



VISO Tundish Stopper

Tundish Stopper

Alumina-graphite stoppers comprise a refractory body with maximum resistance to erosion and thermal shock, combined with a unique range of coupling systems for both tundish and foundry ladle or autopour applications.

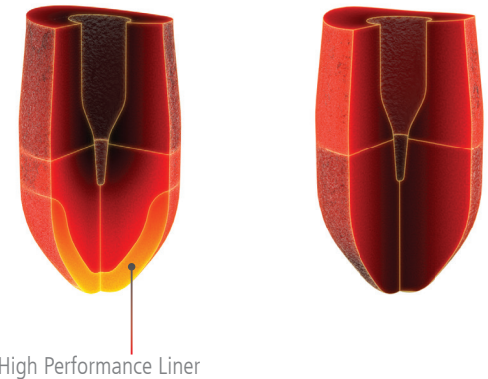
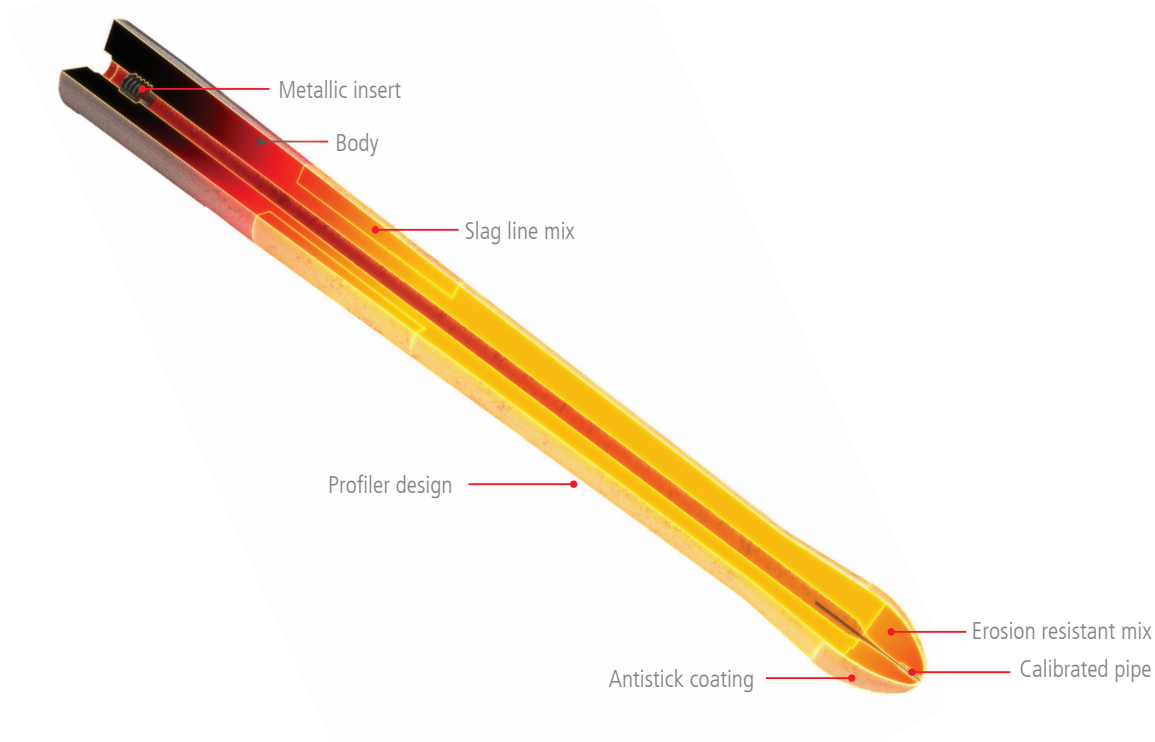
Profiler™ Stopper* design

Proprietary design technologies are used to optimize the shape of the stopper body in order for it to resist the forces encountered in use. The result is a considerable reduction in material volume without a reduction in overall strength. The benefit is reduced weight for improved ease of handling with this optimized design.

(* Profiler™ Stopper : patented)

Material selection

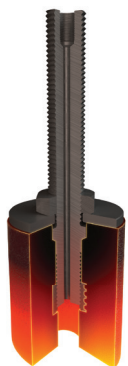
For high performance, a range of special mixes is available for the nose of the stopper, custom-formulated for the particular steel composition or casting conditions. New manufacturing techniques enable high purity low carbon liners to be formed on the stopper-head.



Special surface coatings and body glaze treatments ensure resistance to oxidation during preheat and long sequence casts.

Assemblies

For precise control, the stopper body and steel rod assembly must be mechanically rigid and secure. Vesuvius offers a range of fully proven assembly systems.



Unirod™ stopper

The most commonly used assembly system for safe and reliable performance. The steel rod which is screwed into a metallic insert pressed in the body of the stopper is further blocked with a positive stop in the bore of the stopper.



Rotorod™ stopper

The original assembly system for monobloc tundish stopper applications. The mechanical stresses acting on the stopper are absorbed and dissipated by the ceramic insert.

(*) Rotorod™ stopper: patented



Cross-pin type

The steel pin is inserted through the stopper body and the metallic rod, and then tightened with the top-locking nut. For this purpose, the stopper has an accurately positioned horizontal hole to accept the locating pin.

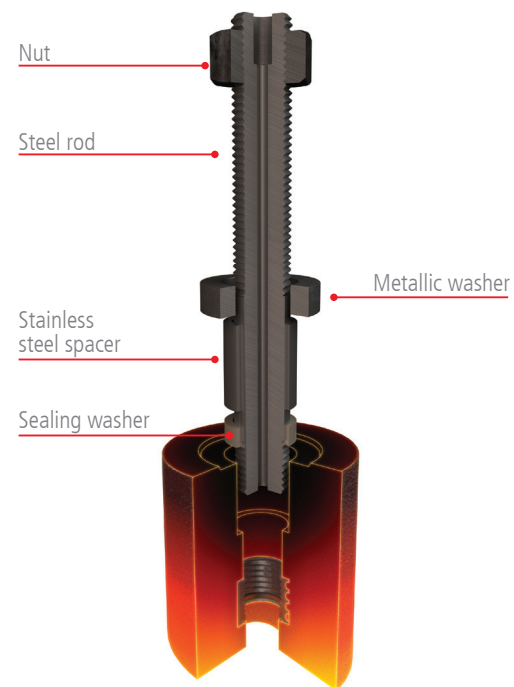


Argorod™ stopper*

This is the optimum argon connection for steelmakers. The innovative design of the Argorod™ stopper ensures a completely gas tight assembly even after long casting times.

(*) Argorod™ stopper: patented

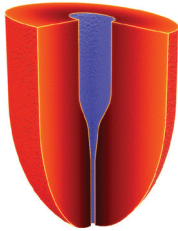
The gas tightness is ensured by the compression of sealing washers against the refractory body of the stopper by means of a stainless steel spacer having a greater thermal expansion than the stopper metallic rod. All the material and components have been designed to ensure that the sealing washers are always kept under compression at any given temperature.



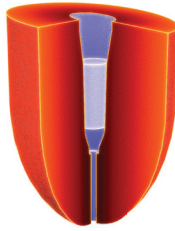
Argon Injection

The introduction of argon into the steel stream, via the tundish stopper, reduces alumina deposits in the sub-entry nozzle and promotes the floatation of inclusions in the mould.

Direct injection



Permeable plug



Different configurations of the stopper nose can be used for argon injection into the steel stream. The most commonly used, direct injection and permeable plug, are shown above. The permeable plug is designed and manufactured to provide:

- Permeability, which yields optimum gas flow.
- Positive pressure inside the stopper, which avoids air suction.
- Resistance to erosion by steel.

Calibrated Pipe* Argon injection

For precise argon control, a calibrated pipe is sealed into the tundish stopper. The calibrated pipe specifications are custom designed for each application to provide:

- Precise control of argon flow
- Consistent, positive gas back-pressure
- Gas injection without risk of air aspiration

Calibrated pipe*



(*) Calibrated Pipe Technology: patented

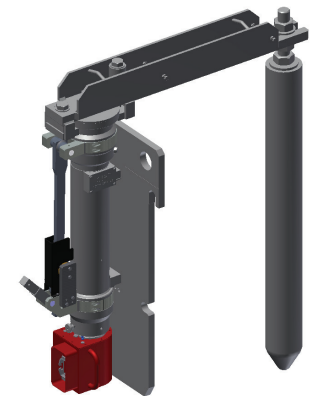
Multiple material and design options to meet customer target needs:

- Proven materials for all steel grades and applications
- Highest reliability in strand control
- Precise, customized argon delivery
- Consistent gas tight assembly

Mould level control

With 40 years of expertise in mould level control, and more than 500 strands equipped with their systems, SERT is a specialist in implementing the complete control loop including the mould level sensor, advanced adaptive controller, and electrically driven stopper positioning units. SERT level control systems feature:

- The entire control loop under the responsibility of a single expert supplier.
- Various sensor choices, including suspended and ledge type full digital eddy-current sensors.
- An advanced adaptive controller to match all major perturbations that can occur during casting sequence.
- An electrically driven stopper valve DEM9M -MQS120M (depicted below), or DEM9P servo-actuators, that guarantee high, consistent performance with minimum maintenance.



Vesuvius Precision Control (VPC)

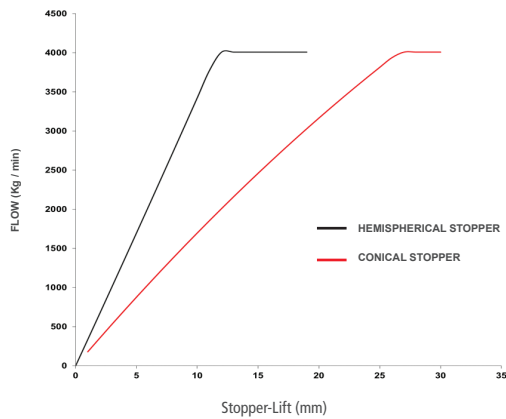
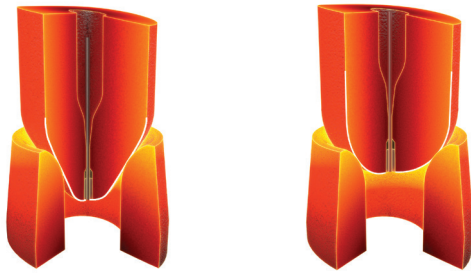
Stopper nose

Geometry

Vesuvius offers various nose profiles to match the customer's needs.

The influence of the stopper nose geometry is shown in the chart below.

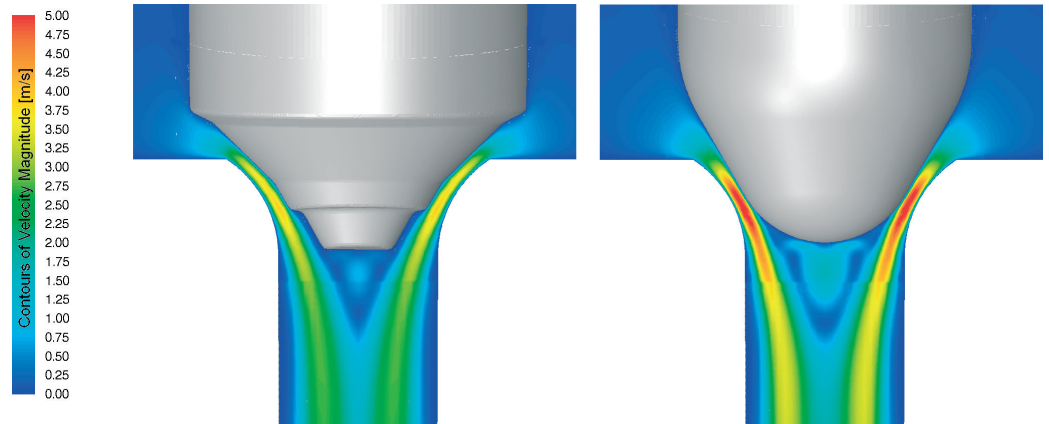
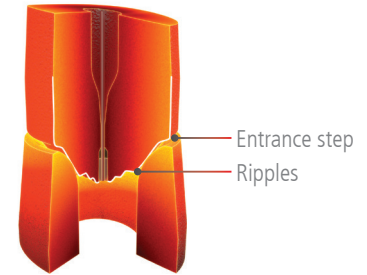
This chart compares the resulting steel flow for a given stopper lift for two stopper nose shapes using the same nozzle -- hemispherical and conical.



Ripple™ Stopper

A stopper with a nose geometry that features:

- Entrance Step: prevents deposition by locally altering the flow and changing the feeding angle.
- Ripples: located downstream of the regulation area, prevent the formation of large scale eddies. Consequently the pressure and velocity fluctuations are reduced improving flow stability in the mould.





For more information on this product and on our complete package of solutions please contact our local service center :

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