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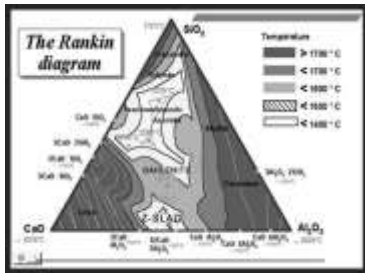
LEADING RECYCLERS OF SPENT CATALYSTS IN INDIA SINCE 1995

Z-Slag CAN PRODUCT DATA SHEET

DISCRPTION

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 Phos 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 varieties 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 help preventing in reversal of metal oxides from slag to steel at the same time prevents

inclusion to float around in the liquid steel.

PRODUCT Z-Slag CAN

C12A7	:	100%
CaO	:	42 to 46%;
Al ₂ O ₃	:	38 to 42%
SiO ₂	:	6 - 10%
FE ₂ O ₃ +FEO	:	2-3%;
TiO ₂	:	0.5% max
Size	:	10-50mm lumps

(With the rising Titanium restriction in finished Steel, this slag conditioner is ideal)
Packaging: 1MT jumbo bag / 20kg HDPE bags in Pallet

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 Z-Slag CAN 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.
- * **Cost saving is more than the cost of addition.**

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.
- * We help control Titanium in steel,

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Z-Slag CA~AL50

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 CA~AL50 a product designed to reduce Manganese consumption by improving Manganese recovery up to 70% or more. Z-Slag CA~AL50 reduces the final Fe(m) and FeO content in the LRF 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.

PRODUCT

Z-Slag CA~AL50 :

C ₁₂ A ₇	: 50%
AL METAL	: 6-8%
AL ₂ O ₃ (Total)	: 55%
CaO (max)	: 30%
SiO ₂ (Max)	: 9%
Fe ₂ O ₃ +FeO	: 3%
MgO (max)	: 4%
TiO ₂	: 0.8%
SIZE	: 2-40 mm
Melting Temp.	: 1380°C

Packaging : 1MT jumbo bag / 20kg
HDPE bags in Pallet

ADDITION OF Z-Slag CA~AL50:

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~AL50 per ton of liquid steel in the empty ladle.
- * Take the ladle to LRF for refining process. During which lime and other flux are 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. This will help reduce all metal oxides 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 CA~AL50:

- * Avoid use of Aluminum Metal.
- * Improves Mn recovery to 70% or more .
as per c% in steel.
- * Reduces Fe(m) and FeO in final discarded furnace Slag
- * Reduce heat loss in 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 and
- * Reduce miss rolls.
- * An effective fluid sink that absorbs inclusions from steel.
- * Fast and better recovery of steel as well as alloys.
- * Z-Slag CA~AL50 works as the catalyst to prevent inclusion, Phosphorus and Sulphur reversal from slag to steel.
- * **Cost saving is more than the cost of addition.**



Z-Slag CA~AL20

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. Kunal minerals private limited is happy to introduce Z-Slag CA~AL20 a product designed to reduce Manganese consumption by improving Manganese recovery up to 70% or more. Z-Slag CA~AL20 reduces the final Fe(m) and FeO content in the LRF 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.

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 inclusion levels. We have added De-Oxidation capability to our product to get the most from the alloying elements added. Z-Slag CA~AL20 help in reversal of metal oxides from slag to steel at the same time prevents inclusion to float around in the liquid steel.

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.

PRODUCT

Z-Slag CA~AL20 :

C ₁₂ A ₇	:	20%
AL METAL	:	10-12%
AL ₂ O ₃ (Total)	:	66%
CaO (max)	:	12%
SiO ₂ (max)	:	9%
Fe ₂ O ₃ +FeO	:	3%
MgO (max)	:	4%
TiO ₂	:	0.8%
SIZE	:	2-40 mm
Melting Temp.	:	1380°C

Packaging : 1MT jumbo bag / 20kg
HDPE bags in Pallet

ADDITION OF Z-Slag CA~AL20:

APPLICATION:(How to use)

- * Once Liquid Steel is ready for tapping and empty ladle is placed add 2kg to 4kg of Z-Slag CA~AL20 per ton of liquid steel in the empty ladle.
- * Take the ladle to LRF for refining process. During which lime and other flux are 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~AL20. This will help reduce all metal oxides 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 CA~AL20:

- * Avoid use of Aluminum Metal.
- * Improves Mn recovery to 70% or more .
as per c% in steel.
- * Reduces Fe(m) and FeO in final discarded furnace Slag
- * Reduce heat loss in ladle.
- * Faster inclusion removal.Clean liquid Steel.
- * Gives better recovery of rolled products and surface finish and
- * Reduce miss rolls.
- * An effective fluid sink that absorbs inclusions from steel. Ladle with gas purging is mandatory to get this benefit. Else add before arcing.
- * Fast and better recovery of steel as well as alloys.
- * **Cost saving is more than the cost of addition.**



SLAG KILL 100

PRODUCT DATA SHEET

DESCRIPTION:

Secondary steel making market in India is highly competitive and being cost effective in manufacturing is the essence for sustainability and growth. Kunal minerals private limited is happy to introduce SLAG KILL 100 a product designed to reduce Manganese consumption by improving Manganese recovery up to 70% or more. SLAG KILL 100 reduces the final Fe(m) and FeO content in the induction 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.

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 but with little modification SLAG KILL 100 is designed keeping in mind acidic lining of secondary steel maker's needs.

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. Synthetic slag practice is normally used to obtain clean steels and for the desulphurization and dephosphorization of the liquid steel but that will not be the case in Acidic lining.

PRODUCT SLAG KILL 100:

AL METAL	:	12- 16%
AL ₂ O ₃ (Total)	:	70%
CaO (max)	:	5%
SiO ₂ (max)	:	8%
Fe ₂ O ₃ +FeO	:	3%
MgO (max)	:	2%
TiO ₂	:	0.8%
SIZE	:	2-40 mm
Melting Temp.	:	1400°C

**Packaging : 1MT jumbo bag / 20kg
HDPE bags in Pallet**

ADDITION OF SLAG KILL 100:

- * After full melting of scrap / sponge iron drain some surface slag.
- * Add SLAG KILL 100 at the rate of 2+1 kg per Ton of molten Steel.
- * Add 20 to 40% SiMn and then add 1 to 2kg slag kill 100
- * Tap the melt in the ladle.
- * Tap the metal in ladle and add rest of the SiMn. For maximum result we can further add 1 to 2kg per ton slag kill 100.
- * Melt is ready for casting.

BENEFITS OF SLAG KILL 100:

- * Avoid use of Aluminum Metal.
- * Improves Mn recovery to 70% or more.
As per C% in Steel.
- * Reduces Fe(m) and FeO in final discarded furnace Slag
- * Reduce heat loss in ladle.
- * Does not affect refractory lining Life.
- * Consistent chemistry of the Steel made.
- * Gives better recovery of rolled products and surface finish.
- * Reduce Miss Rolls.
- * An effective fluid sink that absorbs inclusions from steel.
Ladle with gas purging is mandatory to get this benefit.
- * Fast and better recovery of steel as well as alloys.
- * SLAG KILL 100 works as the catalyst to prevent inclusion, Phosphorus and Sulphur reversal from slag to steel.
- * **Cost saving is more than the cost of addition.**



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 always priced one dollar per Kg lower than Pure Nickel. Also we provide 30 to 40% Iron that is free too. But that's not the only cost benefit, there is no import duty. Ferro Nickel is available in India unlike pure nickel which need to be imported. And if bought from a trader they will also keep their cut. Ferro Nickel will be directly supplied by Us.

Ferro Nickel Vs Pure Nickel

Unlike pure nickel plate Ferro Nickel is a very safe product to store in shop floor. No added care needs to be taken. Ferro Nickel 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

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

Any limitation of using Ferro Nickel

There are no limitationto 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 thebatch 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

Ferro NickelMoly provides great cost saving as some 2 to 3% Moly is free and only need to pay for Ni%and that is at Pure Nickel price. But that's not the only cost benefit, there is no import duty. Ferro Nickel Moly is available in India unlike pure nickel which need to be imported. And if bought from a trader they will also keep their cut. Ferro Nickel Moly will be directly supplied by us.

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 limitation to the use of Ferro Nickel Moly.

Precaution of Using Ferro NickelMoly

The only precaution needed while using Ferro Nickel Moly is to keep a note of the percentage of nickel content in the batch being used and adjust the input weight accordingly. And when adding Ferro Moly to note how much Moly already added as 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 of it been stolen as there is no direct market for it.

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 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

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 pellets 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 LIMITATION OF USING CM

Only precaution is Calcium Moly cannot be added as trimming addition towards the finishing addition. We have to use ferro moly. Calcium Moly has another limitation for use in induction furnace that it requires neutral or basic lining.

PRECAUTION OF USING CM

We advise users to limit Calcium Moly addition in the LRF under 500kg per heat. If by calculation more is needed the same can be added in EAF. As there can be a possibility of uneven result because of coagulation to bigger pieces due to slag coating by tapping metal from EAF in ladle. There is no limit to Calcium Moly addition in EAF, nor is there any loss of moly recovery in EAF.



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	1.5% 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



NICKLE OXIDE (NiO)BB-32

INTRODUCTION:

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	1.5 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	

Application Areas:

- Pigment
- Heat-Resistant Coatings
- Ceramic Coatings
- Conductive Coatings
- Alloy steel industries
- Stainless steel

COBALT OXIDE (CoO.Co₂O₃)GT-90

INTRODUCTION:

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 Nickle Oxide (NiO)		
1	CHEMICAL FORMULA	CoO.Co ₂ O ₃
2	Assay	97%
3	APPEARANCE:	Black Powder
4	CAS No.	1307-96-6
5	Bulk Density	5.85 g/ml
6	Particle Size Mesh	350 mesh Passing
		0.02% max
7	Cobalt	70% Min.
8	Iron	0.3% Max
9	Safety and storage conditions	Store under clean, dry conditions
10	Water Soluble	Nil

Application Areas:

- Ceramic Industry
- Pigment Industry
- Catalysts
- Battery Industry
- Safety Considerations
- Quality Control
- Alloy steel industries
- High Speed steel



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LEADING RECYCLERS OF SPENT CATALYSTS IN INDIA SINCE 1995



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 WO3		
1	CHEMICAL FORMULA:	WO3
2	Assay	96%
3	APPEARANCE:	Green
4	CAS No.:	3931818-8
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 V2O5		
1	Chemical Formula	V2O5
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

Applications of Vanadium Pentoxide (V2O5):

- Catalyst:
- Ceramics and Glass:
- Rechargeable Batteries:
- Pigments:
- Optical Coatings:
- Alloy steel industries

REFRACAST METALLURGICALS PVT.LTD.

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