

REFMET

A STEEL MAKER'S DREAM



STEEL MAKER'S DREAM

INTRODUCTION:

REFMET, established in 1995 under the Companies Act of 1956, stands as a pioneering force in the metallurgical product manufacturing sector. Headquartered in Raipur, the capital of Chhattisgarh State, our brand is the brainchild of visionary technocrats committed to revolutionizing the industry through innovative products and concepts. Our mission is to bolster our clients' profitability by offering unique solutions and collaborating closely to ensure seamless implementation.

At the helm of our operations is Shri Arnab Roy, our esteemed Managing Director, whose leadership and visionary approach have been instrumental in shaping REFMET's trajectory. Joining him in steering the company towards new horizons is Mr. Kunal Jain, a dynamic second-generation Director, who works alongside Mr. Roy to fortify our legacy of innovation and excellence.

Under Mr. Roy's guidance, REFMET has carved a niche for itself with its relentless pursuit of excellence and a deep understanding of steel manufacturing processes. His dedication has been the catalyst for our impressive growth and the bright future that lies ahead. Our portfolio boasts a range of products crafted from indigenous, homegrown technologies, making each offering a testament to self-reliance and a step towards reducing India's import dependency.

We pride ourselves on creating products that are not only import substitutes but also designed with the dual objective of adding value to our customers' steel production and contributing positively to the Indian economy. Each innovation we introduce aims to create a symbiotic relationship with our clients, ensuring mutual growth and success.

PRODUCT

Synthetic Slag

- Z-SLAG CAN
- Z SLAG CA-AL-20
- Z SLAG CA-AL-50

Tundish Flux:

- Tunflux-LC & LS

Noble Ferro Alloys:

- FERRO NICKEL
- FERRO NICKEL MOLY
- CALCIUM MOYBENDIUM (It gives better recovery than ferro Moly or Moly oxide)
- FERRO VANADIUM (V 50% & 78%)

Metal Salts:

- Cobalt Oxide
- Nickel Oxide
- Vanadium Penta oxide V₂O₅.
- Tungsten Oxide W_o3

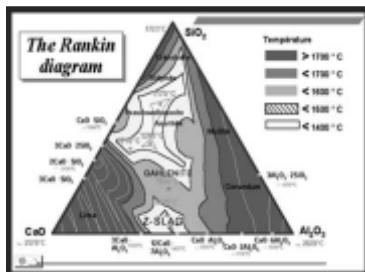




SYNTHETIC SLAG PRODUCT DATA SHEET

DESCRIPTION

Steel making market in India is highly competitive and being cost effective in manufacturing along with good quality steel is the essence for sustainability and growth. Refracast Metallurgical Pvt.Ltd.is happy to introduce Z-SLAG CAN a product designed to improve inclusion removal capacity of LRF slag. By adding the given active C12A7 Sulphur and Phosphorus (reversal) can be controlled to a great extent. The entire LRF slag will get fluidized and the entire slag viscosity will reduce. Making it very easy to handle the slag. No further Re-oxidation of liquid steel will occur as the slag will form a tight seal between steel and atmosphere. Will help improve ladle life by avoiding CaF₂. And will help bring down the total slag volume. Making it energy efficient. As seen in Rankin diagram, all three variables of synthetic slag targets to



make the slag in the C12 A7 phase region. This is a win-win product where cost saving is far more than the cost of addition. It also helps preventing in reversal of metal oxides from slag to steel at the same time prevents

inclusion to float around in the liquid steel.

APPLICATION:(How to use)

- Once the Liquid Steel is ready for tapping and empty ladle is placed add 3kg of Z-Slag CAN per ton of liquid steel in the empty ladle or during the tapping.
- Take the ladle to LRF for refining process. During which lime and other flux are added as per old SOP.
- During final stages if the MnO or FeO content of slag is high add 2kg to 8kg of Easy Slag this will help improve metal oxide reduction back to Metal.
- Make sure after the 2nd addition there is sufficient turbulence in the ladle for proper slag and metal reaction at the interface.

BENEFITS OF Z-Slag CAN :

- Quick Melting Slag cover reduces re-oxidation
- Narrow range of impurities and inclusion level.
- Quick desulphurization right from the tapping of molten steel.
- Saves Al-Metal consumption.
- Reduction of refining time.
- Improves refractory lining Life.
- Avoids use of CaF₂
- Reduces Calcium treatment.
- Reduces Power consumption.
- Most importantly Consistent quality of steel.

FEW OF THE MOST COMMON SMS SHORTCOMINGS WE ADDRESS.

- Fuming in work space.
- Crusting of slag in the ladle.
- Oxidation of liquid steel due to reaction with atmospheric Oxygen.
- Heat loss from slag zone
- Avoid use of CaF₂
- Improve Ladle life
- Reduction in time needed for Sulphur and non-metallic inclusion removal.

Product	Al ₂ O ₃ (min)	CaO (min)	C ₁₂ A ₇	SiO ₂	Fe ₂ O ₃ +FeO	MgO (min)	TiO ₂	SIZE	Melting Temp.
Z-SLAG CAN-HV	38%	45%	100%	5.50%	3% Max	4% Max	0.50%	10-50 mm	1300°C
Z-SLAG CAN- LC	35%	43%	100%	10%	3% Max	4% Max	0.50%	10-50 mm	1300°C
Z-SLAG CAN- Mg	35%	43%	100%	5.50%	3% Max	8% Max	0.50%	10-50 mm	1300°C
Z-SLAG C2A3	45%	38%	100%	5.50%	3% Max	5% Max	0.50%	10-50 mm	1300°C

Packaging: 1MT jumbo bag / 25kg HDPE bags in Pallet.



Z-SLAG CA~AL-50/20

PRODUCT DATA SHEET

DESCRIPTION:

Steel making market in India is highly competitive and being cost effective in manufacturing along with good quality steel is the essence for sustainability and growth. RefracastMetallurgicalsPvt.ltd. is happy to introduce Z-SLAG CA~AL-50/20 product designed for better Metal recovery and lower non metallicinclusion .Z-SLAG CA~AL-50/20reduces the final FeO content in theLRF furnace slag. This is done by killing the slag of excess oxygen and reducing the slag viscosity. Our product also helps reduce non-metallic inclusions to give better surface finish of rolled product. Along with Sulphur removal. This is a win-win product where cost saving is far more than the cost of addition. Synthetic slag has always been a product to be used by Primary steel makers with basic or neutral lining to reduce Sulphur and inclusion levels. We have added De-Oxidation capability to our product. Synthetic slag consists of prepared mixture of several individual compounds which is used during secondary steelmaking to assist the steel treatment in the furnace and ladle from the viewpoint of effective refinement. As we are aware of the complexity of number of items needed for effective steel treatment. That's why we offer this pre-mix material for simplicity.

APPLICATION: Z-Slag CA~AL50/20

APPLICATION:(How to use)

- Once the liquid steel metal is ready for tapping and empty ladle is placed add 2 to 5kg of Z-SLAG CA~AL-50/20 per ton of liquid steel in the empty ladle.
- Take the ladle to LRF forrefining process. During which lime and other fluxare added as per old SOP.
- Depending on the FeO, MnO and other alloying element oxides in slag we can add 2kg to 8kg of Z-Slag CA~AL50/20. This will help reduce all metal oxides to metal. Make sure after the 2nd addition there is sufficientturbulence in the ladle for proper slag and metal reaction at the interface.

BENEFITS OF Z-Slag CA~AL50/20:

- Lower use of Aluminum Metal.
- Lower Sulphur level in finished steel.
- Reduces Fe(m) and FeO in final discarded furnace Slag
- Reduces heat loss in the ladle.
- Faster inclusion removal and clean liquid steel.
- Helps prevent refractory lining Life as the basicity of slag is improved.
- Consistent chemistry of the steelmaking slag.
- Gives better recovery of rolled products and surface finish.
- Reduce miss rolls.
- An effective fluid sink that absorbs inclusions from steel.
- Fast and better recovery of steel as well as alloys.

Cost saving is more than the cost of addition.

Product	<u>C₁₂A₇</u>	Al ₂ O ₃ (Total)	Al Metal	CaO (min)	SiO ₂	Fe2O3+ FeO	MgO	TiO2	SIZE	Melting Temp.
Z SLAG CA~AL 50	50%	55%	6-8%	30%	9%	3% Max	4% Max	0.8% Max	0-40 mm	1380°C
Z SLAG CA~AL 20	20%	66%	10-12%	12%	9%	3% Max	4% Max	0.8% Max	0-40 mm	1380°C

Packaging: 1MT jumbo bag / 25kg HDPE bags in Pallet.

TUNFLUX PRODUCT DATA SHEET

PREFUSED ACTIVE TUNDISH FLUX

A Pre-Fused Mag-Al spinel and Calcium Aluminate based tundish powder which is very active for inclusion absorption.

Special Characteristics:

- Quick self-spreading
- Very active for Alumina inclusion absorption due to its Mag-Al Spinel content.
- TiO₂ in traces / NIL – best suited for ball bearing and Low Titania grades.
- Low heat absorption
- Excellent heat insulator to retain the tundish steel temperature.
- The self spreading liquid phase stops re-oxidation and nitrogen influx at tundish.
- Forms minimum crust even for long sequences to help increasing yield and easy de-skulling.

Specification:

TUNFLUX LC	Mgo	CaO	Al ₂ O ₃	SiO ₂	TiO ₂	Size
	4% max	35%min	35% min	15% max	Traces	- 0.5 mm

TUNFLUX LS	Mgo	CaO	Al ₂ O ₃	SiO ₂	TiO ₂	Size
	4% max	35%min	33% min	10% max	Traces	-0.5 mm

Addition Norms:

The powder is to be added at the start of casting. In case of sequence casting, appropriate quantity is to be added after required interval. For heat insulation, rice husk or similar insulation material may be used after adding the powder.

Packing: Packed in polyethylene lined HDPE bag of 10 kg each.

Storage: Store in dry and covered place.

Shelf life: 1 year from date of dispatch



FERRO NICKEL (60% to 75%, grade) PRODUCT DATA SHEET

What is Ferro Nickel (60% to 75%, grade) ?

Ferro Nickel

Ni 55-75%Ni
C 1.50% Max
S 0.05% Max
Co 0.10% Max
P 0.05% Max, Balance Fe

Size:

1-4 Kg per Piece.
4-10 Kgs per Piece
Pkg- In 1 mt Jumbo bags.

Commercial Benefit

Ferro Nickel is consistently offered at a lower price per kilogram compared to Pure Nickel. Additionally, we include 30 to 40% Iron at no extra cost. Beyond these savings, another advantage is the absence of import duties. Unlike Pure Nickel, which requires importation, Ferro Nickel is readily available within India. As manufacturers of Ferro Nickel, we ensure direct supply to our customers.

Ferro Nickel Vs Pure Nickel

During the Application of Ferro Nickel, some dilution may occur, which is offset by the cost advantage of acquiring 25 to 35% iron at no additional charge. Therefore, extra attention is necessary. To accommodate this, we ensure the supply of Ferro Nickel in sizes ranging from 1kg to 4kg.

Long term availability

We ensure you there is no dearth of raw material source. We have been making this for over 2 decades.

How and when to add Ferro Nickel

Ferro Nickel is to be added just like pure Nickel plates. No special care needed.

Any limitation of using Ferro Nickel

There are no limitation to the use of Ferro Nickel.

Precaution of Using Ferro Nickel

The only precaution needed while using Ferro Nickel is to keep a note of the percentage of nickel content in the batch being used and adjust the input weight accordingly.

FERRO NICKEL MOLY

PRODUCT DATA SHEET

What is Ferro Nickel Moly ?

Ferro Nickel Moly

Ni 60-65%Ni
C 0.05% Max
S 0.05% Max
MO: 2-3%
Co 0.45% Max
P 0.05% Max,
Balance Fe

Size

1-4 Kg per Piece.
4-10 Kgs per Piece
Pkg- In 1 mt Jumbo bags.

Commercial Benefit

Our Ferro Nickel Moly product delivers substantial savings by incorporating 2 to 3% Molybdenum and 30 to 40% Fe at no additional cost, while billing is based solely on the Nickel component, priced as pure Nickel. This domestically-produced alternative avoids the import tariffs associated with pure nickel, it also eliminates the necessity for middlemen and their accompanying charges further augmenting its affordability. As the direct manufacturers, we provide a streamlined and economical option for your requirements.

Ferro Nickel Moly Vs Pure Nickel and Ferro Moly

Unlike pure nickel plate and Ferro Moly, Ferro Nickel is a very safe product to store in shop floor. No added care needs to be taken. Ferro Nickel Moly gives greater control of Nickel addition as the material is provided in great variation from 1kg to 4kg.

In Ferro Nickel some dilution can be observed but then that comes with cost benefit plant gets 25 to 35% fe free of cost.

Long term availability

We ensure you there is no dearth of raw material source. We have been making this for over 2 decades.

How and when to add Ferro Nickel Moly

Ferro Nickel Moly is to be added just like pure Nickel plates. No special care needed.

Any limitation of using Ferro Nickel Moly

There are no limitations to the use of Ferro Nickel Moly.

Precaution of Using Ferro Nickel Moly

The only precaution needed while using Ferro Nickel Moly is to keep a note of the amount of Molybdenum needed and that has already been added in the form of Ferro Nickel Moly.



CALCIUM MOLYBDATE (CM) PRODUCT DATA SHEET

What is Calcium Molybdate (CM).

This is a new cost saving alternate to the traditional ferro moly or Moly Oxide. As each material has its strength and weakness so does Calcium Moly.

CALCIUM MOLYBDATE SPECIFICATION

Mo : 40-45 %

CaO : 27-30%

Free Sulphur is trace, around 0.35% as CaSo4.

P : 0.04% Max

SiO2 : 0.5 to 1% Max

V : 0 to 0.4% Max

Fe : 0.5-0.7% Max

Sn, Sb, Mn, Cu, As : Nil

FERRO MOLY VS CALCIUM MOLY

- No dilution effect of Molybdenum. Unlike Ferro Moly which has around 35% iron contain and rest in Molybdenum. Calcium Moly has only Molybdenum and Calcium which goes to slag so gives a better Moly control.
- The Calcium that separate from Calcium Moly and combines with Oxygen is highly reactive to remove sulphur.
- In addition, Calcium Moly takes up less heat from system per kg Molybdenum than its counterpart ferro Moly.
- With ferro Moly there are possibility of mix-up by traders whereas in Calcium Moly it is not possible.
- Calcium Moly has lower chances addition error.

COMMERCIAL BENEFIT

Calcium Molybdate is always priced a bit lower than ferro Moly. But that's not the only cost benefit. Just like Ferro Moly Calcium Moly does give 100% recovery. Takes less heat, does not dilute the steel, helps remove sulphur. Unlike ferro moly being denser than steel calcium moly does not have a tendency to settle to the bottom. Does require less time and less agitation to form a homogeneous mixture

LONG TERM AVAILABILITY

We ensure you there is no dearth of raw material source. We have been making this for over 2 decades.

HOW AND WHEN TO ADD CM

AOD ADDITION FOR STAINLESS :

CALCIUM MOLYBDATE (CM) is the best source of Molybdenum addition in AOD for stainless steel. With cost saving, impurity removal, power saving all happening at once at lower cost per kg moly. This product has a long-lasting benefit in ever rising cost of SMS. CM can be directly be added in AOD and gives near to 100% recovery. At the same time we get very highly reactive Calcium which helps in Decarbonizing directly reducing need of Lime addition.

LRF / LADLE ADDITION FOR ALLOY STEEL TO REPLACE FERRO MOLY:

CALCIUM MOLYBDATE (CM) is to be added in ladle during tapping from Induction or Arc furnace to replace Ferro Moly to save cost. Quantity of addition should be targeting 90 - 95% of the target chemistry. The balance trimming addition needs to be done by Ferro Moly only during processing.

PRECAUTION : CM should not be added in LRF during processing after formation of slag as in case of crusty slag, CM pallets may get caught in slag and may not reach steel to give less / erratic recovery of Moly.

However, if the steel is taken to VD after LRF treatment, then trimming addition may be done in VD to get full recovery of Moly.

EAF ADDITION TO REPLACE MOLY OXIDE:

CALCIUM MOLYBDATE can also be added in Arc furnace to replace Moly oxide. Recovery of Moly from CM (97-100%) is much better than Moly oxide (92-96%) as Moly doesn't sublime from Calcium Moly (being attached to Calcium) which happens in case of Moly oxide during addition.

ANY PRECAUTION OF USING CM

Only precaution is Calcium Moly should not be added as trimming addition towards the finishing addition. After the formation LRF slag formation. As there can be a possibility of uneven result because of slag coating and coagulation to bigger pieces CM might get trapped in Slag. There is no limit to Calcium Moly addition in EAF, nor is there any loss of moly recovery in EAF. CM does not Sublime like Moly Oxide.

Calcium Moly has another precaution for use in induction furnace that it requires neutral or basic lining

FERRO VANADIUM

PRODUCT DATA SHEET

Commercial Benefit

Ferro vanadium is an alloy composed primarily of iron and vanadium. It is commonly used as an additive in the production of steel to enhance its strength, hardness, and corrosion resistance. The addition of ferro vanadium to steel can improve its structural integrity, making it suitable for applications where high strength and durability are required.

Ferro vanadium is also utilized in the manufacturing of various steel products, including structural steel, tool steel, and stainless steel. It helps to refine the grain structure of steel, increase its tensile strength, and improve its resistance to wear, fatigue, and heat.

In addition to its use in the steel industry, ferro vanadium finds applications in other sectors as well. It is employed in the production of certain superalloys, which are used in aerospace, defense, and high-temperature applications. These alloys possess exceptional strength, heat resistance, and corrosion resistance, making them suitable for extreme operating conditions.

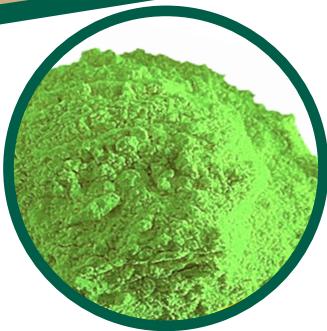
Specification:

FERRO VANADIUM V-50%	
CHEMICAL COMPOSITION	
P	0.05% Max
S	0.05% Max
AL	1.5% Max
Si	2% Max
C	0.2% Max

FERRO VANADIUM V-78%	
CHEMICAL COMPOSITION	
P	0.05% Max
S	0.05% Max
AL	1.5% Max
Si	1.5% Max

Application Area:

- Steel Production
- Structural Steel
- Tool Steel
- Superalloys
- Automotive Industry



TUNGSTEN OXIDE

Nx35

Tungsten oxide is an oxide compound of tungsten and oxygen. This compound is usually used as a host raw material for optical materials. Because it offers unique optical properties as smaller scales, it can be used in a variety of applications. It can be used to produce composite semi-conducting materials and ceramic pigments.

Tungsten oxide is an abundant, versatile oxide that is widely explored for catalysis, sensing, electrochromic devices, and numerous other applications.

Properties of Tungsten Oxide Wo₃

CHEMICAL PROPERTIES WO ₃		
1	CHEMICAL FORMULA:	WO ₃
2	Assay	96%
3	APPEARANCE:	Green
4	CAS No.:	393181-88
5	Bulk Density	7.6 g/cm ³
6	Particle Size Mesh	50 Mesh Passing 0.02% max
7	Tungsten	75%
8	Moly	3% Max
9	Safety and storage conditions	Store under clean, dry conditions

VANADIUM PENTOXIDE

Wn38

Vanadium pentoxide (V₂O₅) is a compound composed of vanadium and oxygen atoms.

Properties of Vanadium Pentoxide (V₂O₅):

CHEMICAL PROPERTIES V ₂ O ₅		
1	Chemical Formula	V ₂ O ₅
2	Assay	98%
3	Appearance:	Brown
4	CAS No.:	131462-1
5	Bulk Density	3.33 g/cm ³
6	Particle Size Mesh	Powder
7	Vanadium	55%
8	Moly	0.3% Max
9	Safety and storage conditions	Store under clean, dry conditions
10	Water Soluble	Nil



NICKLE OXIDE (NiO)BB-32

Nickel oxide (NiO) is a versatile compound that finds various applications in the paint industry. This technical literature aims to provide essential information about the properties, benefits .Nickel oxide is a valuable component in the paint industry, offering benefits such as deep black pigment, heat resistance, corrosion protection, conductivity, and anti-corrosion properties.

Properties of Nickle Oxide (NiO)		
1	CHEMICAL FORMULA:	NiO
2	Assay	97%
3	APPEARANCE	Black Powder
4	CAS No.	1313-99-1
5	Bulk Density	6.67 g/cm ³
6	Form	Powder Form
7	Nickel	75%
8	Cobalt	0.3% Max
9	Safety and storage conditions	Store under clean, dry conditions
10	Water Soluble	Nil
11	High-temperature stability	
12	Excellent corrosion resistance	

COBALT OXIDE (CoO.Co2O3)GT-90

Cobalt Oxide (CoO.Co2O3) is a black powder compound with various applications across different industries. This technical literature aims to provide essential information about the properties, applications, and recommended usage of Cobalt Oxide.Cobalt Oxide (CoO.Co2O3) is a versatile compound with applications in the ceramic, pigment, catalyst, and battery industries

Properties of Cobalt Oxide (CoO.Co2O3)		
1	CHEMICAL FORMULA	CoO.Co2O3
2	Assay	97%
3	APPEARANCE:	Black Powder
4	CAS No.	1307-96-6
5	Bulk Density	6.11 g/ml
6	Particle Size Mesh	200 mesh Passing 0.02% max
7	Cobalt	70%
8	Iron	0.3% Max
9	Safety and storage conditions	Store under clean, dry conditions
10	Water Soluble	Nil



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