GUIDELINE FOR STADIP® STADIP® PROTECT STADIP® SILENCE And STADIP® MIRROR

SAINT-GOBAIN

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1. GENERAL

1.1. PRODUCT DESCRIPTION

Laminated safety and security glass, STADIP® or STADIP® PROTECT, comprises two or more sheets of glass bonded together with one or more interlayers of polyvinyl butyral (PVB) film.

STADIP® glass incorporates a single PVB sheet with a nominal thickness of 0.38 mm, distinguishing it from STADIP® PROTECT glass which has a minimum thickness of 0.76 mm. Laminated glasses with different levels of safety and security can be obtained by varying the number and/or thickness of each of the components.

STADIP® SILENCE is an acoustic laminated safety glass, consisting of two or more sheets of glass bonded together by one or more acoustic Polyvinyl Butyral interlayers

STADIP® MIRROR is a mirror laminated safety glass, consisting of one mirror sheet with one clear float sheet bonded together with one or more interlayers of polyvinyl butyral (PVB) film.

In case of use of extra clear glass DIAMANT® for the STADIP®, the name will be STADIP® DIAMANT. It is the same in case of use of low carbon footprint ORAÉ®, the name of the laminated product will be STADIP® ORAÉ.

To improve customer satisfaction, we constantly improve the quality of our products and learn about the best way how to process it. This could lead to updates in the processing guideline of our products, so please make sure you have an up-to-date version of these guidelines: https://www.saint-gobain-glass.com/processing-guidelines.

1.2. THICKNESS AND DIMENSIONS

Product	Thickness product								Qty of interlayers				Standard dimension
	22.x	33.x	44.x	55.x	66.x	88.x	1010.x	1212.x	.1	.2	.4	.6	
STADIP®													6000 x 3210
STADIP® PROTECT													
STADIP® SILENCE													
STADIP® MIRROR													Contact commercial team

For the coating laminated glass, all the thickness product (without 1212.X) and quantity of interlayers are available except for STADIP® MIRROR version. For 1212.x with coating ask to your commercial team.

1.3. CE MARKING

STADIP® / STADIP® PROTECT / STADIP® SILENCE / STADIP® BUILDER comply with the EN 14449'' Glass in building - Laminated glass and laminated safety glass - Evaluation of conformity/Product standard''. These products receive the CE-Marking.

The Declaration Of Performance (DOP) of each product CE marked is available at the web site:

www.saint-gobain-dop-glass.com/ce

1.4. QUALITY CRITERIA FOR LAMINATED GLASS

1.4.1. Definition of appearance defects

The following definitions are given by the standard EN 12543-6

1.4.2. Conditions of observation

The conditions of observation are given in the standard EN 12543-6. Please refer to it for details.

1.4.3. Acceptance criteria of laminated glass defects

Without prior agreement between both parties, the standard EN 12543-6 will apply.

Note that the smashing of any laminated glass, break a glass in the dumpster is not a proof or a quality test showing good safety performances of the product. Only test according the standard EN 14449 can determine level of performance of safety of glass products.

2. TRANSPORT, RECEPTION, STORAGE AND HANDLING

2.1. TRANSPORT

- Float glass sheets are usually transported in 2.5 tonnes packs measuring 6000 mm x 3210 mm (jumbo or PLF sizes).
- Glass sheets must be transported vertically (at 3 – 7 degrees).
- During transport, violent and repeated shocks should be avoided.
- When handling with a manipulator, measures must be taken not to damage the pack.

2.2. RECEIPT OF THE DELIVERY

- Labels are never placed on the glass face.
- In case of packing (delivery for special application), the pack must be opened with care in order not to damage the glass sheet (contacts, scratches, breakage, etc.).
- All deliveries are identified with an identification label providing the following data:
  - Product name
  - CE Marking
  - Dimensions and thickness
  - Number of sheets
  - Net-weight
  - Date and time of production (laminated glass)
  - Bar code and batch number of the laminated glass
  - Bar code of the laminated glass backing sheet
  - CE marking information: in addition to the CE symbol, website address and CE product code are mentioned. By going on www.saint-gobain-glass.com/ce then entering the product code and the production date, one can access to the CE product declaration of performances and characteristics related to the product (DOP document)

- In case of delivery with obvious disagreements detected at reception (water, breakages…), glass should not be unloaded and waybill (CRM) fully completed by customer and transport entities. A possible expert visit could be organized to define responsibilities.

2.3. STORAGE

All glass products will become stained if they are stored in humid conditions; the iridescence has the appearance of a "rainbow" or milky white coating on the surface of the glass.
The glass sheets have to be stored vertically (at 3 - 7 degrees) under the following conditions:

- In a dry, well-ventilated store, to prevent any condensation on the surface;
- Protected from rain and running water (e.g. any roof leaks must be rectified);
- Never outside or in the open air;
- Protected from wide changes in temperature and humidity.

If the laminated glass is coated, please do never transport the glass on the coated side. Else, the guidelines for the corresponding coated glass apply.

A storage and processing temperature above 20°C will have a positive impact on cutting process of laminated glass. For that reason, it is necessary to have a waiting time before to cut fresh delivery.
This waiting time between delivery and first cutting will let glass to recover a temperature above 20°C. Indeed, during transport, temperature in the pile could decrease a lot and could severe impact the cutting. In general, a waiting time of 24-hour minimum is necessary.

Laminated storage could impact next steps of the processing. **It is really important to have flat storage rack**. If support is inclined, or of different heights, or the support surface is worn on one side, stress is induced in the glass which can induced higher glass breakage at cutting. For that reason, it is recommended to store at reception laminated glass on flat support and use carton interlayer in enough quantity. Pay attention to possible humid spacer that could crash at one position generating one local bow and so stress in the laminated glass.

Shelf life of STADIP® is two years if condition of storage described above are respected.

2.4. CUTTING

2.4.1. Cutting general recommandation

Standard cutting recommendations could be done with possible focus below:

- **Cutting oil in enough quantity** on both sides top and bottom glasses.
  Generally, it could be more difficult to have a good oil cut application on the bottom side glass. For that reason, carry out necessary checks such as the minimum quantity in the tank. Check oil circuit vacuum value and refer to machine supplier recommendation. It is recommended to bleed some oil to eliminate potential air bubbles in the circuit before trying to adjust the micro dosing system.
- **Check corresponding scoring wheel and laminated glass thickness.** The record of the scoring wheel lifetime in use if available provides information on the tool's status. If not sure, change preventively the scoring tool. In case of correct force application but difficulty to score the laminated glass, decreasing the speed can be favourable, then in addition or not, use a slightly narrower angle scoring wheel cutting angle (lower angle) is possible.

- Check the distance between the foil heater and the lower edge of the glass. Getting too close may lead to thermal breakages if too long heating cycle parameters.
- Clean and not too old infrared lamps to have their optimum efficiency.
- **Check the wheel cutting free rotation** with no hard points. It can be blocked, so blow compressed air to remove possible glass chips or dirt in the wheel holder / wheel mechanical system.
- **Check for clean and continuous scoring lines** on top and bottom glasses. It could be tested via machine manual mode, stopping cycle just after scoring, in case of doubt.
- **Check if no offset** between top and bottom cutting wheels, laterally and radially.
- **Check good state of the breaking top roller** and position its precise centering compared to the scoring line
- **Check the foil cutting blade**, to be in good state
- **Check PVB heating cycles**; to avoid edges delamination or thermal breakages it must be as low as possible. It can vary from less than 10 sec to around 30 sec for 44.2. Any above timing can be caused by a technical deviation
- **No high deviation between top and bottom cutting pressure**

It is always advised also:

- Change the wheel and the pin together at the same time. The holder can be changed as a precaution or if there is no knowledge about its lifetime.
- Use metallic holder instead of plastic ones more subject to short term deviation due to potential damages caused by the pin rotating in the plastic holder itself.

2.4.2. Maintenance of cutting table importance

Laminated cutting machines are more complex than most of monolithic cutting table and it is necessary that main process related components of the cutting table should be optimal. For that reason, **a regular and preventive maintenance system implementation is necessary,** to avoid possible deviation and difficulties in cutting. Cutting machines suppliers usually provide guidelines for each machine model. They list and describe main caring points of attention, the necessary period frequency in worked hours.

Saving the maintenance work details in reports is a very good practice. Indeed, it let to be able to follow the equipment and potentially identify the most occurrence issue and adapt the preventive actions.

Experience shows nevertheless that important ones are:

- **The level of the felt or table** specially within a zone of 500mm upstream and downstream of the cutting bridge. It ensures planarity of the machine necessary to cut without defects.
- **Level of suction cups** when equipped or stretching systems
- **Distribution of vacuum aspiration**
- **Cutting heads and breaking roller pressure leakages checks**

Machines' geometry outside of tolerances generates local deformation that could induce inhomogeneity and difficulty during cutting.
The cutting environment (dust, oil, splinters and interlayer powder accumulation) could decrease efficiency of suction cups. For that reason, a regular:

- Vacuum suction cups cleaning is mandatory (solvents are prohibited). Wet clean rag with soapy water. Industrial glass cleaning agent can be used if not composed of additives
- Checks of the return valves are also good practice of failure anticipation.

Regular cutting settings change is an indicator of abnormal deviation of the table condition. **Reference values should be known** and not vary so much and should be adapted by product family (glass and PVB thicknesses).

Measurements of the force applied by the cutting wheel top and bottom but also the breaking roller can let to:

- Validate used recipe for the cut product and possible tolerance for the operator
- Validate no deviation in force used in the time not visible with daily control

2.4.3. Cutting thin laminated glass range and thick PVB

Technical Support Manager (TSM) in your region can potentially advise about how to control the processing force range for cutting, and advise about standard recipes. This check is particularly important for thin laminated glass family (33.x and 22.x) where it has been seen that some machines can work at the limit of their initial design and sensibility as well as cutting heads maintenance benefits to keep their necessary working range / precision.

In case of 22.x laminated glass industrialisation or first time processing, it is recommended to ask the support of your TSM to prior measure the cutting heads of the bridge of your table together and evaluate the possibility to cut this specific laminated glass family.

The use of the recent shift of heating technology with laser can be beneficial but not mandatory. This technology transfers less energy from the heating system to the glass itself of the laminated composition. It can reduce the risk of experiencing thermal breakages by reducing the process cycle time in general. It is a beneficial option in the cut of thick PVB products (higher than 0,76mm) and is so recommended. A cutting table with well-adjusted good IR emitters is also an appropriate solution.

For very short trimming with thick PVB product, it is recommended to reheat the corresponding area with local IR lamps to let the operator to cut manually with a better final quality and avoid glass breakage.

2.4.4. Cutting STADIP® MIRROR

To cut STADIP® MIRROR glass, same parameters as for STADIP® same thickness can be used.

2.5. HANDLING

The float glass sheets must be handled with dry, clean gloves.
In case you cannot avoid handling operations with vacuum cups, make sure that the vacuum cups are silicone free and perfectly clean.

2.6. EDGE WORKING

Use of segmented wheels is compulsory to grind all STADIP®.

3. ENVIRONMENT / WASTE GLASS / HEALTH ISSUES

STADIP® can be recycled. Collection of substrates in what we call cullet is important for many reasons**. Collection should respect rules to get clean cullet possible to reuse in new glass production**.

Laminated glass must be separated to monolithic float in order to collect it and use it as new cullet. All type of STADIP® (PROTECT or SILENCE) could be mixed in same glass container. It is advised to separate STADIP® MIRROR to the other laminated product because of mirror coating presence.

Here is a not exhaustive list of cullet pollutant:

- Papers and cartons
- All metallic sources as aluminium spacer bar
- Pyro ceramic glass
- Borosilicate glass
- Bottle glass
- Georgian wired glass
- Cutting wheel metallic parts
- Glass marker and more generally all elements no nickel sulphite free
- …

Please contact your local commercial team and technical support to have full details about rules of glass collection.

Edge working residues have to be continuously and completely collected during the grinding process. These residues must be further treated in compliance with national legislation about industrial wastes. In some legislation, residues from grinding process have to be treated as toxic waste.

As for any dust coming from the grinding process, any inhalation or skin contact of these residues must be avoided.
On request, a **S**afety **U**se **I**nstruction **S**heet (SUIS) relating to the ECDirective 91/155/EEC can be supplied.

4. DISCLAIMER

SAINT-GOBAIN GLASS has taken every reasonable measure to ensure that the information contained in the present leaflet was exact at the time of its publication.
However, SAINT-GOBAIN GLASS keeps the right to modify or add any information without previous notice.
SAINT-GOBAIN GLASS is not liable for the possible lack of information on STADIP® products that would not be contained in the present document.

No claim can be accepted for damages caused during and after processing due to a lack of adherence to these guidelines. Therefore, glass processor should ensure that the process is adapted for coated glass and that the quality control is relevant to detect any quality problem as soon as possible. In case of claim, samples will be required and a visit from a SGG representative may be requested.

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