Pilkington **Optiphon™**
Laminated Glass for noise control
Pilkington Optiphon™

Laminated glass for superior noise insulation

Pilkington Optiphon™ is the ideal choice of glass in situations where there is excess noise from road, rail or air traffic, or various other sources, for example factories or nightclubs.

Pilkington Optiphon™ is a high quality acoustic laminated glass incorporating a special PVB (PolyVinyl Butyral) interlayer. It offers excellent noise reduction without compromising on light transmittance or impact performance.

The desired acoustic performance can be achieved through combining various thicknesses of glass with a PVB interlayer. With a large variety of product combinations, Pilkington Optiphon™ offers the opportunity to achieve specific noise reduction requirements.

Benefits
- Special PVB interlayer for enhanced sound insulation performance
- A thinner and lighter glass for the equivalent acoustic performance
- Available in jumbo and lehr end sizes
- All products achieve at least safety class 1(B)1 (EN 12600) and are available to meet security glass grades contained in EN 356
- A high acoustic performance can be achieved when used in Insulating Glass Units (IGUs)
- Can also be used to improve noise insulation in a triple glazing construction

Pilkington Optiphon™ can be combined with other Pilkington products for a multi-functional noise-reduction single glazing or IGU providing additional benefits, such as:
- Thermal insulation with Pilkington K Glass™ / Pilkington Optitherm™ (coating in position 3 in IGU)
- Solar control with Pilkington Suncool™ (coating in position 2 in IGU)
- Self-cleaning with Pilkington Activ™ (coating in position 1 in IGU)
Technical Definitions

Sound Reduction Index
$R_w$ is the weighted sound reduction, in decibels, which incorporates a correction for the ear’s response.

$C$ and $C_{tr}$ are the spectrum adjustments, which are the values added to $R_w$ to take account of the characteristics of particular sound spectra. Typical noise sources for each spectrum adaptation terms are given below.

Relevant spectrum adaptation term $C$
Type of noise source:
- Living activities (talking, music, radio, TV)
- Children playing
- Railway traffic at medium and high speed
- Jet aircraft, short distance away
- Motorway traffic >50 mph
- Factories emitting mainly medium and high frequency noise.

Relevant spectrum adaptation term $C_{tr}$
Type of noise source:
- Urban road traffic
- Railway traffic at low speeds
- Aircraft, propeller driven
- Jet aircraft, long distance away
- Disco music
- Factory emitting mainly low and medium frequency noise.
## Sound insulation data for standard products

<table>
<thead>
<tr>
<th>Glass</th>
<th>Sound reduction index (dB)</th>
<th>Octaveband Centre Frequency (Hz)</th>
<th>$R_w$</th>
<th>$R_w+C$</th>
<th>$R_w+C_{tr}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>125</td>
<td>250</td>
<td>500</td>
<td>1000</td>
<td>2000</td>
</tr>
<tr>
<td><strong>Single glazing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 mm Float Glass</td>
<td>17</td>
<td>20</td>
<td>26</td>
<td>32</td>
<td>33</td>
</tr>
<tr>
<td>6 mm Float Glass</td>
<td>18</td>
<td>23</td>
<td>30</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>8 mm Float Glass</td>
<td>20</td>
<td>24</td>
<td>29</td>
<td>34</td>
<td>29</td>
</tr>
<tr>
<td>10 mm Float Glass</td>
<td>23</td>
<td>26</td>
<td>32</td>
<td>31</td>
<td>32</td>
</tr>
<tr>
<td>12 mm Float Glass</td>
<td>27</td>
<td>29</td>
<td>31</td>
<td>32</td>
<td>38</td>
</tr>
<tr>
<td>6 mm Laminated Glass</td>
<td>20</td>
<td>23</td>
<td>29</td>
<td>34</td>
<td>32</td>
</tr>
<tr>
<td>8 mm Laminated Glass</td>
<td>20</td>
<td>25</td>
<td>32</td>
<td>35</td>
<td>34</td>
</tr>
<tr>
<td>10 mm Laminated Glass</td>
<td>24</td>
<td>26</td>
<td>33</td>
<td>35</td>
<td>44</td>
</tr>
<tr>
<td>12 mm Laminated Glass</td>
<td>24</td>
<td>27</td>
<td>33</td>
<td>32</td>
<td>37</td>
</tr>
<tr>
<td><strong>Insulating glass units</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 mm / (6 - 16 mm) / 4 mm</td>
<td>21</td>
<td>17</td>
<td>25</td>
<td>35</td>
<td>37</td>
</tr>
<tr>
<td>6 mm / (6 - 16 mm) / 4 mm</td>
<td>21</td>
<td>20</td>
<td>26</td>
<td>38</td>
<td>37</td>
</tr>
<tr>
<td>6 mm / (6 - 16 mm) / 6 mm</td>
<td>20</td>
<td>18</td>
<td>28</td>
<td>38</td>
<td>34</td>
</tr>
<tr>
<td>8 mm / (6 - 16 mm) / 4 mm</td>
<td>22</td>
<td>21</td>
<td>33</td>
<td>40</td>
<td>38</td>
</tr>
<tr>
<td>8 mm / (6 - 16 mm) / 6 mm</td>
<td>20</td>
<td>21</td>
<td>33</td>
<td>40</td>
<td>36</td>
</tr>
<tr>
<td>10 mm / (6 - 16 mm) / 4 mm</td>
<td>24</td>
<td>21</td>
<td>32</td>
<td>37</td>
<td>42</td>
</tr>
<tr>
<td>10 mm / (6 - 16 mm) / 6 mm</td>
<td>24</td>
<td>24</td>
<td>32</td>
<td>37</td>
<td>44</td>
</tr>
<tr>
<td>6 mm / (6 - 16 mm) / 6 mm Laminated</td>
<td>20</td>
<td>19</td>
<td>30</td>
<td>39</td>
<td>37</td>
</tr>
<tr>
<td>6 mm / (6 - 16 mm) / 10 mm Laminated</td>
<td>24</td>
<td>25</td>
<td>33</td>
<td>39</td>
<td>40</td>
</tr>
</tbody>
</table>

The above are generally accepted values for generic products taken from EN 12758. They are conservative values that can be used in the absence of measured data.

Data for laminated glass is based on pvb interlayers (excluding acoustic pvb interlayers). Glass thickness for laminated glass excludes interlayer thickness.

Data can be adopted for air or argon gas-filled cavities

$R_w$ = Weighted sound reduction. This scale allows for the response of the human ear and could be used for determining a suitable product to reduce noise such as voices.

$C$ = An adjustment to the $R_w$ scale that could be used for selecting a product to reduce noise from music, radio, tv, high speed traffic and other medium to high frequencies.

$C_{tr}$ = An adjustment to the $R_w$ scale that could be used for selecting a product to reduce noise from urban road traffic, disco music and other noises with a large component of low frequencies.

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CE marking confirms that a product complies with its relevant harmonised European Norm.

The Declaration of Performance for each product, including declared values, can be found at www.pilkington.com/CE
### Glass Sound reduction index (dB)

<table>
<thead>
<tr>
<th>Octaveband Centre Frequency (Hz)</th>
<th>R_w(C; Ctr)</th>
<th>R_w</th>
<th>R_w+C</th>
<th>R_w+Ctr</th>
</tr>
</thead>
<tbody>
<tr>
<td>125</td>
<td>26</td>
<td>36</td>
<td>36 (-1; -4)</td>
<td>36</td>
</tr>
<tr>
<td>250</td>
<td>27</td>
<td>36</td>
<td>35</td>
<td></td>
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<tr>
<td>500</td>
<td>31</td>
<td>40</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td>36</td>
<td>40</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>39</td>
<td>43</td>
<td>37 (-1; -4)</td>
<td></td>
</tr>
<tr>
<td>4000</td>
<td>39</td>
<td>43</td>
<td>37</td>
<td></td>
</tr>
</tbody>
</table>

#### Single glazing

- **6.8 mm Pilkington Optiphon™**
  - 125: 26 dB
  - 250: 27 dB
  - 500: 31 dB
  - 1000: 36 dB
  - 2000: 39 dB
  - 4000: 39 dB

- **8.8 mm Pilkington Optiphon™**
  - 125: 24 dB
  - 250: 28 dB
  - 500: 34 dB
  - 1000: 38 dB
  - 2000: 37 dB
  - 4000: 37 dB

- **9.1 mm Pilkington Optiphon™**
  - 125: 26 dB
  - 250: 29 dB
  - 500: 34 dB
  - 1000: 38 dB
  - 2000: 43 dB
  - 4000: 37 dB

- **12.8 mm Pilkington Optiphon™**
  - 125: 30 dB
  - 250: 32 dB
  - 500: 37 dB
  - 1000: 41 dB
  - 2000: 39 dB (0; -2)

- **13.1 mm Pilkington Optiphon™**
  - 125: 30 dB
  - 250: 33 dB
  - 500: 37 dB
  - 1000: 41 dB
  - 2000: 40 dB (0; -2)

#### Insulating glass units

- **6 mm / 16 mm argon / 6.8 mm Pilkington Optiphon™**
  - 125: 22 dB
  - 250: 27 dB
  - 500: 35 dB
  - 1000: 42 dB
  - 2000: 41 dB
  - 4000: 44 dB
  - R_w(C; Ctr) = 38 dB

- **6 mm / 16 mm argon / 8.8 mm Pilkington Optiphon™**
  - 125: 24 dB
  - 250: 26 dB
  - 500: 40 dB
  - 1000: 46 dB
  - 2000: 46 dB
  - 4000: 54 dB
  - R_w(C; Ctr) = 41 dB

- **8 mm / 16 mm argon / 9.1 mm Pilkington Optiphon™**
  - 125: 24 dB
  - 250: 29 dB
  - 500: 41 dB
  - 1000: 47 dB
  - 2000: 47 dB
  - 4000: 47 dB
  - R_w(C; Ctr) = 43 dB

- **10 mm / 16 mm argon / 9.1 mm Pilkington Optiphon™**
  - 125: 29 dB
  - 250: 33 dB
  - 500: 44 dB
  - 1000: 49 dB
  - 2000: 49 dB
  - 4000: 45 dB
  - R_w(C; Ctr) = 45 dB

- **8.8 mm Pilkington Optiphon™ / 16 mm argon / 12.8 mm Pilkington Optiphon™**
  - 125: 26 dB
  - 250: 36 dB
  - 500: 46 dB
  - 1000: 50 dB
  - 2000: 52 dB
  - 4000: 63 dB
  - R_w(C; Ctr) = 47 dB

- **9.1 mm Pilkington Optiphon™ / 20 mm argon / 13.1 mm Pilkington Optiphon™**
  - 125: 29 dB
  - 250: 39 dB
  - 500: 49 dB
  - 1000: 52 dB
  - 2000: 55 dB
  - 4000: 63 dB
  - R_w(C; Ctr) = 50 dB

Measurements undertaken in accordance with BS EN ISO 10140 and R_w (C; Ctr) determined in accordance with BS EN ISO 717-1

For insulating glass units, there is little difference in the sound insulation for cavity widths in the range 6 to 16 mm

Pendulum body impact resistance to BS EN 12600 for all Pilkington Optiphon™ is Class 1 (B) 1

To calculate performance data for Pilkington products, please use our Spectrum online calculator at www.pilkington.co.uk/spectrum

For glass combinations to achieve an R_w value higher than 50 dB, please contact us for more details
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