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## Visual Quality Inspection For Satin Glass Sealed Units

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### AREAS TO BE INSPECTED

#### REBATE ZONE

The area typically hidden within the glazing pocket approximately 25mm wide from edge of glass. This area is exempt from inspection.

#### EDGE ZONE

25mm band between the rebate zone and the main zone. This will be checked for seeds bubbles scratches or marks. Only defects over 2mm will be rejected within this zone unless in a cluster measuring 3mm or over is visible.

#### MAIN ZONE

This is the primary viewing area of both panes of glass for double glazing or a single pane. Inspection will take place as below.

### INSPECTION

All sealed units must be viewed at a distance equivalent to 2 meters or 3 meters when coated glass is used looking through the panes at 90 degrees to the surface. This inspection should take place without direct sunlight, but in good light conditions to simulate looking through a window.

### REJECTS

Any mark or scratch visible upon the above inspection must be more than 1mm in length and not within edge zone of the unit to be deemed as rejects. Any seed or bubble in float or toughened glass measuring more than 1mm should not be visible within the central viewing area (inside the edge zone) from the above inspection and therefore would be rejected. Any debris, mark, or damage on the spacer bar visible upon the above inspection will be deemed as a reject.

### EXCLUSIONS

Any shadow, ghosting or rainbow effect may be inherent with certain products and as such should not be rejected. Any mark that needs the viewing angle to vary before it becomes visible should not be accepted as a reject. The Satin coating applied to the glass is highly susceptible to marking in the manufacturing process. The uniformity of the Satin process cannot be guaranteed with isolated areas appearing either clear or black in appearance are acceptable. If the spacer bars do not line up perfectly, this will not affect the performance of the unit, a tolerance of 2-3mm is acceptable.

### SUMMARY

Any inspection which takes place should adhere to the above guidelines for glazing, an element of common sense should apply, Units which are going to be glazed in a roof or at a high level etc will obviously allow leniency within these guidelines. All sealed units can be highly reflective especially when coated products are used i.e. soft coat or solar control glass. These products may highlight imperfections, curving and ripples in the glass, this will not be deemed as fault as they can be unavoidable.

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## Visual Quality Inspection For Patterned Sealed Units

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### AREAS TO BE INSPECTED

#### REBATE ZONE

The area typically hidden within the glazing pocket approximately 25mm wide from edge of glass. This area is exempt from inspection.

#### EDGE ZONE

25mm band between the rebate zone and the main zone. This will be checked for seeds bubbles scratches or marks. Only defects over 2mm will be rejected within this zone unless in a cluster measuring 3mm or over is visible.

#### MAIN ZONE

This is the primary viewing area of both panes of glass for double glazing or a single pane. Inspection will take place as below.

### INSPECTION

All sealed units must be viewed at a distance equivalent to 2 meters or 3 meters when coated glass is used looking through the panes at 90 degrees to the surface. This inspection should take place without direct sunlight, but in good light conditions to simulate looking through a window.

### REJECTS

Any mark or scratch visible upon the above inspection must be more than 1mm in length and not within edge zone of the unit to be deemed as rejects. Any seed or bubble in float or toughened glass measuring more than 1mm should not be visible within the central viewing area (inside the edge zone) from the above inspection and therefore would be rejected. Any debris, mark, or damage on the spacer bar visible upon the above inspection will be deemed as a reject.

### EXCLUSIONS

Any shadow, ghosting or rainbow effect may be inherent with certain products and as such should not be rejected. Any mark that needs the viewing angle to vary before it becomes visible should not be accepted as a reject. Manufacture of patterned glass may result in marks on the surface of one side. These marks which are white in appearance are acceptable. If the spacer bars do not line up perfectly, this will not affect the performance of the unit, a tolerance of 2-3mm is acceptable.

### SUMMARY

Any inspection which takes place should adhere to the above guidelines for glazing, an element of common sense should apply, Units which are going to be glazed in a roof or at a high level etc will obviously allow leniency within these guidelines. All Sealed units can be highly reflective especially when coated products are used i.e. soft coat or solar control glass. These products may highlight imperfections, curving and ripples in the glass, this will not be deemed as fault as they can be unavoidable.

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## Our Guarantee

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Nicholls & Clarke Glass Ltd will supply Free of Charge replacements for any Eco-lite™ Sealed Units manufactured by the company, provided the following conditions are complied with:

1. That the Double or Triple Glazed Sealed Units have failed with the result of condensation forming within the unit.
2. That the Double or Triple Glazed Sealed Units have been glazed correctly within GGF guidelines.
3. That Wooden Frames glazed with the Double or Triple Glazed Sealed Units have been properly maintained.
4. That the Double or Triple Glazed Sealed Units have not been subject to any misuse or neglect.
5. The guarantee does not cover Glass Breakage.
6. Quality issues should be reported within 5 working days of receipt of goods, any orders placed after 5 days will be treated as new orders and charged accordingly. Please see our returns policy and procedure on page 14 within our Supply Proposal.

The guarantee will be honoured for sealed units glazed into wooden frame for five years. Sealed units glazed into UPVC or Aluminium frames will be subject to a ten-year guarantee.

Any claim against the Company in respect of the guarantee must be in writing, and if required a representative must be given the opportunity to inspect the sealed unit.

All products supplied F.O.C or credit on return under the terms & conditions of this guarantee must be made available for collection or returned to Nicholls and Clarke Glass Ltd.

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## Technical Information Sheet 1

## Fire Resistant Glass

### PRODUCTS

There are various types of fire resistant glass's available and these will generally fall into one of three main categories which are Wired, Laminated and modified toughened.

#### WIRED PRODUCTS

These products are manufactured with a square steel wire mesh running through the glass which is designed to hold the glass together in the event of breakage or fire. Such products are available in both clear and textured (obscured) form and there are also some versions which are safety rated to BS EN 14449 3(B)3 for impact. These products are suitable for integrity only situations and do not offer any insulation. Products that are stocked by N&C Glass which fall into this category are:

**Pyrostem Safety Clear, Georgian Wire Cast.**

#### LAMINATED PRODUCTS

These products are manufactured by sandwiching one or more fire resistant intumescent interlayers in between two or more sheets of clear glass. Ranging in thickness from 7mm to 27mm, such glasses offer varying levels of protection in the event of fire and are also all safety rated for impact to BS EN 14449. As laminated glass's some of them can also offer the additional benefit of insulation from fire, meaning that although a fire may be raging on the other side, the protected side will remain cool to touch for periods of up to 60 minutes for single glazed panels. Amongst the laminated fire resistant glass products that are stocked by N&C Glass are:

**7mm Pilkington Pyrodur Plus, 10 & 13mm Pilkington Pyrodur, 15, 18, 23 & 27mm Pilkington Pyrostop, 7.2mm Pyroguard in Clear, Satin & Obscure, 7mm Firedoor 60.**

#### MODIFIED TOUGHENED

These products are manufactured by toughening glass and adding various metallic coatings to the surface or additional elements into the raw glass mixture in order to give the glass more resistance to heat in the event of fire. However in the same way as the wired products these types of glass can only be used in integrity only situations and do not offer any insulation at all. These are all manufactured to order and therefore are not normal stocked products. N&C Glass can obtain these products if required, and some examples of these glass types are:

**Pyran 'S', Pyrocet, Pyrosec, Pyroclear.**

#### DOUBLE GLAZED FIRE RESISTANT GLASS UNITS

All fire resistant glass's can be incorporated into double glazed units in order to meet either building regulations, extended fire protection criteria or for simple aesthetic purposes. N&C Glass can manufacture fire resistant units to attestation level one which will meet most customer requirements.

To conform to UK legal requirements, all fire rated units must be manufactured to attestation level one.

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The table below lists the products available from stock at N&C Glass along with their respective fire ratings and suitability for use in various situations and frame types.

Fire Resistance Integrity / Insulation	Product	Internal / External	Max Tested Size Timber * Doors/Screens	Max Tested Size Steel * Doors/Screens	Impact Rating To BS EN 14449	Acoustic Rating
30 / 0	Pyrostem Safety Wired Clear	Both	Doors 818 x 1980 high Screens 1208 x 2607 high	No Evidence For Doors Screens 1537 x 2600 high	3 (B) 3	31 dB
30 / 0	7mm Pilkington Pyrodur Plus 30 - 104	Internal	Doors 950w x 2050 high Screens 1093 x 2050 high	Doors 1069 x 2050 high Screens 1690 x 2050 high	2 (B) 2	35 dB
30 / 0	7.2mm Pyroguard	Both	Doors – Various up to 0.72m2 Screens – Various up to 2.52m2	Doors – Various up to 0.82m2 Screens – Various up to 1.62m2	3 (B) 3	31 dB
30 / 0	10mm Pilkington Pyrodur 30 - 201	Both	Doors 965 x 2240 high Screens 2114 x 2523 high	Doors 1069 x 2415 high Screens 2561 x 3000 high	1 (B) 1	36 dB
60 / 0	Pyrostem Safety Wired Clear	Both	626 x 1300 high doors No Evidence For Screens	No Evidence For Doors Screens 1488 x 2516 high	3 (B) 3	31 dB
60 / 0	7mm Firedoor 60 (C G I)	Both	Doors 300 x 1400 high No Evidence For Screens	No Evidence For Doors No Evidence For Screens	3 (B) 3	31 dB
60 / 0	13mm Pilkington Pyrodur 60 - 20	Both	Doors 647 x 2017 high Screens 1400 x 2000 high	No Evidence For Doors Screens 1688 x 2033 high	1 (B) 1	38 dB
60 / 30	15mm Pilkington Pyrostop 30 - 10	Internal	Doors 630 x 1790 high Screens 1750 x 3000 high	No Evidence For Doors Screens 1852 x 1852 high	2 (B) 2	38 dB
60 / 30	18mm Pilkington Pyrostop 30 - 20	External	Doors 630 x 1790 high Screens 1750 x 3000 high	No Evidence For Doors Screens 1852 x 1852 high	1 (B) 1	38 dB
60 / 60	23mm Pilkington Pyrostop 60 - 101	Internal	Doors 793 x 1791 high Screens 1750 x 3000 high	Doors 785 x 2280 high Screens 1495 x 2895 high	1 (B) 1	40 dB
60 / 60	27mm Pilkington Pyrostop 60 - 201	External	Doors 793 x 1791 high Screens 1750 x 3000 high	Doors 785 x 2280 high Screens 1495 x 2895 high	1 (B) 1	41 dB

\* - If your sizes exceed the maximum tested sizes shown above, please contact N&C Glass for further advice.

Improved fire ratings are available for I G Units, please contact N&C Glass for further information.

Information is for guideline purposes only. In order for products to meet their respective fire resistance requirements, they must be installed into an approved framing system using only materials specified in the relevant fire certificate test summary.

Copies of all fire certificate test summaries are available upon request.

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## Technical Information Sheet 2

## Acoustic Glass

### OVERVIEW

Noise is described as any sound that is considered to be disturbing, annoying or painful. It consists of many different sounds across a wide range of frequencies.

There are many contributing factors as to why noise is a bigger problem now than it has previously been in the past :

- Increased activity in road, rail and air traffic
- Higher population density
- Increased cases of stress and illness

Noise intensity is measured in Decibels (dB) and the scale used to measure levels of noise reduction is known as the sound reduction index. 'Rw' is the weighted sound reduction in decibels which allows for a correction for the human ear's response and this is the most commonly used term when specifying noise reduction values.

### KEY FACTORS

#### REQUIRED SOUND REDUCTION

To assess the level of sound reduction required, taking into consideration the location of the construction and the number of noise factors present.

### DOCUMENT L

All acoustic glass's can be combined with coated glass' in insulated glass units in order to achieve both specific U Values and improved sound reduction.

### SAFETY

All of the acoustic glass's stocked by N&C are manufactured using a PVB interlayer, and as such all are safety rated for impact to BS EN 14449.

### INSULATED GLASS UNITS

When specifying double glazed units, it is wrong to assume that using two skins of acoustic glass will double the acoustic value of the unit. In some cases you can achieve a higher sound reduction rating using a single piece of acoustic glass as opposed to a sealed unit.

### COMMONLY USED TERMS

dB – Decibel – This is the unit of measurement used when measuring sound levels.

Rw – Weighted Sound Reduction – The level of sound reduction offered which incorporates a correction for the response of the human ear.

Rw+C – This is an adjustment to the Rw scale used for selecting a product to reduce noise from music, radio, TV, high speed traffic and other medium to high frequency noises.

Rw+Ctr – This is an adjustment to the Rw scale used for selecting a product to reduce noise from urban road traffic, loud disco music and other low frequency noises.

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## COMPARISON CHART

The charts below show comparisons between various types of glass and insulated glass units and also between the Rw, Rw+C & Rw+Ctr indices.

Single Glass	Rw	Rw+C	Rw+Ctr
6.4mm Laminated Safety Glass	32 dB	31 dB	29 dB
6.8mm Laminated Safety Glass	33 dB	31 dB	29 dB
10.8mm Laminated Safety Glass	34 dB	33 dB	31 dB
6.8mm Acoustic Laminated	35 dB	34 dB	32 dB
8.8mm Acoustic Laminated	37 dB	36 dB	33 dB
10.8mm Acoustic Laminated	38 dB	37 dB	36 dB
12.8mm Acoustic Laminated	39 dB	39 dB	37 dB
16.8mm Acoustic Laminated	40 dB	40 dB	38 dB

Double Glazed Units	Rw	Rw+C	Rw+Ctr
4mm / 20 spacer / 4mm IGU	31 dB	30 dB	25 dB
6mm / 16 spacer / 6mm IGU	31 dB	30 dB	27 dB
8mm / 16 spacer / 6mm IGU	35 dB	33 dB	29 dB
10mm / 16 spacer / 6mm IGU	40 dB	38 dB	35 dB
6.8mm Acoustic / 16 spacer / 6mm IGU	38 dB	36 dB	33 dB
8.8mm Acoustic / 16 spacer / 6mm IGU	41 dB	38 dB	34 dB
10.8mm Acoustic / 16 spacer / 6mm IGU	41 dB	39 dB	35 dB
12.8mm Acoustic / 16 spacer / 6mm IGU	41 dB	40 dB	36 dB
16.8mm Acoustic / 16mm spacer / 16.8mm Acoustic	48 dB	46 dB	42 dB

Triple Glazed Units	Rw	Rw+C	Rw+Ctr
4mm / 8mm spacer / 4mm / 8mm spacer / 4mm	31 dB	30 dB	27 dB
4mm / 10mm spacer / 4mm / 10mm spacer / 4mm	32 dB	31 dB	26 dB

Secondary Glazing	Rw	Rw+C	Rw+Ctr
6 / 100 / 4	46 dB		37 dB
6 / 150 / 4	47 dB		39 dB
10 / 200 / 6	49 dB		45 dB

Sound insulation data measured in accordance with BS EN ISO 140-3 and indices derived in accordance with BS EN ISO 717-1

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## Technical Information Sheet 3

## Safety Glass

### OVERVIEW

Safety Glass is any glass product that has been successfully tested to 'break in a safe way', and will therefore minimise the risk to persons from broken glass fragments. The method of testing used is a weighted pendulum which is impacted with a test panel of glass, and then the breakage is assessed and categorised in accordance with BS EN 12600. These products will generally fall into one of three main categories which are wired, laminated and toughened. Each of these types has their own properties and will vary in the method used to achieve their safety rating. All safety glass can be identified by a permanent mark that will be etched either into the surface (usually in one of the corners) or the edge of the glass to identify the glass type and its respective safety rating.

### LAMINATED GLASS

Laminated glass is manufactured by sandwiching one or more Poly Vinyl Butyl (PVB) interlayers in between two or more sheets of glass. When the glass breaks, the PVB holds all of the fragments together and although the glass will show obvious signs of the breakage, there is virtually no danger caused by broken fragments as these are held in place. Ranging in thickness from 4.4mm to well over 50mm for special situations, there are a wide range of products available to meet most requirements where safety and security glass's would be required.

### WIRED SAFETY GLASS

Wired Safety glass's are manufactured by inserting a wire mesh into the molten glass during manufacture and for the most part are generally around 6 or 7mm thick. By using the correct type of wire combined with glass thickness some wired products will meet the safety requirements when tested to BS EN 12600. It is important to check when ordering wired glass where a safety rating is required that a safety wired product is supplied as not all wired glass's meet the safety requirements.

### TOUGHENED SAFETY GLASS

Toughened Safety glass is normal glass which has been specially heat treated after cutting in a toughening plant. After rapid heating and cooling, the glass is under stress and when broken it shatters into very tiny and relatively harmless pieces. Once toughened, the glass cannot be further cut or processed as this will cause the stressed glass to shatter in the same way as when it breaks. Toughened glass is generally four times stronger than the equivalent float glass thickness. Most single glass products can be toughened including float and low E glass's, patterned glass and low iron glass's. Toughened glass can also be laminated after being toughened to offer the best safety features and strengths of both products.

### SPECIALIST SAFETY GLASS PRODUCTS

N&C Glass also stock a range of specialist safety glass products such as Anti Bandit Laminates, Bullet Resistant and Fire Resistant glass's. We also stock safety glass products that can be used for sound control as well as safety backed mirrors which we process at our London factory. We can also offer insulated glass units incorporating all types of safety glass from our sealed unit plant in Fareham.

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## PRODUCTS

The tables below lists some of the safety glass's available from N&C Glass along with their safety and acoustic ratings and approximate weight per square metre:

Thickness	Safety Rating To BS EN 14449	Weight (Kg / m <sup>2</sup> )	Acoustic Rating (Rw dB)
<b>Laminated Safety Glass</b>			
4.4mm	2 (B) 3	10.20	28 dB
6.4mm	2 (B) 2	15.40	32 dB
8.8mm	1 (B) 1	20.80	33 dB
10.8mm	1 (B) 1	25.80	34 dB

Thickness	Safety Rating To BS EN 14449	Weight (Kg / m <sup>2</sup> )	Acoustic Rating (Rw dB)
<b>Laminated Anti Bandit Glass (Also conforms to BS 5544 – Resistance To Manual Attack)</b>			
7.5mm	1 (B) 1	18.75	32 dB
9.5mm	1 (B) 1	23.75	33 dB
11.5mm	1 (B) 1	28.75	34 dB

Thickness	Safety Rating To BS EN 14449	Weight (Kg / m <sup>2</sup> )	Acoustic Rating (Rw dB)
<b>Wired Safety Glass</b>			
7mm Pyrostem Safety Clear	3 (B) 3	18.00	31 dB

Thickness	Safety Rating To BS EN 14449	Weight (Kg / m <sup>2</sup> )	Acoustic Rating (Rw dB)
<b>Toughened Safety Glass</b>			
4mm	1 (C) 1	10.00	29 dB
6mm	1 (C) 1	15.00	31 dB
8mm	1 (C) 1	20.00	32 dB
10mm	1 (C) 1	25.00	33 dB
12mm	1 (C) 1	30.00	34 dB

## CLASSIFICATIONS

Definitions of the safety rating codes shown in the table above :

First number – denotes height of drop test and at which height the glass broke to classification A or B

1 – 190mm & 450mm & 1200mm, 2 – 190mm & 450mm, 3 – 190mm

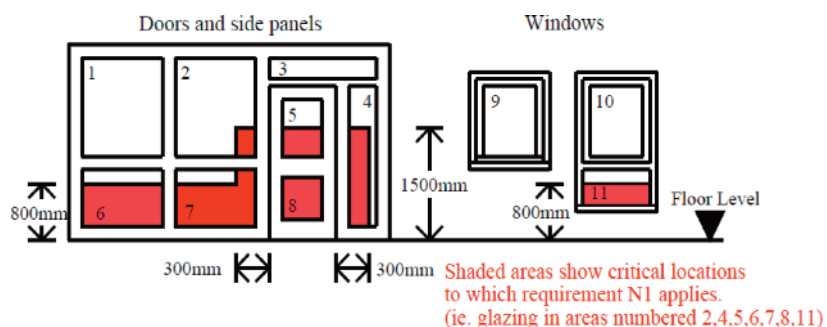
The letter denotes the breakage characteristics :

'A' – Breaks like ordinary annealed glass: 'B' – Breaks like laminated glass: 'C' – Breaks like toughened glass

The second number denotes the height of the drop test at which the glass did not break.

## CRITICAL LOCATIONS

There are situations where safety glass must be installed in accordance with Approved Document N, such as in and around doors and low level windows. The diagram below offers guidance on these critical locations (Shaded areas indicate critical locations).



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## Technical Information Sheet 4

## Low 'E' Glass

### OVERVIEW

Low 'E' glass's are a group of glass products that are used in the manufacture of insulated glass units and are designed to meet the governments requirements on energy savings. There are two main types of Low 'E' glass, Hardcoat and Softcoat. Essentially both of these products aim to offer the same benefits for energy saving, but generally softcoat glass's offer superior performance to hardcoat products, however softcoat products are more difficult to handle and process. These products are designed for use only in insulated glass units, and if they are installed as single glazed they offer no energy benefits at all.

### HARDCOAT LOW 'E' GLASS

These products are coated with a combination of various metal oxides which enhance the glass's ability to reflect radiant heat, thereby retaining warmth in a building. The nature of this type of coating means that it is permanently bonded to the glass surface and is impossible to remove, making the glass very easy to handle and process as there is very little difference between the way this is handled in comparison to normal float glass. These products are toughenable as a safety option, and some are also available in laminated versions. Examples of hardcoat products are Pilkington 'K', Pilkington KOW & Planibel A.

### SOFTCOAT LOW 'E' GLASS

These products are also coated with a combination of various metallic oxides to enhance their ability to reflect long wave energy back into a room, however the coating is not bonded to the glass surface and as such this can make handling and processing very difficult. The coating itself is very soft, and any contact with the coating (such as with a bare hand or an ordinary glass glove) will mark the coating permanently. The glass can only be handled either using special gloves or very specialised equipment in order to avoid damaging the coating. The glass must also be edge deleted (have the soft coat removed around the edge on a specialised machine) before being made into insulated glass units. Also glass washing machines have to be adapted with special soft coat brushes in order to avoid damaging the delicate coated surface. Again these products are toughenable and some are available in a laminated form for safety reasons. Examples of softcoat products are Pilkington KS, Planitherm Total +, & Climaguard A+.

### PERFORMANCE

Both hardcoat and softcoat products offer huge benefits in energy savings when compared to standard float glass's in insulated glass units. They offer much improved 'U' values, and although coated products can appear slightly tinted the light transmission of these units can be as little as 2 – 3% lower than a standard float unit, making such differences virtually invisible to the naked eye. However due to the coating, you may notice slight distortions in reflections on the coated surface.

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## INSULATED GLASS UNIT MAKE UPS

The table below lists some example make ups available from N&C Glass along with their associated 'U' values, light transmissions and solar heat gain :

Unit Make Up – Double Glazed	Centre Pane U-Value W/m <sup>2</sup> k	Light Transmission	Solar Heat Gain (G-Value)	Indicative WER Rating *
4mm Climaguard A+ / 16mm spacer / 4mm Float	1.4	80%	71%	D/C
4mm Climaguard A+ / 16mm spacer & Argon / 4mm Float	1.2	80%	71%	B
4mm Climaguard A+ / 16mm spacer & Argon / 4mm Low Iron	1.2	82%	73%	A
4mm K / 16mm spacer / 4mm Float	1.7	75%	73%	N/A
4mm K / 16mm spacer & Argon / 4mm Low Iron	1.5	76%	78%	B/A
4mm KOW / 16mm spacer / 4mm Float	1.7	77%	74%	D/C
4mm KOW / 16mm spacer & Argon / 4mm Low Iron	1.5	78%	79%	A
4mm Planibel A / 16mm spacer & Argon/ 4mm Float	1.4	72%	73%	B
4mm Planibel A / 16mm spacer & Argon / 4mm Low Iron	1.4	74%	78%	A
4mm Float / 16mm spacer / 4mm Float	2.7	82%	79%	N/A

This table shows just a few example make ups, for clarification on other make ups, please contact N&C Glass. \*Please note indicative WER ratings are with warm edge spacer – please obtain the correct information from your system or trade frame supplier.

## TRIPLE GLAZED UNITS

For even better performance, N&C Glass can also offer triple glazed units incorporating either hardcoat or softcoat glass's. With the correct make ups, U Values as low as 0.5 W/m<sup>2</sup>k can be achieved, meaning huge savings on energy bills. The following table shows some examples of high performance triple glazed units incorporating softcoat Low 'E' glass:

Unit Make Up – Triple Glazed	Centre Pane U-Value W/m <sup>2</sup> k	Light Transmission	Solar Heat Gain (G-Value)	Indicative WER Rating
4mm Float / 12mm Argon / 4mm Softcoat / 12mm Argon / 4mm Softcoat	0.8	74%	61%	A+
4mm Float / 12mm Krypton / 4mm Softcoat / 12mm Krypton / 4mm Softcoat	0.5	74%	61%	A+

For more information or details on other triple glazed make ups, please contact N&C Glass. Please note indicative WER ratings are with warm edge spacer - please obtain the correct information from your system or trade frame supplier.

## ECO LITE SLIM UNITS

N&C Glass also offer a range of slim profile units incorporating softcoat glass's for use in the restoration of sash windows where building regulations will not permit the windows to be replaced with modern Upvc frames. These units are available in two types offering good U-Values and reduced sight lines meaning that they offer a true solution for the window restoration market. More information on this range is available from N&C Glass.

Unit Make Up – Ecolite Slim	Centre Pane U-Value W/m <sup>2</sup> k	Light Transmission	Solar Heat Gain (G-Value)
4mm Climaguard A+ / 4mm Krypton / 4mm Float	1.9	82%	70%
4mm Climaguard A+ / 4mm Special Gas / 4mm Float	1.6	82%	70%
4mm Climaguard A+ / 4mm Xenon / 4mm Float	1.5	82%	70%

Eco-Lite™ Slim units can offer sight lines as low as 5.5mm, for more information please contact N&C Glass.

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## Technical Information Sheet 5

## Glass Processing & Decoration

### OVERVIEW - PROCESSING

The term 'processing' generally refers to an edge treatment being done to the glass to either remove the sharp edge for handling or to improve the edge appearance for aesthetic purposes. It can also refer to hole drilling where holes are drilled into the glass for fittings or sockets to come through. Common types of edgework are polishing, bevelling and arrising.

### POLISHING

This is the most common form of edgework done to glass and is used for aesthetic and handling purposes to remove the sharp edge and to also improve the edge appearance. There are several types of polished edge, however the most commonly used is the 'straight line edge' which is essentially a flat polish with a very slight chamfer to both faces. Also available are such polishes as half round, bull nose or flat, however these can only be done on specialised machinery and can also be very costly.

### BEVELLING

A bevelled edge is a decorative edge where the glass is chamfered at an angle to various widths. This is purely for decorative purposes and in some cases will make the very edge of the panel very thin. The minimum bevel width is 10mm with the maximum on 6mm thick glass being 50mm.

### ARRISED

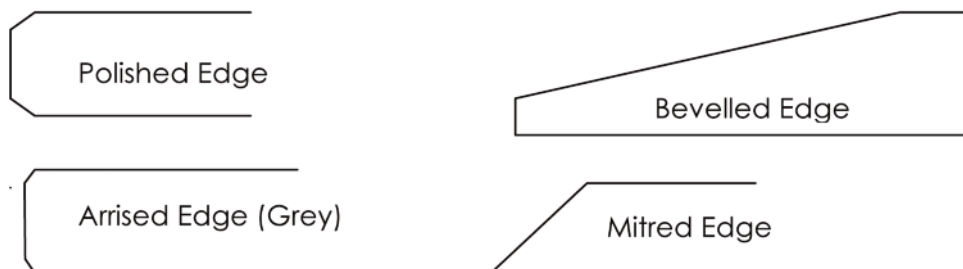
This is only normally used for handling purposes as this is not a particularly handsome finish. Put simply the glass has the sharp edge removed very roughly with an abrasive belt or pad leaving the edge 'grey' but blunt. This type of edgework is standard on toughened glass where no other edgework is requested as it reduces failure rates during the toughening process.

### MITRED

A mitre is a functional edge finish which is used mainly on shopfront glass when two or more panels are to be butt jointed (joined without any framework) around a corner. The mitre is used to accommodate the corner angle allowing for the glass to go around straight angled corners from zero to 90 degrees

### EDGE PROFILES

Below are some drawings showing the above edge profiles for reference only :



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## **OVERVIEW - DECORATION**

Decoration generally refers to a surface treatment that is done to the flat surface(s) of the glass panel which can serve several purposes. Normal surface decoration methods include sandblasting, acid etching or film application, however there are other more elaborate forms of decoration also available.

In most cases, such treatments are used to either obscure vision through the glass or to change to look or colour by design or tinting.

## **SANDBLASTING**

Sandblasting is a very aggressive process by which the glass is subjected to a blast of highly abrasive grit under pressure which has the effect of pitting the surface. This will change the surface appearance from smooth and clear to rough and opaque, and this type of decoration is generally used to obscure either all or part of a panel for privacy reasons. You can also have designs done in the sandblasted surface so that basic shapes, numbers and words can be incorporated into the panel for decorative purposes.

## **ACID ETCHING**

This is where a very aggressive acid is applied to the glass surface in order to remove the clear surface layer, and thus obscuring the glass leaving a smooth milky finish. This process can result in a slightly uneven surface finish which some people find pleasing, however this is an expensive process when compared to sandblasting.

## **FILM APPLICATION**

This is when a film is applied to one surface of the glass in order to change its appearance. Various types of film are available, including tinted, obscuring in various patterns and mirror effect. These films can be applied by anyone however they can be tricky and are normally applied after the glass is installed to ensure they do not get damaged during glazing or finishing works.

## **SPLASH BACKS**

Painted glass is now very commonly used as kitchen splashbacks as it is easy to clean and maintain. Glass can be painted to virtually any colour to match the colour scheme of the room and in some cases various paint effects such as pearlescent or metallic are available. N&C Glass offer a range of seven standard colours of back painted glass from stock in their London Glass range, details of which are available from any N&C Glass branch.

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## Visual Quality Inspection for Triple glazed units

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### REJECTS

Any mark or scratch visible upon the above inspection must be more than 1mm in length and not within edge zone of the unit to be deemed as rejects. Any seed or bubble in float or toughened glass measuring more than 1mm should not be visible within the central viewing area (inside the edge zone) from the above inspection and therefore would be rejected. Any debris, mark, or damage on the spacer bar visible upon the above inspection will be deemed as a reject.

### EXCLUSIONS

Any shadow, ghosting or rainbow effect may be inherent with certain products and as such should not be rejected. Any mark that needs the viewing angle to vary before it becomes visible should not be accepted as a reject. Some coated glass type may have a slightly opaque appearance (milky looking if the sun is shining across the panes) This is perfectly normal and will not effect the performance of the unit, therefore it should not be rejected. If the spacer bars do not line up perfectly, this will not effect the performance of the unit, A tolerance of 2-3mm is acceptable.

### SUMMARY

Any inspection which takes place should adhere to the above guidelines for triple glazing, an element of common sense should apply, Units which are going to be glazed in a roof or at a high level etc. will obviously allow leniency within these guidelines. Triple glazed units can be highly reflective especially when coated products are used i.e soft coat or solar control glass. These products may highlight imperfections, curving and ripples in the glass, this will not be deemed as fault as they can be unavoidable.

### AREAS TO BE INSPECTED

Rebate zone. The area typically hidden within the glazing pocket approximately 25mm wide from edge of glass. This area is exempt from inspection.

### EDGE ZONE

25mm band between the rebate zone and the main zone. This will be checked for seeds bubbles scratches or marks. Only defects over 2mm will be rejected within this zone unless in a cluster measuring 3mm or over is visible.

### MAIN ZONE

This is the primary viewing area of both panes of glass for double glazing or a single pane. Inspection will take place as below.

### INSPECTION

All sealed units must be viewed at a distance equivalent to 2 meters or 3 meters when coated glass is used looking through the panes at 90 degrees to the surface. This inspection should take place without direct sunlight, but in good light conditions to simulate looking through a window.

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## The Visual Quality of Low Emissivity Glass

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### NEW THERMAL INSULATION REGULATIONS

The new Part L (Conservation of Fuel Power) of the Building Regulations came into force on 1 April 2002. For the first time, Part L covers replacement windows, which now have to meet more rigorous standards of thermal insulation. Without low emissivity (Low-e) glass in your windows, you have little prospect of meeting the new requirements.

### WHAT IS LOW EMISSIVITY (LOW-E) GLASS?

Low-e glass is a vital component of energy efficient windows. It has a surface coating that operates as follows:-

- It allows short wavelength heat from the winter sun to enter your home through the glazing
- This solar energy works with your domestic heating system to warm up your room, which then gives off long wavelength heat radiation
- A large proportion of that long wave heat would vanish back out through windows made of ordinary glass. However, the Low-e coating reflects that heat back into your room i.e. the coating traps the heat in your home

As a consequence, you will feel much warmer during the winter, and your pocket will feel the benefit of reduced heating costs.

### WILL LOW-E GLASS MEET THE BUILDING REGULATIONS?

Better than merely meeting the Regulations, Low-e glass is virtually essential to enable you to achieve the new targets.

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### **Are there any disadvantages?**

We have discussed the significant advantages to your pocket and comfort above. Given the substantial benefits of Low-e any disadvantages are insignificant. You are now having to use a coated glass and this means you can see evidence of the coating in one or all of the following ways:-

- As a tint, making some materials appear differently when viewed directly through the glass
- As a 'haze', when viewing the glass at some angles and in some lighting conditions

### **By the appearance of condensation on the outside surface of the glass under certain weather conditions.**

This being positive proof that the glass is preventing heat loss from your house. As the glass is becoming colder than normal and allowing dew to form

It may also be possible that Low-e glass may exhibit minor blemishes and the tint may also change if windows are made at different times or from different batches of glass. These are not detrimental to the functioning of the unit and are not deemed to be a defect.

### **How is visual quality assessed?**

The visual quality of a window is assessed by looking through it from the room side, at right angles to the glass, standing at a distance of not less than 3 metres from the glass, under natural daylight and not direct sunlight, with no visible moisture on the surfaces of the glass. Provided your vision through the glass is not impeded under these conditions, for example, by scratches, bubbles or distortion of external objects, your windows are of a good visual quality.

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## High Performance Glass

Fareham December 2013

### SunGuard High Selective Range

6mm Toughened Super Neutral 70 /37 (SN70/37)

6mm Toughened Super Neutral 62 / 34 (SN62/34)

### SunGuard High Performance Range

6mm Toughened H P Neutral 60 / 40 (Neutral 60 /40)

6mm Toughened H P Neutral 50 / 32 (Neutral 50 / 32)

Please note that all of the above products are STOCKED at Fareham, for any other enquiries for High Performance Glasses please contact the Branch.

Product	Light Transmission	(G-Value) EN410	U-Value Air	U-Value Gas
SN 70/37	70	37	1.3	1.0
SN 62/34	62	34	1.3	1.0
HP 60/40	60	40	1.4	1.1
HP 50/32	50	32	1.4	1.1

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## Sealed Unit Options

December 2013

Surface 1 Surface 2	Float K Glass	Optiwhite K Glass	Optiwhite K OW	Float ClimaGuard A +	Low Iron ClimaGuard A +	Float Planibel A	Float ClimaGuard A 1
Light Transmission	74	76	78	82	82	72	71
Light Reflectance	17	18	18	13	13	17	21
G Value	0.72	0.78	0.79	0.71	0.73	0.73	0.54
U Value	1.7	1.7	1.7	1.4	1.4	1.6	1.3
U Value Argon	1.5	1.5	1.5	1.2	1.2	1.4	1.0
Indicative WER	C	B	A	B	A	B	N/A

Based on 16mm Warm Edge Cavity

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## Triple Glazed Sealed Unit Options

December 2013

Surface 1 Surface 2 Surface 3	Optiwhite K OW K OW	Float ClimaGuard A + ClimaGuard A +	Float ClimaGuard A 1 ClimaGuard A 1
Light Transmission	67	74	58
Light Reflectance	25	17	29
G Value	0.69	0.61	0.42
U Value	1	0.8	0.7
U Value Argon	0.8	0.6	0.5
Indicative W E R	A	A	N/A

Based on 16mm Warm Edge Cavity

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