

## DIFFERENCES BETWEEN THE TYPES AND STRUCTURES OF PLATE HANDLES, WHICH ARE FASTENED TO THE CAR WINDSHIELD IN THE MANUFACTURE OF MACHINE DETAILS

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### Abstract

Plate grips that attach to the car windshield, in relation to their types and structures, are important in ensuring the functionality and safety of vehicles. These handles are mainly divided into three different types: monolithic, modular and special design handles. Monolithic handles, produced as a whole, hold the mirror firmly. Modular handrails, on the other hand, consist of several parts, allowing easy replacement and repair. Specially designed handlebars are usually designed for specific car models, taking into account the aerodynamic and aesthetic aspects. Constructively, grips are differentiated according to materials, strength, and application conditions. For example, some handles are made of metal or high-quality plastic, which increases their impact resistance. On the other hand, the aerodynamic design helps to reduce the air resistance of the mirrors. These differences allow automakers to choose grips to suit different conditions and needs, increasing the overall performance of the car and driver safety.

**Keywords:** plate handle, types, structures, monolithic handle, modular handle, materials, strength, aerodynamic, repair.

### Introduction

Quality problem solving is the most important factor in increasing the standard of living, economic, social and environmental security. Quality is a complex concept that describes the effectiveness of all areas of activity: strategy development, production organization, marketing, etc.

In the literature and in practice. The International Organization for Standardization defines quality as one of the characteristics of an object related to its ability to meet defined and accepted needs. In many cases, needs may change over time. This implies periodic analysis of quality requirements. Typically, requirements are transferred to product features based on established criteria. Requirements include performance, availability, reliability, operational safety, environmental safety, economic and aesthetic requirements, etc. issues such as

In the conditions of market relations, when enterprises and organizations are given the right to enter the foreign market independently, the need to objectively evaluate the quality and reliability of their products is certified by them. Certification is done by providing documentary evidence by a third or independent party that the product meets certain requirements, certain standards or technical conditions. Thus, the certification of safety laminated glass in the system is a document confirming compliance with the standards of the state standard "State Standards" GOST 5727-88, which is carried out by an independent, authorized body. Safety windows for vehicles, general technical conditions, product quality indicators are different. Therefore, for each type of product, a range of relevant indicators that most accurately represent its quality is



selected. According to the characteristics, the following groups of indicators are used: purpose and economic. These indicators are divided into two groups: production and consumers.

The indicators of the consumer group include: dimensions, limiting the limits of dimensions, thickness deviation, light transmission, optical distortion, shock resistance, etc.

The consumer group also includes tough and safe laminated glass, environmental indicators representing the level of harmful effects around the glass and the processes related to storage, transportation, use.

Economic indicators of product quality are usually divided into indicators of production and consumer groups. Indicators of the production group include: price of laminated and laminated car glass, capital investment in the production of car glass, production profitability, etc.

can include investments related to product processing, etc.

The expected value of expensive products for the consumer is very important. If the customer is satisfied, the consumer will use the product. It creates its worth and value. Mirror factories that cater to the needs of auto collectors in terms of value or value will find that customers abandon them and lose their market place to more professional competitors with a better understanding of customer needs. The higher the level of customer satisfaction, the higher the business process development opportunities for automotive glass manufacturers.

As the mechanical engineering industry develops, the demand for machines and mechanisms, their quality, performance, and service life is increasing day by day. At the same time, we can see a growing demand for a plate holder that holds the rear view mirror firmly to the windshield of cars . This is because it serves to monitor the vehicle behind and the traffic behind it while driving [1,2,3].



Figure 1. Today's leading car manufacturers use windshields for their cars.

### The Main Part

As the automobile manufacturing industry advances in mechanical engineering, the demand for windshield wipers is also increasing. Reason mirrors modern appearances and constructions developed is coming That's it o ' rinda new kind of plate handles to the construction was demand too o ' sib is going Current of the day cars for plate handles types are shown in Fig. 2 shown.



Autolovov structural garden of tape technical requirements.

Best practices for glazed windows

This bulletin describes the application/recycling best practices for heat-treatable, 3M TM Structural Bonding Tapes (SBT) #9214 and #9270 for the permanent attachment of metal and plastic fittings to automotive windshields, pre-cut. used as tape pads. For example, buttons for rear mirrors and brackets for rain, light and condensation sensors. 3M TM SBT # 9263 is used exclusively for windshield button assembly as supplied by 3M USA to their North American customers. Therefore, SBT #9263 is not normally available for European customers.



Figure 2

However, previously and due to the geographic needs and circumstances of some OEM / Tier suppliers, some applications using #9263 were delivered through 3M's European sales and marketing organization. Summary: This bulletin assumes that the 3M manufacturing site will convert SBT master rolls into pre-cut, pre-separated weed pads, usually on the original liner and in the required length for use in the customer's process designated as roll. The tape pads supplied to customers in this format allow the product to be used in a variety of situations and environments, providing maximum process flexibility with high field performance. The information provided in the Buyer is derived from European sources and is designed as a general handling guide to supplement existing data sheets and bulletins. Although most applications comply with this guideline, product and process suitability should always be checked, as there are always exceptions that may require special or even unique solutions! Additional information on the properties of components and glass substrates is also included for those not familiar with automotive glass processing [4].

### Processing:

1. Warranty on delivery of pre-cut SBT parts to customers The 3M manufacturing plant, which converts jumbo materials into coils, provides a warranty of 6 months from the date of delivery to the customer, but only in accordance with the recommended storage conditions at the customer's location where these coils are stored (see below) Best Before Expiration / Best Before Date The customer is advised to use SBT materials on first access and of course before the expiration date (before BB) date, clearly printed on the roll cores and packaging and should be stored under 3M recommended conditions. Recommended storage conditions structural adhesive tapes are sensitive to temperature and humidity and gradually lose the healing ability of active components as their performance characteristics decrease. Products supplied in rolls must be stored in a suitable refrigerator / freezer at <5 C to comply with the 5 month shelf life



guarantee. Materials stored at  $>5$  C, including ambient conditions, provide a guaranteed shelf life of only three months from delivery.

2. Typical substrate materials used with 3M™ SBT applications mirror button powder metallurgy (P/M) technologies are used to produce a wide range of small, complex parts with high strength for a variety of automotive applications, including mirror buttons. Many types and combinations of metal powder granules can be compressed together with lubricants under conditions of heat and pressure to form alloy parts within a mold or matrix. The sintering of these formed parts is carried out by a diffusion process to eliminate lubricants and increase the inherent strength, which can be increased by controlled shrinkage using a heat treatment process and subsequent surface treatment.

Plain sintered steel and stainless steel buttons are the most commonly used types, but are porous and can be affected by moisture. Sandblasted sintered stainless steel buttons provide a large surface area for improved adhesion with many bonding systems. Steel types can be organically coated (black) to prevent corrosion. More recently, inorganic chemical treatments and organic coatings have resulted in buttons with a dark grey/black appearance and are becoming more popular with increasing numbers of OEMs. These coatings are less susceptible to moisture/water absorption before and during button application. Brackets - aluminum matrices, impregnated metal alloys, PA or PBT hard plastic parts, significantly larger than mirror buttons, often shaped to fit the curvature of the glass. Due to the shapes, tolerances and low volumes, it is generally preferred to attach the SBT offline to the substrate [5,6].

Glass and Glass Properties Generally, the upper limit of the glass transition temperature for soda/lime float glass is around 550 C. Around 600 C, glass can be called visco-plastic. Glass can be annealed to make it amorphous or can be tempered to make it more crystalline, thus providing different strength and fracture properties depending on the application requirements of the glass. PVB Interlayer Films Poly-(vinylbutyral) film has been around for 70 years and is the most common material used as a bonding agent for laminated glass structures. PVB is a tough, elastic material that provides excellent impact properties after hardening in laminated glass structures that are critical to meeting global glass regulations.

Low temperature processing of infrared reflective (IRR) interlayer films. When metallized IRR interlayer films such as Southwall XIR™ are used in bright structures, temperatures during autoclave processing are typically around 125 C. 3M™ SBT # 9270 can be processed at low temperatures and is preferable to # 9214 / in such cases \* 3M™ Solar Reflective Film (SRF1100) non-metallic IRR interlayer film can be processed at high temperatures up to 145 C with all types of SBT Black printed ceramics SBT changes from black to pepper gray during frit heat treatment. This usually unwanted color must be hidden behind an opaque black frit printed as a ceramic paste directly onto the #2 and/or #4 glass surfaces for cosmetic and design reasons. The picture above shows part of the printed frit for the combined mirror housing (mirror mount, light sensor and rain sensor). First, the frit is dried in an oven using UV or IR lamps, then it is fully cured during the glass bending process or fired at a temperature of around 600 C. Whether the SBT is to be attached to plain glass or a frit printed on a #4 glass surface, both provide a keyed surface for perfect adhesion.

straight line is drawn from the top edge of the windshield to the bottom edge and the resulting gap is the curve of the windshield front bracket in mm, the radius of the windshield is mm when





measured from left to right. . Compensation of round glass buttons to match the glass curvature is usually not necessary, except for side wings of smaller and thus different radii, but when the diameter increases  $> 25$  mm or the area increases  $> 500$  mm<sup>2</sup> or the curvature of the glass becomes excessive, the button for compensation forming may be necessary, rectangular mirror buttons, for which the longest side is connected to the front in the vertical direction (cross-curvature), compensation is usually not necessary brackets, usually in place of the rectangular shape of the sensor unit cut . Constant loads of up to 40N can be applied to the bracket and this may mean that some shaping is required to accommodate the curvature of the glass. Alternatively, a thicker 3M TM SBT caliper such as #9263 or #9270 can be used to make better contact with the surface (see also tips for improving wettability). For glass knobs and brackets that fit well with stainless steel parts, aluminum bracket casting may not always be satisfactory and may cause damping effects due to different coefficients of expansion.

3. Preparation of components before use Cleaning of sintered metal buttons and brackets are usually plain or sandblasted, stainless steel buttons / brackets do not need to be cleaned before application to SBT, and even suppliers of sintered metal buttons do not recommend cleaning. If in exceptional cases it is necessary to use a cleaning operation, only black chromed, stainless steel type knobs should be protected against moisture. Before using isopropyl alcohol, the preferred solvent should be to dry the buttons for at least 4 hours at 120 C. Consult your bracketed aluminum casting clearance vendor or perform in-house testing to determine compatibility [7,8].



Figure 3. Views of 20 different types of license plates on modern cars.

Under normal operating conditions, the attachment of the plate holder is carried out with a pneumatic device with a pressure of 30-50 N/cm. Typical holding conditions are 10 seconds at 140 °C . It responds to normal autoclave processes.

This process shows how to apply 3M structural bonding tape to a plate holder. In this technological process, the 3M structural bonding tape is cut in an automatic line with the help of a pneumatic device on the perimeter of the plate handles. This pneumatic device is universal and can be adapted to any type of plate holder. Today's automotive factories use 3M structural bonding tape for their vehicles.



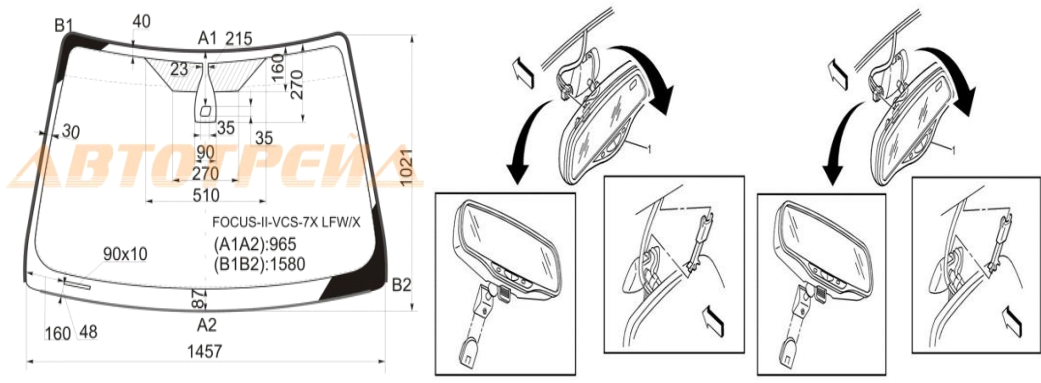


Figure 4. Schematic and parameters of mounting the mirror to the windshield of the car by fixing the plate holder with 3M structural bonding tape.

After fixing the plate holder to the windshield, the scheme of fixing the mirror by inserting it into the plate holder is shown. In this assembly process, the parameters must be assembled. The reason is that the mirror should be in the upper part of the windshield and in the center. Two types of 3M structural adhesive tape are used in automotive manufacturing. 3M hermetic and tape types are used for plate holder tape.



Figure 5. Sealant and Tape Types of 3M Structural Bonding Tape .

This connection tape can be used to fasten all types of plate handles to glass. Today's modern cars fully meet the requirements of the manufacturing plant.

**9270 Structural Bonding Tape.**

**Procedure**

- 1)Put the button on the ribbon cut and then remove the ribbon button protective liner by cleaning the lining. Apply the taped button to the cleaner glass surface.
- 2) glued buttons should be at or above room temperature during application. During application, the temperature of the bottle should be 80-95 ° C; if not A hot plate should be used at a



temperature of 180 ° C. Buttons can even be successful. If the surface of the button is suitable, it is applied to the glass at room temperature the bottle works well with the outline and enough pressure is used to soak.

3) Firm pressure should be used to apply the buttons (generally 5.5 -7.0 kg/cm<sup>2</sup>) recommended. Pressure should be applied evenly to the button and tape for complete wetting.

4) Tape assembly at 140°C for 20 minutes or other recommended conditions.

1. Procedure where the mirror button is attached to a piece of tempered glass using the recommended application and treatment method. Expose the connected assembly to the specified environmental conditions, then install the bottle in a vertical position in the holder. Connect the clamp to the window button; have a hand grip 70mm from the bottom of the clamp button. Set the arm permanently on the puller and (2.5 mm / minute) hold the hand. Record the value when the button is broken and is released from the window. A stainless steel button with an area of 5.5 cm<sup>2</sup> is available for these tests . 2. 25 .7 mm wide, 12.7 mm overlapped, E coated metal coupons. Bond at 140°C Treat for 20 minutes. Expose the bonded assembly to the specified environmental conditions. Measure overlap in a speed puller tester at 5 mm/min [9,10].

3. Attach the mirror switch to the laminated glass using the recommended application and cure procedure. Attach the mirror bracket assembly and install the assembly in the glass position (inverted at an angle of 45 °) hanging on a bracket with a weight of 2 .7 kg. Open the linked items, specified environmental conditions.



Fig. 6 Example mounting of a rearview mirror to a plate holder bolted to a car windshield.

Car windshield rearview mirrors with plate holder connecting windshield and mirror by mounting a sample mirror to a plate holder bolted to the windshield. The purpose of the installation is to verify that the mirror is installed in accordance with the requirements.

#### Requirements:

- Compatibility with vibration
- Positioning accuracy
- Endurance



This plate grip is considered plate grip # 9263. This plate holder was used in Uz. DAEWOO factory for Tiko, Matiz, Nexia cars. The advantage is the presence of a recess that limits the movement of the mirror up and down. The disadvantage is low load carrying capacity. The reason is that the adhesive surface of the windshield is small and the accuracy of the adhesive surface is low [11,12].

### Conclusion

In conclusion, plastina handles that are fastened to the car windshield are produced with a variety of materials, constructive solutions and installation methods. Their choice is associated with safety, functionality and aesthetic requirements, affecting the overall quality of the car.

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