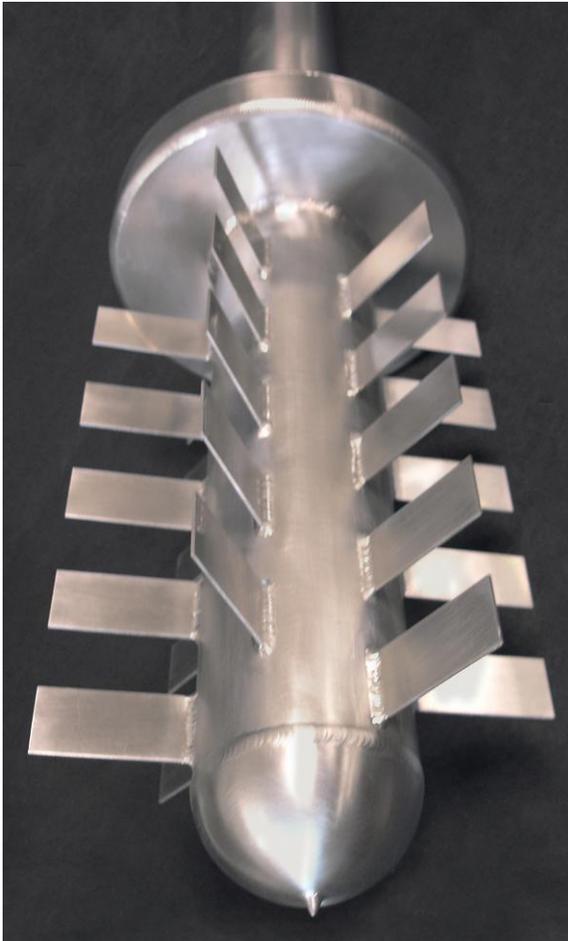


NOBLE METALS



Fabricated stirrer, made of rhodium/platinum sheet, design from Füller Glastechnologie

Fabrications and Linings For the glass industry

Platinum/rhodium fabrications & linings

ZGS platinum/rhodium alloys fabrications & linings

Iridium fabrications & linings

Johnson Matthey Noble Metals is a long-established supplier of platinum group metals (PGM). These alloys are inert in contact with molten glass and provide unequalled resistance to erosion. Johnson Matthey sells sheet, tubes and more complex parts.

Sheet will be supplied to standard tolerances or to specific customer requirements where possible. Most common requirements are flatness and surface finish. Each sheet is produced from an ingot that has a unique batch number to allow for full traceability.

Precious metal tubes are also routinely supplied. They are manufactured to the highest quality and tolerances. They can be supplied seamless (drawn) or with a seam weld if this is not possible. They are generally used in bubblers, drains and thermocouple sheaths.

More complex parts such as stirrers, spout bowls, refiners or feeder chambers are produced to Johnson Matthey drawings, based on customer designs and specific tolerances. These could either be self-supporting fabrications or linings on free issue parts. Fabrications or linings withstand thermal cycling, ceramic cracking and exchange of contacting parts.

Johnson Matthey is the only global fabricator offering a complete range of complementing technologies for glass manufacturers.

For higher temperature applications, platinum/rhodium alloys with dispersed zirconia particles (ZGS) give increased mechanical strength and durability. Zirconia particles slow down the process of degradation. ZGS alloys are therefore more resistant to grain growth, contamination and deformation. They are also an alternative to high rhodium content alloys.

Iridium is one of the platinum group metals and is inert to molten glass. It is an ideal alternative to platinum/rhodium alloys in reducing environments. It is used in fabrications or linings for the most innovative and demanding applications. It can be used at temperatures up to 2000°C in air. It has a higher mechanical strength than ZGS platinum/rhodium alloys but may require some oxidation protection. Any iridium solution can give competitive advantages and open doors to new glass applications.

Johnson Matthey can weld sheet from 0.35mm to 10mm thick achieving full penetration with the minimum of distortion. Welds can also be dressed to become non-visible which can be desirable in some glass contact areas. On-site welding at glass factories is provided when required.

Different PGM solutions might apply to a glass process but only one will deliver the optimum costs/benefits. Johnson Matthey will assist and objectively recommend the PGM technology that best fits each customer's need.

Johnson Matthey offers full precious metal recovery for all fabrications and linings with metal returns of greater than 98%*.

Johnson Matthey Glass Products

Glass type	All types, including the most corrosive
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Platinum/rhodium fabrications and linings

Benefits	Withstands thermal cycling, ceramic cracking and exchange of contacting parts
Typical metal return	Greater than 98%*

ZGS Platinum/rhodium fabrications and linings

Benefits	Increased strength for the most demanding applications
Typical metal return	Greater than 98%*

Iridium fabrications and linings

Benefits	Maximum strength, reducing environment, applications up to 2000°C
Typical metal return	Greater than 96%*

* Based on estimated returned weight

NOBLE METALS

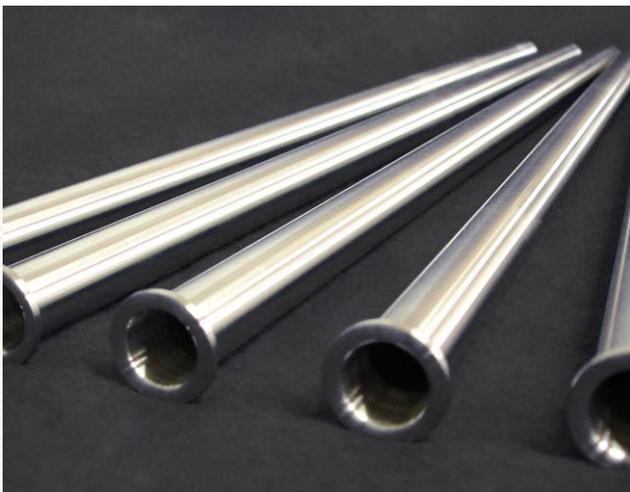
Fabrications and Linings For the glass industry



**Spout bowl, protected with a lining made of ZGS
platinum/rhodium sheet**



Fabricated chamber made of iridium sheet



**Fabricated thermocouple sheath made from ZGS
platinum/rhodium alloy**



Fabricated tube made of platinum/rhodium sheet

If you require more information on Johnson Matthey Noble Metals products please contact our technical support team.

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