



**VISHVA VISHAL REFRACTORY LIMITED**

AN ISO 9001:2015 COMPANY

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**QUALITY REFRACTORIES**

# PURSUIT OF EXCELLENCE

in all fields of its activities

## VISHVA VISHAL REFRACTORY LTD.

Vishva Vishal Refractory Limited established its business in 1989 and has more than 30 years of experience in Refractory Manufacturing. We have **customers worldwide** and have an international presence in **5 countries** namely South Africa, USA, Spain, Italy and Bangladesh.

Our products go through **stringent Quality Checks** in different process points to deliver consistent products to our customers.

We are an ISO 9001:2015 Certified Company and have **3 International Technical Tie-ups** with **Renowned Research Institutes** for constantly innovating, developing and upgrading our products.

**LIRR, China** [Sinosteel Luoyang Institute of Refractories Research Co., Limited, China for CCR

**MAK, Ukraine** for Ceramic Welding Powder

**Mckeown, USA** for CCR & Ceramic Welding Powder



## TAP HOLE MASS FOR BF & COREX

We manufacture a complete range of Tap Hole Mass to meet widely varying demands of wide range of Blast Furnaces and Corex units. The Unique Characteristic are:

- Good workability to facilitate extrusion
- Consistency of structure to prevent oozing out of nose of the gun
- Controlled coking-out time to ensure adequate strength of extruded material
- Lower volatile to minimize fumes evolution and quick setting
- Good resistance to oxidation, metal and slag attack
- Ease of drilling at the time of Tap Hole opening
- Reasonably high shelf life



Tap Hole Mass



Shrink Proof M/C for  
Mudgun Cake



Eirich Mixer Machine



Mudgun Cake Cutter

## RUNNER MASS / TROUGH MASS

We manufacture improved range of Tar and Resin Bonded Trough / Runner mass to meet the demanding service requirements of today's Indian Blast Furnaces. The Properties are:

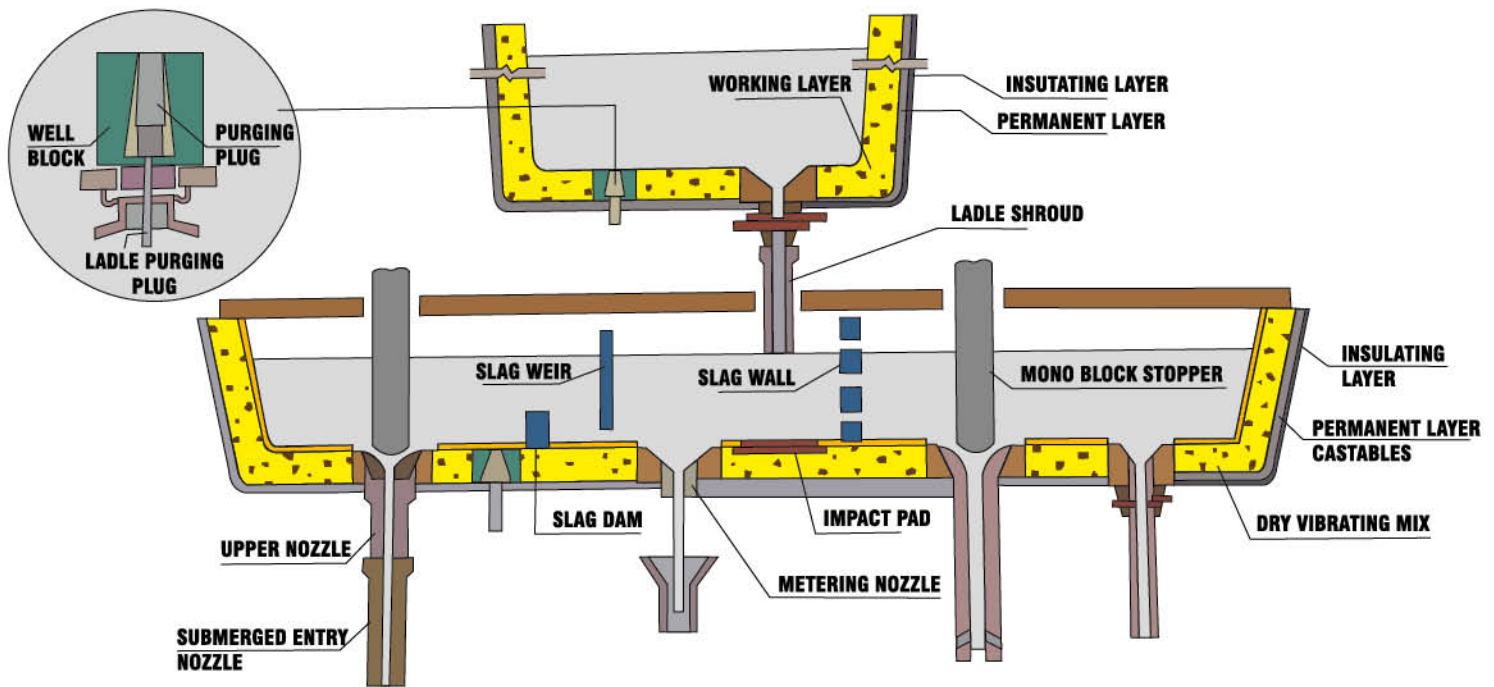
- Erosion resistance from Iron and Slag
- Low porosity to resist metal penetration
- Thermal stability and shock resistance
- Structural integrity
- Non sticking properties with metal slag



Runner Mass / Trough Mass

## BLAST FURNACE & COREX MASSES

TYPICAL PROPERTIES OF BLAST FURNACE AND COREX MASSES							
Product	Mudgun Mass			Runner Mass / Trough Mass			
	upto 250	<600	<1500	<2500	4000	Tar Bonded (RM)	Resin Bonded (RM)
<b>Chemical Analysis (%)</b>							
Al <sub>2</sub> O <sub>3</sub> (Min.) %	30	35	45	45	45	55	65
Fe <sub>2</sub> O <sub>3</sub> (Max.) %						1.5	1
C + Sic (Min.) %	25	25	30	35	35	25	25
<b>Physical Properties</b>							
A.P. (Max)%	30	30	28	28	28	25	25
V.M. (Max) %	10	8	7	7	6	7	7
B.D. (gm/cc) Min.	1.5	1.6	1.8	1.9	1.9	2.1	2.3
C.C.S. (Kg/cm <sup>2</sup> ) Min	40	45	55	75	95	75	150



Started manufacturing **Continuous casting Refractories (CCR)** from the year **2003**, Our product range includes Ladle Shorud (LS), Sub Entry Nozzle (SEN), Mono Block Stopper (MBS), Tundish Nozzle (TN) etc.

We also carry out **Total Tundish Management (TTM)** and supply all the items required in a Tundish and provide technical services and applications at site.

## SPECIAL FEATURES IN OUR PRODUCTS:

- ❑ Facility for gas purging.
- ❑ Anti oxidant properties.
- ❑ Design and size as per customer's requirement.
- ❑ Clogging free casting for long and longer sequence.
- ❑ Gas purging facilities to prevent alumina clogging (optional).
- ❑ Slag zone immersed part re-inforcement with special material for longer life.
- ❑ Argon sealing purging arrangement with failor made design provided on customer's request.
- ❑ Wide range of formulation to suit Customer requirements.
- ❑ We also manufacture Silica free Oxy-bore ladle shroud for higher life. for specific application.



Isostatic Press



Ladle Shroud



Sub Entry Nozzle



Tundish Nozzle



Mono Block Stopper



## CONTINUOUS CASTING REFRACTORY (CCR)

TYPICAL PROPERTIES OF DIFFERENT PARTS OF CCR PRODUCTS																			
Product	Sub Entry Nozzle					Mono Block Stopper			Ladle Shroud			Tundish Nozzle							
	Seat		Body			Slag Zone			Head	Body	Body	Slag Zone	Seat	Body					
Refractory Grades	VB6	VB14	CT142	CT170	CT182	CT199	CT141	CT67	VE3	VB6	VB14	CT75	VD1	CT193	CT198	VD3	VB6	CT-100	
<b>Chemical Analysis</b>																			
Al <sub>2</sub> O <sub>3</sub> (Min.) %	75		65	40	47	84		71	70	75		55	45	50	64	50	75		70
SiO <sub>2</sub> (Max.) %	5	1	7	20	15		3	3	3	5	1	15	15	18		10	5		6
MgO (Min.) %		75									75								
ZrO <sub>2</sub> (Min.) %							84												
C (Max.) %	20	22	25	30	30	13	13	25	26	20	22	30	38	30	28	35	20		23
<b>Physical Properties</b>																			
A.P. (Max.) %	15	17	15	15	15	15	15	15	15	15	15	17	15	15	15	15	15		15
B.D. (gm/cc) Min.	2.65	2.55	2.55	2.45	2.28	2.60	3.80	2.50	2.50	2.65	2.55	2.35	2.35	2.40	2.55	2.35	2.65		2.55
C.C.S. (kg/cm <sup>2</sup> ) Min.	225	200	225	180	180	220	225	200	180	225	200	180	180	180	225	180	225		200

We have a comprehensive range of Slide Gate refractory products of all grades and shapes according to the need of Customers.

### The models are equivalent to

- Saflo Slide Plate
- 1QC Slide Plate
- 2QC Slide Plate
- 4200 Slide Plate
- 6300 Slide Plate
- New Generation Slide Plate
- FF - 80
- CS - 80
- S - 2
- 13QC
- LS - 22
- LS - 70



Hydraulic Press 600 MT



Hydraulic Press 1600 MT



Pitch Impregnation Plant



Surface Grinder

## SLIDE GATE REFRACTORY

### TYPICAL PROPERTIES OF SLIDE GATE REFRACTORY PRODUCTS

Product	Slide Plate		Collector Nozzle		Ladle Nozzle	
Refractory Grades						
<b>Chemical Properties</b>						
Al <sub>2</sub> O <sub>3</sub> (Min.) %	88	85	84	85	84	85
Fe <sub>2</sub> O <sub>3</sub> (Max.) %	0.15	0.15	0.15	0.15	0.15	0.15
C (Max.) %	3	5	3	5	3	5
<b>Physical Properties</b>						
A.P. (Max.) %	12	10	12	11	12	12
B.D. (gm/cc) Min.	3	3	2.95	2.95	2.95	2.95
C.C.S. (Kg./cm <sup>2</sup> ) Min.	800	500	600	400	400	400
HIMOR - 1400°C	100	80	80	80	80	80



## MONOLITHIC LANCES

We manufacture monolithic lances for different applications, such as Oxygen Lance, Argon Lance, Gas Stirring Lance and Desulphurization Lance having the following properties:

- Having composite materials in different zones for higher life
- High corrosion and erosion resistance to metal and slag
- Excellent thermal shock properties
- Maintained dimensions as per customer requirements



Monolithic Lances

## PURGING PLUGS

We offer pre-cast directional purging plugs systems equivalent to IPV, GP II and GP III systems.

## SLAG ARRESTING DART

Mix designed to control density which effects to arrest slag enfans into the ladle during tapping of steel. Hence makes possible to tap Clean Steel.



Purging Plugs, Darts & Tundish Nozzles

## PURGING PLUG HOUSING BLOCK AND LADLE WELL BLOCK

Housing blocks are designed to fix the plug perfectly. We offer wide range of shapes / sizes of Ladle Well Blocks as per the requirement of customer with  $Al_2O_3$  ranging from 45% to 90%.



Precast Blocks

## TUNDISH FLOW MODIFIER

Suitably designed as per Tundish configuration to reduce splashing and turbulence, minimizes slag emulsification and inclusion of non metallics in steel.

## TUNDISH NOZZLES:

These are highly suitable for open casting. We offer two types of Tundish Nozzles as mentioned below:

- Alumina-carbon Tundish Nozzle with Zirconia Insert
- Fully Zirconia Nozzles of different designs

These Zirconia Nozzles are very dense having **AP < 5%**, **Bulk Density > 5.4g/cc** and allows a steady flow of metal stream to the mould. Capable of withstanding a casting duration of 12 hours.



1700 °C Furnace



## PURGING AND SHAPE REFRACTORY

TYPICAL PROPERTIES OF PURGING & SHAPED REFRACTORY PRODUCTS									
Product	Porous Plug		Porous Plug Well Block	Ladle Well Block	Lances			Zirconia Insert Tundish Nozzle	
					Argon	Desulphurization	Oxygen		
Refractory Grades									
<b>Chemical Analysis (%)</b>									
Al <sub>2</sub> O <sub>3</sub> (Min.) %	91	91	91	80	85	85	90	NA	
Fe <sub>2</sub> O <sub>3</sub> (Max.) %	0.2	0.2	0.2	1	2	2	0.2	0.2	
MgO (Max.) %	5	5	5	NA	5	5	NA	NA	
SiO <sub>2</sub> (Max.) %	NA	NA	NA	NA	NA	NA	NA	2	
CaO (Max.) %	2.1	2.1	2.1	1.2	6	6	5	NA	
<b>Physical Properties</b>									
A.P. (Max.) %	13	13	13	13	18	18	15	5	
B.D. (gm/cc) Min.	2.9	2.9	2.9	2.9	2.8	2.8	2.9	5.2	
C.C.S. (kg/cm <sup>2</sup> ) Min	600	600	600	400	400	400	400	NA	

## WELL FILLER COMPOUND (WFC)

- Well Block and Inner Nozzle are filled with Well Filler Mix. Ensures free opening.
- The Well Filler Mix have good free flowing properties, and favours easy opening of slide gate system without any mechanical support.



Well Filler Compound

## OUR SPECIAL PRODUCTS

Product	Tap Hole Sleeve			Ceramic Welding Powder		Well Filler Compound	
Refractory Grades	THS-2	THS-7	THB-3	CWP		WFC	
<b>Chemical Properties</b>							
Al <sub>2</sub> O <sub>3</sub> (Min.) %	NA	NA	NA			Cr <sub>2</sub> O <sub>3</sub> %	15-45
MgO (Min.) %	88	81	85	Total SiO <sub>2</sub> (Min.)%	92	SiO <sub>2</sub> %	20-80
ZrO <sub>2</sub> (Min.) %				Total Al <sub>2</sub> O <sub>3</sub> (Min.)%	4.5	ZrO <sub>2</sub> % (Max)	10
C (Max.) %	8	15	15	Fe <sub>2</sub> O <sub>3</sub> (Max) %	1	C (Max) %	2
<b>Physical Properties</b>							
A P (Max.) %	3	3.5	3				
B.D. (gm/cc) Min.	2.9	2.8	2.9	L.P.D. (gm/cc) Max	1.35	L.P.D. (gm/cc)	1.52-2.2
C.C.S. (Kg/cm <sup>2</sup> ) Min.	450	350	350	Grain Size (mm)	0 - 2	Grain size (mm)	0 - 2

## TAP HOLE SLEEVE

### Mag - Carbon Sleeve for Converter

We offer high class Tap Hole Sleeves for the converter. The performance of Tap Hole Sleeve influences the productivity of Basic Oxygen Furnace. Tap Hole Sleeves are made from mixture of Fused Magnesia and Graphite compacted into a dense form by using High Capacity 150 Press.



### Properties

- High thermal spalling resistance, abrasion, superior Erosion and Corrosion Resistance
- Enhances furnace availability and eliminates time for intermittent repairs
- Easy to change, Long life and Much less down time for Tap.
- Favours to make clean steel due to low refractory dissociation in steel

## CERAMIC WELDING POWDER

VVRL has tied up with MAK, a part of Europe's Famous Group Concord for providing full range of services - supply of material to their applications.



Ceramic Welding Powder



**We are breathing second life into the ovens and provide real economic efficiency for the enterprises.**

MAK specializes in Ceramic Welding in Coke Ovens, Full Heating Wall Rebrickng, Hot & Cold repairs, Ceramic Welding in Glass Making Furnaces, Lime Shaft Kiln and Petro Coke Industries.

For its 30-years history, the company has implemented more than a hundred of projects related to rebuilding of Coke oven batteries, hot and cold repairs of industrial ovens at the plants in Russia, Poland, Hungary, Czech Republic, Bulgaria, Pakistan and other countries. Level of engineering skills, quality of implemented activities and timely completion of undertaken responsibilities are enabling the company of keeping the competitive position in the market and facing the future positively.

- Rocking Runner and Slag Runner Castables gel bonded
- Low Cement Castables
- High Alumina Castables
- Mortars
- Basic Ramming and Gunning Mass
  - ❖ Basic Ramming Mass (Induction Furnace)
  - ❖ Magnesite Ramming Mass (ARC Furnace)
  - ❖ Basic Gunning Mass
- Tundish Vibro Mass, Tundish Spray Mass



Tundish Working Lining

## LOW CEMENT CASTABLES

The product range includes low cement castable of different Alumina content ( $Al_2O_3$  varying from 45% to 90%) with service range between 1,500°C to 1,800°C. These are characterized by  $Al_2O_3$  content and specific low  $Fe_2O_3$  and low CaO content. Also water requirement for casting is less than 5%. These castables have very short curing time requirement. These are suitable for use in places where very quick setting is required thus reducing the downtime of Furnaces. These are being extensively used in furnaces like:

- Ladle and Tundish back-up lining
- Sintering Furnace roof
- Soaking pit covers
- Health of re-heating furnaces



Low Cement Castables

## HIGH ALUMINA CASTABLES

The product range includes High Alumina Castables different Alumina content varying from 50% upto 95%. The water requirement of casting is 7 to 10% and have a short curing time. These castables are used in reheating furnaces, steel ladles and as a general purposes repair.



High Alumina Castables

## MORTARS

We manufacture 90K Green Mortar having 70-90%  $Al_2O_3$ , chemically bonded with excellent bonding strength and resistance to metal penetration.

The properties of 90K Mortar are:

- High strength at higher temperature
- Superior performance in corrosive environments



Mortars

# BASIC MONOLITHICS

## MAGNESITE RAMMING MASS

Suitable for Ramming of Electric Arc Furnace, Ultra High Power (UHP), EBT (Eccentric Bottom Tapping) furnaces of various capacities and also as a repair material with quick thermosetting properties.



Magnesite Ramming Mass

## BASIC GUNNING MASS

Suitable for gunning of L.D. converters and Electric Arc Furnaces for production of high quality alloy steel, mild and low alloy steel.



Basic Gunning Mass

## TUNDISH VIBRO MASS

- We manufacture magnesite based moldable water-free mix for Tundish lining
- It is easily filled between the permanent layer of Tundish and the steel former
- The forma is heated upto 300°C by a hot air generator for 2-2.5 hours, and then removed by crane after cooling
- It is formed at designed thickness. It performs at long sequence lengths more than 20 hours and protects the quality of steel
- Deskulling is a safe and quick process with our vibro mass, reducing downtime and lowering maintenance costs. It can be used in both cold and hot tundish practices



Tundish Vibro Mass

## TUNDISH SPRAY MASS

The working lining of Tundish plays an important role in providing quality and cost effective steel.



Tundish Spray Mass



# VISHVA VISHAL REFRACTORY LIMITED

## CASTABLES AND MASSES

### TYPICAL FORMULATIONS OF CASTABLES & BASIC MASS

#### Chemical Analysis (%)

Product	Mortar	High Alumina Castables				Low Cement Castables				Basic Mass			Tundish Vibro Mass	Tundish Spray Mass		
		90 - K Mortar (G)	60% HA	70% HA	90% HA	LC 45	LC 60	LC 70	LC 80	LC 90	Gunning Mass	Ramming Mass			Tundish Spray Mass	
Grades	90 - K Mortar (G)	90	60	70	90	90% HA	LC 45	LC 60	LC 70	LC 80	LC 90	Gunning Mass	Ramming Mass	Tundish Vibro Mass	Tundish Spray Mass	
Al <sub>2</sub> O <sub>3</sub> (Min.) %		90	60	70	90		45	60	70	80	90	80	84	75	70	80
MgO (Min.) %																
Fe <sub>2</sub> O <sub>3</sub> (Max.) %							1.5	1.5	1	1	1		2.5	2	2	2
SiO <sub>2</sub> (Max.) %												8	5.5	15	20	10
Cr <sub>2</sub> O <sub>3</sub> %												2				
CaO (Max.) %		4	4	4	3.5									3	3.5	3.5

#### Physical Properties

Product	Mortar	High Alumina Castables				Low Cement Castables						Ramming Mass	Tundish Vibro Mass	Tundish Spray Mass		
		2.75	2.35	2.4	2.6	2.3	2.6	2.7	2.9	3.2	2.35				2.65	Tundish Spray Mass
B.D. (gm/cc) Min. 110°C/24 hrs	2.75	2.35	2.4	2.6	2.3	2.6	2.7	2.9	3.2	2.35	2.65	Tundish Spray Mass				
C.C.S. (kg/cm <sup>2</sup> ) Min. / 110°C	250	200	800	850	700	750	800	850	900	400	450	300	300	300		
C.C.S (kg/cm <sup>2</sup> ) Min. Drying @800°C / 3 hrs soaking			850	900	800	800	860	950	1000							
C.C.S (kg/cm <sup>2</sup> ) Min. Drying @1100°C / 3 hrs soaking			900	950	900	900	950	1050	1150							
C.C.S (kg/cm <sup>2</sup> ) Min. Drying @1500°C / 3 hrs soaking			1000	1000	1000	1000	1000	1150	1150		400	300	300	300		
Thermal Conductivity (k cal/m/hrs°C)			1.2	1.2	1.16	1.2	1.29	1.8	2.3							
P.L.C. max at 1500°C	±1	-0.8	-0.7	±0.8	±1	-0.8	-0.7	±0.8	±0.8	-1.2	-1.2	-3	-3	-3		
Shelf Life (months)		6	6	6	6	6	6	6	6	6	6	6	6	6		
L.B.D. (gm/cc) Min.														1.6	1.7	
Skull Removal														Smooth	Smooth	Smooth
Grain Size (mm) Max.			5	6	6	6	6	6	6	3	5	1	0.5	0.5	0.5	

Neutral Ramming Mass is a high alumina mix predominant aggregate, component of alumina imparts a strong skeleton aggregate structure of

- ❑ Superior uniform heat stability
- ❑ Ability to withstand corrosive-erosive attack of molten metals and their acids
- ❑ Excellent volume stability
- ❑ Superior structure heat stability
- ❑ Low apparent porosity
- ❑ Strong abrasion resistance Matrix



Neutral Ramming Mass

Physical Properties	
Grain Size (mm)	0 - 4
Density (gm/cc)	3.0
Initial sinter temperature (°C)	1260
Final sinter temperature (°C)	1650
Maximum use temperature (°C)	1750
Chemical Properties	
Al <sub>2</sub> O <sub>2</sub> (%)	82 - 86
MgO (%)	12 - 16
SiO <sub>2</sub> (% max)	1



A well-established manufacturing setup supported by a testing and quality control laboratory. The comprehensive Research and Quality Control Facilities installed in the plant comprises

- Eirich Mixer
- Glaze Furnace
- Programmable Dryer
- Machine tools for shaping & drilling
- Cold and Hot mixing of various raw materials
- Control atmosphere rooms for mix storage
- Cold Iso-static press and 1600 ton hydraulic press for pressing 600T Hydraulic press
- High temperature PID / PLC control furnace
- Non-destructive testing equipments for quality and process control
- Backed and supervised by well trained, experienced and highly qualified technical personnel



## EQUIPMENTS

Muffle furnace (1100°C)	Carbon Apparatus	HMOR Furnace (1400°C)	Oven
Hot Air Oven (300°C)	Magnetic Analyser	Digital pH Meter	1000°C Electrical Furnace
Heating Furnace (1400°C)	Distillation Apparatus	Moisture Testing Apparatus	PCE Furnace
Heating Furnace (1700°C)	Dean and Stark Apparatus	Brookfield Viscometer	Planetary Mixer
Spalling Resistance Furnace	Drier	Optical Pyrometer	Vicat Apparatus
CCS Testing M/C 200 Ton	CCS Testing M/C 100 Ton		

## VVRL'S PRODUCT RANGE

- Tap Hole Clay (Mud Gun Mass) Tar Bonded & Resin Bonded**
- Runner Mass (Trough Mass) Tar Bonded and Resin Bonded**
- Trough Castable (Metal & Slag) Gel Bonded & LC/ULC Castables**
- Continuous Casting Refractories (Tundish Refractories)**
- Ladle Slide Gate Refractories**
- Purging Plugs for Ladles**
- Gas Purging Lances**
- Basic Ramming Mass & Neutral Ramming Mass for Arc & Induction Furnace**
- Basic Spray Mass & Dry Vibratable Mass for Tundish**
- Ceramic Welding Powder**
- Slag Arresting Dart**
- Complete Range of Castables like Conventional Castables / Low Cement / Ultra Low Cement / Nano Castables (Gel Bonded)**
- All types of Well Filler Mix**

# PROMINENT CUSTOMERS



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