PURGING REFRACTORIES

Inert Gas is injected in the molten metal steel through bottom mounted Purge Plug. This is the most cost effective and efficient method of gas stirring in Ladle for a number of important metallurgical reasons in Steel Making Process:

- To enhance chemical reaction rates.
- Homogenize temperature and chemical composition.
- Removing impurities and non-metallic inclusions.
- Uniform dispersion of deoxidizers & alloy additives.
- Inhibits nozzle clogging.

Purging Plug being the main element should have high performance i.e. the body should be:

- Corrosion Resistant.
- Erosion Resistant.
- Thermal Shock Resistant.

Use of Purge Plug provides a flexibility that enables a purging sequence to be performed at any of the following positions on the ladle route:

- While tapping.
- In transit to the rinsing station.
- Enclosed within a vacuum tank.
- At a ladle furnace.
- At a rinsing station.
- During casting.

Factors influencing the wear of purging plugs and selection of plug type:

- Chemical and thermal analysis of steel.
- Cleaning practice after ladle deslagging.
- Holding time of hot metal.
- Housing block quality and design.
- Purging pressures.
- Purging time and frequency.

SLOTTED PURGE PLUG

The wide range of Slotted Purge Plugs with unidirectional channels for the range of gas purging applications for its flexible design:

- Commonly used unidirectional design.
- Flexible design.
- Variable slot numbers & profile possible.
- Appearing or disappearing type indicator.
- Made with Alumina-Spinel (ASL).
SEGMENT PURGE PLUG

The segment type Purge Plug has the unidirectional gas passage formed by pressed and pre-fired plates of Corundum-Mullite or Alumina-Chrome-Zirconia with a porous insert as a security device at the bottom, cast in Alumina-Spinel (ASL) body.

- Unique Purging Channels design provides more gas availability & regular bubble pattern.
- Enhanced plug life.
- High purging rate.
- Easily adjustable gas flow.
- Improved wear rate.
- Security device (Porous Insert) at the bottom of plug.

PURGE PLUG WITH RCA TUBES

RCA (Re-crystallized Alumina) tubes cast with Alumina-Spinel plug ensure complete gas flow into the hot metal.

- Slotted RCA tube to provide purging Channels.
- Reliable & Quality Purging.
- Improved wear rate.
- Modifiable slot profile to maximize gas flow.
UNIFLOW PLUG

Typical zigzag flow channel network ensures safety, better control over Argon consumption, least lancing requirement with purging reliability.

- ZigZag flow channel network.
- Safe and reliable design.
- Recommended for higher gas pressures.
- Customized flow channel network.
- Appearing or disappearing type indicator.

COMPOSITE (HYBRID) PLUG

Multicomponent, pressed and cast plug with random and directed pore structure. Almost 100% opening rate with minimum maintenance, high purging availability and adjustable gas flow.

- Porous core cast in Low Cement Alumina-Spinel castable.
- Controlled pore size of porous core.
- Good permeability for reliable and quality purging.
- Capable to operate at wide range of pressures.
- Useful for low gas pressure.
- Adjustable gas flow.

1. PA / PAZC (Porous Al / Porous Al-Zirconia Chrome)
2. PA (Porous Alumina)
PREASSEMBLED PLUGS

Purge plug and Housing Block are preassembled in IFGL plant and shipped as one unit for ready-to-use. The preassembled unit can be fitted with any type of plugs. The pre-assembled unit can also be used with IPV mechanism. The pre-assembled unit essentially offers the convenience of quick changeover.

- Preassembled unit ready to install.
- Time saving during change of plug in the ladle.
- It is possible to preassemble plug of any type and design.

FLOW CHARACTERISTICS OF VARIOUS PLUGS:
THIS GRAPH MAY GUIDE THE USER TO CHOOSE A PLUG.

![Graph showing flow characteristics of various plugs](image)

Technical Data for Purging Refractories

<table>
<thead>
<tr>
<th>Quality</th>
<th>ASL-01</th>
<th>ASL-02</th>
<th>ASL-04</th>
<th>ASL-05</th>
<th>RCA</th>
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<tbody>
<tr>
<td>$\text{Al}_2\text{O}_3$ (%)</td>
<td>88.00</td>
<td>94.00</td>
<td>91.00</td>
<td>88.00</td>
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<tr>
<td>$\text{SiO}_2$ (%)</td>
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<td>$\text{CaO}$ (%)</td>
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<tr>
<td>$\text{MgO}$ (%)</td>
<td>5.65</td>
<td>2.25</td>
<td>4.85</td>
<td>5.65</td>
<td>-</td>
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<tr>
<td>LOI (%)</td>
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<td>1.50</td>
<td>2.75</td>
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<tr>
<td>Bulk Density (g/cc)</td>
<td>3.13</td>
<td>3.15</td>
<td>3.13</td>
<td>3.13</td>
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<tr>
<td>Apparent Porosity (%)</td>
<td>13.30</td>
<td>15.00</td>
<td>13.30</td>
<td>13.30</td>
<td>3.90</td>
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</tbody>
</table>
IPV MECHANISM AND REFRACTORIES

IFGL manufactures Purge Plugs for most sophisticated IPV Gas Purging System. It provides complete turnkey engineering, installation and commissioning of equipment for the IPV Gas Purging System for ladles.

IPV Purging System benefits steel-makers in many ways:
- Extremely safe system.
- Reliability of purging.
- Improved gas flow.
- Prevents risk of breakout.
- Gives shut-off facility in the event of steel breakout.
- Fast ladle turn around.
- Easy access to refractories.
- Shut-off valve is automatically operated via gas supply, obviating the need for external power source.
S-IPV SYSTEM IN LADLE

S-IPV System is the state-of-art innovation in the field of ladle purging.

- An IPV System with Purge Plug Sleeve
- Purge Plug height remains constant
- Less dependence on Patching Masses
- Consistent Purge Plug performance
- Minimized erosion of the Housing Block.
- Improves lives of Housing Block and Plug

SIPV ASSEMBLY

- Sleeve
- Plug
- Housing Block
- Adaptor Plate
- Ladle Shell
- Inner Nozzle
- Mounting Plate
- Retaining Plate
- Valve Cover
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