

# No. 2003 Processing instructions for coated optical interference glasses

AMIRAN<sup>®</sup>, CONTURAN<sup>®</sup>, DARO, MIROGARD<sup>®</sup>, MIRONA<sup>®</sup>, NARIMA<sup>®</sup>

## 1. Sol-gel coated glasses

SCHOTT uses the sol-gel method to manufacture the following coated glasses at its site in Grünenplan:

- AMIRAN<sup>®</sup> – anti-reflective glass for architectural applications
- CONTURAN<sup>®</sup> – anti-reflective glass for technical applications
- MIROGARD<sup>®</sup> – anti-reflective glass for picture glazing
- MIRONA<sup>®</sup> – metamorphosis glass
- NARIMA<sup>®</sup> – color effect glass

## 2. Transport / Packaging

Coated glass from SCHOTT is normally delivered packaged in wooden crates. Here, the panes are separated by special acid-free paper. To avoid damage to the coating during internal transport, we recommend that you take a similar approach (plastic powders and films can also be used) for each transport operation.

The panes are transported using vacuum cups (with clean rubber surfaces!). Do not allow the panes to slide on top of one another because this can cause scratching.

## 3. Cutting

Cutting oil that evaporates should be used during cutting of all coated glasses. Strong oily cutting agents leave residues which then require tedious cleaning.

Broken glass should always be removed from cutting tables (by vacuuming). Scratches on coated glasses are highly visible! After cutting, the glass should to be stacked in such a way that the coated surface is protected from damage (paper liner, cardboard strips or suitable adhesive plastic pads – not cork pads).

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## 4. Edge processing, drilling, edge / cutouts

As with normal float glass, the edges of coated glass can also be seamed, ground or polished (DIN 1249, Part 11). Cutouts along the edges or within the surface of the glass (usually for attaching fittings) and holes are possible in accordance with the same technical regulations that apply to uncoated glass, as long as the coated glass with the high-quality coating is treated accordingly. To prevent possible damage by the transport jaws of grinding machines, we recommend that you protect the glass surfaces in the appropriate areas.



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### 5. Washing / Cleaning

Washing machines with roller brushes that are equipped with soft bristles on the front and back are well suited for cleaning coated glass if the brush distances are adjusted to suit the respective glass thickness. The coated pane may not remain stationary on the running brushes. Hard or hardened brushes should never be used.

Caution should be exercised with circular brushes, which are mostly intended for hard pre-cleaning. They can leave grinding marks. For this reason, please don't use plate brushes to clean the glass.

The brushes should always be cleaned thoroughly before using the washer.

**Note:** Some washing, cutting and conveying systems are equipped with sensors that automatically set up the rollers to suit the respective glass product by performing reflection

measurements or by measuring the electrical conductivity of a glass. Due to the low reflectivity, these sensors do not react to anti-reflective glasses. Therefore, the roller pairs must be adjusted by hand to suit the proper distance to the glass.

#### Suitable cleaning agents:

- warm water
- slightly alkaline detergents
- slightly acidic detergents

#### Not allowed:

- abrasives
- detergents that contain hydrofluoric acid

Labels, label residues and dirt can be removed before and after the washing process by spraying on a suitable glass cleaner and wiping it dry with a soft cotton cloth.

### 6. Toughening of coated glass

Sol-gel coated glasses can be toughened in accordance with the valid specifications (except for DARO). Here, please make sure that only the coatings developed for the respective toughening process are used. DARO needs to be applied after any tempering process! The heat of the toughening process will change the optical appearance of the glass slightly. Some of the glasses that can be toughened achieve their specified characteristics with regard to residual reflection and color impression only after they have been toughened (except for NARIMA<sup>®</sup>, MIRONA<sup>®</sup> and chemical toughening). During toughening, a distinction is made between thermal and chemical toughening.

#### 6.1. Thermal toughening

Thermal toughening is only recommended if the appropriate toughening furnaces are used. Here, the furnace parameters must normally be adapted to suit coated glasses; the parameters for Low-E glass can be used as a point of reference.

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The following error characteristics can occur during thermal toughening:

### Anisotropies

Thermally toughened glass is horizontally heated up to a high temperature inside an automatically controlled toughening furnace and then convectively quenched with cold air. This quenching produces optical oscillation fields near the air nozzles. This confirms the fact that this is actually thermally toughened glass. Anisotropies are caused by production and are unavoidable.

### Medium pressure line

Due to the immediate contact with the rollers during the thermal toughening process, slight surface changes can occasionally occur on the underside of the glass. This ripple (better known

as roller waves in technical terms) is for physical reasons and is not always avoidable. It occasionally results in a slight deterioration of the reflected image. The permissible extent of the medium pressure line can be discussed if necessary.

### 6.2 Chemical toughening

The approved coatings listed in the respective valid specification sheet are to be used in following the recommendations for parameters and the process chain for chemical toughening. The glasses must be cleaned both before and after the chemical toughening process.

## 7. Processing into laminated glass

### 7.1 Anti-reflective laminated glass

With anti-reflective glass, material that features an anti-reflective coating on one side is to be used. Otherwise the anti-reflective effect of the laminate will be canceled. The panes must also be cleaned beforehand.

### Recognizing the anti-reflective side

Glasses that have been coated on one side are marked with labels on the anti-reflective side (except for DARO, because labels will not stick to DARO). Exception: one side coated and DARO are marked with labels on the uncoated side, because the labels don't stick on the DARO coating. Because it is difficult to determine which side is the anti-reflective side, the labels should not be removed from the anti-reflective surface until preliminary assembly has been completed. The non-reflective side of glasses that have been coated on one side

can be recognized by its higher reflectance, in other words by holding a white sheet of paper next to it or by looking through the edge, but most easily by using a special test lamp.



Uncoated side facing upwards



Anti-reflective coating on top

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### 7.2 Laminated glass that features a coating on both sides (not AR!)

In this case, the usual procedures for manufacturing laminated glass must be observed.

### 7.3. Mirrored glasses

Mirrored glasses on one side are labeled accordingly on the mirrored side. Because it is difficult to determine which side is the reflective side, the labels should not be removed from the reflective surface until preliminary assembly has been completed.

### 7.4. Joining to form a laminate

It is recommended that you leave the labels on the coated side of the one side of coated glasses until prelamination has been completed to avoid any possible confusion. The labels should then be removed, however, because they usually stick to the rollers and contaminate the panes during the prelamination process due to the higher temperature (~140°C).

### 7.5 Prelamination pressing

Since the coated surfaces of the glass face outside in this process and the pressure rollers weigh heavily on the glass surfaces, it is important to keep the rolls and rollers very clean. Hard rubber or wrapped rollers and cylinders must be inspected and cleaned. High-speed rollers (transition from slow pressing to fast transport) can cause slippage or damage the coating by rubbing against it.

### 7.6. Laminates inside an autoclave

The assembled pre-composite glasses should not be placed glass to glass, but rather by using the appropriate spacers in the racks of an autoclave. Do not use glued spacers to separate them because this will leave smudges that are very difficult to remove. Otherwise, the coated glasses should be treated just like any other laminated glass in an autoclave.

## 8. Processing into insulating glass

Basically, the cleaning instructions No. 2001 and the treatment instructions No. 2002 on sol-gel coated glasses from SCHOTT are to be observed during further processing.

### Additional information:

The coating on the edge does not need to be removed because two component polysulfide sealants made of polysulphide, polyurethane or silicone bond well with sol-gel coated glasses from SCHOTT. Please ask your sealant manufacturer if appropriate test results are available. It is strongly recommended that sealants with which it is not known whether they can be used with sol-gel coated glasses from SCHOTT be tested for bonding, water resistance and climate change stress in collaboration with the sealant manufacturer.

The almost inevitable spill of sealants must be removed immediately after the sealing process of the glass surface before they harden. Spray Ajax glass cleaner and wipe it off using clean rubber wipers. During curing and packaging, please make sure that acid-free intermediate layers of cardboard, paper, film or suitable adhesive plastic pads (no cork-pads!) are used as spacers between the coated panes.

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### 9. Allowed characteristics

Sol-gel coated glasses from SCHOTT are technical products for use in structural glazing. They may have allowed features that do not impair the functionality of the product. Under certain lighting conditions and angles, slight fluctuations in the residual

reflection and possibly also weak scattered light effects can be observed. These are due to manufacturing and do not constitute grounds for a complaint.

### 10. Visual quality

The assessment of the visual quality of sol-gel coated glasses from SCHOTT should take place based on the respective valid specification TE for Technical Characteristics.

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