



MONOCON

# LADLE PURGING REFRACTORIES



ISO 9001 : 2000 / FM 71747

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**DEDICATED TO CLEAN STEEL**

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## 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 :-*

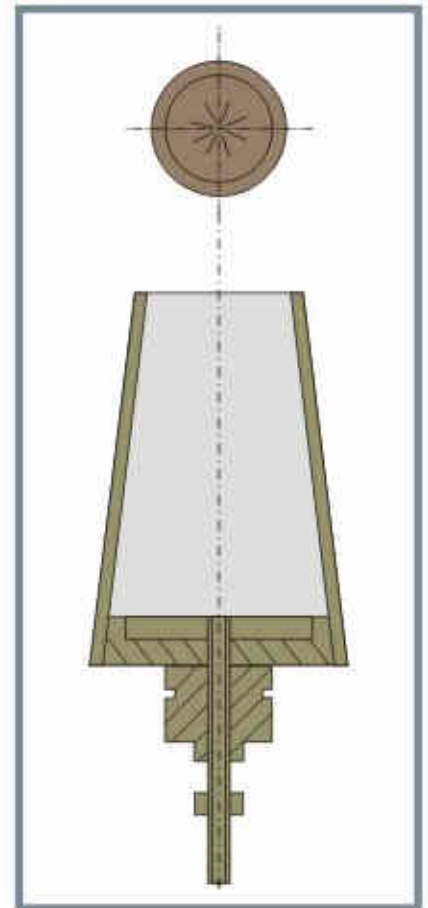
- *Corrosion Resistant.*
- *Erosion Resistant.*
- *Thermal Shock Resistant.*

*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 de-slagging.*
- *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)*

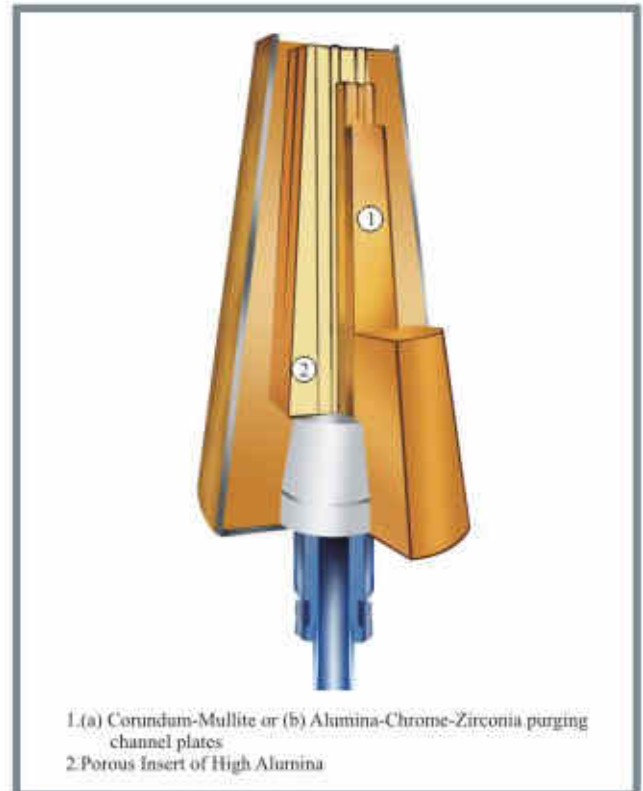




## SEGMENT PURGE PLUG

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.

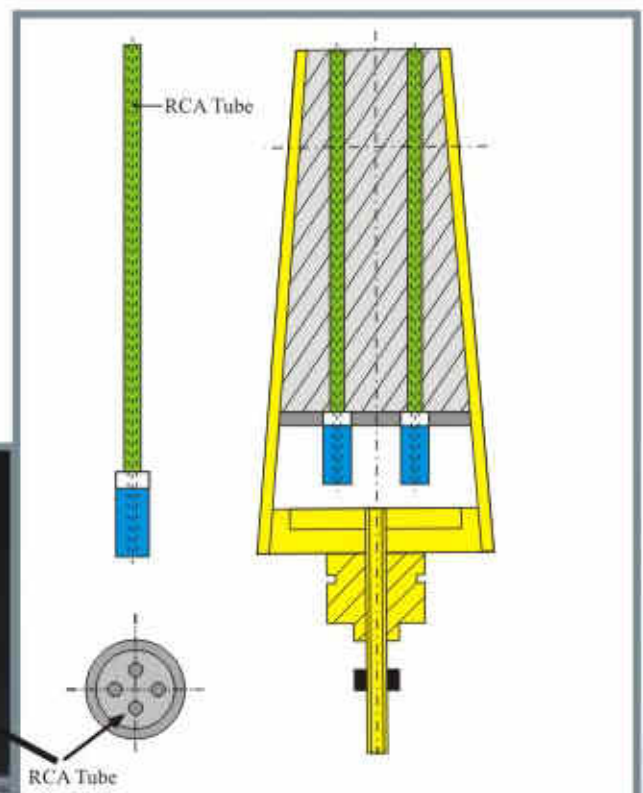
- ▶ Unique Purging Channels design provides more gas availability & regular bubble pattern.
- ▶ Enhanced plug life.
- ▶ High purging rate.
- ▶ Easily adjustable gas flow.
- ▶ Improved wear rate.
- ▶ Security device (Porous Insert) at the bottom of plug.



## PURGE PLUG WITH RCA TUBES

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

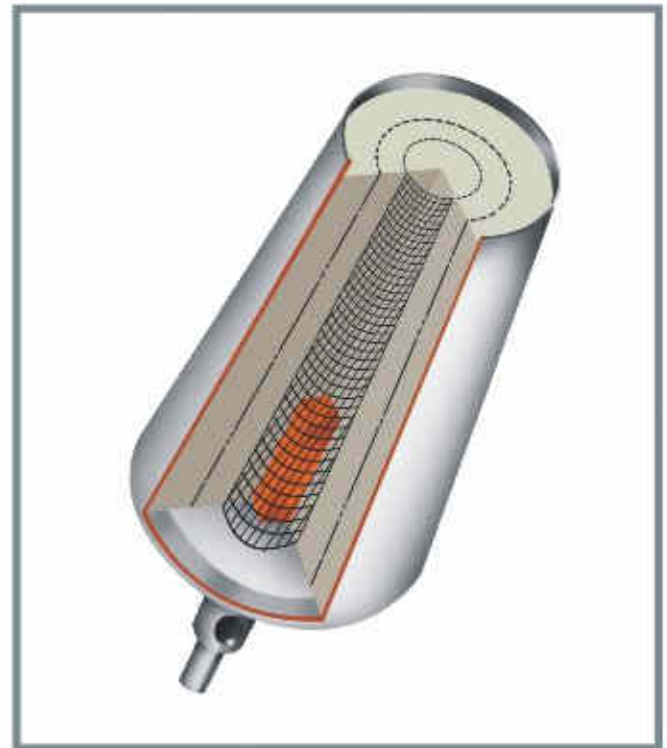
- ▶ Slotted RCA tube to provide purging Channels.
- ▶ Reliable & Quality Purging.
- ▶ Improved wear rate.
- ▶ Modifiable slot profile to maximize gas flow.



## UNIFLOW PLUG

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

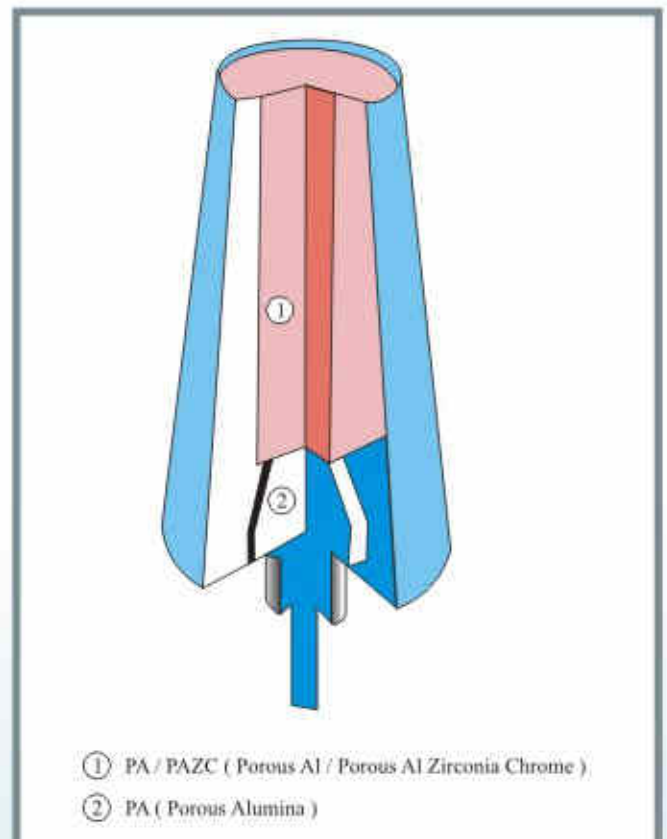
- ▶ ZigZag flow channel network.
- ▶ Safe and reliable design.
- ▶ Recommended for higher gas pressures.
- ▶ Customized flow channel network.
- ▶ Appearing or disappearing type indicator.



## 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.



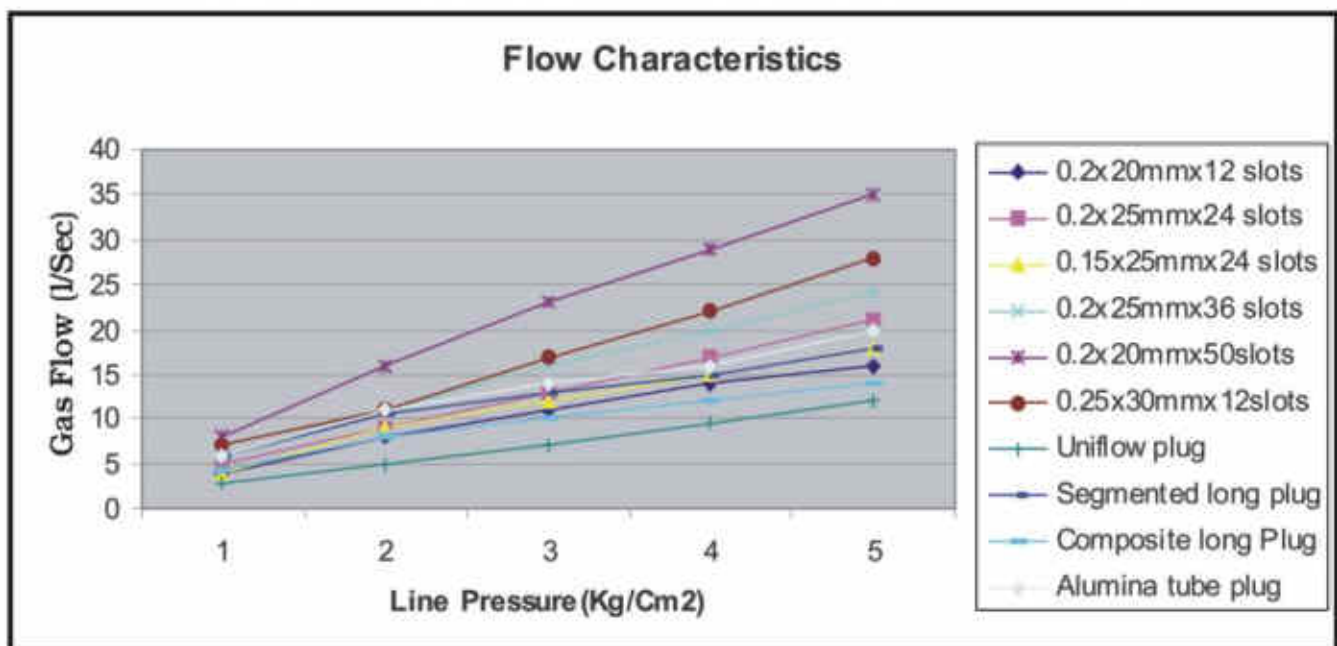
## PREASSEMBLED PLUGS

*Purge plug and HousingBlock 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.**



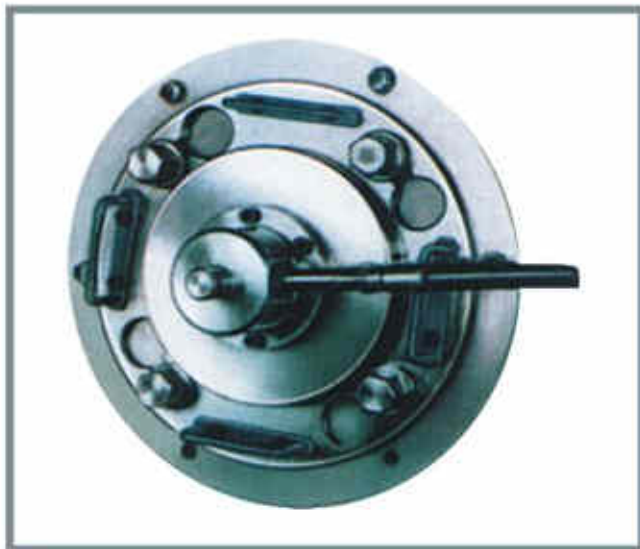
## Technical Data for Purging Refractories

Quality	ASL-01	ASL-02	ASL-04	ASL-05	RCA
Al <sub>2</sub> O <sub>3</sub> (%)	88.00	94.00	91.00	88.00	99.70
SiO <sub>2</sub> (%)	0.65	0.09	0.15	0.65	-
CaO (%)	2.25	2.00	2.12	2.25	-
MgO (%)	5.65	2.25	4.85	5.65	-
LOI (%)	2.75	-	1.50	2.75	-
Bulk Density (g/cc)	3.13	3.15	3.13	3.13	3.80
Apparent Porosity (%)	13.30	15.00	13.30	13.30	3.90



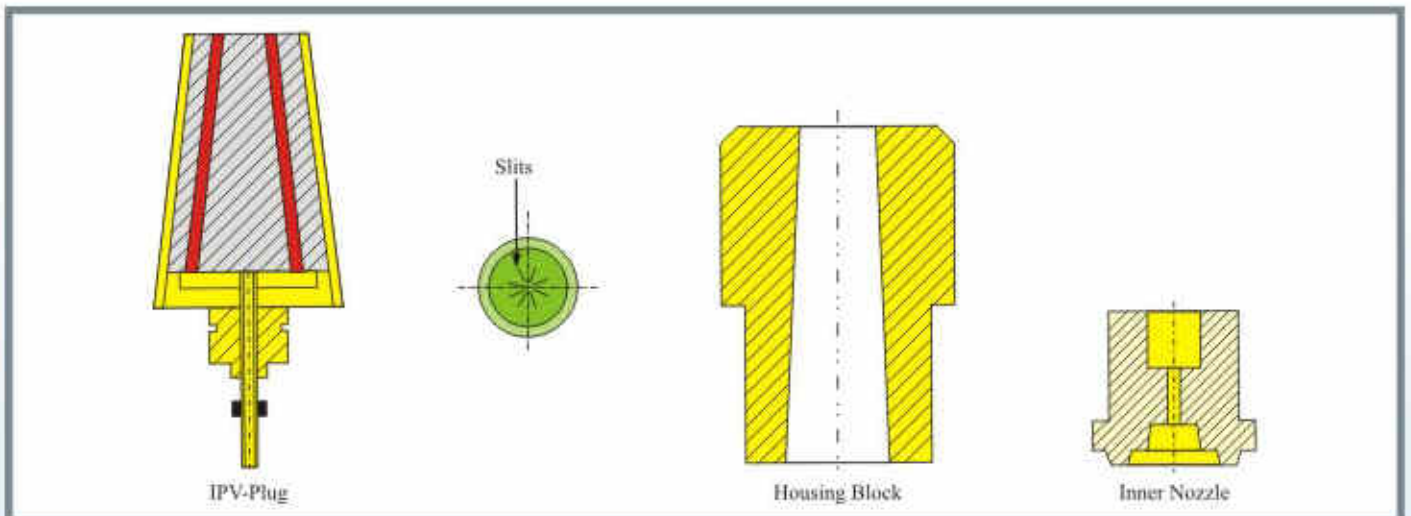
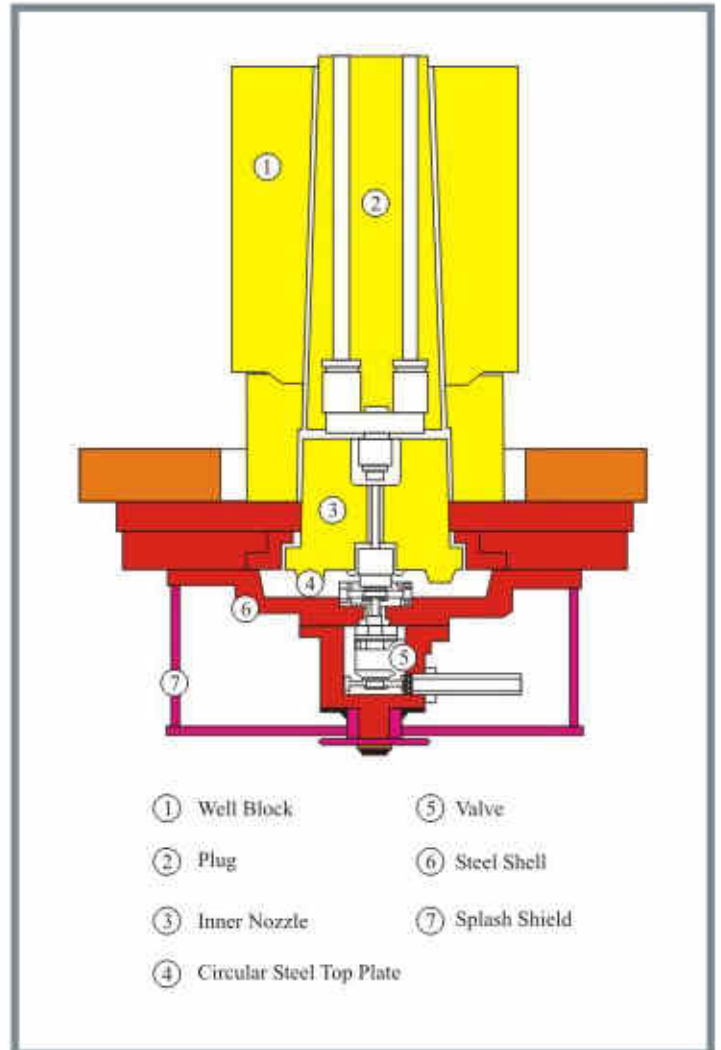
## IPV MECHANISM AND REFRACTORIES

*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.*

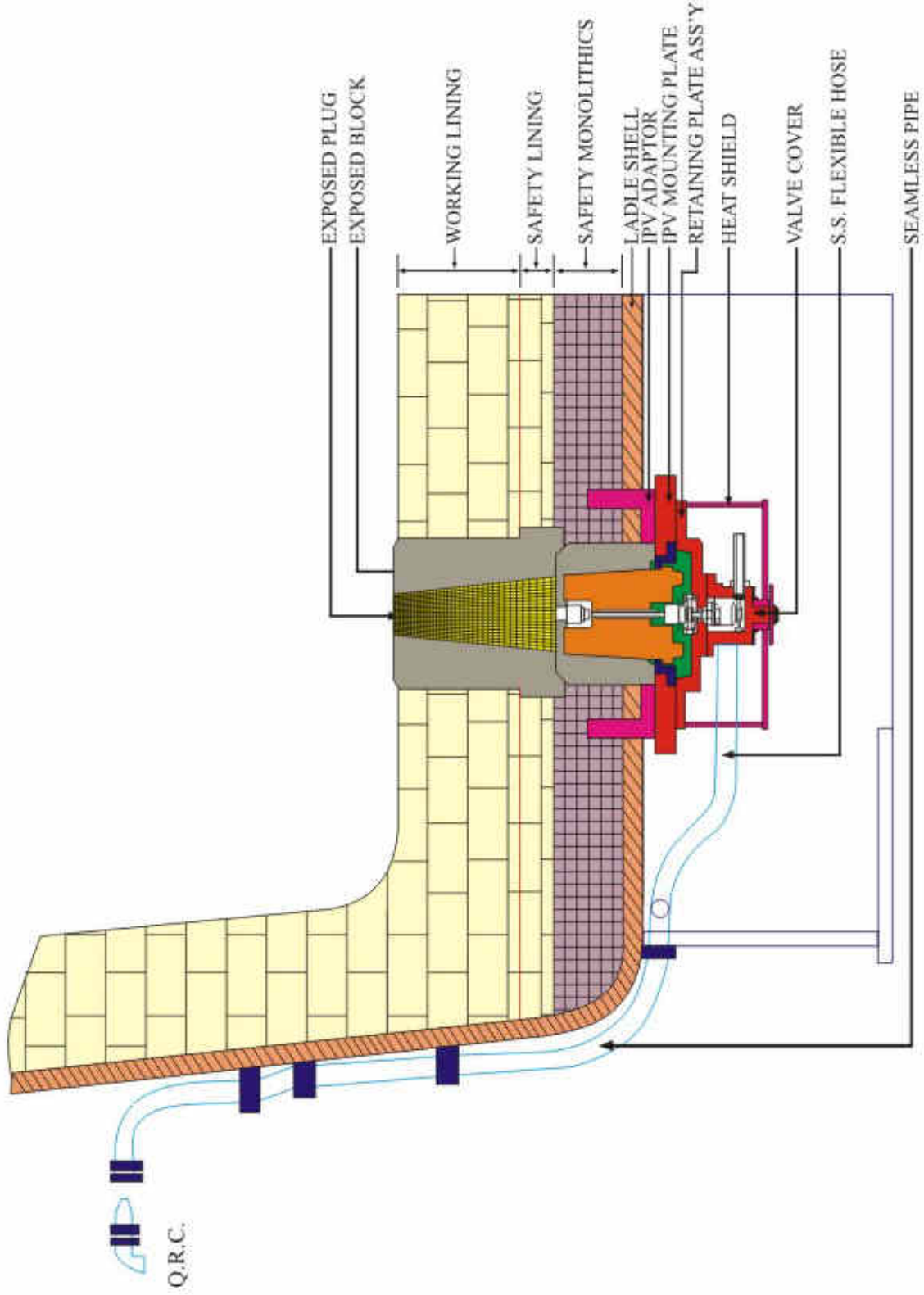


*IPV Purging System benefits steel-makers in many ways:-*

- *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.*



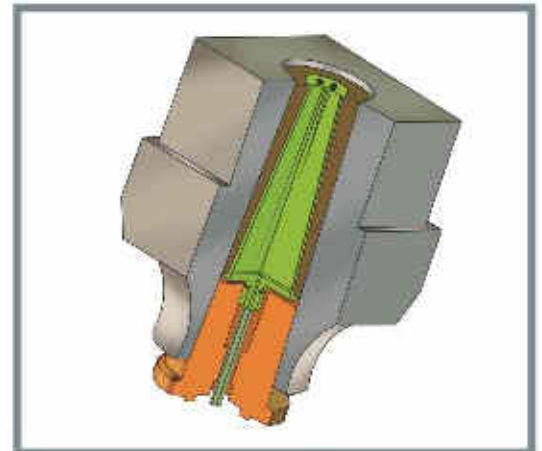
# IPV SYSTEM IN LADLE



## 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 HousingBlock.
- Improves lives of HousingBlock and Plug



Housing Block

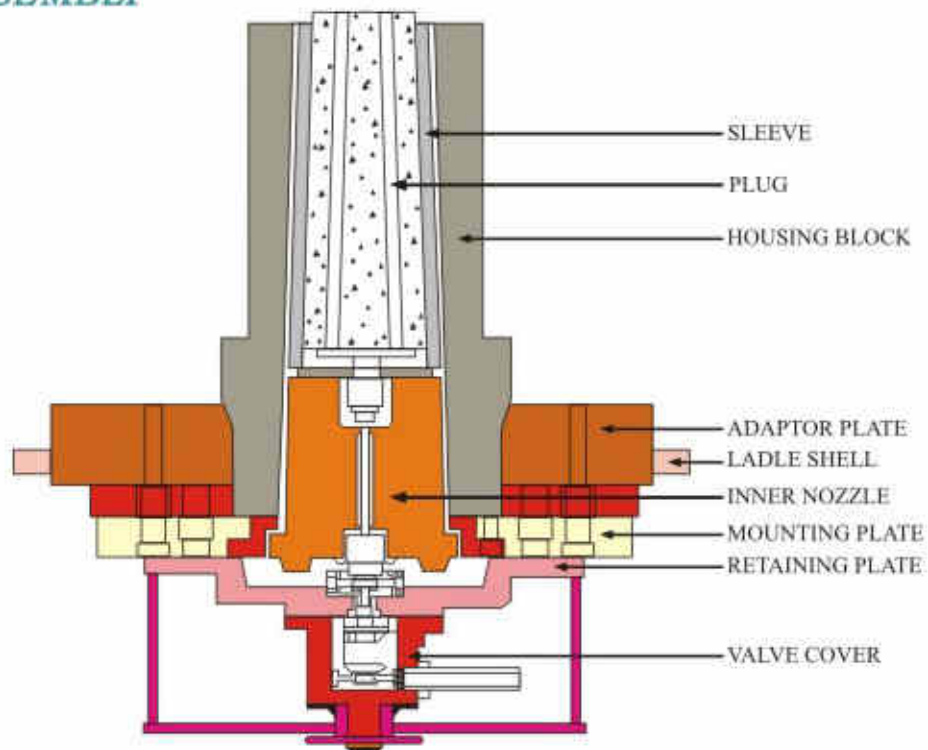


Sleeve



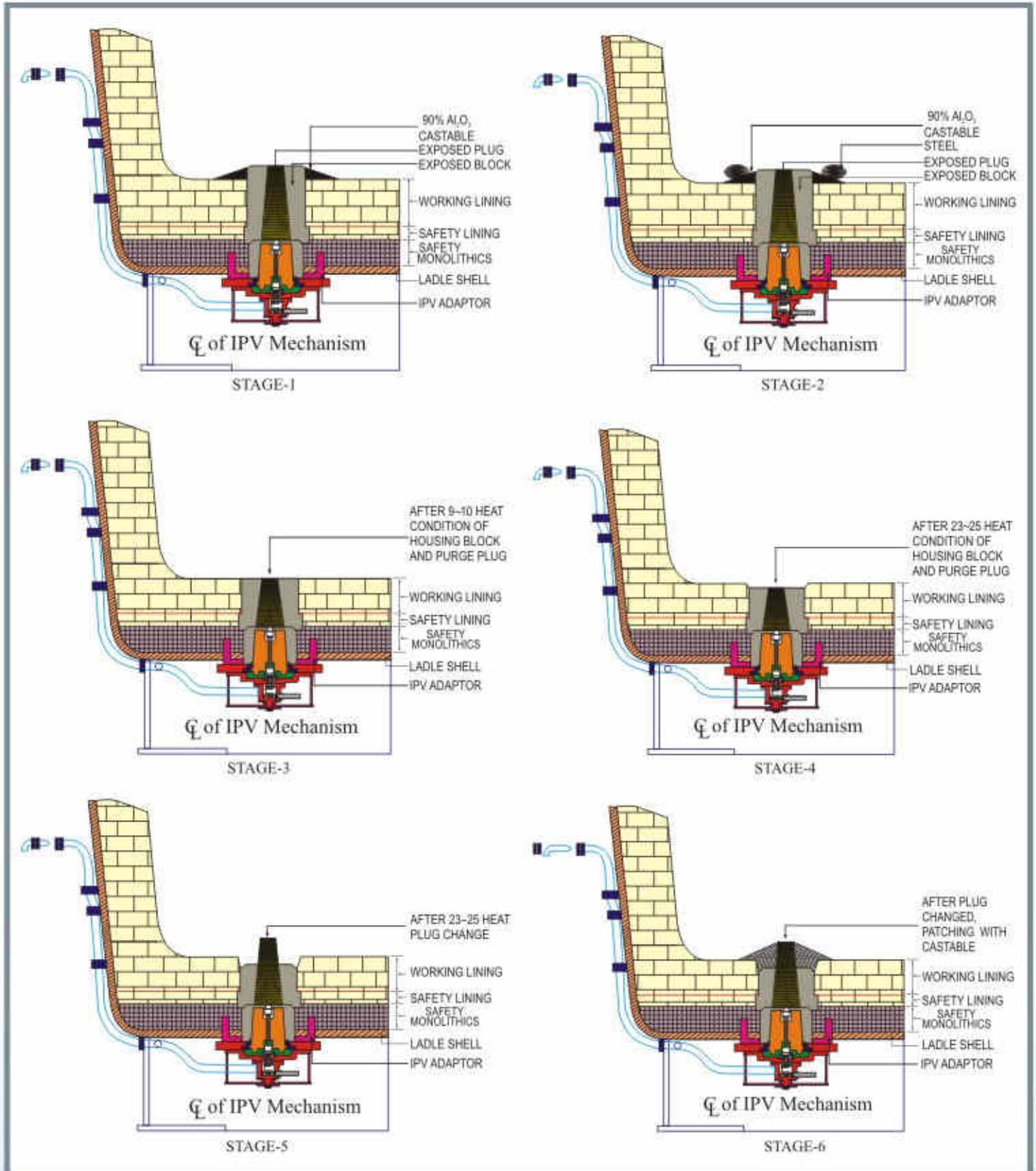
Plug

## SIPV ASSEMBLY





## WEAR PATTERN OF HB & PP





### **IFGL Refractories Ltd**

Head & Corporate Office :  
3 Netaji Subhas Road, Kolkata - 700 001, India  
Tel: +91 33 2248 2411, Fax: +91 33 2243 0886  
E-mail: ifgl@bajoria.in, Website : www.ifglref.com



### **Monocon International Refractories Ltd.**

Monocon Head Office & Works:  
Old Denaby, Doncaster, South Yorkshire, DN12 4LQ, UK  
Tel: +44 1709 864848, Fax: +44 1709 860481  
E-mail: sales@monocon.com, Website : www.monocon.com



### **Tianjin Monocon Refractories Co. Ltd**

No.17, 5th Avenue, TEDA, Tianjin 300457, Peoples' Republic of China.  
Tel: +86 22 66293 / 245 66293 246, Fax: +86 22 66293 243  
E-mail : tianjin@monocon.com

### **Tianjin Monocon Aluminous Refractories Co. Ltd.**

JinBin Warehouse No.14, No.33 Baihe Road,  
TEDA, Tianjin 300457, Peoples' Republic of China.  
Tel: +86 22 66293 245 / 66293 246, Fax: +86 22 66293 243  
E-mail : tianjin@monocon.com



### **Mono Ceramics Inc**

2235 Pipestone Road, Benton Harbour, Michigan 49022, USA  
Tel: +1 269 925 0212, Fax: +1 269 925 5222  
E-mail:sales@monoceramics.com



### **Monotec Refratarios Ltda**

Av. Jandira, 316 - Conj. 4, Cep 04080-001, Sao Paulo, Brazil  
Tel: + 5511 5055 8476, Fax: +5511 5055 4294  
E-mail: gwoelfert@uol.com.br

[www.ifglref.com](http://www.ifglref.com)  
[www.monocon.com](http://www.monocon.com)