

CONSUMABLES FOR RAIL WHEEL FACTORY, BANGALORE, INDIA.

The following consumables used in Rail Wheel Factory are essentially needed to be multi-sourced. The particulars given hereunder is indicative and are meant to help suppliers for developing and supplying the same to RWF. Potential suppliers may make use of the literature. Exhaustive details and specifications / drawings of the items can be accessed from RWF on request.

Sl. No.: 1

Consumable Name: Asbestos Gasket

Application/ Job requirement: Asbestos Gasket is used as a sealant between drag and pouring tube in casting of railway cast steel wheel to prevent bleeding of liquid steel. One asbestos gasket is used for casting each wheel.

Estimated Annual Requirement: 332486 Nos

Specification/ Drawing No: RWF/M/SPECN-1/001/1987

Sl. No.: 2

Consumable Name: Ingate Sleeves

Application/ Job requirement: Clay Graphite Tapered Ingate Sleeve of the Type B or D is as given in Drawing No. RWF/SK/MW-393, RWF/SK/MW-394 or WAP/SK/MW-282 latest alteration. The Clay Graphite Tapered Ingate Sleeve shall be fired/baked in controlled reducing atmosphere. The kilns shall have control mechanism to achieve uniform heating at a controlled rate as established by the manufacturer's firing schedule. The Clay Graphite Tapered Ingate Sleeves have to be encased in a suitable medium like graphite, calcined petroleum coke or similar during firing so as to avoid oxidation.

During the mould assembly for casting steel railway wheels, the Clay Graphite Tapered Ingate Sleeve is required to be fixed in the graphite drag against the taper at a pressure of 52-56 kg/cm² and ingate sleeve is retained in position using ingate-retaining ring. It is functioning as ingate track for molten metal generally in the range of 1610 – 1500°C. The ingate shall have adequate thermal shock resistance and should resist the reaction with steel flowing through it at temperature range 1500 – 1610°C. It must be machinable and strong enough to withstand the pressure of stopper during plunge down (shut off) upto 45 psi (3.16 kg/cm²). As the mould is reused, after each casting the ingate is reamed using grinding stone for proper seating of the clay graphite stopper in the stopper seat.

Estimated Annual Requirement: 4779 Nos

Specification/ Drawing No: RWF/M/SPECN-1/123/2014

Sl. No.: 3

Consumable Name: *Ceramic Pouring Tube*

Application/ Job requirement: The pouring tube is assembled with pressure Pouring Tank cover. The molten metal rises through the pouring Tube into the mould by means of controlled pressure (35psi max.) pouring technique.

Estimated Annual Requirement: 3948 Nos

Specification/ Drawing No: RWF/M/SPECN-1/012/1987

Sl. No.: 4

Consumable Name: *Pouring Tube Glaze*

Application/ Job requirement: The pouring tube glaze is used as a coating applied to the ceramic pouring tube by dipping the tube in it to fill the pores of the tube and make the tube air tight.

Estimated Annual Requirement: 4364 Ltrs

Specification/ Drawing No: RWF/M/SPECN-1/010/1987

Sl. No.: 5

Consumable Name: *Clay Graphite Stopper*

Application/ Job requirement: The Clay Graphite Stopper, made of clay graphite, is used to prevent the back flow of molten metal after pouring the metal into the mould. It is fixed at the machined end of the Stopper Pipe, suiting exactly to the Stopper bore dimension so that there is no gap in between the stopper and stopper pipe, fitting snugly and rigidly to one another after assembling. The tolerances of the Stopper bore is to be adjusted so that the stopper pipe properly fits inside the stopper bore.

The stopper with pipe assembly is set with cope on the required height and used for the manufacture of cast steel wheels. Molten metal rises through the gap available between the stopper and mould box by means of pressure pouring technique. Once the metal rises to the required height of risers the Clay Graphite Stopper is pressed down for closing the molten metal incoming port by Pneumatic cylinders.

Estimated Annual Requirement: 216116 Nos

Specification/ Drawing No: RWF/M/SPECN-1/019/1988

Sl. No.: 6

Consumable Name : *Stopper Pipe*

Application/ Job requirement: It is fixed to the Clay graphite stopper, suiting exactly to the Stopper bore dimension so that there is no gap in between the stopper and stopper pipe, fitting snugly and rigidly to one another after assembling.

The stopper with pipe assembly is set with cope on the required height and used for the manufacture of cast steel wheels. Molten metal rises through the gap available between the stopper and mould box by means of pressure pouring technique. Once the metal rises to the required height of risers the Stopper pipe

along with stopper is pressed down for closing the molten metal incoming port by pneumatic cylinders.

Estimated Annual Requirement: 211960 Nos

Specification/ Drawing No: C/MO-16/12, C/MO –16/58, C/MO – 16/59, C/MO-16/66

Sl. No.: 7

Consumable Name: Dome Disc

Application/ Job requirement: Dome Disc is used in the Stopper Setting Unit, the stopper with pipe is set along with Dome Disc. (i) to maintain required height of blind riser above the wheel hub, (ii) to maintain alignment of stopper Pipe.

The Dome Disc shall come in contact with molten metal at 1600°C.

Estimated Annual Requirement:3000 Nos

Specification/ Drawing No: RWF/M/SPECN-1/033/1994

Sl. No.: 8

Consumable Name: Phenol Formaldehyde Resin

Application/ Job requirement: The Phenol Formaldehyde Resin is required to prepare Resin Coated Sand of suitable quality by hot coating method to be used for shell baking in graphite moulds during the manufacture of cast steel wheels. Sand shell is formed with graphite mould at the temperature of 234 - 285°C and shell baking pad at the temperature of 300 - 380°C and curing time of 40 seconds; this should give sand shell of uniform thickness of 10 - 12 mm & pad 12 - 16 mm..

Estimated Annual Requirement: 1435982 kg

Specification/ Drawing No: RWF/M/SPECN-1/0031994

Sl. No.: 9

Consumable Name : Silica Sand 45 AFS

Application/ Job requirement: The 45 AFS silica sand shall be of naturally occurring mined silica sand having shape of round to predominantly sub-angular, washed, dried and containing the least clay content. The supplier shall take extreme care to meet the technical requirement specified in Clauses 4.0 & 5.0. The supplier shall have adequate facility including source/mine licence and legal & regulatory requirements issued by competent authority and documentary evidence shall be submitted to RWF along with the offer. The supplier shall have the machinery and plant to process and achieve the specified quality of the sand.

Estimated Annual Requirement: 8624 MT

Specification/ Drawing No: RWF/M/SPECN-1/008/1987

Sl. No.: 10

Consumable Name : Silica Sand for Mould Cleaning (100 AFS)

Application/ Job requirement: The Mould Cleaning sand shall be of naturally occurring mined silica sand having shape of round to predominantly sub-angular, washed, dried and containing the least clay content While sieving the total retention on 100, 140 and 200 US Sieves be approximately in the ratio of 30:50:20 so as to ensure as AFS value of around 100.. Mould Cleaning Sand should conform to IS 1987: 2002. The sand should be dried. It should be from Natural source i.e., from riverbed, desert or sea. Crushed quartz is not suitable.

Estimated Annual Requirement: 114292 kg

Specification/ Drawing No: RWF/M/SPECN-1/020/1988

Sl. No.: 11

Consumable Name: Calcined Lime

Application/ Job requirement: Calcined (Burnt) Lime obtained by calcination of low silica and low sulphur lime-stones conforming to flux Grade-I lime-stones, used in steel plants to IS 10345:1992. The fuel used during calcination in kilns shall be such that sulphur content is not increased during calcination.

This Calcined Lime is used as flux for making slag in the steel making process through Electric Arc Furnace melting practice.

Estimated Annual Requirement: 9523 MT

Specification/ Drawing No: RWF/M/SPECN-1/047/1987

Sl. No.: 12

Consumable Name: Ferro Silicon

Application/ Job requirement: Ferro Silicon is used as a ladle addition to the liquid Steel tapped from the Electric Arc Furnace. Final chemistry with respect to Silicon is achieved suitably for casting of Railway steel wheels.

Estimated Annual Requirement: 1435982 kg

Specification/ Drawing No: RWF/M/SPECN-1/004/1987

Sl. No.: 13

Consumable Name: Silico Manganese

Application/ Job requirement: Silico Manganese is used as a ladle addition to the liquid steel manufactured in Electric Arc Furnace steel making practice. Final chemistry with respect to Manganese and partly Silicon is achieved suitably for casting of Railway steel wheels. Non-metallic/slag/sand inclusions in the Silico Manganese results in the formation of slag and therefore, wheels thus cast will tend to have non-metallic inclusions causing rejection or rework. RWF has no facilities for secondary refining or vacuum degassing or Argon purging in the ladle.

Estimated Annual Requirement: 453468 kg

Specification/ Drawing No: RWF/M/SPECN-1/024/1988

Sl. No.: 14

Consumable Name: Ferro Manganese

Application/ Job requirement: Ferro Manganese is used as furnace addition in the making of steel from Electric Arc Furnaces for casting of Railway steel wheels.

The material shall be reasonably free from non- metallic/slag/sand inclusions. RWF has no facilities for secondary refining or vacuum degassing or Argon purging in the ladle.

Estimated Annual Requirement: 675667 kg

Specification/ Drawing No: RWF/M/SPECN-1/027/1988

Sl. No.: 15

Consumable Name : Graphite Powder/ Granule

Application/ Job requirement: Graphite Powder/Granules is used in the Electric Arc Furnace at RWF, steel scrap is melted for casting of railway wheels. During the course of melting, Graphite Granules are added to maintain the carbon content in the steel.

Estimated Annual Requirement: 1149 MT

Specification/ Drawing No: RWF/M/SPECN-1/043/1993 (for graphite powder)
RWF/M/SPECN-1/100/2007 (for graphite granules)

Sl. No.: 16

Consumable Name: Magnaglo Powder

Application/ Job requirement: Magnaglo powder is a dry, free flowing, speckled brown and white magnetic powder which fluoresces bright yellow-green under black light (wave length of 365 nanometres). Magnaglo powder is intended for use in high sensitivity wet method magnetic particle inspection using water as suspension vehicle. It is used to locate fine surface and sub-surface discontinuities such as cracks, inclusions, seams, shrinkage porosity, tears, laps flakes etc., in cast steel wheels for Rail road application.

Estimated Annual Requirement: 1220 kg

Specification/ Drawing No: WAP/M/SPECN-1/011/1987

Sl. No.: 17

Consumable Name: Copper Coated Graphite Electrode (25.4 mm dia.)

Application/ Job requirement: Copper Coated Graphite Electrodes is used to remove the Riser stubs from the Cast Steel Wheel in such a manner that Stubs do not protrude excessively, and the wheel is not gouged.

Estimated Annual Requirement: 676 MT

Specification/ Drawing No: RWF/M/SPECN-1/036/1990

Sl. No.: 18

Consumable Name: Dry Ramming Mass

Application/ Job requirement: Magnesite Dry Ramming Mass (DRM) is used in High Powered Electric Arc furnaces of 20 MT capacity each for building working hearth. The hearth should withstand all working conditions like temperatures up to 1750°C, thermal and mechanical shocks, while top loading of heavy steel scraps like railway wheels, foundry returns etc. Steel produced in EAF is generally medium carbon steel, with a melting period of 60 minutes and a refining period of 60 minutes.

The product should be such that the material after first heat, sinters to a sufficient thickness to withstand shock loads, thermal and chemical attacks, and then progressively sinters to the full depth during subsequent heats.

Estimated Annual Requirement: 1160878 kg

Specification/ Drawing No: RWF/M/SPECN-1/037/1990

Sl. No.: 19

Consumable Name: Gunning Mass

Application/ Job requirement: Gunning Mass used as a monolithic hard base on heating in the hearth portion of the direct arc furnace. The progressively sintering hearth formed shall offer resistance to slag attack, mechanical shock loads and shall not soften at temperatures below 1750°C.

Estimated Annual Requirement: 154 MT

Specification/ Drawing No: RWF/M/SPECN-1/025/1988

Sl. No.: 20

Consumable Name : Air Setting Mortar (Super 3000)

Application/ Job requirement: The air setting mortar is used to assemble ceramic pouring tube in the holding casting. After final setting, the pouring tube is dipped in a glazing tank containing glaze material. It is subsequently heated to 990°C at the rate of around 110°C rise in temperature per hour. The mortar doesn't come in contact with molten metal.

Estimated Annual Requirement: 33249 kg

Specification/ Drawing No: RWF/M/SPECN-1/031/1989

Sl. No.: 21

Consumable Name: Aluminised Rayon Suit

Application/ Job requirement: Aluminised Rayon Suit is used for personal protection of the operator during wheel manufacturing process. The Aluminium Rayon suit shall be made out of aluminised PFR Rayon as per the drawing No. RWF/MISC/ M-821 alt. b and it shall be comfortable to wear and user friendly.

Estimated Annual Requirement: 200 Nos

Specification/ Drawing No: RWF/M/SPECN-1/112/2009

Sl. No.: 22

Consumable Name: *Leather Outer Shroud Sprue Wash Helmet*

Application/ Job requirement: Leather Outer Sprue Wash Helmet is used as protection for operator from the heat generated while Arc Air Gouging of Sprues on cast steel wheels at temperature of 800°F to 1000°F.

Estimated Annual Requirement: 55 Nos

Specification/ Drawing No: RWF/M/SPECN-1/028/1998

Sl. No.: 23

Consumable Name: *Grinding Wheel for Portable High Cycle Straight Grinder
(Spindle Dia = 20 mm)*

Application/ Job requirement: The Grinding Wheels are used in portable high cycle straight grinders for the fast removal of riser stubs of approximately 75 mm dia. and 6 mm height and slight sub surface wheels. No coolant is used while grinding.

Estimated Annual Requirement: 8520 Nos

Specification/ Drawing No: RWF/M/SPECN-1/043/1992

Sl. No.: 24

Consumable Name: *Carboxy Methyl Cellulose (CMC)*

Application/ Job requirement: Carboxy Methyl Cellulose (CMC) Type -7 High (a Cellulose Gum) is a film former, thickener, suspending agent, stabilizer and binder. Its chief use is for its adhesive qualities. CMC is a well known suspending and bonding agent, which thickens, and increase the viscosity of the slurry. Type - 7 refer to 7 Carboxymethyl molecular groups for every ten (10) Cellulose Groups. This degree of substitution (7 for 10, or 0.7) lies in group type of 0.65 – 0.90. H refers to High range of viscosity 1500 – 3000 Centipoises

Estimated Annual Requirement: 208 kg

Specification/ Drawing No: RWF/M/SPECN-1/035/1989

Sl. No.: 25

Consumable Name : *Veegum Granules*

Application/ Job requirement: Veegum (Granules) is used for the preparation of spray for graphite moulds. It should serve as an emulsion stabilizer, suspending agent, film former, binder and organic gum modifier, when added with other additives to prepare mould spray. It should improve the suspension of inert materials such as Silica Flour, clay etc.

Estimated Annual Requirement: 2078 kg

Specification/ Drawing No: RWF/M/SPECN-1/018/1988

Sl. No.: 26

Consumable Name: Steel Shots

Application/ Job requirement: The steel shots are used for cleaning and peening of the Cast steel wheels of hardness of 255 to 363 BHN with the following composition range.

Carbon	: 0.47 to 0.77%	Nickel	:0.25% max
Manganese	:0.60 to 0.90%	Chromium	:0.25% max
Silicon	:0.30 to 1.00%	Molybdenum	:0.15% max
Sulphur	:0.03% max	Vanadium	:0.10 to 0.20%
Phosphorus	:0.03% max		

The steel shots should conform to IS 4606, Grade S.S. 1700

Estimated Annual Requirement: 270 MT

Specification/ Drawing No: IS 4606

Sl. No.: 27

Consumable Name: Steel Blooms for forging Diesel/Electric loco and EMU Driving axles as per IRS R 43

Application/ Job requirement: The steel blooms shall be manufactured from steel made by basic electric arc furnace or any other process recommended as equivalent and approved by the purchasing railways. The steel must be degassed under vacuum. It must be killed and bottom cast.

Hydrogen content in the liquid steel determined by standard analysis method on LECO hydrogen analyser or similar precision equipment shall not exceed 2 ppm.

Nitrogen content of the steel determined by the standard analysis method on LECO nitrogen analyser or any other established instrumental method shall not exceed 0.007% (70 ppm).

Estimated Annual Requirement: 6350 MT

Specification/ Drawing No: RWF/M/SPECN-1/006/1991

Sl. No.: 28

Consumable Name: Steel Blooms for forging axles of carriages, wagons and EMU trailer coaches as per IRS R 16

Application/ Job requirement: The steel blooms shall be manufactured from steel made by basic electric arc furnace or any other process recommended as equivalent and approved by the purchasing railways. The steel must be degassed under vacuum. It must be killed and bottom cast.

Hydrogen content in the liquid steel determined by standard analysis method on LECO hydrogen analyser or similar precision equipment shall not exceed 3 ppm.

Nitrogen content of the steel determined by the standard analysis method on LECO nitrogen analyser or any other established instrumental method shall not exceed 0.007% (70 ppm).

Estimated Annual Requirement: 18708 MT
Specification/ Drawing No: RWF/M/SPECN-1/064/1991

Sl. No.: 29

Consumable Name : Graphite Mould Blanks

TYPE A: 1105 Dia x 584 Height -PL No.81980851
TYPE B: 1232 Dia x 584 Height -PL No.81980802
TYPE C: 1334 Dia x 584 Height -PL No.86967848

Application/ Job requirement: The Graphite Blanks shall be used as permanent graphite moulds (Cope and Drag), after machining, for manufacture of Cast steel wheels by the pressure pouring method, i.e., forcing up molten metal into mould cavity through the in-gate made up of clay graphite. The temperature of molten metal is in the range of 1600-1620°C. Moulds are pre heated to 350°C before using and the surface is protected using fused silica spray coating. Cast moulds are recycled after cleaning the surface by sand blasting using fine sand. The graphite Mould shall withstand the operating condition and shall have good wear/ erosion and oxidation resistance under the operating condition.

Estimated Annual Requirement: Type A: 282 Nos, Type B: xxxxx, Type C: xxxxx
Specification/ Drawing No: RWF/M/SPECN-1/016/1987

Sl. No.: 30

Consumable Name: Forging Hammer

Application/ Job requirement: The forging hammers are used for forging different steel axles and armature shaft for railway use.

Forging Hammers are made from DIN 56NiCrMoV7 steel quenched and tempered to 34 HRC.

The reclamation process is described in the RWF specification for reclamation. Entire process followed for reclamation must be documented and be made available to inspecting officials.

Estimated Annual Requirement: 5 Sets

Specification/ Drawing No: WAPM- SPECN-1/074/1999, RWF/SK/MA-341

Attention, Potential Suppliers/ Manufacturers!!!

Prospective manufacturers/ suppliers for the consumables listed are encouraged for developing themselves as reliable sources to RWF for supplying premium quality consumables and get registered themselves as vendors to RWF.

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