

Quality Assurance Specification –For visible defects in TUF**ig** IND toughened glass and toughened glass sealed double glazing units for use in transport applications (excludes screenprint).

1. SCOPE

This specification defines the level of acceptance for visible defects in clear or tinted TUF**ig**IND toughened glass and toughened glass sealed double glazing units used on or in land transport vehicles or other specialist non architectural applications. It applies to glasses incorporating screen-printing but specifically excludes the screen-printed area of the glass. It does not apply to coated or textured glass.

2. OBJECTIVES

All glasses supplied should be free from defects caused in manufacture, handling, storage and transit. However, the buyer shall accept glass with minor imperfections provided that they fall within the scope of the following definitions and acceptance criteria.

3. DEFINITIONS

Since the inspection of a glass will be based on visual examination, the terms used in stating acceptance criteria are defined as follows:-

3.1 Viewing Distance

The distance from the observer's eye to the glass surface.

3.2 Critical Area

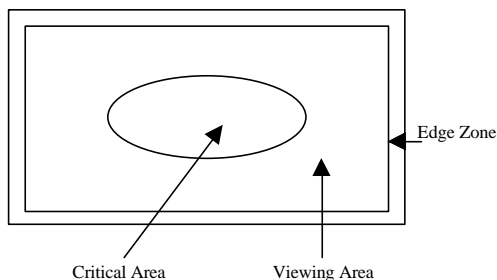
An elliptical area, shown in the diagram, which lies centrally in the glass and whose major axis is half the longer dimension of the glass; the minor axis being one third of the small dimension of the glass. Where length and width are equal, either may be regarded as that used for determining the major and minor axis.

3.3 Edge Zone

A zone parallel to the edge of the glass, which extends round the perimeter of the glass and is normally within the glazing frame or area. It is 13mm regardless of the size of the glass.

3.4 Viewing Area

The area of glass lying between the Critical area and the Edge zone



3.5 Scratch

A long narrow surface flaw produced by a hard object, e.g. grit, which produces a perceptible depression.

3.6 Slick

A fine scratch with no perceptible depression.

3.7 Bubble

Small holes partially or wholly enclosed by glass which normally contain air. These may be spherical or non-spherical depending on the mode of formation.

3.8 Inclusion

Insoluble matter retained within or on the surface of the glass during manufacture.

3.9 Scar

A scratch which is obtrusively visible being normally white in colour.

4. METHOD OF VISUAL INSPECTION

The glass is to be mounted vertically so that the whole surface can be seen. The glass may be examined from either side or both.

A background which provides natural uniform daylight, or the equivalent, **must** be used.

4.1 Viewing Distance

Single glass -A minimum viewing distance of 1.5 metres is to be used.

Sealed unit – A minimum viewing distance of 2 metres is to be used.

4.2 Viewing Aids

No visual aids other than spectacles for normal visual correction shall be used.

4.3 Visual Focus

Vision is to be directed at a point not less than 2 metres on the opposite side of the glass from the observer. This is to ensure that the glass is looked **through** and that the vision is **not** concentrated on the surface.

5. ACCEPTANCE CRITERIA

Minor defects/imperfections are to be accepted if they fall into the categories below: -

5.1 Defects within the Critical Area

- Scratches and sleeks which are not visible when examined as specified in Section 4 are to be accepted.
- Bubbles and inclusions not greater than 1.5mm in maximum dimension are acceptable provided any such defects are not less than 150mm apart.
- White scars are not acceptable.

5.2 Defects within the Viewing Area

- Scratches and sleeks which are not visible when examined as specified in Section 4 are to be accepted.
- A maximum of four surface scars each not over 50mm long and not over 0.5mm wide are acceptable provided such defects are not less than 150mm apart.
- Bubbles and inclusions not greater than 2.0mm in maximum dimension are acceptable provided any such defects are not less than 150mm apart.

5.3 Defects in Edge Zone

Scratches, sleeks, bubbles and inclusions are acceptable.

6. OTHER VISUAL CRITERIA

Other important visual criteria are as specified in 'Data sheet – TUF**ig**IND toughened glass' and 'Data sheet – Sealed Double Glazing units' and will apply.