



ACOUSTICS TESTED WINDOWS & DOORS



/ AWS SOUND INSULATING WINDOW SYSTEMS



# AWS HAS WINDOW AND DOOR SOLUTIONS TO HELP YOU MANAGE AND MINIMISE THE IMPACT OF SOUND WITHIN YOUR PROJECTS

## DISCLAIMER

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AWS is committed to offering window and door solutions that not only provide light and ventilation but help to create unique living spaces protected from harsh environmental elements.

Unwanted or harmful noise has increasingly become part of our urban environment causing annoyance and disturbance to our lifestyle.

Through considered innovation, AWS offers a range of windows and doors from the Elevate, Vantage and ThermalHEART brands to assist in insulating the building envelope from unwanted noise - making it easier to create beautiful living spaces which meet contemporary aspirations for efficiency and comfort.

These systems are tested by the National Acoustic Laboratories to provide the highest level of assurance in their performance integrity.



/ Scotts School, Albury. NBRSP Architects. Windows by DLG Aluminium & Glazing.



Our expectation for comfort and efficiency in our built environment is changing. Urban in-fill development, busier transportation routes and changes in the ways we use our homes are increasing our focus on achieving “acoustic comfort”.

In recent years the problem of unwanted or harmful noise has become a pressing issue throughout Australia. Local governments have

introduced regulations to address the problem, in some instances local municipalities have their own regulations or guidelines regarding noise abatement. It is likely that over the next few years regulations to address intrusive external noise will strengthen.

The correct selection of window and door systems can have a significant effect on the internal acoustic comfort of a building.

### SOUND LEVELS

Sound levels are expressed in decibels (dB). The higher the dB rating, the stronger the sound source – this is a measure of the Sound Pressure Level (SPL). SPL is a measure of the power of the sound source. Generally, we refer to this as “loudness”. Technically speaking, “loudness” is really a combination of the SPL and the duration of the sound.

The higher the dB rating, the stronger the sound. For example, the sound of a whistling bird (50dB) is stronger than the sound of a falling leaf (10dB).

Sound can occur as a single frequency (e.g. a single musical note) or can be made up of various frequencies (e.g. traffic noise).

A frequency is expressed in hertz (Hz). Generally when we refer to “high” or “low” pitched sound we are talking about sound frequency. Frequencies can be broken in to three categories, low tones, mid tones and high tones, The frequency range of urban road traffic is concentrated around the low tones whereas a whistling tea kettle consists of high tones.

The loudness (dB) and pitch (Hz) of a sound taken together determine their impact on our acoustic comfort and how to manage it.

100dB

EQUATES TO



NEARBY AIRCRAFT  
TAKING OFF



JACKHAMMER  
2M AWAY



NEARBY HEAVY  
TRAFFIC/HORNS

ACOUSTICS TESTED WINDOWS & DOORS  
**SOUND LEVELS**

WORLD HEALTH ORGANIZATION (WHO) COMMUNITY NOISE GUIDELINES

The Guidelines for Community Noise developed by the WHO seek to consolidate scientific knowledge on the health impacts of community noise. The report provides guidelines to environmental health authorities and professionals trying to protect people from the harmful effects of noise in non-industrial environments and establish criteria to protect the majority of the population from ill effects based on the research findings. These ill effects might typically be reducing the quality of sleep – which can have long term impacts on our general physiological health and well being.

MEASURING THE ACOUSTIC PERFORMANCE OF A WINDOW

Sound or acoustic performance of a window is measured by the weighted sound reduction index or  $R_w$  value.  $R_w$  values are determined by measuring the reduction in dB achieved where a window is used to insulate against a sound source.

The  $R_w$  value will increase as the acoustic performance of a window improves, so that a window with an  $R_w$  value of 41 has a significantly improved acoustic performance over a window with an  $R_w$  value of 30. Every improvement in  $R_w$  value equates to a reduction in decibels of 1.

$$80\text{dB} - R_w41 = 39\text{dB}$$

EXTERNAL NOISE      GLAZING UNIT      INTERNAL SOUND

RW CORRECTION VALUES

$R_w$  values represent aggregated data showing the average performance of a window across a broad spectrum of sounds.

One of the limitations of using this as measure of performance is that the response of the human ear to differentials in sound level is logarithmic, not linear.

What this means is that we are very sensitive to small changes in sound level, up or down, and that we perceive this change as being much greater or smaller depending on how loud the sound was in the first place.

Normal, casual conversation happens around the 60dB mark. We are most sensitive to changes around the mid frequency levels – 70dB (a dog barking) to 100dB (a lawnmower). Note that the sound levels we find annoying represent relatively small increases in the sound level (10dB to 40dB) but we would perceive these changes as more than doubling the impact of conversation level noise in the room in the first place.

To provide a more accurate description of a window's performance when subjected to different types of sound, we use correction values – these values are shown in brackets beside the  $R_w$  value, for example,  $R_w41 (-1,1)$ . These values are designed to balance the complex considerations of "loudness" (dB), "pitch" (Hz) and the intended use of the room.

The first value is the "C" value which represents mid and high tone noises (e.g. people talking). The second "C" value represents sound dominated by low and mid tones (e.g. road traffic noise). By applying these values to the defined  $R_w$  value you achieve a more reliable interpretation of a window's performance when subjected to specific noise sources.

If required, AMS can supply more specific information on the performance of our tested systems.

| TYPE OF NOISE SOURCE   | ADAPTATION TERM |
|--|-----------------|
| Living activities (talking, music, radio, tv)<br>Children playing<br>Railway traffic at medium and high speed<br>Highway road traffic >80km/h<br>Jet aircraft, short distance<br>Factories emitting mainly medium and high frequency noise | C               |
| Urban road traffic<br>Railway traffic at low speeds<br>Aircraft, propeller driven<br>Jet aircraft, large distance<br>Amplified music<br>Factories emitting mainly low and medium frequency noise   | Ctr             |

# WINDOW SELECTION CONSIDERATIONS

Correct specification and installation of windows for a project will help to ensure a building envelope achieves desired outcomes for reduction of unwanted sound. Sounds such as traffic or airport noise are major contributors to sound nuisance and can cause a range of physical and psychological concerns of residents. The ability for a window or door to provide good sound reduction is dependent upon a number of factors:

- » Glass selection
- » Quality of gaskets and seals
- » Window style
- » Correct installation

## GLASS SELECTION

### SINGLE GLAZING

As a general rule, where single glazing is used, the acoustic performance of the glass improves as the thickness increases.

### LAMINATED GLASS

Laminated glass will typically deliver better sound reduction properties than float or toughened glass. Laminated glass is made up of two panes of glass pressed together with a polyvinyl butyral inter layer. This layer is typically only .38mm in thickness but helps to absorb some vibrations, therefore performing better for sound reduction.

Special products have been designed to further improve the performance of laminated glass for sound reduction. Viridian VLam Hush™ uses a unique inter layer which is designed to dampen sound transmission over critical frequencies. This means that thinner and lighter glass can be used for equivalent acoustic performance of a thicker and heavier glass panel.

### DOUBLE GLAZING

Whilst double glazed door and window systems perform well in terms of sound reduction, double glazing may not necessarily deliver better acoustic performance than single glazing – particularly when compared with specially laminated glass.

Double glazing will perform better acoustically when the thickness of the two panes is increased and one of the panes is different in thickness to the other, known as asymmetric double glazing.

### ASYMMETRIC GLAZING

This involves placing two panes of differing thickness into one sealed unit e.g. a 6mm outer pane and a 4mm inner pane. This leads to a perceptible difference in performance compared to normal double glazing with two panes of the same thickness.

## INSTALLATION

Regardless of how a window is specified or constructed, if it is poorly installed it will not deliver its maximum sound reduction properties. Vantage, Elevate™ and ThermalHEART™ windows and doors must always be installed by a licensed builder or installer in accordance with correct installation guidelines.

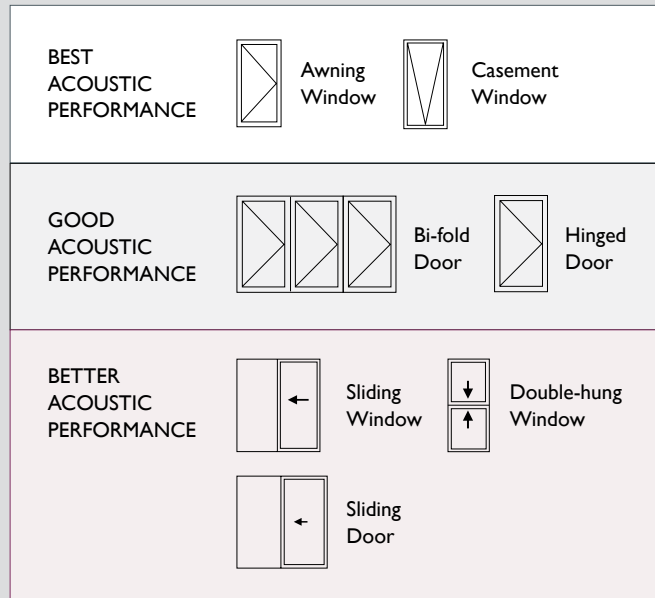
## WINDOW STYLE

The design, or format of a window or door will impact on its ability to deliver sound insulation.

By design, some windows and door styles “seal” better than others. For example, an awning window or casement window is designed so that the operable sash physically compresses the window seals when it closes, and as such will provide a much better performance than a sliding window which brushes past the sealing component (typically a mohair brush seal).

In the same way that water can leak into a poorly sealed structure, sound can leak or seep through a poorly sealed or poorly installed window.

### Comparison of acoustic performance by window style

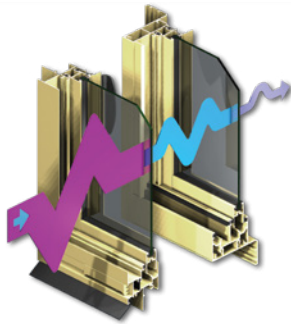


ACOUSTICS TESTED WINDOWS & DOORS  
**SOUNDOUT™ WINDOWS**

The best acoustic performance for windows comes when an air gap between 20mm and 150mm can be produced. This air gap is much larger than can be produced using typical hermetically sealed double glazed units. Instead a secondary window is installed 100mm behind the usual window (also known as secondary glazing).

AWS offers a number of SoundOUT™ secondary glazing solutions including:

- » Series 531 SoundOUT™ Sliding Window
- » Series 532 SoundOUT™ Casement Window
- » Series 533 SoundOUT™ Sliding Door
- » SoundOUT™ products can be installed behind existing windows or doors to achieve increased sound insulation for the building envelope.
- » SoundOUT™ secondary glazing system



SoundOUT™ secondary glazing system

ACOUSTIC TESTED SYSTEMS

AWS has tested the acoustic performance of a number of glass and frame combinations. All AWS windows and doors which have been acoustics tested are identified by the Acoustics Tested symbol illustrated on the right.



AWS has tested a number of systems for acoustic performance. The table below provides a summary of all tested systems.

| Series | Description                            | Glass                                    | R <sub>w</sub> (C <sub>tr</sub> ) | Test Report   |
|--------|--|--|-----------------------------------|---------------|
| 105    | Office Partitioning System             | 6.38mm/40mm Air/6.38mm                   | 40 (-3,-8)                        | 15-083-01     |
| 105    | Office Partitioning System             | 10.38mm/40mm Air/6.38mm                  | 44 (-1,-6)                        | 15-083-02     |
| 105    | Office Partitioning System             | 10.38mm/40mm Air/10.38mm                 | 45 (-1,-5)                        | 15-083-04     |
| 105    | Office Partitioning System             | 10.38mm                                  | 35 (-1,-2)                        | 15-083-04     |
| 400    | CentreGLAZE™                           | 6.5 Vlam Hush™                           | 34 (0;-3)                         | 4867-5 REV A  |
| 400    | CentreGLAZE™                           | 10.5 Vlam Hush™                          | 37 (0;-3)                         | 4867-6 REV A  |
| 400    | CentreGLAZE™                           | 10.38 Lam                                | 34 (-1;-2)                        | 4867-7 REV A  |
| 400    | CentreGLAZE™                           | 6.38 Lam                                 | 32 (-2;-3)                        | 4867-8 REV A  |
| 411    | Top-Hung Bifold Door                   | 6.38 Lam                                 | 28 (0;-2)                         | 4867-22       |
| 411    | Top-Hung Bifold Door                   | 8.38 lam                                 | 31 (-1,-2)                        | 4867-23       |
| 424    | CentreGLAZE™                           | 8.5 Vlam Hush™/10mm Air/6.5 Vlam Hush™   | 39 (-2;-6)                        | 4867-1        |
| 424    | CentreGLAZE™                           | 6.5 Vlam Hush™/12mm Air/6mm Tgh          | 36 (-1;-5)                        | 4867-2        |
| 442    | Commercial D'Stacker                   | 6.38 Lam                                 | 32 (-1,-2)                        | ALA-16-090-11 |
| 442    | Commercial D'Stacker                   | 10.5mm Vlam Hush™                        | 36 (0,-2)                         | ALA-16-090-12 |
| 442    | Commercial D'Stacker (Rail Stiffeners) | 12.5mm Vlam Hush™                        | 38 (-1,-3)                        | ALA-16-090-13 |
| 466    | Commercial Awning Window               | 6.5mm Vlam Hush™/10mm Air/8.5 Vlam Hush™ | 41 (-1;-5)                        | 4867-10       |
| 466    | Commercial Awning Window               | 6mm Tgh/12mm Air/6.5 Vlam Hush™          | 40 (-1;-5)                        | 4867-11       |
| 466    | Commercial Awning Window               | 6.5mm Vlam Hush™                         | 35 (-1;-4)                        | 4867-9        |
| 471    | Apartment Sliding Door                 | 6.5 Vlam Hush™                           | 32 (-1,-3)                        | 4867-19       |
| 471    | Apartment Sliding Door                 | 10.5 Vlam Hush™                          | 33 (0,-2)                         | 4867-20       |
| 471    | Apartment Sliding Door                 | 6.5 Vlam Hush™ / 8Air / 5Toughened       | 33 (-1;-2)                        | 4867-21       |
| 504    | Sliding Window                         | 3mm float                                | STC22                             | ATF283        |
| 504    | Sliding Window                         | 6.38mm Lam                               | 32 (-1;-2)                        | ATF813        |
| 504    | Sliding Window                         | 7.52mm Lam                               | 32 (-1;-2)                        | ATF814        |
| 504    | Sliding Window                         | 20mm IGU (6mm/8 Air/6.38 Lam)            | 30 (0,-1)                         | ALA 17-086-1  |
| 504    | Sliding Window                         | 6mm Glass                                | 29 (0,-1)                         | ALA 17-086-2  |
| 504    | Sliding Window                         | 10mm Glass                               | 31 (0,-1)                         | ALA 17-086-3  |
| 514    | Double-Hung Window                     | 7.52mm Lam                               | 30 (-2;-3)                        | AFT785        |
| 514    | Double-Hung Window                     | 5mm float                                | 28 (-2;-3)                        | ATF783        |
| 514    | Double-Hung Window                     | 6.38mm Lam                               | 29 (-3;-4)                        | ATF784        |
| 514    | Double-Hung Window                     | 7.52mm Lam                               | 30 (-2;-3)                        | ATF785        |
| 516    | Awning Window                          | 6.38mm Lam                               | 34 (-1;-2)                        | ATF1195       |
| 516    | Awning Window                          | 3mm                                      | STC30                             | ATF262        |
| 516    | Awning Window                          | 10.38mm Lam                              | STC36                             | ATF265        |
| 516    | Awning Window                          | 20mm IGU (6mm/8mm Air/6.38mm Lam)        | 33 (-1,-4)                        | ALA 17-086-4  |
| 516    | Awning Window                          | 6mm                                      | 30 (-1,-1)                        | ALA 17-086-5  |
| 516    | Awning Window                          | 10mm                                     | 33 (-1,-2)                        | ALA 17-086-6  |



| Series | Description  | Glass                              | Rw (C;C <sub>tr</sub> ) | Test Report   |
|--------|--|------------------------------------|-------------------------|---------------|
| 531    | SoundOUT™ Sliding Window with primary 504 Awning window (3mm float) and 100mm air gap  | 6.38mm Lam                         | STC38                   | ATF284        |
| 531    | SoundOUT™ Sliding Window with primary 504 Sliding window (3mm float) and 100mm air gap | 7.52mm Lam                         | 41 (-2;-8)              | ATF816        |
| 531    | SoundOUT™ Sliding Window with primary 504 Sliding window (3mm float) and 100mm air gap | 6.38mm Lam                         | 41 (-2;-7)              | ATF817        |
| 532    | SoundOUT™ Casement with primary 516 Awning window (3mm float) and 100mm air gap        | 6.38mm Lam                         | STC45                   | ATF263        |
| 532    | SoundOUT™ Casement with primary 516 Awning window (3mm float) and 100mm air gap        | 10.38mm Lam                        | STC50                   | ATF264        |
| 533    | SoundOUT™ Sliding Door with primary 541 Sliding Door (4mm Tgh) and 100mm air gap       | 6.38mm Lam                         | 42 (-1;-6)              | ATF798        |
| 533    | SoundOUT™ Sliding Door with primary 541 Sliding Door (4mm Tgh) and 100mm air gap       | 6.38mm Lam                         | 42 (-1;-6)              | ATF799        |
| 533    | SoundOUT™ Sliding Door with primary 541 Sliding Door (4mm Tgh) and 100mm air gap       | 4mm Tgh                            | 41 (-2;-7)              | ATF800        |
| 533    | SoundOUT™ Sliding Door   | 6.38mm Lam                         | 30 (1;-1)               | ATF801        |
| 533    | SoundOUT™ Sliding Door   | 7.52mm Lam                         | 31 (1;-1)               | ATF802        |
| 541    | Sliding Door   | 6.38mm Lam                         | 30 (-3;-4)              | ATF792        |
| 541    | Sliding Door   | 6.38mm Lam                         | 32 (-1;-2)              | ATF793        |
| 541    | Sliding Door   | 10.38mm Lam                        | 35 (-2;-3)              | ATF794        |
| 541    | Sliding Door   | 7.52mm Lam                         | 32 (0;-1)               | ATF795        |
| 541    | Sliding Door   | 5mm Tgh/9mm Air/5mm Tgh            | 33 (-1;-3)              | ATF796        |
| 541    | Sliding Door   | 4mm Tgh                            | 28 (-1;-2)              | ATF797        |
| 542    | Sliding Door   | 20mm IGU (6mm/8mm Air/6.38mm Lam)  | 33 (-1, -3)             | ALA 17-086-9  |
| 542    | Sliding Door (with rail stiffeners)  | 20mm IGU (6mm/8mm Air/6.38mm Lam)  | 34 (-1, -3)             | ALA 17-086-10 |
| 542    | Sliding Door (with rail stiffeners)  | 10mm Glass                         | 33 (-1, -3)             | ALA 17-086-11 |
| 542    | Sliding Door (with rail stiffeners)  | 6 mm Glass                         | 31 (-1, -2)             | ALA 17-086-12 |
| 548    | French Door System Outward Opening   | 5mm Tgh/9mm Air/5mm Tgh            | 33 (-2;-4)              | ATF803        |
| 548    | French Door System Outward Opening   | 6.38mm Lam                         | 32 (-2;-3)              | ATF804        |
| 602    | Sliding Window   | 20mm IGU (6mm/8mm Air/6.38mm Lam)  | 34 (-1, -3)             | ALA 17-086-7  |
| 601    | Sliding Window   | 4mm Float                          | 31 (-1;-2)              | ATF1198       |
| 601    | Sliding Window   | 10.38mm Lam                        | 35 (0;-1)               | ATF1199       |
| 601    | Sliding Window   | 6.38mm Lam                         | 33 (0;-1)               | ATF1200       |
| 601    | Sliding Window   | 4mm float/8mm Air/4mm Float        | 32 (0;-2)               | ATF1201       |
| 613    | Double-Hung Window   | 6.38mm Lam                         | 30 (0;-1)               | ATF1320       |
| 614    | Sashless Double Hung   | 6mm float                          | 26 (0;0)                | ATF1202       |
| 616    | Awning Window  | 4mm float                          | 32 (-2;-3)              | ATF1210       |
| 616    | Awning Window  | 6.38mm Lam                         | 34 (-1;-2)              | ATF1211       |
| 616    | Awning Window  | 10.38mm Lam                        | 36 (-1;-2)              | ATF1212       |
| 616    | Awning Window  | 6mm/12mm Air/6mm                   | 35 (-1;-3)              | ATF1213       |
| 618    | MAGNUM™ Sliding Door   | 6.38mm Vlam Hush™                  | 32 (0;-2)               | 4867-16       |
| 618    | MAGNUM™ Sliding Door   | 10.5mm Vlam Hush™                  | 34 (0;-2)               | 4867-17       |
| 618    | MAGNUM™ Sliding Door   | 6.5V Lam Hush™ / 8Air / 5Toughened | 35 (-1;-4)              | 4867-18       |

ACOUSTICS TESTED WINDOWS & DOORS  
**AWS PRODUCT SOLUTIONS**

| Series | Description                       | Glass  | Rw (C;C <sub>u</sub> ) | Test Report      |
|--------|-----------------------------------|--|------------------------|------------------|
| 622    | FrontGlaze™ Wide Gap Framing      | 10.76 Lam  | 38 (-1,-2)             | AC-PR0038F-CT-01 |
| 622    | FrontGlaze™ Wide Gap Framing      | 12.76 Lam  | 39 (-1,-2)             | AC-PR0038G-CT-01 |
| 626    | FrontGLAZE™ Double Glazed Framing | 6mm/12mm Air/6mm                                 | 32 (-2,-5)             | AC-PR0038J-CT-01 |
| 642    | Commercial D'Stacker Door         | 12.5mm VLam Hush™                                | 37 (0,-2)              | ALA-16-090-16    |
| 646    | SoundOUT™ FrontGLAZE™             | 12.50mm VLam Hush™ / 87.5Air / 12.50mm VLam Hush | 51 (-2,-6)             | 14-086-01        |
| 646    | SoundOUT™ FrontGLAZE™             | 10.50mm VLam Hush™ / 87.5Air / 10.50mm VLam Hush | 50 (-1,-5)             | 14-086-02        |
| 646    | SoundOUT™ FrontGLAZE™             | 10.38mm VLam Hush™ / 87.5Air / 10.38mm VLam Hush | 46 (-2,-5)             | 14-086-03        |
| 646    | SoundOUT™ FrontGLAZE™             | 10.5mm VLam Hush™ / 92.5Air / 6.50mm VLam Hush   | 50 (-2,-6)             | 14-086-04        |
| 646    | SoundOUT™ FrontGLAZE™             | 6.5mm VLam Hush/97.5Air/6.5VLam Hush             | 48 (-2,-6)             | 14-086-05        |
| 646    | SoundOUT™ FrontGLAZE™             | 6.38mm Lam /97.5mm Air/6.38mm Lam                | 43 (-2,-6)             | 14-086-06        |
| 665    | Commercial Awning Window          | 6mm/12mm Air/6.38mm Lam                          | 37 (-2,-6)             | AC-PR0038H-CT-01 |
| 665    | Commercial Awning Window          | 6mm/12mm Air/6mm                                 | 33 (-1,-4)             | AC-PR003I-CT-01  |
| 665    | Commercial Awning Window (AF)     | 6mm/12mm Air/6.38mm Lam                          | 33 (-2,-4)             | AC-PR0038C-CT-01 |
| 665    | Commercial Awning Window (A,F)    | 6mm/12mm Air/8.38mm Lam                          | 38 (-1,-4)             | AC-PR0038D-CT-01 |
| 704    | SlideMASTER™ Sliding Door         | 6.38mm Lam                                       | 30 (0;-1)              | ALA10-080        |
| 704    | SlideMASTER™ Sliding Door         | 10.38mm Lam                                      | 31 (-1;-1)             | ALA10-080        |
| 704    | SlideMASTER™ Sliding Door         | 10.5 VLam Hush™                                  | 33 (0;-2)              | ALA10-080        |
| 704    | SlideMASTER™ Sliding Door         | 6.38mm/11.24mm Air/6.38mm                        | 33 (-1,-3)             | 14-087-01        |
| 704    | SlideMASTER™ Sliding Door         | 10.38mm/7.62mm Air/6mm Tgh                       | 35 (0,-2)              | 14-087-02        |
| 726    | Thermally Broken Awning Window    | 8.5 VLam Hush™/10mm Air/6.5 VLam Hush™           | 41 (-1;-5)             | 4867-12          |
| 726    | Thermally Broken Awning Window    | 6.5 VLam Hush™/12mm Air/6mm Tgh                  | 40 (-1;-5)             | 4867-13          |
| 731    | Thermally Broken Sliding Door     | 8.5 VLam Hush/10mm Air/6.5 VLam Hush™            | 37 (-1,-3)             | 4867-14          |
| 731    | Thermally Broken Sliding Door     | 6mm Tgh/12mm Air/6.5 VLam Hush™                  | 37 (-1,-4)             | 4867-15          |
| 804    | Thermally Broken CentreGLAZE™     | 8.5 VLam Hush™/10mm Air/6.5 VLam Hush™           | 39 (-1;-6)             | 4867-3           |
| 804    | Thermally Broken CentreGLAZE™     | 6.5 VLam Hush™/12mm Air/6mm Tgh                  | 37 (-1;-5)             | 4867-4           |
|        | Sliding Window                    | 3mm/13mm Air/3mm                                 | 30 (-1;-3)             | ATF815           |
|        | Sliding Window                    | 6.38mm Lam                                       | 31 (0;-1)              | ATF818           |
|        | Sliding Window                    | 7.52mm Lam                                       | 31 (0;-1)              | ATF819           |



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