



RHI MAGNESITA

# Expendables & Forehearth for the glass industry

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# Production in Germany

- Refractory materials are manufactured and distributed from the production site at Wetro in Puschwitz Germany.
- The fundamental start point for the earlier production was the high-grade refractory clays of the Lausitz region, which were mined in the plant's own open pit mines. Today, the plant relies on selected raw materials being obtained on the world market.
- The product range of the feeder expendables, forehearth and and special refractory accessories are competitive.

more than  
100 years

16.000 +  
products

outstanding  
experience

# Customer focus

RHIM Wetro's quality driven production set up, strives for innovation and its outstanding customer service is unique in the industry.

The Company's customer service and after sales team responds rapidly to provide knowledgeable assistance to help its customers to eliminate downtime and maximize production efficiency.

The skilled and local craftsman, many with more than a decade of experience, are at the heart of the production and ensure a precise and high-quality product.

In case of product failure, the RD&E team immediately assists its customers and investigates the root cause with the help of its in-house laboratory.

This set up and extraordinary customer support is unique within the industry.

**Customer Focus:  
Minimized production  
down-time granting  
highest customer  
satisfaction.**

More than 100 years of experience in the production of refractory products.

The company has well documented refractory application know how, technology and drawing library.

A well trained and dynamic RD&E team constantly researches new mixtures, production processes and designs to reduce application failures like Thermal Shock, Alkali Vapor Attack, Static Glass Corrosion and Dynamic Glass Corrosion.

RHIM Wetro has implemented a wide range of quality controls along its entire production process starting from the analysis of incoming raw materials to the in-depth final inspection. Only after passing all controls, the goods are released for shipment.



# Refractories for all Glass Process Types

**We supply precision crafted refractory products for a very wide range of glass applications. The refractory product line is not glass container specific nor limited to Feeder Expendables:**

- Glass Containers
- Forehearth & Distributors blocks
- Burner blocks (furnaces / kilns)
- Fiberglass (C , E glass)
- Hand Glass
- Tableware
- Press ware
- Lighting (Danner , Vello , Ribbon)
- Advanced Glasses (Medical / Cellular phone etc..)
- Rolled Plate
- Float Glass
- Pharmaceutical



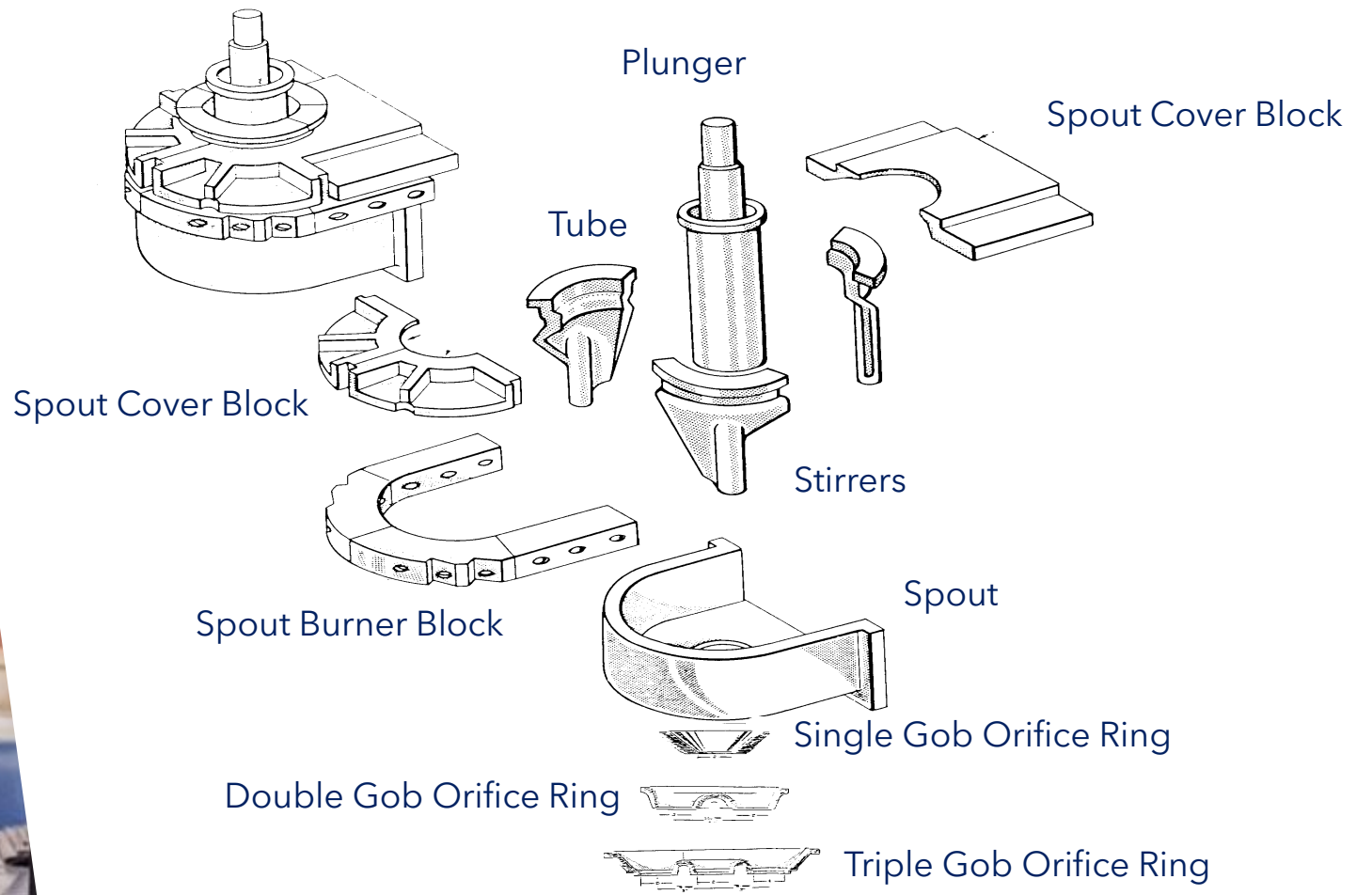


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# Feeder Expendables







# Spouts

Our standard spout mix ZM30F is the ultra premium mix of our competitors.

The ZM30F is the work horse mix of RHIM Wetro. It has good reputation and performance since decades. Good resistance to glass corrosion and thermal shock.

Other special qualities are available upon request.

Brand	ZrO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	Bulk Density	Apparent porosity	Cold Crushing Sterngth
	%	%	%	%	g/cm <sup>3</sup>	Vol. %	Mpa
ZM30F	35,0	50,0	15,0	0,2	3,20	17	100
ZA30S	20,0	69,0	10,0	0,1	3,10	19	120
ZM30BC	27,5	56,0	13,0	0,1	3,00	16	120
A95S	-	94,0	5,0	0,1	3,00	21	130

## Typical lifetime

Low pull rate:  
12-24 months

High pull rate:  
9-14 months



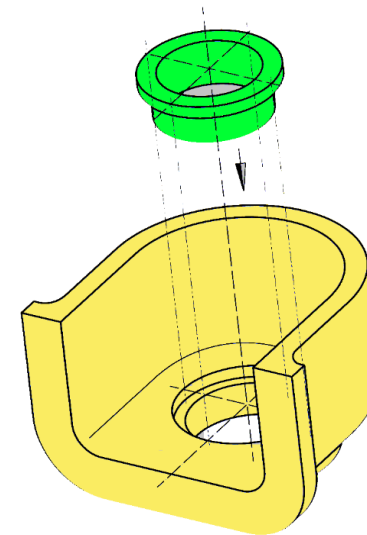
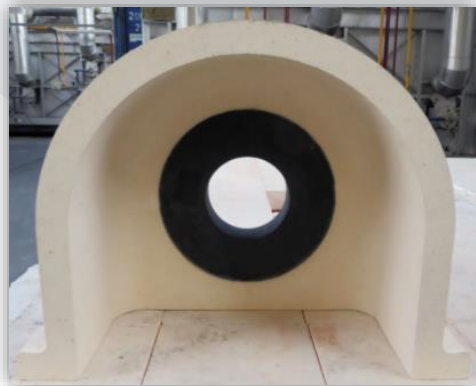
# Spouts with insert

The highest wear area in a spout is the lip surrounding the bottom aperture. If the orifice ring must be replaced after the lip has been corroded, it is impossible to stop the glass stream by lowering the feeder tube.

RHIM offers spouts with CR insert (CR90GE). Used in conjunction with ZM30F spout bodies. Inserted spouts have much longer life span, depending on production conditions in the glass plant.

AZS Inserts are also available upon request.

Brand	Cr <sub>2</sub> O <sub>3</sub>	Al <sub>2</sub> O <sub>3</sub>	TiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	Bulk Density	Apparent porosity	Cold Crushing Strength
	%	%	%	%	g/cm <sup>3</sup>	Vol. %	Mpa
CR90GE	90,0	0,0	4,0	0,0	4,10	20	120



**Significantly longer lifetime**

Low pull rate:  
36-60 months

High pull rate:  
24-38 months



# Spout accessories

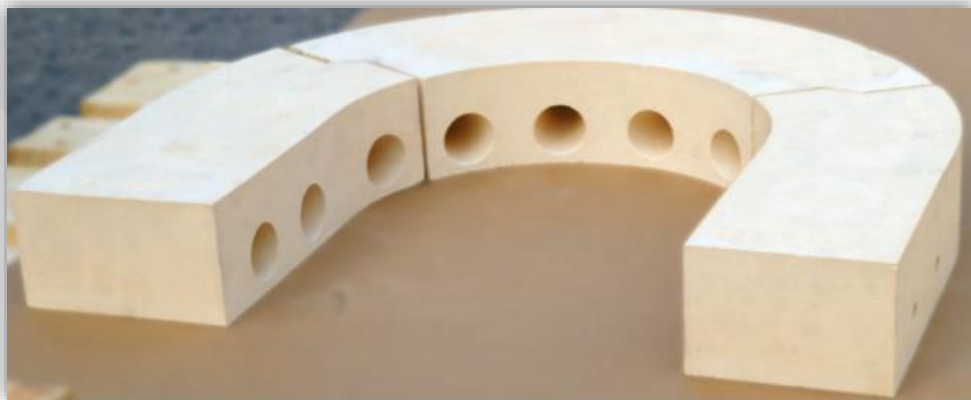
Excellent surface quality sillimanite, mullite and zirconium-mullite accessories are available. Huge selection of different sizes and formats, even special dimensions upon request.

The precocious casting techniques and high-tech grinding machines provide accurate joint structures between the parts.

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- Spout burners
  - Spout covers
- 

- Mantle blocks
  - Skimmers
- 

- Back blocks
- Insulation



# Tubes, plungers, stirrers, rotor segments

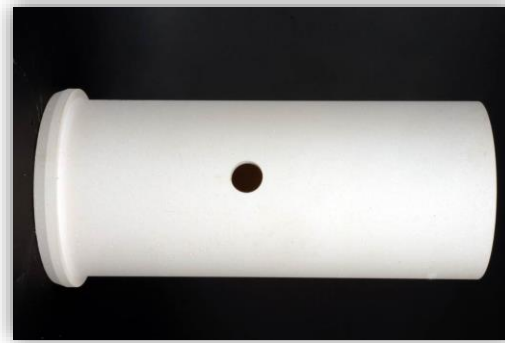
In addition to the standard, conventional feeder expendables RHIM also offers the complete range of metering spout accessories.

Brand	ZrO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	Bulk Density	Apparent porosity	Cold Crushing Strength
	%	%	%	%	g/cm <sup>3</sup>	Vol. %	Mpa
ZM30F	35,0	50,0	15,0	0,2	3,20	17	100
ZA30S	20,0	69,0	10,0	0,1	3,10	19	120
ZM30BC	27,5	56,0	13,0	0,1	3,00	16	120
A95S	-	94,0	5,0	0,1	3,00	21	130

## Typical lifetime

Low pull rate:  
6-10 months

High pull rate:  
3-7 months



# Orifice rings

## ZK20SZ

Excellent balance of thermal shock and corrosion resistance. Reasonable pricing, good for frequent job change shops. Typical life span is up to 5-8 weeks

## ZA30SZ

Good thermal shock resistance. Used for long production run shops as well. Typical life span is upto 6-12 weeks.

Brand	ZrO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	Bulk Density	Apparent porosity	Cold Crushing Sterngth
	%	%	%	%	g/cm <sup>3</sup>	Vol. %	Mpa
ZK20SZ	13,0	70,0	14,0	0,3	2,80	26	50
ZA30SZ	20,0	69,0	10,0	0,1	3,10	19	120
A95SZ	94	5,0	0,1	0,0	2,80	24	80

## For High Job Change Lines

These lines account for 90% of the total Container lines installed throughout the world

Frequency of change is 1-12 days





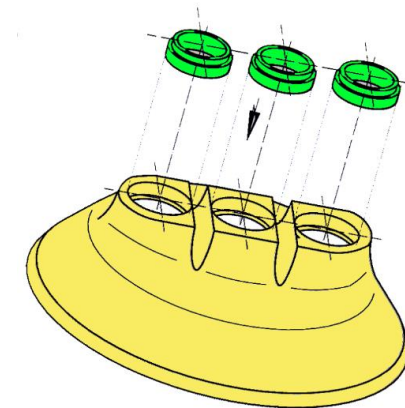
# Orifice rings with insert

Typically these lines manufacture beer and wine containers and account for approximately 10% of global installed IS container machines.

RHIM offers multi gob orifice rings with very dense corundum inserts made of AL95TB.

By using these special inserts orifice ring the saving is going to be significant due to the less job changes and the higher gob weight homogeneity during a campaign.

Brand	Al <sub>2</sub> O <sub>3</sub>	TiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	Bulk Density	Apparent porosity	Cold Crushing Sterngth
	%	%	%	g/cm <sup>3</sup>	Vol. %	Mpa
AL95TB	95,0	4,0	0,0	3,60	2,0	n.b.



For Pat Lines  
Long run

The lifetime could be  
50-200% more  
with these inserts

Premium product

# Mortars, luting cements, insulations, patches

To complete the feeder product portfolio, we offer a complete range of the dry and wet mixes to insulate, joint or bind the feeder parts. They may contact the molten glass, so they must combine a good corrosion resistance and low (or no) blistering rate.

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- Spout luting cement
  - Orifice luting cement

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- Spout insulating grains
  - Spout insulating castable

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- Anti adhesive cement
  - Ceramic fibre products



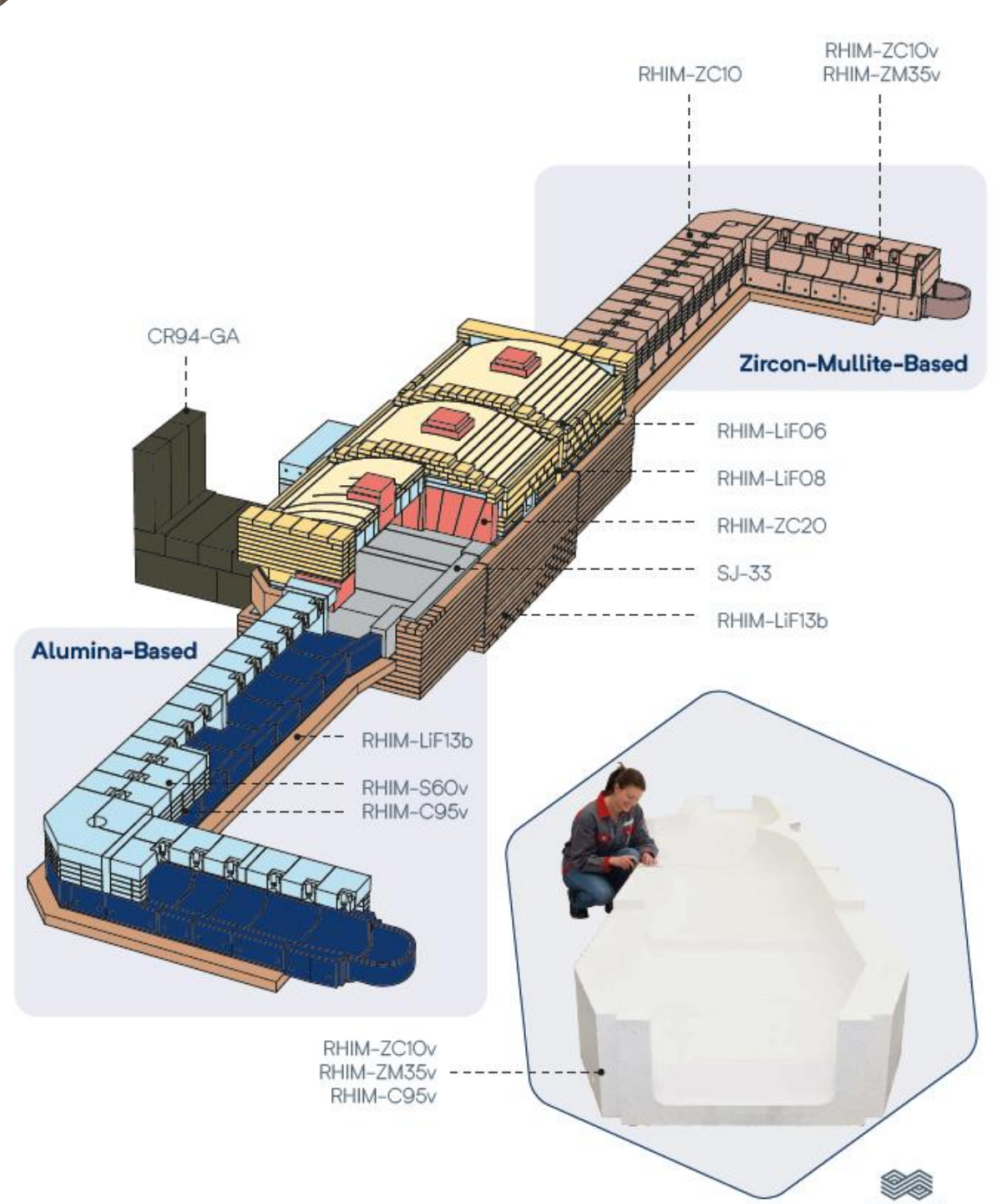


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# Forehearth and parts





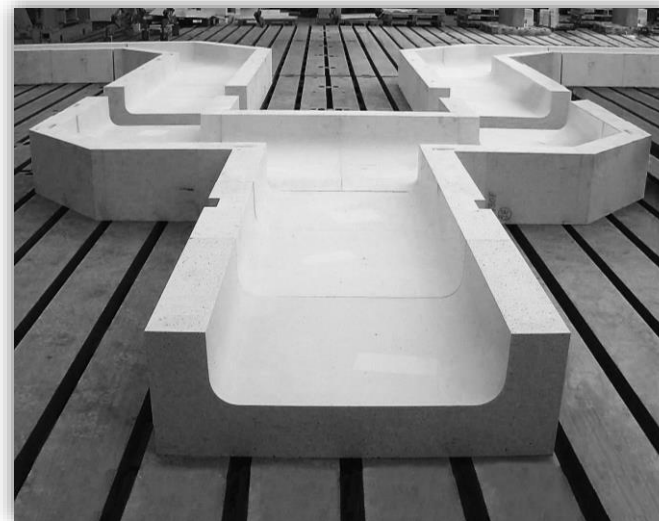


# Channel blocks

Channel wide from 16 up to 48 inch are available in zircon-mullite and free-zircon grades. The free-zircon grade helps minimize or eliminate the cat scratches and the zircon chords in the molten glass in the feeder.

Surfaces are diamond grounded to guarantee best fitting and small joints between the blocks.

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	%	%	%	%	g/cm <sup>3</sup>	Vol. %	Mpa
ZK20F	12	75	12	0,1	3,00	17	120
ZM30F	35,0	50,0	15,0	0,2	3,20	17	100
A95F	-	94,0	5,0	0,1	3,10	16	180



Channel wide  
from 16" to 48"

Zircon free grade is  
available.

Premium products



# Portfolio, inspection, pre-assembly

Channel blocks and superstructures of all feeder lines are pre-assembled and marked at our site to ensure measurement and quality requirements.

Customer inspection of the goods at site is possible and required.

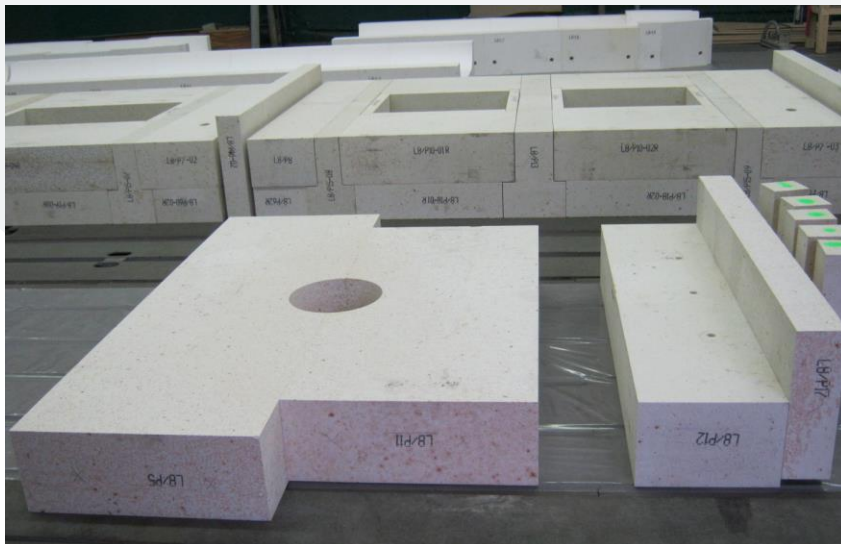
Result of our laboratory tests, chemical analysis are stated at our quality certificate.

Documents are passed along with the goods.

- 
- Channel blocks
  - Sub- and superstructure
  - Feeder cover plates

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- Special shaped and oversized bricks
  - Complicated and small shaped burner blocks

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- Insulation bricks, materials
  - Suitable mixes and mortars







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# Specials

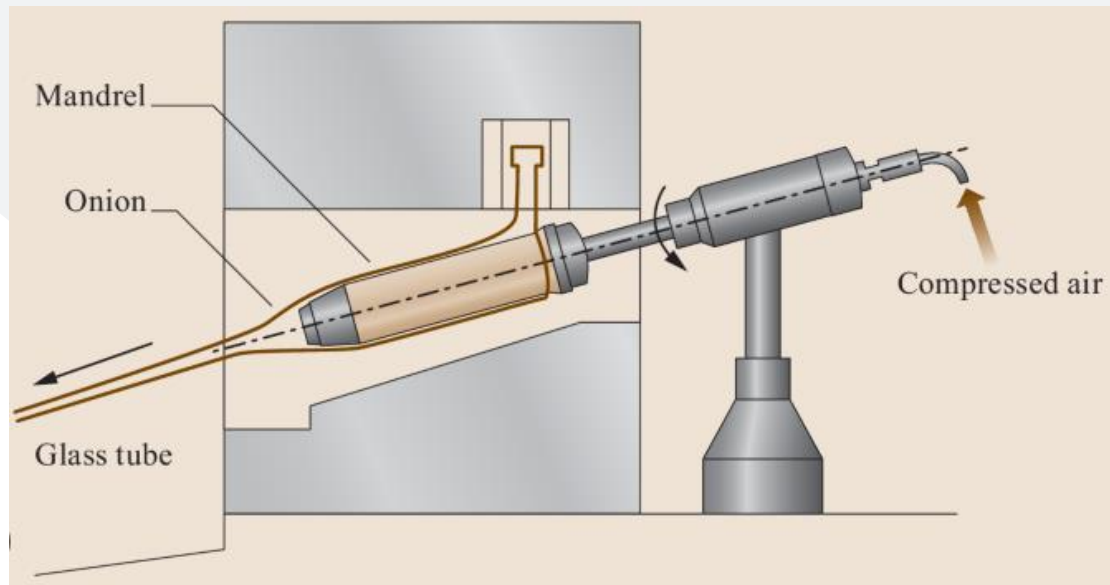


# Mandrels for the glass tube production

The refractory mandrel is particularly important in the Danner processing to produce glass tubes. The surface and dimension accuracy is essential for the consistent glass quality.

Mandrels by RHIM ensure these requirements with precise tolerances and extra smooth surface.

The best fit mixes are defined according to the requests of the customer and the glass parameters and conditions.



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High quality expectations.

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Tough tolerances.

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Precise finishing.

# Gathering balls

## Handmade or semi-automated table-ware production

These special, handmade gathering balls are essential for the traditional handmade glass production and for the gathering robots.

It's perfect chemical composition combined with the smooth surface is a perfect match for the quality glass production.

Big range of diameters are available, even special design is also possible.



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Niche.

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Crack resistance.

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Accurate dimension.



# Glass - Worldwide Customer Base





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# Thank you for your attention

## Get in Touch

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