TempaGLAS™

HEAT SOAKED SAFETY GLASS

AC YULE

TEMPAGLAS HEAT-SOAKED

TempaGLAS Heat-Soaked Toughened Safety Glass is manufactured to comply with the safety criteria of BS 6206: 1981 (1994) Class A (or class C1 after the standard is harmonised with Europe) - Specification for impact performance of safety glass for use in buildings. The actual heat-soak process is, in effect, a destructive qualitative test, and in the absence of a British Standard, this is based on the German Standard DIN 18 516.

DESCRIPTION

TempaGLAS Heat-Soaked Toughened Safety Glass is four to five times stronger than ordinary glass and can, as a result, be used as a safety glass in certain applications.

TempaGLAS Heat-Soaked Toughened Safety Glass is subjected to a further heat test to reduce the risk of spontaneous breakage which can occur at a later date, even when the glass panel has been glazed and in place for some time.

Spontaneous breakage can occur as a result of foreign particles within the glass, most commonly known as nickel sulphide. During the toughening process, the particles within the glass change state (high temperature state). During the rapid cooling process the nickel sulphide particle does not immediately revert to its low temperature state (because of the speed of the cooling process required for toughening glass), but the particles do eventually return to their original state over a period of time.

During this reversal, the particle increases in size and if it is contained in the critical tensile portion (the central third of the thickness of a panel) this can lead to failure of the panel and fracture. The heat-soaking process accelerates the change in state of nickel sulphide inclusions from high temperature back to low temperature. The strict regime of the heat-soaking process can also eliminate panels with damaged edges or other defects.

APPLICATIONS

The use of TempaGLAS Heat-Soaked Toughened Safety Glass is recommended where the risk of spontaneous breakage would cause difficulty, either from a replacement point of view, or where falling glass fragments may be unsuitable, such as roof or high level glazing, balustrades, screens, inaccessible glazing (high level curtain walling) particularly in public areas such as shopping centres and offices. Additionally, the use of TempaGLAS Heat-Soaked Toughened Safety Glass is appropriate where there is a risk of human impact. If breakage does occur, the breakage pattern is such that the resultant pieces of glass are relatively harmless and are unlikely to cause severe injury.

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MANUFACTURE

AC Yule manufactures TempaGLAS Heat-Soaked Toughened Safety Glass in its modern tempering and heat-soaking facility and a very high quality product is assured. The Company operates a third party certified quality system in accordance with and assessed against BS EN ISO 9002 : 1994 (formerly BS 5750 Part 2).

The panel is heated to approximately 630ÞC in a custom designed furnace and cooled rapidly with controlled blasts of air in a quenching chamber. The entire process is computer controlled from start to finish on an integral, state-of-the-art manufacturing plant.

The glass is then passed into a chamber for a further heating process, it is reheated to a temperature of approx 290ÞC. This process will eliminate any potential flaws with the glass such as nickel sulphide inclusions.

All edgework on TempaGLAS Heat-Soaked Toughened Safety Glass must be completed prior to the toughening process. The minimum finish for TempaGLAS Heat-Soaked Toughened Safety Glass is an arrissed edge, however, given the nature of most applications, a polished edge is more likely to be specified.

PRODUCT RANGE

For the full range of glass which can be heat-soaked please see the TempaGLAS Toughened Safety Glass brochure.

FLATNESS TOLERANCE

A degree of bow may be introduced to TempaGLAS Heat-Soaked Toughened Safety Glass owing to the nature of the tempering process, but generally, this is kept to a minimum by utilising state of the art plant and equipment.

Maximum acceptable bow is 2mm per metre. Bow is measured as the maximum difference between the true vertical line and the concave surface of the glass held in a vertical position at the quarter points.

VISUAL APPEARANCE

TempaGLAS Heat-Soaked Toughened Safety Glass is virtually indistinguishable from ordinary glass of the same type and thickness when viewed under normal conditions. Some slight distortion of images in reflection may occur, however.

The tempering process, i.e. computer controlled heating and rapid cooling, will inevitably result in a product whose optical quality is not as high as annealed float glass. The process introduces high compression near each surface and compensating tension in the centre of each fully tempered panel. This process greatly increases resistance to stresses of a mechanical and thermal nature.

PROCESSING TOLERANCES

Dimensional Tolerances
(Thickness overall dimensions and weight)

TempaGLAS Heat-Soaked Toughened Safety Glass				
TOLERANCES THICKNESS MM	NOMINAL THICKNESS MM	PATTERNED MM	SIZE ARRISSED MM	WEIGHT KG/M^2
4	3.8 - 4.2	3.5 - 4.5	-2 + 1	10.0
5	4.8 - 5.2		-2 + 1	12.5
6	5.8 - 6.2	5.5 - 6.5	-2 + 1	15.0
8	7.7 - 8.3		-2 + 1	20.0
10	9.7 - 10.3		-2 + 1	25.0
12	11.7 - 12.3		*	30.0
15	14.5 - 15.5		*	37.5

* Toughened glass in thicknesses greater than 10mm requires a higher standard of edge finish. Dimensional tolerances for such thicknesses depend on the final application.

OPTICAL QUALITY

The tempering process reduces the surface flatness of glass panels and this is exacerbated when viewing images in reflection, particularly where body tinted floats and reflective coatings have been used in conjunction with ceramic painted surfaces to produce TempaGLAS Heat-Soaked Toughened Safety Glass.

IMPACT STRENGTH

TempaGLAS Heat-Soaked Toughened Safety Glass is manufactured to comply with the safety criteria of BS 6206: 1981 (1994) Class A (or class C1 after the standard is harmonised with Europe) - Specification for impact performance of safety glass for use in buildings which stipulates that sample panels must comply with a fragmentation test. This test determines the minimum number of particles in a pre-determined area and if this test is satisfied, the manufacturing process is capable of producing safety glass with the required impact strength.

Reference to BS 6262 should be made prior to the selection of glass types and sizes that are to be subjected to wind loads. Although TempaGLAS Heat-Soaked Toughened Safety Glass is much stronger than annealed glass, because the Young's Modulus of elasticity of both glass types is the same, the deflection characteristics, thickness for thickness are identical. As a consequence, it is necessary to restrict deflection to an acceptable visual degree, rather than design purely according to strength.

FRACTURE

TempaGLAS Heat-Soaked Toughened Safety Glass will break when static or impact loads bend the glass sufficiently to overcome compressive stresses and put the surface into tension, exceeding its breaking stress. It can also break when the severe impact of a sharp object penetrates the compressive stresses in the surface. Deep scratches may have this effect and cause fracture when the glass is subsequently loaded.

THERMAL STABILITY

TempaGLAS Heat-Soaked Toughened Safety Glass can be used in all climates and can withstand heat up to 295ÞC and extreme cold for long periods. It can also resist large, sudden temperature changes.

SITEWORK

TempaGLAS Heat-Soaked Toughened Safety Glass must be carefully inspected prior to installation to ensure no surface or edge damage has occurred. TempaGLAS Heat-Soaked Toughened Safety Glass cannot be cut or worked in any way.

HANDLING

Edges and corners are vulnerable during handling and storage, and care must be taken to ensure necessary protection is provided during installation. Site operatives, installers and glaziers should ensure that they have had the appropriate training regarding manual handling and also have the necessary personal protective equipment available prior to handling or lifting TempaGLAS Heat-Soaked Toughened Safety Glass.

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STORAGE

TempaGLAS Heat-Soaked Toughened Safety Glass should be stored at an angle of between 3Þ and 6Þ from the vertical with sufficient lateral support to prevent bowing, in a clean, dry, ventilated space. The units should be set on strips of wood or other soft material and contact with hard, abrasive materials should be avoided.

GLAZING

Glazing and fixing techniques should comply with the recommendations of BS 6262.

MAINTENANCE AND WARRANTY

As with ordinary glass, TempaGLAS Heat-Soaked Toughened Safety Glass should be washed down with clean water upon installation to remove abrasive dust. Normal cleaning solvents may be used to keep the glass surface clean.

LEAD TIME

The additional process will add five working days to the standard lead time for TempaGlas Toughened Safety glass. More time will be required if processes such as edge polishing, holes, notches and cut-outs are required. Please contact us for advice about lead times.

QUESTIONS AND ANSWERS

What type of panels are best to be Heat-Soaked?
Any panels where the risk of spontaneous breakage would cause difficulty, such as roof or high level glazing, balustrades, screens, inaccessible glazing (high level curtain walling) particularly in public areas such as shopping centres and offices.

Can I get my own glass Heat-Soaked?
Provided the glass has been fully tempered (toughened) with good quality edges, then customers own glass can be Heat-Soaked by AC Yule. Being a heat test to eliminate defects from the glass manufacturing process, there is obviously a risk of breakage. In this instance, AC Yule cannot be held responsible for any such breakage and Heat-Soaking is done at customers own risk.

How much will it cost?
There is a two level charging structure for TempaGlas Heat-Soaked Toughened Safety Glass. If glass and all processing is carried out by AC Yule, then replacement panels will be our responsibility. A higher premium is required to cover this eventuality. When we Heat-Soak customers own glass at your own risk, we charge a nominal rate for recovery of furnace running costs. Please contact our Estimating Department for further details about the cost of the process.

Does it make TempaGLAS Toughened Glass unbreakable?
No. TempaGlas Heat-Soaked Toughened Safety Glass still requires to be handled and glazed with the same caution as ordinary toughened glass.

Does it weaken TempaGLAS Toughened Glass?
No. ***TempaGLAS*** still complies with BS 6206 Class A - Specification for impact resistance for safety glass for use in buildings, after Heat-Soaking.

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