

CLEMENT WINDOWS LTD

Specification for Curved Sealed Units

Construction and Quality

The glass used by Clement Windows Ltd will be supplied in accordance with:

BS952: Glass for glazing: Part 1: 1995 Classification and Part 2: 1980 Terminology for work on glass and BS EN 572: Glass in Building – Basic soda lime silicate glass products: Part 1: 1995 Definitions and general physical and mechanical properties and Part 2: 1995 Float glass – Glass for glazing.

Curved Sealed Units are manufactured to similar stringent quality controls as flat units however curved units are not able to be kite marked as yet no British or European standard applies to curved units.

Stepped and simple shaped units can be manufactured in a variety of glass types and thickness. Screen-printed, standard or bespoke patterns and spandrel panels (with insulation if required) are also available.

The screen printing process uses ceramic inks that after toughening integrate with the glass surface and have excellent abrasion and environmental resistance. A variety of colours are available. Heat soaking of toughed glass is optional.

Kommerling butyl is used as a primary sealant and normally increases the nominal width of the unit by up to 1.0mm. The units are sealed with Dow Corning 3540 black silicone with a minimum edge bite thickness of 6mm unless otherwise specified. The compatibility of any sealant to be utilised for installation should be checked. The units are supplied without perimeter taping.

Distortion and Visual Quality

Toughened curved safety glass normally exhibits higher levels of distortion than flat toughened safety glass. This is due to the toughening/curving process. Thinner glasses exhibit more distortion than thicker glasses. Certain glass types particularly reflective glass will emphasise visible distortion. The optical effect created by roller wave is dictated by the direction of the curve (i.e. it will always run parallel to the curved edge). Polarisation effects may be visible in toughened curved units dependant on the combination of glass types used. Similarly distortion levels can be emphasised.

The unit edge seal will be wavy in appearance due to the inherent distortion in the toughened curved glass. Slight butyl intrusion may also be visible inside the sight line. These effects do not detract from the performance of the sealed unit but may be visually unacceptable in some applications, particularly if visible after framing. This visual effect can either be reduced with the use of bronze/black spacer bar or can be completely

obscured with a screen-printed border applied to the glass prior to bending and toughening, where required.

Where improved distortion and edge seal appearance is required curved units can be supplied in annealed glass or for safety glass requirements, laminate glass.

Due to the subjective nature of assessing the visual quality of curved units Clement Windows Ltd may for certain unit specifications, insist upon the provision of a sample, for approval and authorisation by the prospective client, prior to acceptance of a contract to manufacture units.

Technical Specification

Curved Toughened Units

Material

Clear, tinted low-E. Seralit and Emalit, available in 6, 8, 10 and 12mm thickness. Clear material is available in 15mm thickness. Solar, heat reflective and roll-patterned materials are also available. Note: coatings, Seralit, Emalit and rolled patterns are always to the concave surface i.e. unit face 2. (Except Emalit which is usually face 4).

Spacer bar is available from 6mm to 20mm dependent upon size and curvature. Silver, bronze, and other spacer bar colours are available.

Size	Max	Min
Length	3650mm	325mm
Developed Width	2130mm	220mm

Glass type and the weight of the unit will effect maximum size.

Framing systems used in curved units must be able to accommodate the tolerances for size, square-ness, twist, edge straightness, curvature, and overall unit thickness as detailed below.

The unit sizes and specification defined on Customer orders should also take those tolerances into account.

Due to variations as a result of the effect of these tolerances curved units may not be suitable for structurally bonded systems.

For framed systems it is recommend that a compatible periphery silicone seal is applied between the DGU and the rebate to ensure no water ingress. For aesthetic purposes after the pressure plates and capping are fixed, a compatible silicone-capping fillet may be required inside and outside the unit.

Size Tolerance	Thickness		
	6mm	8 & 10mm	12 & 15mm
Up to 1000mm	+/- 1mm	+/- 2mm	+/- 2mm
Over 1000 mm	+/- 2mm	+/- 2mm	+/- 3mm

Squareness

Up to 1000mm	4mm	Squareness is measured by comparison of diagonals
Over 1000mm	5mm	

Torsion (Twist)

+ 5mm per metre measured along the straight edge

Edge straightness

General Bow
+ 3mm per meter

Curvature

Cylindrical curvatures with radii to a minimum of 500mm and with a maximum tangential angle of 90 degrees are possible. Regular, irregular, central and one-sided shapes are possible.

Glass curvature tolerances are

6-12 mm thickness +/- 3mm from nominal form
15mm thickness +/- 4mm from nominal form

Curved panels will always fit into a drawn envelope constructed from the curved glass thickness and the curvature tolerance.

Overall Unit Thickness

The nominal thickness of the unit can be increased by up to +1mm due to the butyl bead. Glass curvature tolerance can also effect the thickness of the unit.

Edgework

Produced with flat ground edges as standard. Polished edges can be supplied upon request.

Designs and Printing

Any decoration is always to the concave surface.

Toughening Standard

Curved panels are toughened so that when a sample, usually a set up piece is purposely broken, but supported to prevent the particles separating, there will not be less than 40 off counted particles in a square of side 50mm.

Dimensional Criteria

When specifying size requirements the following dimensions are required:

Outside Radius of Unit

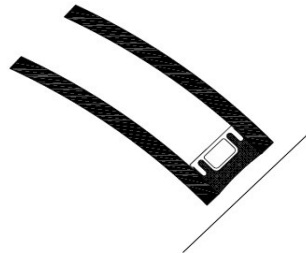
External Girth measurement of unit

Length of Unit

The edge detail required (dependent upon framing system) must be specified with order:



Vertical Edge



Radial Edge

(Please note the potential impact on unit sight line)

Visual Quality Checks

The visual quality of panels and units is checked at each stage of manufacture to ensure conformity. The viewing arrangements and criteria used in assessing the visual quality of curved units are as per Glass and Glazing Federation guidelines.

Faults, such as scratches, seeds, bubbles, blisters, sealant particles etc which are visually obtrusive when viewing the unit from a distance of 3 metres, will be deemed unacceptable.

Reflections

Visible double reflection can occur when a unit is viewed under certain lighting conditions and especially if the unit is viewed from an angle. This is an optical phenomenon arising from multiple surface reflections in the sealed unit.

Colour Consistency

There should be no significant colour variations in body tinted or surface coated glasses of the same type and thickness. Different glass thickness of the same type of body tinted or surface coated glass will show significant colour differences.

Marking and Identification

Where applicable and unless otherwise specified by the customer, a toughening/heat soak mark will be added to each curved panel. The marks will be readable through 'face one' and located in the bottom left hand corner of the unit, approximately 25mm in from the corner.

Similarly a product identification label will be attached in the top right hand corner and on face one of each unit.

Cleaning

Curved toughed glass should only be cleaned using glass cleaner or alcohol and a soft cloth. Abrasive cleaners must not be used as they may scratch the surface of the glass.

Warranty

All Clement Windows Ltd curved sealed units are warranted for five years against defects in materials or workmanship causing visual obscuration from condensation or dust collection within the sealed unit. The detailed terms of warranty are published separately and are available upon request.