







Airborne Sound Data Report

Technical Report

81668-SRL-RP-XT-001-P1

Project

The Laboratory Measurement of the Airborne Sound Insulation of Various Marmox Fire Barriers

Prepared for

Marmox (UK) Ltd

Published

16 November 2023





| | Quality Assurance | |
|----------------|--|-------------------|
| Project Title | The Laboratory Measurement of th Various Marmox | |
| Document Title | Laboratory Te | st Report |
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1.0 Description of Test

Tests have been done in SRL's Laboratory at Holbrook House, Sudbury, Suffolk, to determine the sound reduction index of various Marmox Fire Barriers in accordance with BS EN ISO 10140-2: 2021.

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.

1.1 Description of Sample

Various Marmox Fire Barriers were tested. See Section 2.0, Data Sheets I to 6 and Drawings I to 2 for details.

| Sampling plan: | Enough for test only |
|----------------------|----------------------|
| Sample condition: | New |
| Details supplied by: | Marmox (UK) Ltd |
| Sample installed by: | Marmox (UK) Ltd |

1.2 Sample Delivery Date

10 November 2023

1.3 Test Procedures

The sample was mounted/located and tested in accordance with the relevant standard. The details of measurements are given in Appendix A. The method and procedure are described in Appendix B. The measurement uncertainty is given in Appendix C.



2.0 Results

The results of the measurements and subsequent analysis are given in Data Sheets I to 6 and summarised below.

Results relate only to the items as received and tested.

| SRL Test No. | Description in Brief | R _w (C;C _{tr}) |
|--------------|--|-------------------------------------|
| I | 100mm SS Marmox Fire Board | 26 (-2;-4) dB |
| 2 | 50mm DS Marmox Fire Board | 23 (-2;-3) dB |
| 3 | 20mm DS Marmox Fire Board | 23 (-1;-3) dB |
| 4 | 20mm DS Marmox Fire Board, 12.5mm DS XPS | 23 (-1;-2) dB |
| 5 | 12.5mm DS XPS | 22 (-1;-3) dB |
| 6 | 20mm DS XPS | 22 (-1;-3) dB |





| | | | | | <u>Shee</u> | | | | | | | | | | | | |
|----------------------------|-----------------------------|------------------|---------------------------|--------|-------------|--------|----------|-------|-----------------------|--------------|----------|-------------|-----------------------|--------|--------|--------|--------------|
| Test Number: | Laboratory Me | asurement I | of Soun | d Rec | uctior | n Inde | | | n isc Roo i | | 40-2:2 | | Sourc | - | | Recei | vina |
| Client: | Marmo | י k (UK) Ltd | | | | | | | | eratu | re | | 12.2 ° | | | 12.1 | |
| Test Date: | | 0/11/2023 | | | | | | | | dity: | i c. | | 68 % | - | | 68 | |
| Sample Height: | | 2.12 | m | | | | | 'olui | | arcy. | | | 52.3 n | | | 50.1 | |
| Sample Width: | | 2.00 | | | | | | | ress | ure: | | | | | ' mba | | |
| Sample Weight: | | | kg/m² | | | | | | | | | | | | | | |
| Product Identification: | 100mm SS Marmox Fir | e Board | 7 | ′0.0 T | | | | | | | | | | | | | |
| | | | , | | | | | | | | | | | | | | |
| Frequency Hz | Sound Reduction Inde | ex, dB | | - | | | _ | | ound ndex | Reduc | tion | | | | | | |
| | ⅓ Oct | Octave | 4 | 0.0 | | | | — F | Rw rei | ference | curve | | | | | | |
| 50+ | 27.0 | | | | | | | | | | | | | | | | |
| 63+ | 20.4 | 20.8 | | | | | | | | | | | | | | | |
| 80+ | 18.6 | | | - | | | | | | | | | | | | | |
| 100 | 20.4 | | | - | | | | | | | | | | | | | |
| 125 | 21.9 | 21.4 | 5 | 0.0 | | _ | | | | | _ | | | | | | \mathbb{A} |
| 160 | 22.0 | | | - | | | | | | | | | | | | | / |
| 200 | 24.4 | | | : | | | | | | | | | | | | | |
| 250 | 21.3 | 21.7 | | | | | | | | | | | | | | | |
| 315 | 20.4 | | Sound Reduction Index, dB | | | | | | | | | | | | | I | |
| 400 | 15.1 | | dex | 0.0 | | | | | | | | | | | | | |
| 500 | 14.0 | 16.1 | L L |] | | | | | | | | | | | Χ | | |
| 630 | 24.5 | | ictio |] | | | | | | | | | | | ´ | | |
| 800 | 29.7 | | edu | : | | | | | | | | | | X | | | |
| 1000 | 25.4 | 27.8 | a br | 0.0 | | _ | | | | | _ | | 1 | | | | |
| 1250 | 30.0 | | Sour | - | | | | | | | 1 | 171 | 1 | | | | |
| 1600 | 32.9 | | | - | | | | | | | -1/ | $ \rangle$ | / | | | | |
| 2000 | 37.4 | 35.9 | |] | | | \wedge | | / | | 1 | | | | | | |
| 2500 | 41.1 | <u> </u> | |] | \nearrow | + | | Ľ | 1 | | / | | | | | | |
| 3150 | 46.2 | | 2 | 0.0 | - | + | | ·^ | $\land \uparrow$ | | \vdash | - | -+ | | + | | + |
| 4000 | 51.5 | 49.6 | | 1 | | | 1 | | $ \rangle $ | / | | | | | | | |
| 5000 | 57.4 * | | | 1 | | 1 | 1 | | \ | \checkmark | | | | | | | |
| 6300+ | 61.7 * | (0.0 | | 1 | | / | | | | Ĩ | | | | | | | |
| 8000+ | 62.4 > | 60.9 | | 0.0 | / | | | | | | | | | | | | |
| | 59.3 > | | • | | / | | | | | | | | | | | | |
| Average 100-3150 | 26.7 | SRL Version 3 | | | | | | | | | | | | | | | |
| * shows measureme | ent corrected for backgrour | nd | |] | | | | | | | | | | | | | |
| > shows measurem | ent limited by background | | | 0.0 | | | | | | | | | | | | | |
| | beyond standard and not | UKAS accr | | | 125 - | - 091 | 200 - | 2007 | 400 | 500 | 630 | 008 | - 1 52 7, Hz | - 0091 | 2000 - | 3150 - | 4000 - |
| Rating according to | BS EN ISO 717-1:2020 | | | | | | | | | | Frequ | iency | , Hz | - | 0 0 | M M | 4 |





| | | | <u>I</u> | Data S | Sheet | 2 | | | | | | | | | | |
|--------------------------------------|----------------------------|------------------|---------------------------|------------|--------|--------------|--------------|---------------------|-----------------|---------|---------|-------------|------|--------|------|----------|
| | Laboratory Me | asurement | of Sound | l Redu | iction | Inde> | to E | BS EN | ISO | 10140 | -2:202 | 21 | | | | |
| Test Number: | , | 2 | | | | | | est R | | | | | irce | | Rece | iving |
| Client: | Marmo | x (UK) Ltd | | | | | Α | ir Te | mpe | rature | : | 12.2 | 2 °C | | 12. | ۱°C |
| Test Date: | I | 0/11/2023 | | | | | Α | ir Hu | ımidi | ty: | | 68 | % | | 68 | 8 % |
| Sample Height: | | 2.12 | m | | | | V | olum | e: | | | 62.3 | 3 m³ | | 50. | l m³ |
| Sample Width: | | 2.00 | m | | | | Α | ir Pr | essur | ·e: | | | 9 | 987 mb | ar | |
| Sample Weight: | | 12.0 | kg/m² | | | | | | | | | | | | | |
| Product Identification: | 50mm DS Marmox Fire | e Board | | | | | | | | | | | | | | |
| | | | 7 | 0.0 T | | | | | | | | | | | | |
| | Sound Reduction Inde | ex, dB | | 1 | | | | | | | | | | | | |
| Frequency Hz | | | | 1 | | | | — So | und R | eductio | n | | | | | |
| | ⅓ Oct | Octave | 1 | 1 | | | | Inc | lex | | | | | | | |
| 50+ | 22.3 | | | 0.0 | | | | - R14 | v refer | ence ci | | | | | | |
| 63+ | 16.6 | 17.7 | 6 | | | | | | | | | | | | | |
| 80+ | 16.3 | | | 1 | | | | | | | $\neg $ | | | | | |
| 100 | 17.9 | | | 1 | | | | | | | | | | | | |
| 125 | 18.7 | 18.6 | | 1 | | | | | | | | | | | | |
| 160 | 19.2 | | 5 | 0.0 + | | | | | | | | | | | | -+ |
| 200 | 21.1 | | |] | | | | | | | | | | | | / |
| 250 | 18.7 | 19.7 | |] | | | | | | | | | | | | ' |
| 315 | 19.5 | | | 1 | | | | | | | | | | | | |
| 400 | 16.9 | | db , | | | | | | | | | | | | | |
| 500 | 13.7 | 14.6 | Xap 4 | 0.0 + | | | | | | | | | | | | |
| 630 | 13.9 | | r L | 1 | | | | | | | | | | X | | |
| 800 | 21.4 | | ctio |] | | | | | | | | | | | | |
| 1000 | 26.1 | 24.1 | edu | : | | | | | | | | | | / | | |
| 1250 | 26.9 | | Sound Reduction Index, dB | 0.0 + | | | | | | + | | | | / | | |
| 1600 | 30.8 | | Sour | 1 | | | | | | | | | | | | |
| 2000 | 37.1 | 34.3 | | 1 | | | | | | | | . 🖊 | r | - | - | |
| 2500 | 40.5 | | | 1 | | | | | | 4-1 | -1 | | | | | |
| 3150 | 46.4 | 40.7 | |] | | | | | ,- ⁻ | ·[| 1 | | | | | |
| 4000 | 51.8 | 49.7 | 2 | 0.0 + | | \checkmark | \mathbf{n} | $ \rightarrow $ | | + | \neg | | | | | |
| 5000 6300+ | 56.1 | | | 1 | | | | $\langle 1 \rangle$ | \mathbf{N} | | | | | | | |
| 8000+ | 58.9 60.1 * | 60.6 | | 1 | | | / | | | | / | | | | | |
| 10000+ | | 00.0 | | 1 | | | 1 | | | M | | | | | | |
| | 64.6 > | | | 0.0 | | / | | | | | | | | | | |
| Average 100-3150 | 24.3 | SRL Version 3 | | | 1 | | | | | | | | | | | |
| * shows measurem | ent corrected for backgrou | nd | - |]. | | | | | | | | | | | | |
| | ent limited by background | | | ľ | | | | | | | | | | | | |
| | beyond standard and not | UKAS accr | edited | | | | | | | | | | | | | |
| | BS EN ISO 717-1:2020 | | (| 0.0 ↓ S | 5 | | | <u>ہ</u> ک | | | | | | | | |
| R _w (C;C _{tr})= | 23 (-2;-3) dB | | | 001 | 125 | 160 | 2 F | 315 | 400 | 500 | 3 8 | 8 ncy, H | 125 | 2000 | 2500 | 4000 |



| | | | | Dat | shee | <u></u> | | | | | | | | | | |
|--------------------------------------|--|------------------|---------------------------|--------|--------|---------|------------------|--------|----------|-------------|--------------|---------------|-----------|-----------|---------|----------------|
| | Laboratory Me | asurement | of Sou | und Re | ductio | n Inde | ex to l | bs en | ISO I | 0140-2 | :2021 | | | | | |
| Test Number: | | 3 | | | | | т | est Ro | oom: | | | Sour | ce | I | Receivi | ng |
| Client: | Marmo | < (UK) Ltd | | | | | Α | ir Te | mper | ature: | | 12.2 | °C | | 12.1 ° | |
| Test Date: | 10 | 0/11/2023 | | | | | Α | ir Hu | midit | t y: | | 68 % | 6 | | 68 % | |
| Sample Height: | | 2.12 | m | | | | | olum | | | | 62.3 | m³ | | 50.1 m | 1 ³ |
| Sample Width: | | 2.00 | m | | | | Α | ir Pre | essur | e: | | | 987 | 7 mbar | | |
| Sample Weight: | | 6.8 | kg/m² | | | | | | | | | | | | | |
| Product Identification: | 20mm DS Marmox Fire | Board | | | | | | | | | | | | | | |
| | | | | 70.0 | | | | | | | | | | | | Τ |
| Frequency Hz | Sound Reduction Inde | ex, dB | | | | | | | | | 4 | | | | | |
| | | | | | | | | | | duction | | | | | | |
| | ⅓ Oct | Octave | | | | | | Ind | ex | | | | | | | |
| 50+ | 19.8 | | | 60.0 | | | | – Rw | refere | ence cur | ve 🗋 | | | | | |
| 63+ | 15.2 | 15.1 | | | | | | | | | | | | | | |
| 80+ | 12.8 | | | | | | | | | | | | | | | |
| 100 | 14.2 | | | | | | | | | | | | | | | |
| 125 | 16.3 | 15.5 | | | | | | | | | | | | | | |
| 160 | 16.5 | | | 50.0 | | | | | | | | | | _ | | |
| 200 | 18.6 | | | | | | | | | | | | | | | |
| 250 | 16.4 | 17.6 | | | | | | | | | | | | | | |
| 315 | 18.1 | | | | | | | | | | | | | | | |
| 400 | 19.9 | | dВ | | | | | | | | | | | | | |
| 500 | 21.0 | 20.7 | Sound Reduction Index, dB | 40.0 | | | | | | | | | | _ | | |
| 630 | 21.3 | | on Inc | | | | | | | | | | | | | |
| 800 | 20.4 | | tior | | | | | | | | | | | | | |
| 1000 | 18.8 | 19.3 | onp | | | | | | | | | | | | | |
| 1250 | 18.9 | | l Re | 20.0 | | | | | | | | | | Λ | | |
| 1600 | 24.2 | | ound | 30.0 | | | | | | | | | | | | |
| 2000 | 32.4 | 28.2 | S | | | | | | | | | | / | | | |
| 2500 | 37.3 |] | | | | | | | | | . † - ' | 1 | ľ | | | |
| 3150 | 39.1 | | | | | | | | | | | | Λ | | | |
| 4000 | 42.1 | 41.6 | | 20.0 | | | | | <u>'</u> | \vdash | \downarrow | | \square | | | |
| 5000 | 46.2 | | | 20.0 | | | $ \downarrow $ | j. | | | | + | ' | | | |
| 6300+ | 49.1 | | | | | - | | | | | | | | | | |
| 8000+ | 51.0 | 51.1 | | | | | 1 | | | | | | | | | |
| 10000+ | 54.8 * | | | | | / / | 1 | | | | | | | | | |
| Average | 22.1 | SRL Version 3 | | 10.0 | | | | | + | + | - | | | | | - |
| 100-3150 | | | l | | | | | | | | | | | | | |
| | ent corrected for backgrour ent limited by background | D | | | 1 | | | | | | | | | | | |
| + shows Frequency | beyond standard and not | UKAS accr | edited | 0.0 | | | | | | | | | | | | |
| Rating according to | BS EN ISO 717-1:2020 | | | | 125 | 160 | 50 | 315 | 400 | 500 630 | 300 | 80 5 y, Hz | 0091 | 2000 | 3150 | 4000 |
| R _w (C;C _{tr})= | 23 (-I;-3) dB | | | | . – | | | | Ν. | -, Fre | guenc | ў, нź | 2 2 | З | a N | 4000 |





| | | | | <u>Data</u> | a Sheet | <u>t 4</u> | | | | | | | | | | | |
|--------------------------------------|----------------------------|------------------|---------------------------|-------------|-------------------------|------------|--------------|------------|--------|--------------|----------------|--------------|--------|--------------|--------|--------|----------------|
| | Laboratory Me | easurement | of Sou | nd Re | duction | Inde | x to | BS EN | n ISO | 1014 | 0-2:2 | 021 | | | | | |
| Test Number: | - | 4 | | | | | | Fest F | Roon | n: | | S | ource | | R | eceivi | ng |
| Client: | Marmo | x (UK) Ltd | | | | | | Air To | empe | eratur | ·e: | 12 | 2.2 °C | | | 12.1 ° | С |
| Test Date: | I | 0/11/2023 | | | | | | Air H | umic | lity: | | e | 68 % | | | 68 % | |
| Sample Height: | | 2.12 | m | | | | ` | /olun | ne: | | | 62 | 2.3 m³ | | | 50.1 m | 1 ³ |
| Sample Width: | | 2.00 | m | | | | 1 | Air Pı | ressu | re: | | | | 987 | mbar | | |
| Sample Weight: | | 10.8 | kg/m² | | | | | | | | | | | | | | |
| Product Identification: | 20mm DS Marmox Fire | e Board, I | 2.5mn | n DS | XPS | | | | | | | | | | | | |
| | | | | 70.0 | | | | | | | | | | | | | |
| Frequency Hz | Sound Reduction Ind | ex, dB | | | 1 | | | | | | | - | | | | | |
| | | | | |] | | | | | Reduct | ion | | | | | | |
| | ⅓ Oct | Octave | | | | | | In | Idex | | | | | | | | |
| 50+ | 23.3 | | | 60.0 | | | | R | w refe | erence | curve | | | | | | |
| 63+ | 18.8 | 18.7 | | | | | | | | | | | | | | | |
| 80+ | 16.5 | | | | 1 | | | | | | | | | | | | |
| 100 | 18.9 | | | | | | | | | | | | | | | | |
| 125 | 19.0 | 19.2 | | | | | | | | | | | | | | | |
| 160 | 19.7 | | | 50.0 | | | | + | | | | | | | | _ | + |
| 200 | 21.3 | | | | | | | | | | | | | | | | 1 |
| 250 | 19.4 | 20.2 | | | | | | | | | | | | | | | |
| 315 | 20.0 | | | | | | | | | | | | | | | | |
| 400 | 20.4 | | dB , | 40.0 | 1 | | | | | | | | | | | | |
| 500 | 18.6 | 18.6 | dex | 40.0 | | | | | | | | | | | | | |
| 630 | 17.4 | | - L | |] | | | | | | | | | | | | |
| 800 | 17.2 | 10.0 | ictio | | | | | | | | | | | | \vee | | |
| 1000 | 20.4 | 19.8 | tedu | | | | | | | | | | | / | 1 | | |
| 1250 | 25.2 | | Sound Reduction Index, dB | 30.0 | $\downarrow \downarrow$ | _ | - | | | _ | | | | \downarrow | | _ | |
| 1600 | 28.6 | 310 | Sour | | | | | | | | | | | | | | |
| 2000 | 33.6 | 31.9 | | |] | | | | | | | | [| - | - | | |
| 2500 | 39.0 | | | | | | | | | - 1 | +-1 | | Λ | | | | |
| 4000 | 42.8 | 46.2 | | | : | | \downarrow | | 1 | - | | | / | | | | |
| 5000 | 48.5 | 70.2 | | 20.0 | \vdash | + | | ┝┤ | 4 | \checkmark | | \checkmark | | + | | | + |
| 6300+ | 53.2 | | | | 1 | | | | | | \vdash | / | | | | | |
| 8000+ | 57.9 * | 58.0 | | | 1 | | 1 | | | | | | | | | | |
| 10000+ | 62.2 * | - 38.0 | | |] | | 1 | | | | | | | | | | |
| Average | 02.2 | | | 10.0 | | 1 | | | | | | | | | | | |
| 100-3150 | 23.8 | SRL Version 3 | | 10.0 | | ' | | | | | | | | | | | |
| * shows measurem | ent corrected for backgrou | nd | • | | | | | | | | | | | | | | |
| > shows measurem | ent limited by background | | | | 1 | | | | | | | | | | | | |
| | beyond standard and not | UKAS accr | edited | | | | | | | | | | | | | | |
| | BS EN ISO 717-1:2020 | | | 0.0 | ⊷ و ∿ | - Q | | i n N | , 0 | | | 2 0 | | 0 | | | + 2 |
| R _w (C;C _{tr})= | 23 (-1;-2) dB | | | | 100 | 160 | 200 | 250 315 | 400 | 500 | සි දි Frequ | 8 8 | 125 | 0091 | 2500 | 3150 | 4000 |





| Selient: Marmox (UK) Ltd Air Temperature: 12.2 °C 12.1 °C Gest Date: 10/11/2023 Air Humidity: 68 % 68 % ample Height: 2.12 m Air Pressure: 987 mbar ample Weight: 4.0 kg/m² Air Pressure: 987 mbar Product I2.5mm DS XPS 68 % 68 % dentification: 11.6 11.6 11.6 S0+ 17.3 11.6 11.6 100 11.5 11.9 11.6 125 11.3 11.9 11.6 1200 15.0 13.9 14.1 400 14.9 16.5 800 20.3 20.0 16.5 800 20.3 20.9 26.5 1250 12.9 13.9 14.1 4000 14.9 16.5 16.5 800 20.3 20.0 27.0 21.9 1250 27.0 28.6 20.0 27.0 3150 27.3 28.6 20.0 27.0 3150 27.3 | | | | | | <u>She</u> | | | | | . | | | | | | | | |
|---|---|---------------------------------------|-------------|---------|--------|------------|--------|----------|--------------|------------|----------|---------|-----------|-------------|-----|-------|------|--------------|--------|
| Client: Marmox (UK) Lid Air Temperature: 12.2 °C 12.1 °C Test Date: 10/11/2023 Air Humidity: 68 % 68 % Sample Height: 2.12 m Air Pressure: 987 mbar Sample Weight: 4.0 kg/m ³ Air Pressure: 987 mbar Product I2.Smm DS XPS Volume: 62.3 m ³ 50.1 m ³ Marmox (UK) Lid Air Pressure: 987 mbar Sample Weight: 4.0 kg/m ³ Air Pressure: 987 mbar Product 12.Smm DS XPS Image: Sound Reduction Index, dB Image: Sound Reduction Index, dB <th>Test Number:</th> <th>Laboratory M</th> <th></th> <th>of Sour</th> <th>nd Re</th> <th>ductic</th> <th>n Inde</th> <th></th> <th></th> <th></th> <th></th> <th>140-2</th> <th>:202</th> <th></th> <th>rce</th> <th></th> <th>R</th> <th>eceiv</th> <th>ing</th> | Test Number: | Laboratory M | | of Sour | nd Re | ductic | n Inde | | | | | 140-2 | :202 | | rce | | R | eceiv | ing |
| Test Date: 10/11/2023 Air Humidity: 68 % 68 % Sample Width: 2.12 m Air Pressure: 62 % 68 % Sample Width: 2.00 m Air Pressure: 987 mbar Sample Width: 2.00 m Air Pressure: 987 mbar Sample Width: 2.00 m Air Pressure: 987 mbar Product I.S.mm DS XPS Identification: 60 % 60 % Frequency Hz Sound Reduction Index, dB 00 0 0 0 0 0 0 0 <td< td=""><td>Client:</td><td>Marmo</td><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>ture:</td><td></td><td>12.2</td><td>°C</td><td></td><td></td><td></td><td></td></td<> | Client: | Marmo | - | | | | | | | | | ture: | | 12.2 | °C | | | | |
| Sample Height: 2.12 m Volume: 62.3 m ³ 50.1 m ³ Sample Width: 2.00 m Air Pressure: 987 mbar Sample Weight: 4.0 kg/m ³ 100 11.5 Product ISmm DS XPS Identification: 11.6 ^{1/} / Oct Octave 50+ 11.6 11.6 11.6 100 11.5 125 11.3 1100 11.5 125 11.3 100 11.5 125 11.3 11.6 11.6 100 11.5 125 11.3 11.6 11.6 100 12.2 11.5 14.1 400 14.9 50.0 16.7 16.0 22.1 210 26.5 2200 26.5 250 27.0 1600 25.3 26.2 2500 27.0 28.6 3000 30.0 2000 26.5 2000 27.0 10000 27.1 10000 27.1 10000 28.8 880.0+ 30.0 </td <td>Test Date:</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Air H</td> <td>Iumi</td> <td>idity</td> <td>:</td> <td></td> <td>68</td> <td>%</td> <td></td> <td></td> <td>68 %</td> <td>, ></td> | Test Date: | | | | | | | | Air H | Iumi | idity | : | | 68 | % | | | 68 % | , > |
| Sample Weight: 1.0 kg/m ² Product: IS.nm DS XPS Iteratification: Iteratification: Frequency Hz Sound Reduction Index, dB 100 11.6 100 11.6 100 11.5 1225 11.3 100 13.5 1255 12.9 1315 14.1 400 14.9 500 16.7 1315 14.1 4000 14.9 1500 16.5 1600 22.1 1255 12.9 1315 14.1 4000 22.1 1600 23.3 1600 25.3 1600 25.3 1600 25.3 1600 25.3 1600 25.3 1600 27.0 1600 27.0 1600 27.0 1600 27.0 1600 27.0 1600 27.0 1600 27.0 1600 30.0 1600 27.0 1600 30.0 1600 27.0 1600 30.0 1600 < | Sample Height: | | 2.12 | m | | | | | | | | | | 62.3 | m³ | | ļ | 50.1 r | n³ |
| Product Identification: Sound Reduction Index, dB Frequency Hz Sound Reduction Index, dB ½ Occ Occave 50+ 17.3 100 11.5 125 11.3 110 11.9 250 12.9 250 12.9 1315 14.1 400 14.9 550 16.5 630 18.5 1000 22.1 125 21.9 1315 14.1 4000 12.2 1300 22.1 21.0 21.9 135 24.2 1600 25.3 2200 26.5 2500 27.0 315 27.3 2800 20.0 2000 26.5 2000 26.5 30.0 30.4 30.0 30.4 30.0 30.4 30.0 30.4 30.0 | Sample Width: | | 2.00 | m | | | | | Air F | ress | ure | | | | ç | 987 n | nbar | | |
| Hdentification: Frequency Hz Sound Reduction Index, dB 100 11.5 11.5 11.6 100 11.5 125 11.3 100 11.5 125 11.3 100 11.5 125 11.3 100 15.0 200 15.0 250 12.9 1315 14.1 400 14.9 500 16.7 1600 22.1 21.9 21.9 135 14.1 4000 22.1 21.0 21.9 1350 27.3 2000 26.5 2500 27.0 3150 27.3 4000 29.0 2500 30.0 630+ 30.4 800+ 30.4 800+ 30.4 800+ 30.4 800+ 30.4 800+ 30.4 800+ 30.4 80 | | | 4.0 | kg/m² | | | | | | | | | | | | | | | |
| Sound Reduction Index, dB Sound Reduction Index, dB Sound Reduction Index, dB 50+ 17.3 Octave 63+ 11.6 11.6 80+ 9.3 11.5 125 11.3 11.9 160 13.2 000 200 15.0 255 12.9 315 14.1 400 14.9 500 16.7 1600 22.1 1150 22.1 1600 25.3 2000 26.5 2500 27.0 1600 25.3 2000 26.5 2500 27.0 1600 25.3 2000 26.5 25500 27.0 3150 27.3 4000 29.0 3150 27.3 4000 29.0 3150 27.3 4000 29.0 3150 27.1 10000+ <td></td> <td>I2.5mm DS XPS</td> <td></td> | | I2.5mm DS XPS | | | | | | | | | | | | | | | | | |
| Frequency Hz 50+ 17.3 Octave 50+ 17.3 11.6 11.6 80+ 9.3 11.5 1125 11.3 11.9 160 13.2 200 15.0 255 12.9 13.9 315 14.1 400 14.9 500 16.7 630 18.5 6300 22.1 2150 24.2 1600 25.3 2000 26.5 3150 27.3 4000 29.0 25500 27.3 4000 29.0 2500 27.3 4000 29.0 2500 27.3 4000 29.0 3150 27.3 4000 29.0 3150 27.3 4000 30.0 3150 27.1 10000+ < | | | | | 70.0 | | | | | | | | | | | | | | |
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| 504 17.3 Octave 63+ 11.6 11.6 80+ 9.3 100 11.5 125 11.3 125 11.3 125 11.3 200 15.0 250 12.9 315 14.1 400 14.9 500 16.7 1600 22.1 2150 24.2 1600 25.3 2000 26.5 2500 27.0 3150 27.3 4000 29.0 28.6 3000+ 30.4 8000+ 30.0 1000+ 24.1 Average 18.8 | | | | | | | | | | | | uction | | | | | | | |
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| 63+ 11.6 11.6 80+ 9.3 100 11.5 125 11.3 125 11.3 1200 15.0 2200 15.0 250 12.9 315 14.1 400 14.9 500 16.7 630 18.5 800 20.3 1000 22.1 2150 22.1 2150 22.1 2150 24.2 1600 25.3 2000 26.5 2500 27.0 3150 27.3 4000 29.0 20.0 30.4 8000+ 30.4 8000+ 30.4 8000+ 30.4 8000+ 30.4 8000+ 30.4 8000+ 38.8 | | | | | 60.0 - | | | | 1 | Rw re | eferer | nce cur | ve 🗆 | _ | | | | | |
| 100 11.5 125 11.3 11.9 160 13.2 13.9 200 15.0 13.9 250 12.9 13.9 315 14.1 400 400 14.9 6.5 630 18.5 800 20.3 1000 22.1 2150 24.2 1600 25.3 2000 26.5 2500 27.0 3150 27.3 4000 29.0 28.6 5000 30.0 6300+ 30.4 8000+ 30.0 27.1 1000+ Average 18.8 SRLVersion SRLVersion | | | 11.6 | | | | | | | | | | | | | | | | |
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| 400 14.9 500 16.7 630 18.5 800 20.3 1000 22.1 21.9 21.9 1600 25.3 2000 26.5 2500 27.0 3150 27.3 4000 29.0 28.6 20.0 6300+ 30.0 6300+ 30.0 20.0 27.1 1000+ 24.1 Average 18.8 SRLVersion SRLVersion | | | 13.9 | | | | | | | | | | | | | | | | |
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| 2000 26.5 26.2 2500 27.0 3150 27.3 4000 29.0 28.6 5000 30.0 6300+ 30.4 8000+ 30.0 27.1 10000+ 4.1 10.0 | | | 10.5 | nde | | | | | | | | | | | | | | | |
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| 5000 30.0 6300+ 30.4 8000+ 30.0 10000+ 24.1 Average 18.8 | | | 28.6 | | | | | | | | † | | | 1 | | | | | |
| 6300+ 30.4 8000+ 30.0 10000+ 24.1 Average 18.8 | | | | | 20.0 - | | | | | / | | | \square | | | | | | |
| 8000+ 30.0 27.1 10000+ 24.1 Average 18.8 | | | | | | | | | 1 | | | | | | | | | | |
| I 0000+ 24.1 Average 18.8 SRLVersion | 8000+ | | 27.1 | | | | | \wedge | 1, | \vdash | | | | | | | | | |
| Average 18.8 SRLVersion 10.0 | 10000+ | | | | | | | 1 | \checkmark | | | | | | | | | | |
| | Average 100-3150 | | SRL Version | | 10.0 | \square | / | | | | | | | | | | | | |
| | | | nd | | | // | | | | | | | | | | | | | |
| * shows measurement corrected for background | | | | | - | r I | | | | | | | | | | | | | |
| > shows measurement limited by background | | • | UKAS accr | edited | 0.0 | | - | <u> </u> | <u> </u> | | | -+ | + | <u> </u> | | | -+ | <u> </u> | + |
| > shows measurement limited by background + shows Frequency beyond standard and not UKAS accredited 0.0 | Rating according to R _w (C;C _{tr})= | BS EN ISO 717-1:2020 22 (-1;-3) dB | | | 2 | 125 | 160 | 200 | 250 | 315 400 | 6 | 630 | 800 | 8 cy, Hz | 250 | 2000 | 2500 | 3150 | 4000 |





| | | | | Data | shee | <u>et o</u> | | | | | | | | | | | | |
|----------------------------|--------------------------------|------------------|---------------------------|--------|--------|-------------|------|--------------|------------|------------|------------|---------|--------------|-----|--------|----------|----------|------|
| | Laboratory N | | of Sou | ind Re | ductio | n Ind | ex t | | | | 0140-2 | :202 | | | | | <u> </u> | |
| Test Number: | | 6 | | | | | | | : Roo _ | | | | Sou | | | | ceivi | - |
| Client: | Marm | ox (UK) Ltd | | | | | | | | | ture: | | 12.2 | | | | 2.1 °C | |
| Test Date: | | 10/11/2023 | | | | | | | Hum | | / : | | 68 | | | | 68 % | |
| Sample Height: | | 2.12 | | | | | | | ime: | | | | 62.3 | | ~ 7 | | 0.1 m | 3 |
| Sample Width: | | 2.00 | | | | | | Air | Press | sure | : | | | 9 | 87 m | ibar | | |
| Sample Weight: | | 4.3 | kg/m² | | | | | | | | | | | | | | | |
| Product Identification: | 20mm DS XPS | | | | | | | | | | | | | | | | | |
| | | | | 70.0 | | | | | | | | | | | | | | |
| Energy an av Lie | Sound Reduction In | dex, dB | | | | | | | | | | 4 | | | | | | |
| Frequency Hz | | | | | | | - | | | | luction | | | | | | | |
| | ⅓ Oct | Octave | | | | | | | Index | | | | | | | | | |
| 50+ | 15.5 | | | 60.0 | | | | | Rw re | eferer | nce cui | ve L | | | | | | |
| 63+ | 11.5 | 11.1 | | 00.0 | | | | | | | | | |] | | | | |
| 80+ | 8.7 | | | | | | 4 | | | | | | | | | | | |
| 100 | 11.0 | | | | | | | | | | | | | | | | | |
| 125 | 2. | 11.7 | | | | | | | | | | | | | | | | |
| 160 | 12.0 | | | 50.0 | | _ | _ | _ | - | | | _ | | | | | | |
| 200 | 15.3 | | | | | | | | | | | | | | | | | |
| 250 | 13.3 | 14.3 | | | | | | | | | | | | | | | | |
| 315 | 14.5 | | | | | | | | | | | | | | | | | |
| 400 | 16.1 | | Вb | | | | | | | | | | | | | | | |
| 500 | 17.5 | 17.4 | lex, | 40.0 | | | - | | | | | - | | | | | | |
| 630 | 19.2 | | u luc | | | | | | | | | | | | | | | |
| 800 | 20.3 | | tior | | | | | | | | | | | | | | | |
| 1000 | 22.2 | 21.9 | onpa | | | | | | | | | | | | | | | |
| 1250 | 24.2 | | Sound Reduction Index, dB | 30.0 | | | | | | | | | | | | | | |
| 1600 | 25.1 | | unc | 30.0 | | | Τ | | | | | | | | | | | F |
| 2000 | 25.6 | 25.6 | х | | | | | | | | | | | | | | 1 | |
| 2500 | 26.1 | | | | | | | | | | | 1- | 1- | | \neg | | | |
| 3150 | 27.7 | | | | | | | | | ا بر ا | † ' | - | \backslash | | | | | |
| 4000 | 29.4 | 28.9 | | 20.0 | | | + | | / | | | \prec | | | | | | |
| 5000 | 30.1 | | | | | | | | i | | \wedge | | | | | | | |
| 6300+ | 28.8 | | | | | | | 1 | | | | | | | | | | |
| 8000+ | 21.2 | 23.5 | | | | | | \checkmark | 1 | | | | | | | | | |
| 10000+ | 23.3 | | | | | \dashv | / | | | | | | | | | | | |
| Average 100-3150 | 18.9 | SRL Version 3 | | 10.0 | | ,/ | - | | | | | + | | | -+ | | + | |
| | l ent corrected for backgro | und | | | | | | | | | | | | | | | | |
| | ent limited by background | | | | | | | | | | | | | | | | | |
| | beyond standard and no | t UKAS accr | edited | 0.0 | | | | | - | | | | <u> </u> | | | <u> </u> | <u> </u> | |
| Rating according to | BS EN ISO 717-1:2020 | | | | 125 | 160 | 200 | 250 | 315 | 400 700 | 500 630 | 800 | 8 cy, Hz | 007 | 2000 | 2500 | 3150 | 4000 |





Drawing I – Front View







Drawing 2 – Rear View







Appendix A - Details of Measurements

| A1. | Location |
|-----|--|
| | SRL Technical Services (Sound Research Laboratories) |
| | Holbrook House |
| | Little Waldingfield |
| | Sudbury |
| | Suffolk |
| | CO10 0TF |
| | Tel: 01787 247595 |

A2. Test Dates

10 November 2023

A3. Tester

Richard Calvert of SRL Technical Services Limited

A4. Instrumentation and Apparatus Used

| Make | Description | Туре |
|----------|--------------------------------|--------|
| Norsonic | Multichannel Sound Level Meter | Nor850 |
| Norsonic | Rotating microphone boom | Nor265 |
| G.R.A.S | Microphone Pre-Amp | 26AK |
| G.R.A.S | Calibrator | 42AB |
| G.R.A.S | Microphone | 40AR |





| Make | Description | Туре |
|---------------------|-----------------------------------|----------|
| dbx | Graphic Equaliser | 131s |
| Crown | Class D Amplifier | XLS 1502 |
| Ntek | Rotating microphone boom | MB01 |
| Bruel & Kjaer | Omni directional loud speaker | 4296 |
| QSC Audio | Power Amplifier | RMX 1450 |
| National Geographic | Temperature & Humidity & Probe | 9070600 |

A5. References

| BS EN ISO 717-1:2020 | Rating of sound insulation in buildings and of building elements. Part 1: Airborne Sound Insulation. |
|------------------------|--|
| BS EN ISO 10140-2:2021 | Laboratory measurement of sound insulation for building elements. Part 2: Measurement of airborne sound insulation. |





Appendix B – Test Procedure

Measurement of Sound Transmission in Accordance With BS EN ISO 10140-2 - TP33

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 block dividing wall between the two rectangular reverberant or acoustically "live" rooms, both of which are constructed from blockwork with reinforced concrete floors and roofs. The block wall has dimensions of 4.18m wide x 2.62m high and forms the whole of the common area between the two rooms.

One of the rooms termed the source room has a volume of 62.3 cubic metres and is isolated by the use of resilient mountings and seals, from the surrounding structure and the adjoining room. The adjoining receiving room has a volume of 50.1 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, filtered into one third octave band widths, integrated and averaged by means of a Real Time Analyser using a microphone on an oscillating microphone boom. The value obtained at any particular frequency is known as the equivalent sound pressure level for either source or receiving rooms. The change in level across the test sample is termed the equivalent sound pressure level difference, i.e.

$D = L_1 - L_2$

where

- D is the equivalent sound pressure level difference, dB
- L_1 is the equivalent sound pressure level in the source room, dB
- L₂ is the equivalent sound pressure level in the receiving room, 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:

$$R = D + 10log_{10} \frac{s}{4}$$
in decibels

where

- S is the area of the sample, m²
- A is the total absorption in the receiving room, m²

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 a sample is installed on site and forms part of an enclosure of building, the sound insulation obtained will be dependent upon its surface area, the larger the area the greater the sound energy transmitted, as well as the absorption in the receiving area. In addition, the overall sound insulation of an enclosure is also determined by the sound transmission through other building elements, some of which may have an inferior performance to the sample. Because of this the potential Sound Reduction Index of a sample is not always fully realised in practice. A further consequence is that the Sound Reduction Index of a particular sample can only successfully be measured in a laboratory because only under such controlled conditions can the sound transmission path be limited to the sample under test.

 R_w , C and C_{tr} have been calculated in accordance with the relevant section of BS EN ISO 717-1 from the results of laboratory tests carried out in accordance with BS EN ISO 10140-2.





Appendix C – Measurement Uncertainty

TP33 - Measurement Uncertainty BS EN ISO 10140-2

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, ± dB |
|---------------|-------------------|
| 100 | 3.2 |
| 125 | 2.9 |
| 160 | 2.5 |
| 200 | 2.5 |
| 250 | 1.8 |
| 315 | 1.8 |
| 400 | 1.5 |
| 500 | 1.5 |
| 630 | 1.2 |
| 800 | 1.2 |
| 1000 | 1.2 |
| 1250 | 1.2 |
| 1600 | 1.2 |
| 2000 | 1.2 |
| 2500 | 1.2 |
| 3150 | 1.2 |





Acoustics

Since 1967, our team of acoustic consultants has played a key role in major projects where noise or vibration is an issue, in the UK and across the globe – whether it's planning, performance prediction, design, inspection, troubleshooting, measurement or commissioning.

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We offer a comprehensive service to model, monitor and analyse air quality, delivering assessments for a broad range of projects and purposes, for both private and public sector clients.

Carbon & Net Zero

Top of the agenda is tackling energy and carbon reduction to limit the impact of climate change. Our team of consultants will help you to achieve your sustainability objectives.

Lab & Site Testing

Design based on test data will always achieve the best results – and that's why we offer a wide range of acoustic testing at our independently accredited laboratories, as well as on-site testing to support live projects.

Monitoring

Our specialist services to monitor and assess noise, vibration, dust, air quality and odour employ the latest technology to provide remote access to data, helping to address issues quickly and to protect our clients.

Noise & Vibration

Ensuring noise and vibration does not exceed agreed levels is an important part of our environmental management services, using state-of-the-art technology to access real-time data remotely, to enable swift remedial action if required.

Odour & Dust

As part of our portfolio of environmental monitoring services, we offer specialist advice on the adverse impact of dust and odour across a range of projects including construction, waste handling and mineral extraction.

Sustainability

Minimising the impact on the environment is at the centre of today's business objectives. Our specialist services help our clients to fulfil their obligations, whether it's a BREEAM assessment, Energy Carbon Reduction or Net Zero.