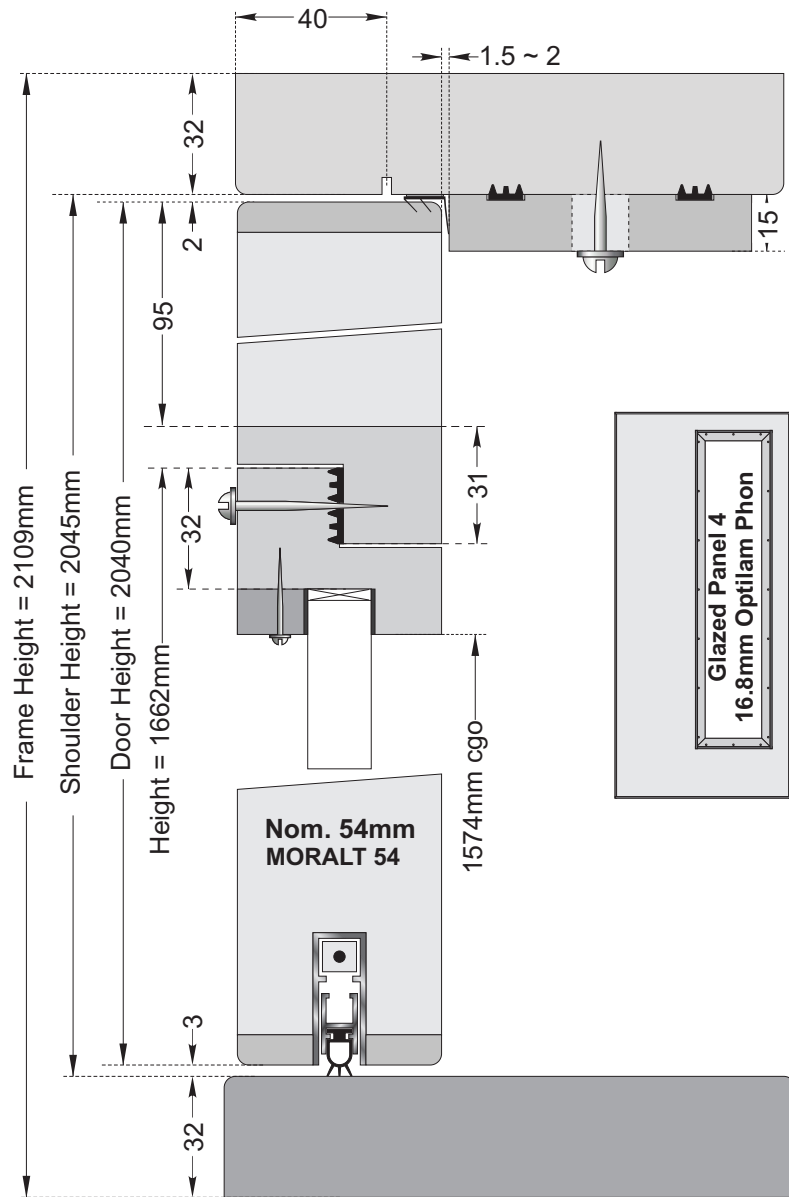
Tony Palmer  
Doortech 2000



**TEST 59:** NORSOUND 710 to Head & Jambes & NORSOUND 810 to Threshold.  
15mm Pilkington Pyrostop glass. **SRL Test 38 = Rw.36dB**

<b>Dwg. Ref:</b>	Sk/AHP/260908/T055		
<b>TITLE</b>	NORSEAL Acoustic Tests Test 59 <b>MORALT 54</b>		
<b>Scale</b>	1 : 2	<b>Date</b>	26/9/08
<b>Revisions</b>			

Tony Palmer  
Doortech, 2000



**TEST 60:** NORSOUND 710 to Head & Jambes & NORSOUND 810 to Threshold.  
16.8mm Pilkington Optilam Phon glass. **SRL Test 39 = Rw.36dB**

<b>Dwg. Ref:</b>	Sk/AHP/260908/T056		
<b>TITLE</b>	NORSEAL Acoustic Tests Test 60 <b>MORALT 54</b>		
<b>Scale</b>	1 : 2	<b>Date</b>	26/9/08
<b>Revisions</b>			

Tony Palmer  
Doortech, 2000