Glasma 700 Studio

Technical Guideline

About Glasma

Glasma's heritage dates back to 1742, with roots in the founding of Kosta Glasbruk in Sweden and traditions from Czech glassmaking. Our factory in Sweden, built in 1979 in the heart of the Kingdom of Crystal, is staffed by people who grew up in the region.

We continuously develop our glass formulas in close cooperation with customers and leading glass experts—primarily from Europe, but also from the United States, especially within the studio glass community. Glasma works exclusively with the purest raw materials and an extensive network of reliable suppliers. ISO 9001, ISO 14001, and a full commitment to CSR are integral parts of our business.

With a world-class factory, skilled employees, and exceptional products, we provide ideal conditions for creating the most fantastic glass art of highest quality.

Glasma 700 Studio

Glasma 700 Studio is a lead-free premium studio glass designed to be used in both electric and gas heated furnaces:

Optical clarity: Superior – crystal clear!

Improved process: Minimal dusting and clumping, no pre-heating needed, safe handling without sharp shards, no "explosions" when charging, low melting and refining temp, long and agile to work with, good for torch work.

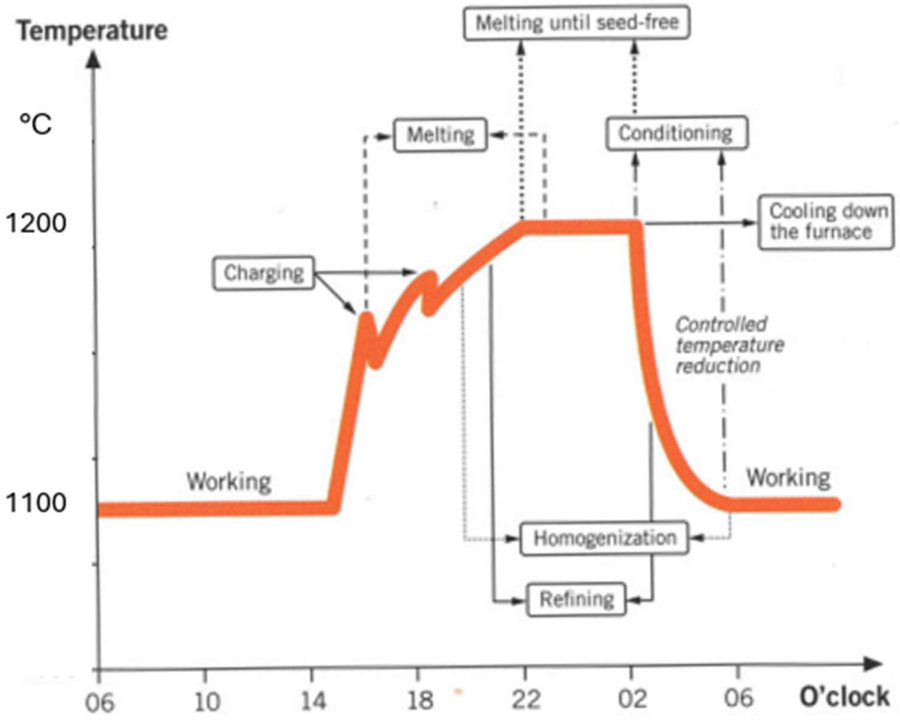
Compatibility: Compatible with COE 96, works with most colour systems (e.g., Reichenbach / Gaffer, Kugler).

Sustainability: Low total energy consumption (low CO_2 footprint), melting and refining gases are 99% water and CO_2, free from NOx, minimal waste, low moisture content, high yield.

Support: Worldwide deliveries, uninterrupted supply since 1979, 99% deliveries on time, professional and responsive support.

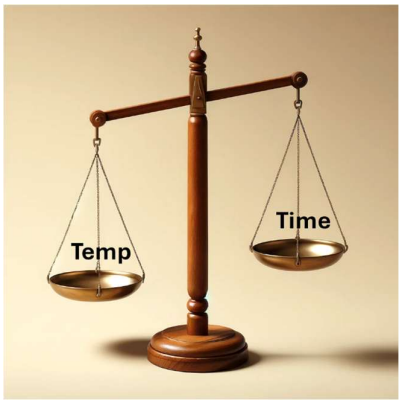
General Principles of Melting and Refining

During the ***melting phase***, the pellets are transformed into molten glass. In the subsequent ***refining phase***, the melt continues to release gases until seeds and bubbles stop changing in size and quantity, and during conditioning finally gets crystal-clear when the remaining bubbles are absorbed back into the glass solution. A typical melting and refining cycle are approximately 15 hours, although the exact duration varies depending on furnace type, size and application.



Ref: "An Introduction to Glass" (ISBN 978-91-7003-295-0)

Melting and refining are always a ***balance between temperature and time***:



- Lower temperature → longer process time, lower energy consumption, less equipment wear
- Higher temperature → shorter process time, but more stress on furnace and refractories

Finding the optimal balance requires some experimentation. Always *change* ***only one parameter at a time*** and document all changes.

Glasma 700 Studio can be melted at temperatures as low as 1200 °C, but we recommend using a furnace

capable of at least 1250 °C. Remember that air temperature readings may not reflect the actual temperature in the melt.

Example of a Melting and Refining Cycle in a Pot Furnace

(Always follow the recommendations of your furnace and crucible manufacturers)

Step 1 – Preparation

- Ensure that the temperature in the crucible is approximately 1200 °C.

Step 2 – First Charge

- Charging can start already at 1150 °C.
- Allow the material to build up into a mound.
- Let each layer melt completely before adding the next.
- Add material layer by layer to promote quick melting and ensure an even melt.
- We recommend starting with thin layers and gradually increasing the amount to determine the optimal charging sequence for your furnace capacity.
- Addition of a small amount of cullet on top of each charge is recommended if available. Be sure cullet is free of all fine dust, as it can cause bubbles that cannot be melted out.

Step 3 – Continue Charging

- Add second and subsequent charges in the same way.
- The melted glass level should remain 3–5 cm below the crucible edge.

Step 4 – Refining: Cooking

- Once fully melted, the refining starts. Stay at roughly the same temperature and let the temperature equalize through the melt.
- Perform test gathers at regular intervals to observe the bubble size and quantity. Record your results and take photos of the glass.
- When the size and quantity of bubbles stop changing, proceed to Conditioning or “Squeezing”.
- Continue taking test gathers during conditioning to monitor the changes in the bubbles.

Step 5 – Conditioning: Cool to Working Temperature

- Lower to approximately 1100 °C, or to the temperature suitable for your process.
- Results vary dependent on furnace conditions, but it is generally understood that decreasing the temp down to working temperature quickly is best for the “Squeeze” or absorption of gases back into the glass solution.

Temperature and Time Optimization

A typical cycle starts in the afternoon and finishes in the early morning.

- Start melting and refining at 1200 °C.
- If the glass is not ready on time, increase temperature in 10 °C steps in next cycle to decrease your refining time.
- You may also be able to cool the glass faster during conditioning if you are able to automatically or manually cool your furnace.
- Continue until you reach the lowest possible temperature that still fits your desired cycle time.
- Record temperature, time and the quality of the glass, for future reference.

Decolourisation

All melting processes introduce small amounts of impurities. Refractories, crucibles, tools, recycled cullet, and other materials can all contribute. In the final glass this may appear as a slight green tint.

To compensate for this, Glasma adds small amounts of decolourising agents. Over the years, we have learned how much is needed to suit 99% of all glass studios.

If you are among the remaining 1%, this typically indicates an exceptionally clean process with very low impurity levels. In such cases, please contact Glasma for further guidance

Combining with Coloured Glass

Most glassblowers combine Glasma 700 Studio with coloured glass from typical sources: Reichenbach/Gaffer and Kugler. Use coloured glass compatible with COE 96 (+/-2) and avoid large geometry differences between clear and coloured glass.

Switching Glass and the Use of Cullets

- Before changing glass composition, remove as much as possible of the glass or replace the crucible.
- A new crucible and new glass typically need a few melts to stabilize.
- Cullets can be used together with Glasma pellets and often benefit from them, as the pellets help reduce seeds and bubbles.
- Always ensure cullets are of the same glass type and free from impurities and fine dust, even very small contamination can cause defects or discoloration.

Annealing

Use the **Glasma Annealing Calculator** as a starting point:
https://glasma.com/annealing-calculator/

Furnace

Studio glasses are ***soda-lime glass with high content of alkalis****, which sets a certain standard on the equipment used for melting and refining. Let your equipment manufacturer know what type of material you are melting and always follow the recommendations.

- Every furnace is unique and can behave differently.
- Temperature measurement systems vary and should be regularly calibrated.
- Trials and errors are normally needed to reach crystal-clear glass at lowest possible energy consumption and minimum waste.

Refractories:

The optimal refractory selection depends on the furnace design and it varies between different furnace types. Refractory materials must be fit for purpose and can vary between different zones in the furnace. Dense high-alumina refractories (typically 60–70% Al_2O_3) or AZS or equivalent materials, are recommended due to their chemical resistance and durability.

Crucible:

Let the crucible manufacturer know what type of material you are melting and also follow recommendations from the furnace manufacturer.

**Alkalis improve the glass melting process in many ways, most important they decrease the melt temp with appr. 1000 deg C. They are soda, potash, lithium oxide and also boron oxide.*

Ventilation & Emissions

Always ensure proper ventilation when melting any type of glass material. When melting Glasma 700 Studio more than 99% of the melting and refining gases are water and CO_2. Please observe that holding any type of glass at excessive temperature for long periods, can cause increased evaporation of alkalis and they will increase the wear on equipment.

Is ventilation through the furnace gathering port sufficient?

It is possible but could result in premature wear around the opening. A flue is recommended if possible.

Glasma Colour System

Glasma offers a complete range of colouring additives designed specifically for being melted together with Glasma pelletized products.

- Each portion is designed for 100 kg of pellets.
- Portion size varies from grams up to 20 kg.
- Adding colour additives, changes the glass properties — especially viscosity.

Typical adjustments:

- Viscosity usually decreases → compensate by lowering working temperature with 20–40 °C
- Coloured batches melt more slowly → use smaller charges.
- Some colours may cause foaming → reduce charge size.
- For perfect homogeneity, stir or bubble the melt after final charge. A common practice for bubbling studio glass is placing a potato on the end of a rod and plunging it to the bottom. Large bubbles are quickly formed, aiding in the mixing of the glass.

Working method for colours:

- Avoid inhalation and wear protection mask.
- See MSDS for each colour.
- Weigh 100 kg pellets.
- Add colour additive portion.
- Mix thoroughly.
- Melt using smaller and more numerous charges.
- Observe first melt carefully and adjust if necessary.

Important notes:

- Keep additives strictly separated during storage.
- Always start with the weakest colour when changing colours in the same crucible.
- It may take several melts to fully remove a strong colour.
- If mixing pellets with cullets, consider 100 kg pellets as 85 kg cullets.

Troubleshooting Guide

Most possible reasons:

- **Cords:** Inhomogeneous melt or contamination from crucible
- **Bubbles:** Refining time too short or temperature too low
- **Impurities:** From refractories, tools, dust, or dirty cullets
- **Discolouration:** Metal contamination from equipment or cullets
- **Cracking:** Incorrect annealing, too large deviations in COE's and/or too complicated geometry.
- **Stones:** Refractory particles in the melt
- **Refractory corrosion:** Too high melting temp and/or inferior refractory material
- **White powdery deposit on furnace:** The off-gassing is mainly CO_2 and water, but they will bring small amounts of sodium, potassium, lithium and boron. Also sulphate can be found if gas is used for heating. Please handle the deposit in accordance with the Safety Data Sheet of Glasma 700 Studio.

Health & Safety

Glasma 700 Studio contains none of the classic toxic substances such as cadmium, lead or arsenic.

Small amounts of boron, antimony and barium are present, but at low levels. See the Safety Data Sheet for details.

Independent testing has shown that exposure levels to respirable dust and respirable crystalline silica remain below recommended occupational exposure limits during handling of the pellets. However, we recommend using a protection mask to prevent inhalation.

Some colours in the Glasma Colour System are classified as hazardous — always wear protection mask and consult the Safety Data Sheet of the relevant colour.

If ventilation is insufficient, remain outside the studio during the melting phase. This period typically lasts 4–6 hours and is normally scheduled overnight.

Final Note

Glasma products deliver consistently high quality. Nevertheless, each furnace, crucible, and studio process have its own characteristics. Structured testing, thorough documentation, and step-by-step optimization are the keys to reaching optimal performance and the perfect crystal-clear glass. If you intend to produce a large series of glass art, first make a small number of test pieces to confirm quality.

Contacts

Czech Republic: www.novotnyglass.cz/en/

Japan: https://sunengco.com/glasma/

North America: https://meltbatch.com/

UK: www.englishantiqueglass.co.uk/pages/glasma-batch

Rest of the world: www.glasma.com