SURFACE VEHICLE RECOMMENDED PRACTICE

J673	JUN2015
Issued 1950-07 Revised 2015-06 Superseding J673 OCT2005	

Automotive Safety Glazing Materials

RATIONALE

This SAE Recommended Practice updates and revises J673 (2005).

1. SCOPE

This SAE Recommended Practice is intended to cover current safety glazing practice applicable to safety glazing for use in motor vehicles and motor vehicle equipment. Nominal specifications for thickness, flatness, curvature, size, and fabrication details are included principally for the guidance of body engineers and designers.

2. REFERENCES

2.1 Applicable Document

The following publication forms a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue shall apply.

2.1.1 ISO Publication

Available from American National Standards Institute, 25 West 43rd Street, 4th Floor, New York, NY 10036, Tel: 212-642-4900, www.ansi.org.

ISO 3536 Road Vehicles - Safety Glazing Materials - Vocabulary

3. DEFINITIONS

3.1 SAFETY GLAZING MATERIALS

Glazing material consisting of organic and/or inorganic materials so constructed or treated to minimize the likelihood of injury to persons as a result of contact with these safety glazing materials when used in a vehicle, and which complies with specified requirements for visibility, strength, and durability.

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3.1.1 Laminated Safety Glass

Glazing material consisting of two or more layers of glass held together by one or more interlayers.

NOTE Two types are recognized:

- Ordinary: when none of the layers of glass, of which it is composed, has been treated, i.e., normal annealed glass; and
- Treated: when at least one of the layers of glass, of which it is composed, is toughened safety glass or glass which has been treated in any controlled process in order to give it increased resistance to mechanical and thermal stress.

3.1.2 Toughened Safety Glass

(Other terms such as “heat treated glass,” “tempered glass,” “case-hardened glass,” and “chemically tempered glass” are used also.) Glazing material consisting of a single layer of glass which has been subjected to special treatment to increase its mechanical strength and/or to condition its fragmentation after shattering.

3.1.3 Glass-Plastic Safety Glazing Material

Glazing material which may comprise one or more layers of glass and one or more layers of plastic in which a plastic surface faces inward toward the passenger compartment when installed in a vehicle.

3.1.4 Plastic Safety Glazing Material

Glazing material that contains as an essential ingredient one or more layers of organic polymeric substances.,

NOTE Two types are recognized:

- Rigid Plastic: Organic polymeric material which maintains its structural stiffness over the intended use range; and
- Flexible Plastic: Organic polymeric material which remains conformable over the intended use range.

4. GLASS SIZES

There are no standard sizes applicable to safety glasses for use in motor vehicles and motor vehicle equipment. The feasibility of proposed safety glass sizes developed by the motor vehicle/motor vehicle equipment manufacturer must be determined by conference with the glass manufacturer.

5. USE OF DESCRIPTIVE TERMS

As the definition indicates, safety glazing materials, in comparison with annealed float glass, are intended to reduce the likelihood of injury or the severity of injury in the event of their breakage. Therefore, terms such as “nonbreakable,” “nonshatterable,” and “nonsplinterable,” should not be interpreted by the driving public as meaning that absolute protection is afforded to the occupants of the vehicle by the safety glazing materials so described, as the descriptive terms might seem to warrant. No such terms are used in the safety standard.

Bullet-resistant glazing should not be termed “bullet-proof,” since no bullet-resistant glazing is completely resistant to penetration by all types of missiles fired from all types of armament.

6. DEGREE OF SAFETY

One safety glazing material may be superior for protection against one type of hazard, whereas another may be superior against another type. Since accident conditions are not standardized, no one type of safety glazing material can be shown to possess the maximum degree of safety under all conditions, against all conceivable hazards.

7. TYPICAL COMMERCIAL TOLERANCE INFORMATION

7.1 Thickness

Commercially available flat or curved safety glass ordinarily has a thickness tolerance of ±0.1 x (n)·mm ('n' being the number of layers of glass). (See Table 1.)

Table 1 - Nominal thicknesses

Type of Safety Glass	Typical Nominal Thickness[1] mm	Typical Nominal Thickness[1] In
Laminated	8.0	0.315
	7.0	0.276
	6.5	0.256
	6.0	0.236
	5.5	0.216
	5.0	0.197
	4.5	0.177
Tempered	6.5	0.256
	6.0	0.236
	5.0	0.197
	4.5	0.177
	4.0	0.157
	3.5	0.138
	3.0	0.118

1. Other glass thicknesses may become available, and would be acceptable for use in motor vehicles and motor vehicle equipment provided they meet the requirements of all applicable laws, regulations, codes, and practices in effect at the time an automotive safety glass is manufactured.

7.2 Specifying Dimensional Tolerances for Curved Automotive Safety Glass

7.2.1 Tolerances on the physical dimensions of curved automotive safety glass parts shall be specified as follows, with reference to the numeric design data, or to a master die model derived from numeric data supplied by the motor vehicle and motor vehicle equipment manufacturer:

7.2.1.1 Overall Size - Maximum as defined by manufacturer for the component.

7.2.1.2 Thickness - Nominal thickness, with acceptable commercial ranges above and below nominal.

7.2.1.3 Curvature - Peripheral or edge contour may be specified in terms of maximum departure from the peripheral face of the desired surface. Central area surface contour may be specified in terms of permissible deviations of curvature from the designed contour. For example, this contour may be measured from the vertical centerline chord of the glass, taken at the point of maximum designed depth of curvature.

NOTE: Manufacturing tolerances on size and curvature will vary with design and should be established between the glass fabricator and customer. Designs for complex curved parts should recognize and accommodate necessary tolerances on size and shape.

7.2.2 Curved safety glass parts are generally checked for size and curvature on a checking gauge made to receive the desired surfaces of the glass, as illustrated in Figures 1 and 2. The checking gauge should be accurate, rigid, and permanent. Size is checked using maximum and minimum lines, stops, or notches on the gauge.

7.2.3 Peripheral or edge contour is usually checked by inserting a thickness feeler gauge, taper gage, or dial indicator (where possible) between the face of the checking ledge and the glass. The width of the face of the checking ledge can vary with design, and should be established by conference.

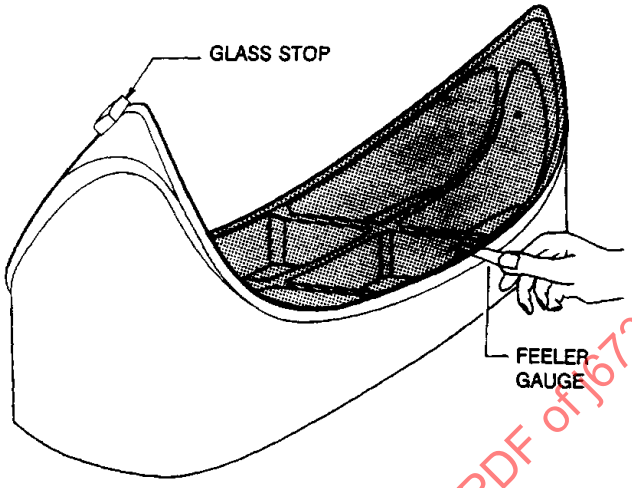

Figure 1 - Concave-type checking gauge

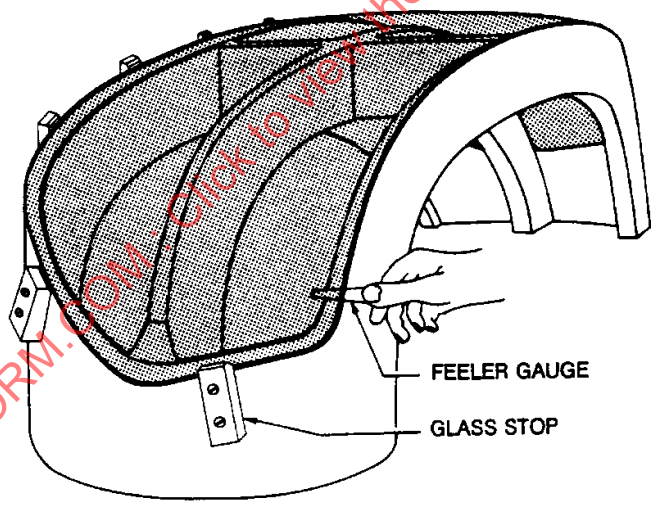

Figure 2 - Convex-type checking gauge

7.2.4 The central area of the checking gauge is undercut, with a spring pin or other means of checking the surface contour at the specified area.

7.3 Overall Size

Tolerance for flat laminated safety glazing and flat tempered safety glazing is ±0.8 mm (±0.03 in), except for vertically sliding door glass where the height dimension may be ±1.5 mm (±0.06 in), unless otherwise specified.

7.3.1 Size tolerances for curved laminated safety glazing and curved tempered safety glazing are affected by shape and degree of curvature, and should be checked with the component fabricator.

7.4 Overlap

For laminated safety glass, an overlap, offset or slip of 1.5 mm maximum (0.06 in) of one piece over the other on all edges, except Crown Edge finishes No. 1 and 2, is permissible unless otherwise specified and provided the overall dimension is within tolerance. On Crown Edge finishes No. 1 and 2, a maximum overlap, offset or slip of 1.1 mm (0.04 in) is permissible, unless otherwise specified and provided the overall dimension is within tolerance, on laminates with the plies individually ground.

7.5 Tong Marks

Center of tong marks may be located 8 mm (0.3 in) maximum from edge of glass, unless otherwise specified.

7.6 Mold Marks

Mold marks may extend 8 mm (0.3 in) maximum from edge of glass depending on the size and complexity of the curved part, unless otherwise specified.

7.7 Drilled Holes

For tempered safety glass, the dimensions and tolerances for the size and location of drilled holes will vary with design and glass thickness and should be determined by conference with the glass fabricator.

8. EDGES

For various applications and locations, Figure 3 to Figure 6E.

NOTE: Flake (shell) chips 2.3 mm (0.09 in) and small shiners (wheel skips) 3.1 mm (0.12 in) diameter or 1.5 mm (0.06 in) wide by 13 mm (0.5 in) long, to an accumulated length of 38 mm (1.5 in), are allowed on Edge No. 1. Larger chips are allowed on other type edges as long as the proper function of the glass is not impaired.

8.1 Edge No. 1

Crown Edge, Satin Finish (such as diamond wheel) (Figure 6A) indicates an approximate radius fine grind along the edges. This finish is suitable for all exposed edges.

8.2 Edge No. 2

Crown Edge, Semisatin Finish (Figure 6B) indicates a modification of Edge No. 1 where the finish is not so fine, and larger shiners (wheel skips) are permissible in center area of the crown. This finish is suitable for unexposed edges sliding in channels.

8.3 Edge No. 3

Semicrown Edge, Semisatin Finish (Figure 6C) indicates a modification of Edge No. 2 where the central part of the edge need not be touched with the edging wheel. This finish is suitable for edges enclosed in fixed channels, or stationary installations.

8.4 Edge No. 4

Seamed Edge (Figure 6D) indicates that the original cut edge of the glass is ground off to an angle of approximately 45 degrees. Usually, the width of the seam is approximately 0.8 mm (0.03 in). A seamed edge is the minimum type of edge work acceptable for tempered safety glass. This finish is suitable for edges enclosed in fixed channels or stationary installations.

8.5 Edge No. 5

Plain Edge (Figure 6E) indicates that the glass part has no further work done upon the original cut edges, except that the sharp edges may be removed if desired. This finish is suitable for edges enclosed in fixed channels, not acceptable for tempered safety glass.

9. MARKINGS

Markings shall be in accordance with the requirements of all applicable laws, regulations, codes, copyrights and practices to which automotive safety glasses are required to conform at the time of manufacture.

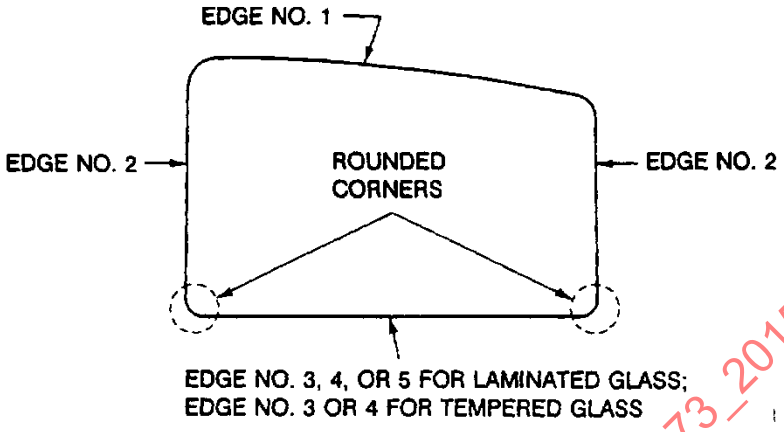

Figure 3 - Illustrative vertically sliding door or quarter window

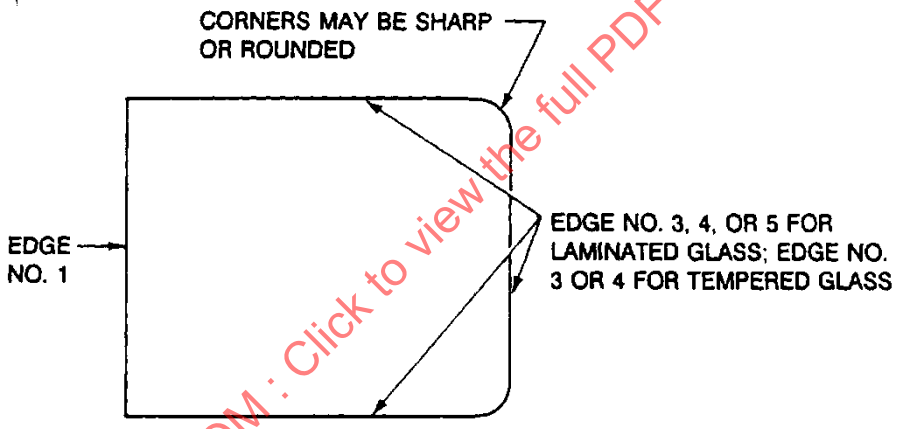

Figure 4 - Illustrative sliding window with channel on three sides

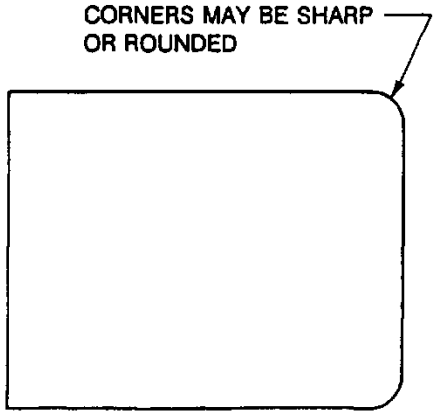

Figure 5 - Illustrative sliding window with channel on four sides - edge no. 3, 4, or 5 for laminated glass all around; edge no. 3 or 4 for tempered glass all around.