ALL INDIA INDUCTION FURNACES ASSOCIATION

AIIFA

INDUCTION FURNACE NEWSLETTER

Vol. No. XVIII
Issue No. 2
Feb. 2018

What's Inside

1. Union budget
2. Meeting of Centre of Excellence in Steel Technology
3. Production of Popular Hot Work Tool Steel
4. Cabinet approves proposal for Amendment
5. News
6. Classified

हमारे सभी सदस्यों को महाशिवरात्रि की हार्दिक शुभकामनाएँ

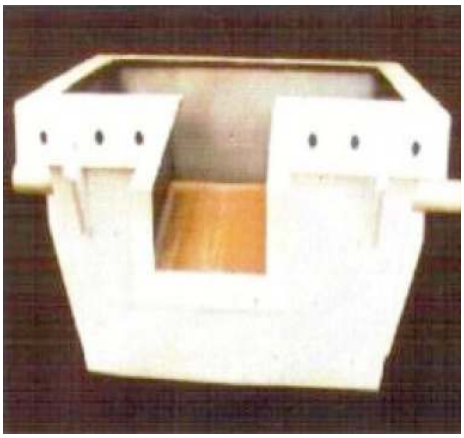
AIIFA SECRETARIAT:
504, Pearls Omaxe, Tower-1, Netaji Subhash Place, Pitampura,
Delhi-110034 INDIA
Tel: 011-2735 1346/1347
Mobile : 9810410186
Email: aaiifa6@gmail.com
Website: www.aiifa.org
Facebook A/c:
aiifa1987 or 9810410186
twitter A/c :
aiifa1987@gmail.com

DUTTASON ENGINEERS

CONSULTING ENGINEERS & STEEL FABRICATORS

G.T. ROAD, DHANDARI KHURD, LUDHIANA - 141 010 (INDIA)
Ph.: (0) 0161-2510714, 2510715 Fax. : 91-161-2510716
E-mail : duttason_ers@hotmail.com, duttason@outlook.com
Website : www.duttason.com Mobile + 91 9814023608

Ladle
5ton - 60 ton



Tundish for Continuous Castel

Geared Ladle
300 Kg - 5000 Kg

Charging Bucket

Ladle Preheater

Vaccume Degassing Vessel

Leading Manufacturer and Exporter of Ladles for Steel Plants & Foundries (Lip Pouring & Bottom Pouring), Tundish for Continuous Casters, Ladle Pre-Heaters (Vertical & Horizontal) Scrap Charging Buckets (Multi Leaves & Clam-Shell Type), Water Cooled Panels (Tubular & Plate Type) Water Cooled Roof for L.R. Furnaces, Fume Extraction Systems, Fabricated Sheet Metal Components, Machinery Parts, All types of Fabrications in Mild Steel, Stainless Steel & Aluminum.

UNION BUDGET 2018

Ahead of the Union Budget, the **All India Induction Furnace Association (AIIFA)** has requested the government to remove the import duty on steel melting scrap which is the key raw materials for the induction furnace industry. In India, 52 **MT** of steel produced through electric route (**DRI-EAF& Scrap/DRI-EIF).** Out of **52MT**, about **24 million** tonnes was supported by **sponge iron** as feed material. This leaves about **28 million tonnes** of steel to be served by way of **steel scrap**. At **1.1 tonnes** of scrap per tonne of crude steel, one may expect that to produce **28 million** tonnes of steel, one would need 30.8 million tonnes of scrap. India imports about close to 7 million tonnes of scrap which would leave us with a need to internally generate over 23 million tonnes of steel scrap annually.

Kamal Aggarwal, Hon. Secretary General, AIIFA said "As, the availability of domestic scrap is very scarce because of low per capita consumption of steel and has to be imported and hence customs duty on import of steel melting scrap may be reduced to NIL from current duty of 2.5%." This would help in reducing the cost of producing the end product and would help to increase the profitability of this segment, which would, in turn, benefit the industry as well as the economy as a whole.

Added to this, he also said that, this budget, also disappointed the middle-class by not announcing any changes in the income tax slab while choosing to dedicate the fiscal space to farmers, poor, rural population and small businesses. As the government breached the fiscal deficit target of 3.2% of the GDP, and revised it to 3.5% of the GDP in the fiscal year 2017-18, budget is mainly focus on few select areas, with an aim of keeping the fiscal deficit target under 3.3% in the fiscal year 2018-19.

He further said that, **"Moving from blackboards to digital boards"- t**his could be the only solution to (a) increase outreach particularly to rural areas overcoming constraints on teacher availability etc. and (b) standardize teaching content and ensure consistent quality. However, the success would depend on effective implementation and leveraging the Technologies and skill sets already existing in the public sector.

It is encouraging to note the focus on new generation technologies like robotics, artificial intelligence, analytics etc. as far as skill building initiatives go. It remains to be seen how partners from the private sector eco-system with knowledge & expertise in these areas get involved in this initiative.

Investments in rural wi-fi infrastructure will be a good complement to the Bharat Net initiative which provides connectivity till the Gram Panchayat level – this should facilitate online public services delivery in rural areas.

As expected, the Budget has announced upcoming regulation for governing **crypto-currencies** and usage of Block chain based technologies for land registration and other public services. The Finance Minister has again confirmed that the Government does not recognise crypto currency and will take all steps to stop usage and circulation of such crypto currency.

This clearly indicates that the Government will now either come out with a legislative mechanism or make suitable amendment in existing legislation to ensure that dealing and trading in crypto currency is made illegal and to penalise entities and individuals who are involved in trading and circulation of crypto currency. We will have to wait and watch as to what will be final framework of such legislation, if introduced.

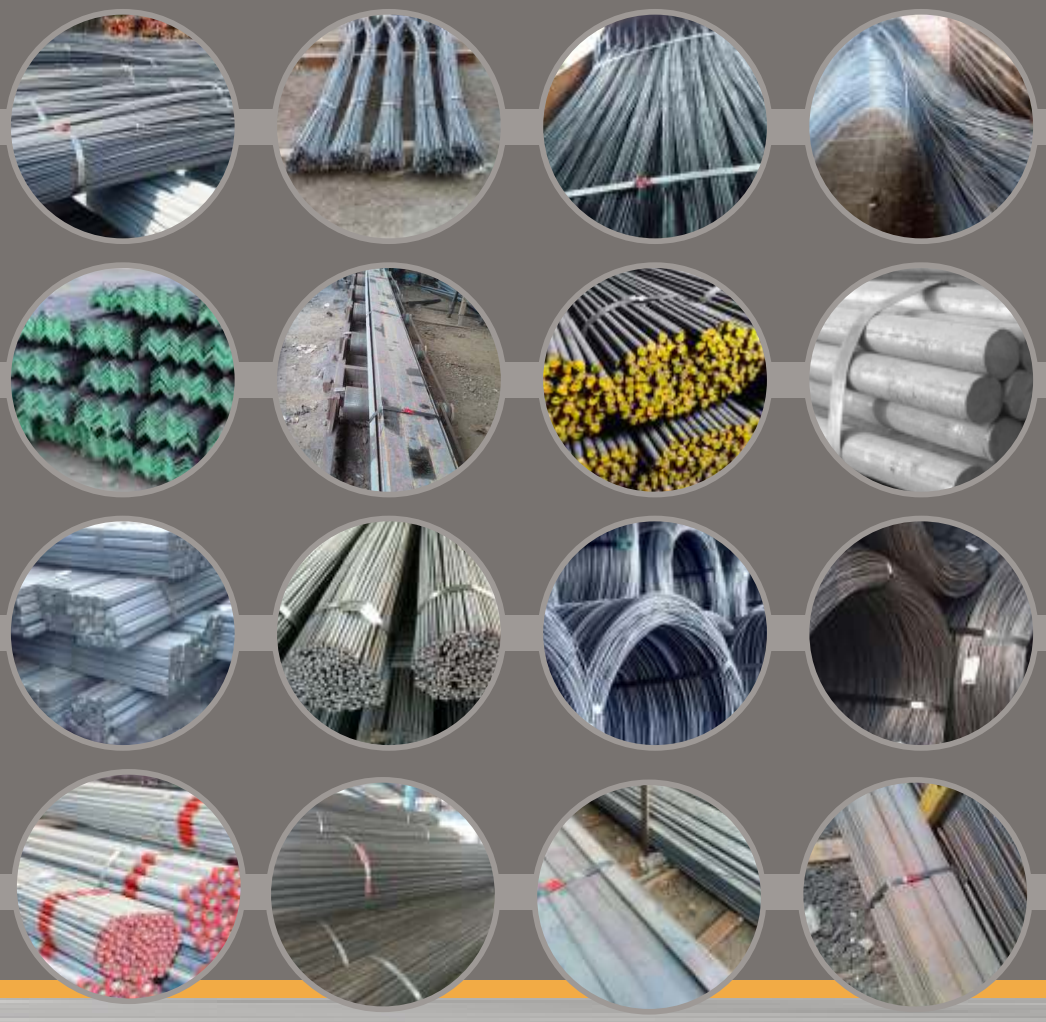
The National Health Protection Scheme announced by the government will be the world's largest health insurance support covering ~50 crore people i.e. 40% of the Indian population. By providing Rs 5 lakh per year to poor families for secondary and tertiary care related hospitalization needs, the government has indeed taken concrete steps in reducing India's health burden.

Current focus on developing ground infrastructure and emphasizing education, agriculture, fisheries and allied areas seems to be in the right direction. ……..

PACWEL®

STRAP BINDING SYSTEMS

FAVOURITE TOOLS INTERNATIONAL ARE THE PIONEERS & LEADERS IN PROVIDING STRAP BINDING SYSTEMS TO STEEL ROLLING MILLS FOR BUNDLING TMT BARS, ANGLES, CHANNELS, ROUNDS, FLATS, WIRE RODS, BILLETS, TUBES, ROLLED BARS, SECTIONS & ALLIED PRODUCTS. STRAP BINDED STEEL LOOKS IMPRESSIVE, PREVENTS THEFT, SAVES SPACE AND HAS MANY OTHER ADVANTAGES.



FAVOURITE TOOLS INTERNATIONAL

REGD OFFICE :67 B NETAJI SUBHAS RD SUITE NO - 23,
KOLKATA -700001, WEST BENGAL INDIA
Phone : +91-33-22426706, 40245423
Fax : +91-33-22433930
Mobile : +91 98310 61852
Email : favouritetools@hotmail.com
Website: www.strapbinding.com

www.premiumtmt.com

PREMIUM®

High-Strength Reinforcement Steel

Fe-500 D

PREMIUM FERRO ALLOYS LIMITED

Admn Office : 54/819-2, 3rd Floor, KK Road, Kochi - 682 017
Ph: 91- 484 - 4015453 / 4014453 Email: premiumferro@vsnl.com

FACTORY: VI/ 565 F, Industrial Development Area, Edayar, Binanipuram
Alwaye - 683 502 Ph: 91-484 - 2543307 / 2556601/ 2542028

Customer Care: 97449 76699

IS 1786 CM/L-6619176

IS 2831 CM/L-6942385

ISO9001:2008

ENVIRONMENT FRIENDLY STEEL

infocus/chn

Meeting of Centre of Excellence in Steel Technology

As you are aware, recently a half day meet on "Centre of excellence in Steel Technology" which was held on 5th January 2018 at Indian Institute of Technology, Mumbai. Mr S.K Bhatnagar, Dy. Industrial Adviser from Ministry of Steel, Govt. of India, was present in the meeting along with the senior Faculty members of IIT Bombay, senior representatives of Sail, Tata Steel and JSW Steel Ltd., AIIFA

Primarily the discussions were centered to the Technology up gradation of Main Steel Producers. Perhaps this is the first time Induction Furnace Industry were present in this Forum. Except for Mr Bhatnagar all the participants were ignorant of our Steel Industry and AIIFA.

On behalf of AIIFA, Mr. Jitendra Singh, Patron had made a presentation which appeared to be serious to work for the benefit of our Industry. The brief of his presentation is given below:

"It was my pleasure to be invited by Ministry of Steel, Government of India, to attend the Meeting at Director Conference Room of IIT Bombay on 5 January 2018. I thank everyone present in the meeting for giving me an opportunity to place the short comings being presently faced by small Electric Induction Steel Producers in India.

As this was my first attendance in CoEST meeting, I heard the deliberations and the contribution towards improvement of Technology mainly for the Oxygen route Steel Producers.

Sir, I as Past President on behalf of All India Induction Furnace Association, AIIFA, represent small Electric Steel Manufacturers. Steel Scrap and Sintered Iron Ore as Sponge Iron are the main Input Raw Materials along with Electrical Energy. This technology of Steel Making is totally indigenous. Indian entrepreneurs have taken this unique Steel Making technology to many parts of developing countries overseas. Our members in India collectively produce 42% approx. of the total Steel produced in India. We are about 1500 small Units dispersed all over the country. The end products are mainly construction grade Steel, low alloy Steel and Castings.

With the phenomenal growth in the last three decades, it is this industry that needs your immediate attention and contribution in upgrading the present practice of Melting and Refining Technology presently being practiced by almost all the Steel Producers of our Industry. IIT Bombay can study the related problems of our Industry and commercially market technical solutions as a package with certification of process developed by this Institute.

There is a great potential to further increase the Capacity of Steel Making by Electric Induction Melting Furnaces in our Country and reach the coveted desired 200 Million Tonnes by 2022. Your Institute if a Temple of Highly Qualified Faculty and Research Scholars who can assist our Industry to increase the Steel Production economically. Your contribution can be in the areas of improving the existing melting practice, better efficiency of Ferro Alloys additions, increase the furnace refractory lining and lastly to reduce the Power consumption.

Another major area of research required is to study the required Specifications of the Continuous Billet Casting Technology for optimum economical operation. This machine has an application of five or more Engineering Streams namely, Metallurgy, Mechanical, Structural, Fluid Mechanics, Electronics and Electrical.

On behalf of AIIFA, I can assure to assist your research team in providing input Data, study present melting practice and the technical problems being faced by small Steel Producers.

Thanks with Best Wishes,

Production of Popular Hot Work Tool Steel Thru' IF. Route by

Indian Mini Steel Plants

S.Chakraborty
A.**Niyogi**

Abstract

Tool products produced from various hot work tool steels with stringent property requirements, are used for cutting, forming, shaping materials as parts or components of definite shape in automobile, engineering, manufacturing, construction and shaping operations in different industries. The most important properties are their strength, hardness and wear resistance at higher working temperatures as well as resistance to rapid, cyclic changes in temperature. The above properties are archived by the chemical composition of steel, standard process in melt shop, hot working stages and heat treatment conditions.

INTRODUCTION:

Tools, dies, and molds are the most essential items for production in the automobile, engineering, manufacturing and many other industries. Products made from tool steels are used to cut and form metals and other materials for shaping, stamping and forging operations. Tool and die manufacturing companies, the typically small businesses houses under MSME/SMEs, are staffed by skilled craft workers who produce quality and innovative products for light, medium and heavy industries procuring good quality tool steel products from mini steel plants.

Hot work tool steel family with exceptional thermal difusivity, toughness both fracture toughness and notch sensitivity resilience and hardenability, mechanical resistance and yield strength both at room and high temperature are the major criteria for application in the industry. Hot work tool steels can be used for producing hot-work steel objects, such as tools suitable for the working of materials, in particular in die casting, in extrusion or in drop forging tools, die-casting dies, punches or the like, which must have special mechanical strength properties at high working temperatures. Further application area for hot-work steels are tools for the injection molding of plastics.

MARKET SCENARIO & DEMAND PROJECTION:

The increasing demands of advanced production technologies and economic pressures in engineering and manufacturing industries forced mini steel plants to constantly improve the quality of high performance alloy tool steel for making punches, dies or cutting tools requiring specific properties such as high strength and hardness combined with toughness. International research analysts Technavio research has predicted growth of Indian machine tool market steadily at a CAGR of 6% and likely to continue in same fashion or even at improved rate in future. This increase in growth is mainly attributed to the rising demand for fabrication of metals from the construction, automobile and machinery industries including ammunition, small arms, buildings products, springs, cutlery and utensils, stamped metal products, fasteners, tanks and cranes, and hardware etc

SUB-GROUPS OF HOT WORK TOOL STEELS (PREFIX H) AND THEIR CHARACTERISTICS) SHOWN BELOW:

High levels of hot strength, ductility, toughness, thermal conductivity, creep strength, temper resistance and also low thermal expansion maintaining all such properties at high temperatures are the important properties of HW tool steels which have, also, an increased temper resistance achieving an appropriate strength even after tempering at 550-650°C. The strong carbide forming elements Cr,Mo,W,V and precipitates as fine alloy carbides retard softening increasing hardness when subjected to high temperatures.

A. Sub –groups (AISI specn.) divided as –

1. H10 - H19 Chromium types,
2. H20 - H39 Tungsten types,
3. H40 - H59, Molybdenum types .

Among all hot working tool steel grades, the common and most popular grades produced in substantial quantities by mini steel plants through induction furnace route are H11,H12,H13, nominal composition and equivalent standards are mentioned below :

Grades	Nominal Composition of Major Elements					Equivalent Standard		
	C	Mo	Cr	V	W	British(BS)	Germany(DIN)	Japan(JIS)
HW11	0.35	1.5	5	0.4	-	BH11	X37CrMoV5-1	SKD6
HW12	0.35	1.5	5	0.4	1.5	BH12	X35CrWMoV5	SKD62
HW13	0.35	1.5	5	1.0	-	BH13	X40CrMoV5	SKD61

Molybdenum hot-work steels (types H42 and H43) are almost similar to tungsten hot-work steel having identical characteristics and uses, but have their principal advantage in their lower initial cost. The tool steels, especially molybdenum and the low carbon content, make the steel more resistant to heat checking. High mechanical strength at high temperature and toughness are fundamentals for hot-work steels. Of course, fine, small in length, net work of cracks known as heat checking is observed on surface after tooling operations made from HW steel due to thermal fatigue caused from repeated temperature fluctuations (heating and cooling) during tool operation. Such heat checking and lack of toughness may lead to tool failure. (Heat Treating of Hot-Work Tool Steels. - Source: ASM International, vol-4)

The wide area applications of hot-work steel find use in a variety of fields particularly for the non-cutting form of work pieces made of ferrous and non-ferrous metals as well as their alloys at high temperatures like pressure die casting, extrusion and drop forging as well as in tube and glass product manufacturing. During processing, hot-work tool steel is generally exposed to high temperatures exceeding 200 °C. Good quality hot-work tool steel products ensure a high degree of operating efficiency and productivity during manufacturing for thermal shock resistance, high tempering resistance, high-temperature strength, high temperature toughness, and wear resistance.

B. Characteristics

1. Possess operating temperature between 450 -650?C
2. Good working in the annealed condition and in some cases in quenched and tempered condition.
3. Good dimensional stability.
4. High resistance to hot wear.
5. Good resistance to temperature changes and heat fatigue/stress.
6. Good mechanical strength and toughness at high temperature.
7. High level of hardness (reachable in many cases with high carbon content).

CUSTOMERS' CHOICE FOR SELECTION OF TOOL STEEL GRADE :

Different countries like US, UK, Germany, Russia, Sweden, Japan and others classify tool steels in different ways but all standards are related as per composition and properties. Indian mini steel plants, commonly, produce tool steel grades in specifications as SAE/AISI, En/BS. Before tool steel procurement, users or customers demand chemical composition and quality of products, physical & mechanical properties.

Few customers insist for heat treatment conditions and parameters followed as the phase transformations in the products which are controlled by diffusion with a given chemical composition and heat treatment parameters in tempering treatment just after hardening. (Ref: G.L.Huyett – Engineering Hand Book, D. Jarvis, Metallurgy of Tool Steels).

STEEL MAKING & PROCESSING:

Melting: The manufacture of tool steels takes place under carefully controlled conditions to produce the required quality. Tool steel has a carbon content of between 0.5% and 1.5%. The manufacturing process introduces alloying elements that form carbides, commonly tungsten, chromium, vanadium and molybdenum. The most important manufacturing processes for tool steel are as follows:
Primary Melting - Tool steel is, often, made by melting of around 75% scrap – a mixture of mill scrap and purchased scrap/ sponge iron or scrap substitutes. It's very important to avoid contamination of the scrap.

The majority of tool steel production in India is done through Induction Furnace (IF) melting established as cheapest route. There are two stages in steel making:

1. The scrap is melted rapidly in the furnace.
2. The hot metal is transferred to a separate ladle or converter vessel to be refined. This process is known as secondary refining, and it allows for great efficiency and the processing of large volumes.

The refined liquid steel is then transferred into the pit-side commonly termed as casting station and poured into ingots. The resulting ingots are usually annealed (heated and cooled slowly) to prevent cracking caused from thermal stress.

Steel making by induction furnace has started in large scale from late 60s and early 70s by micro, small and medium enterprises (MSME) who are involved in steel melting, rolling, forging and casting activities in the country contributing over 65% of the country's finished rolled steel products and about 10% tonnage of total steel produced in the category of alloy steel forgings and bar products. Induction furnace melting process has its uniqueness and flexibility in operations for production of alloy & special steels in a cheaper way. More than **1300 Induction furnace** units, **over 1700 steel rolling mill units,** few thousand forging and casting units are scattered across different geographical locations in the country.

Steel is made in induction furnace by melting a mixture of return/ home scrap, purchased scrap, sponge iron and ferro-alloys avoiding contamination of undesirable elements/ metals as far as possible stated to be objectionable in the specification and tapped at temperature of about 1649?C. In making tool steels, special care should be taken during charge preparation avoiding scrap contamination from elements such as nickel, cobalt and copper (within permissible range), which can not be oxidized out of the melt.

Liquid steel is tapped from furnace in a heated ladle (approx. 900-1100?C) or heated converter vessel where the majority of refining activities like argon rinsing, vacuum degassing, ladle refining in furnace where refinings are performed. A combined gas purging and stirring in vacuum (VD Unit) is an effective way to produce clean steel. The cast ingots, are normally annealed to prevent cracking or stripped and heated directly in re-heating furnace for forging or rolling. The treatment in the ladle furnace station starts with complete deslagging liquid steel to remove the oxygen rich IF-slag.

Melters should keep in mind that ferroalloy recovery is a function of the dissolution rate of the alloy, their density and dissolved oxygen in the liquid steel. There is a tendency of lowering the alloy recovery decreasing the dissolution rate of alloys by dissolved oxygen. Several melting units make alloy addition to the ladle either during tap or in the secondary reefing units like VD and/ or LRF.

However, by doing chemical correction from the melting furnace to the ladle, the modern steel making practice can have reduced time controlling energy consumption in the IF as an achievement. Steel is melted and superheated in the furnace keeping additional temperature working out the make-up of expected heat losses mainly due to (a). radiation and alloying additions during tap, (b). heat accumulated by ladle lining and heat conducted through ladle walls,(c). convection and radiation loss from the melt.

Liquid steel is only tapped in the heated ladle reaching the desired level of tap temperature. In absence of secondary refining facilities (many units), argon purging is done in liquid steel in the ladle for 5- 8 minutes and then liquid steel is teemed into the molds. Sulphur is the most harmful element in tool steel. Efforts are to be made to keep it to a minimum (About 0.015% but it may be as high as 0.04% in cheaper variety steel).

RECENT DEVELOPMENT IN TOOL STEEL MAKING:

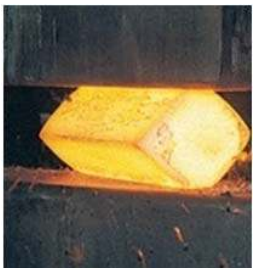
Powder Metallurgy steelmaking using Hot Isostatic Pressing process has got popularity where hot iso-static pressing begins with an initial melt furnace similar to a conventional melting process but on a much smaller scale. In this process, each powder particle behaves as a micro ingot with minimal segregation and fine carbides which are retained through the hot working process. After atomization, the powder is collected, screened to specific mesh requirements, blended and loaded into steel containers, evacuated of air and then sealed. The steel containers full of powder are then loaded into an autoclave and hot isostatically pressed at pressures and temperatures approximately the same in forging range where bonding of loose powder taken place into a fully dense ingot providing more uniform carbide size and distribution. These ingots are, then, forged and or rolled to final finished dimensions. .

Spray forming process , at much smaller scale, is used to produce tool steels at places where initial melting is made in arc or induction furnace. Here instead of teeming as ingot, the liquid steel is poured through a small nozzle where high pressure gas atomizes the liquid stream. The atomized droplets are directed onto a rotating plate where droplets collide and fuse taking shape into a fully formed ingot Each powder particle, in this process, acts as a micro ingot with minimal segregation and fine carbides retained through rolling/ forging to get finished shape.

ESR process is used in limited ways for specialized applications. The primary benefits of remelting a consumable electrode under vacuum removes dissolved gases e.g. hydrogen, nitrogen and CO, undesired trace elements forming, improving steel cleanliness , reduction of macro & micro segregation due to directional solidification of the ingot from bottom to top. Further, micro-segregation, oxide removal is achieved by chemical and physical processes. Less stable oxides or nitrides are thermally dissociated or are reduced by carbon present in the alloy and are removed via the gas phase. Non-metallic stable inclusions in high-alloyed steels are removed by flotation during remelting and remaining small size inclusions are broken up and evenly distributed in the cross-section of the solidified ingot.

FORGING & ROLLING OF TOOL STEEL:

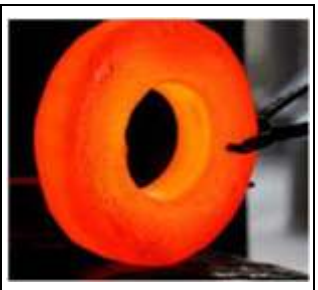
The shaping operation of tool steel is done in mini steel plants by **forging** in pneumatic / steam hammer or press or rolling the heated ingot, bloom. The compressive forces applied to ingot/ bloom/ billet in forging/ rolling changes the shape into desired dimensions. The forging process, normally, begins with starting stock, usually a cast ingot (or a "cogged" bloom/ billet which has already been forged from a cast ingot), which is heated to its plastic deformation temperature, then forged/ upset or "kneaded" between dies to the desired shape and size. During the hot forging process, the coarse grain structure of ingot is broken up and replaced by finer grains. Shrinkage and gas porosity inherent in the cast ingot are consolidated through the reduction of the ingot to lower size achieving sound centers and structural integrity. Mechanical properties are therefore improved through reduction of cast structure, voids and segregation.



Press Forging

Hammer Forge

Ingot Heating in Furnace



Tool Steel Ring

If the deformation conditions such as temperature and strain rate are not controlled properly during forging, the finished forged products may have inadequate strength or residual stresses that could be detrimental to the life of the products. The medium-to-high alloy contents of many tool steels require careful control of forging and rolling, otherwise, output results in generating large amount of process scrap.

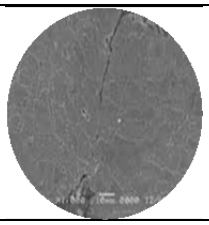
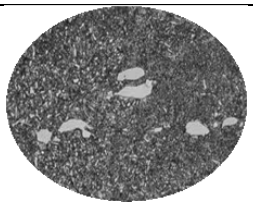
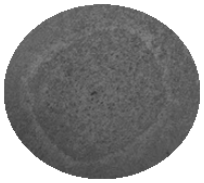
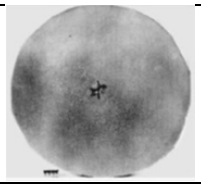
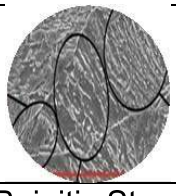
Heat Treatment of Hot Work Tool Steel : The heat treatment operation of products starts by heating products to various definite temperatures, holding these for various time durations and cooling at various rates. This combination of controlled heating and cooling determine not only nature and distribution of micro-constituents (which determine the properties), but also the grain size removing or relieving induced strains or stresses from cold working (drawing, bending etc.) or non-uniform cooling of hot metal (for example welding). However, metallurgical properties vary due to chemical composition of steel and heat treatment of products. Mini steel plants produce , normally, H11, H12 &H13 grades of hot work tool steels because of more demand from hot work tool steel family. Hot worked tool steel products in grades H11, H12, H13 are heat treated in the following manner as shown below:

Grade	Pr. Heat ?C	Austen. Temp?C		Aust Time(min)	Quenching medium	Tempering Temp?C	Hardness HRc
		Salt bath	Contr. atm				
H11	788	996	1010	5-15	Air	552	53
H12	788	996	1010	5-15	Air	552	53
H13	788	996	1010	5-15	Air	552	52

Inspection & Quality Control:

Quality of steel products is broadly defined as the combination of attributes that make the products fit for further processing ensuring final / end product perform in operation or in service till end of product life. Establishing quality of tool steel meeting all property requirements optimizing the product cost is the most important and challenging tasks for the producers of tool steel. A Variety of problems in tool steel products like, cracks porosity, blow hole, H2 flaking, carbide segregation etc are encountered causing limited tool or die life at customer end. These include, but are not limited to, excessive wear, galling, pickup, erosion, pitting, cosmetic and corrosion problems, and distortion during heat treatment, machining, or service. Producers should be able to provide products satisfying quality and all other properties from their expertise, skill and knowledge to address all the tooling issues. The cause and origin of defects, commonly observed, in tool steel products and their remedial measures are mentioned below:

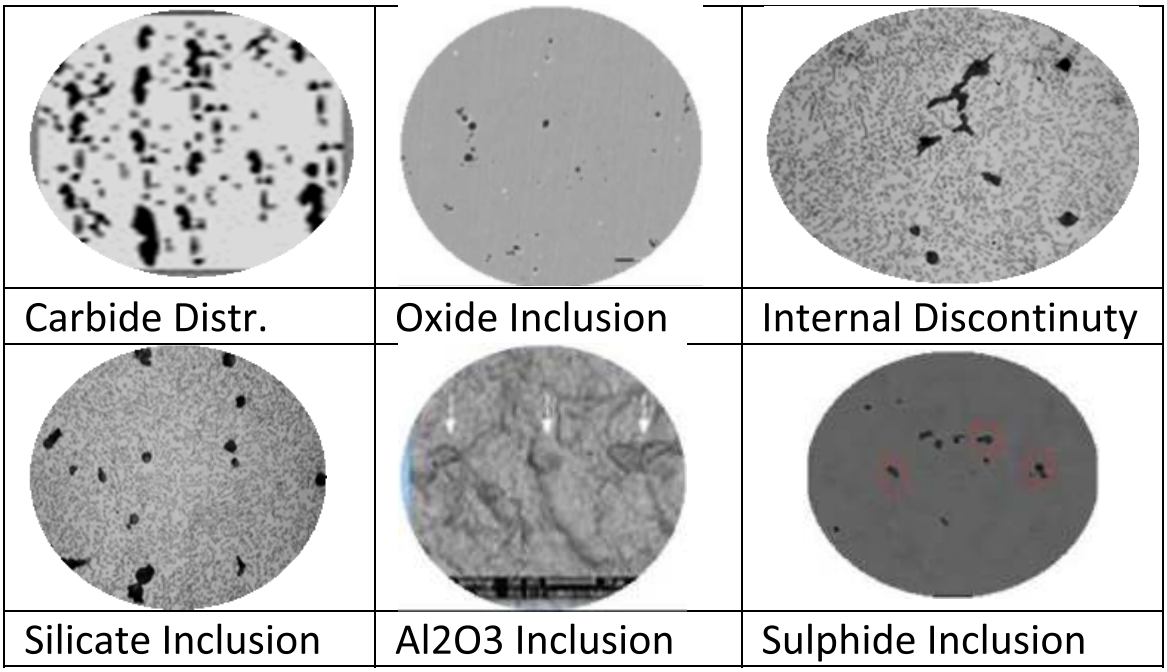
Shrinkage - If adequate feed material is not available in stock to compensate for any shrinkage during forging, this defect observed as solidification of thick metal and such defects can be split into two different types like open or close shrinkage defects which can be seen by checking by macro test or under microscope.

			
Hammer Burst	H2 Induced Crk	Carbide Seggr	H2 Flaking
			
Carbide Micro str	Segregation	Inclusion	Porosity
			
Forging Lap	Blow Hole	Shrinkage	Bainitic Struct

Porosity- Tool steel ingots may have porosity due to formation of bubbles during ingot casting and solidification which may be present as pores in the surface or inside. The common gases like Nitrogen, Hydrogen and Oxygen in the liquid steel form gas porosity in tool steel.

Blowhole – Gas bubbles of tiny form are called porosities, but larger forms are called blowholes or blisters which are caused by air entrained in the melt, steam or smoke from the refractory material or other gasses from the melt or mold. Proper liquid steel temperature, dried up mould, use of bottom pouring compound can reduce the occurrence of these defects. Blowholes may be detected by ultrasonic testing. Another possible cause may be back pressure from improperly vented mold cavities.

Inclusions, generally, originate during liquid steel teeming. Carbides or Sulphides or Silicates, the metal contamination of dross, if solid, or slag may enter in liquid steel. Also, erosion from furnace or ladle linings, or contaminates from the mold may cause inclusion in steel. Inclusion concentration can be controlled by melting with flux, vacuum treatment in inert atmosphere. Other ingredients can be added to float inclusion to the top where it can be skimmed off before teeming of liquid steel into the mold. If this is not practical, then a special ladle that pours the metal from the bottom can be used. With liquid steel temperature decreases the solubility of "S", "P", "N" are becoming lower combining with the metallic compound creating inclusion. Steel ingot/ billet surface or sub-surface bubble/ inclusions etc. may be exposed during hot rolling/ forging operation.



Carbide Microstructure & Size Distribution - Large amounts of carbide particles, resulting in more segregation, and more non-uniformity in the steel microstructure, are to be controlled to desirable range giving attention in furnace charging with balanced raw materials, melting and tapping heat, teeming practice, slow cooling of ingot, maintain ideal reduction ratios in forging and rolling followed by specified heat treatment practice. The carbides formation and change of size take place during solidification of the liquid steel and also during hot working and heat treatment operations afterwards. Carbide particle size and distributions can be affected by the rate of cooling of the ingot, ingot size and hot working process, size and distribution of carbides, inclusions shown in the picture. The shops should use very stringent internal specifications to ensure consistent quality of the tool steel products. Experience, skill and knowledge of the employees help to maintain

Crack/Fracrure – Crack/ fracture in tool steel products takes place at two stages. Firstly, microcracks are initiated at stress concentration spots like non-metallic inclusions, individual carbides and carbide clusters or (if they are present) at voids which take place either upon loading with stresses below the macroscopic yield or rupture strength of the material or during quenching after austenitizing. Secondly, coalescence and growth of these microcracks are observed, if a very sharp pre-crack is present. For this purpose plane strain fracture toughness tests are carried out. The influence of carbides take on matrix plasticity and consequently on fracture (Ref: W. Liebfahrt B¨ohler Edelstahl GmbH & Co KG, R& D, Kapfenberg, Austria).

In the quality control process, failure analysis helps to provide a total picture of all problems to take or initiate corrective actions. Aside from cracking, a variety of problems can be encountered causing limited tool or die life due to excessive wear, galling, erosion, pitting, cosmetic problems, corrosion in service.

Conclusion : Sound quality management system in tool steel production route right from IF melting to finishing followed by heat treatment in cost-effective ways is the only solution to the tool steel producers to stay comfortably in the competitive market adopting bench mark concept for continuous improvement. Weaknesses in the production and marketing system has to be eliminated or minimized by technical support utilizing human resources in proper way. Mini steel units using induction furnace for steel making with other processing units have to invest in process up-gradation/ modernization/ process/ product development improving melting efficiency reducing power consumption, installing secondary refining facilities for quality improving yield which lead directly to the success of entire tooling business in the market.

References:

[01] Technavio Research, International Research Analyst, AIIFA News Letter.

[02] Cryogenic Treatment of Tool Steel Products

[03] Asustenite Transformation to Martensite – Marvada et al.

[04] Phase Transformation – G.L. Huyett, Engg. Hand Book

[05] Forging/ Rolling Hand Book, ASM – D. Darvis, Metallurgy of Tool Steel

[06] MPT & US Test Insp in Non-Destructive Evaluation of Q.C – Vol 17, ASM Hand Book

[07] Photo Micro-Graph of Defects / Micro-Structure/ Carbide in Tool Steels(SEM)

[08] SOP in Major Areas of Mini Steel Plants. (Observation of Consulting Team)

? ex ASP, Member of Consulting Team, LM

?? ex DGM I/C (RCL), ASP, ex Consultant Dasturco, Leader of Consulting Team, ,LM

Cabinet approves proposal for Amendment to the Micro, Small and Medium Enterprises Development Act, 2006 to change the criteria of classification and to withdraw the MSMED (Amendment) Bill, 2015 – pending in Lok Sabha

Posted On: 07 FEB 2018 8:14PM by PIB Delhi

The Union Cabinet chaired by the Prime Minister Shri Narendra Modi has approved change in the basis of classifying Micro, Small and Medium enterprises **from 'investment in plant & machinery/equipment' to 'annual turnover'**.

This will encourage ease of doing business, make the norms of classification growth oriented and align them to the new tax regime revolving around GST (Goods & Services Tax).

Section 7 of the Micro, Small and Medium Enterprises Development (MSMED) Act, 2006 will accordingly be amended to define units producing goods and rendering services in terms of annual turnover as follows:

- A micro enterprise will be defined as a unit where the annual turnover does not exceed five crore rupees;
- A small enterprise will be defined as a unit where the annual turnover is more than five crore rupees but does not exceed Rs 75 crore;
- A medium enterprise will be defined as a unit where the annual turnover is more than seventy five crore rupees but does not exceed Rs 250 crore.
- Additionally, the Central Government may, by notification, vary turnover limits, which shall not exceed thrice the limits specified in Section 7 of the MSMED Act.

At present the MSMED Act (Section 7) classifies the Micro, Small and Medium Enterprises (MSMEs) on the basis of investment in plant and machinery for manufacturing units, and investment in equipment for service enterprises. The criterion of investment in plant and machinery stipulates self declaration which in turn entails verification if deemed necessary and leads to transaction costs.

Taking turnover as a criterion can be pegged with reliable figures available e.g. in GST Network and other methods of ascertaining which will help in having a non discretionary, transparent and objective criteria and will eliminate the need for inspections, make the classification system progressive and evolutionary, help in overcoming the uncertainties associated with the classification based on investment in plant & machinery/equipment and employment, and improve the ease of doing business. In addition the amendment will provide flexibility to the Government to fine-tune the classification of MSMEs in response to changing economic scenario without resorting to the amendment of MSMED (Micro, Small & Medium Enterprises Development) Act.

The change in the norms of classification will enhance the ease of doing business. The consequent growth and will pave the way for increased direct and indirect employment in the MSME sector of the country.

Source: PIB

Large Power Consumers may not Have to Bear Cross-Subsidy Charges: Singh

Our Bureau

New Delhi: The government is planning to remove cross-subsidy charges levied on large power consumers, power minister RK Singh said on Wednesday, offering a major relief to industrial and commercial establishments.

The minister said the government is planning to amend the national tariff policy, which provides for a maximum of 20% cross-subsidy charges. "Some states are charging as high as 100%," he said.

"We want to do away with the cross-subsidy charges. Rather the states should give direct benefit transfers to the targeted consumers," Singh said, speaking at a conference organised jointly by the Central Electricity Authority and Independent Power Producers Association of India.

The Union power ministry will consult the state governments on the removal of cross-subsidy charges, he said. Singh also said the government plans to introduce a licence renewal mechanism for electricity distribution companies to keep a check on the power supply capabilities of the utilities. The proposal is likely to be part of Electricity Act amendment bill likely to be tabled in Parliament in the budget session, he said.

As per the proposal, the distribution utilities will have to apply for renewal of their licences every five years. "Licences of discoms that do not have adequate long-term power tie ups will not be renewed," Singh said.

The amendment bill is likely to propose raising multifold the penalties on distribution companies for load-shedding and propose a direct benefit subsidy transfer mechanism by state governments to power consumers.

ET had on January 9 reported that the government was working on amendments to the Electricity Act to levy hefty penalties on power distribution companies for load-shedding and make provisions for direct subsidy transfers by states to power consumers.

At present, the Act fixes universal service obligation on distribution licensees to provide electricity to all applicants and the penalty for non-compliance can extend up to ₹1,000 per day of default.

NGT Objects to Units Violating Norms

A bench of the National Green Tribunal has directed the Ministry of Environment and Forests not to clear any new thermal power plant till it complies with the standards set by it.- PTI

Minister Supports Tax Sops for EVs

Power minister R K Singh sought tax sops for electric vehicles and said the ministry will soon come out with regulations, adding that the electricity amendment bill is likely to be moved in the budget session - PTI

औद्योगिक इकाइयों को बिजली के क्रॉस-सब्सिडी चार्ज से मिल सकती है मुक्ति

पावर मिनिस्टर आर के सिंह ने बताया, सरकार नेशनल टैरिफ पॉलिसी में संशोधन करने जा रही है

ईटी ब्यूरो | नई दिल्ली

इंडस्ट्रियल और कमर्शियल एंटिटीज को बड़ी राहत मिल सकती है। सरकार ने बड़े पावर कंज्यूमर्स पर लगाए जाने वाले क्रॉस-सब्सिडी चार्ज को हटाने का प्रपोजल दिया है। पावर मिनिस्टर आर के सिंह ने बुधवार को बताया कि सरकार बड़े पावर कंज्यूमर्स पर क्रॉस सब्सिडी चार्ज हटाने के लिए नेशनल टैरिफ पॉलिसी में संशोधन करने की योजना बना रही है। अभी नेशनल टैरिफ पॉलिसी के अनुसार अधिकतम क्रॉस सब्सिडी चार्ज 20 पर्सेंट है। सेंट्रल इलेक्ट्रिसिटी अथॉरिटी (CEA) और इंडिपेंडेंट पावर प्रोड्यूसर्स एसोसिएशन ऑफ इंडिया (IPPAI) की ओर से आयोजित एक कॉन्फ्रेंस में सिंह ने बताया कि कुछ राज्य 100 पर्सेंट तक चार्ज वसूल रहे हैं। उनका कहना था, 'हम क्रॉस सब्सिडी चार्ज को खत्म करना चाहते हैं। इसके बजाय राज्यों को टारगेट कंज्यूमर्स को डायरेक्ट बेनेफिट ट्रांसफर देना चाहिए।' उन्होंने कहा कि पावर मिनिस्ट्री क्रॉस सब्सिडी चार्ज हटाने के लिए राज्य सरकारों से बातचीत करेगी।

उन्होंने कहा कि यूटिलिटीज को पावर सप्लाई कैपेबिलिटी पर नजर रखने के उद्देश्य से सरकार इलेक्ट्रिसिटी डिस्ट्रीब्यूशन कंपनियों के लिए लाइसेंस रिन्यूअल मैकेनिज्म लाने की योजना बना रही है। यह प्रपोजल इलेक्ट्रिसिटी अमेंडमेंट एक्ट का हिस्सा हो सकता है। एक्ट को आगामी बजट सत्र में संसद में पेश किया जाएगा।प्रपोजल के अनुसार, डिस्ट्रीब्यूशन यूटिलिटीज को हर पांच साल में लाइसेंस रिन्यूअल के लिए आवेदन करना होगा। सिंह ने बताया कि जिन कंपनियों के पास लॉन्ग-टर्म पावर परचेज एग्रीमेंट नहीं होगा, उनके लाइसेंस रिन्यू नहीं किए जाएंगे। इलेक्ट्रिसिटी एक्ट अमेंडमेंट बिल में लोड शेडिंग के लिए डिस्ट्रीब्यूशन कंपनियों पर पेनाल्टी कई गुणा बढ़ाने का प्रपोजल हो सकता है। इसमें पावर कंज्यूमर्स के लिए राज्य सरकारों की ओर से डायरेक्ट सब्सिडी ट्रांसफर मैकेनिज्म का प्रपोजल भी शामिल होगा।

ईटी ने 9 जनवरी को रिपोर्ट दी थी कि लोड शेडिंग के लिए पावर डिस्ट्रीब्यूशन कंपनियों पर भारी पेनाल्टी लगाने के मकसद से सरकार इलेक्ट्रिसिटी एक्ट में संशोधन पर काम कर रही है। इसके साथ ही पावर कंज्यूमर्स को राज्यों की ओर से डायरेक्ट सब्सिडी ट्रांसफर के लिए भी प्रोविजन किया जाएगा। पावर मिनिस्ट्री संसद के बजट सत्र में इलेक्ट्रिसिटी एक्ट अमेंडमेंट बिल पेश करना चाहती है। अभी एक्ट में डिस्ट्रीब्यूशन कंपनियों को सभी आवेदनकर्ताओं को बिजली उपलब्ध कराने की जिम्मेदारी तय है। इसका पालन न करने पर डिफॉल्ट के प्रत्येक दिन के लिए 1,000 रुपये तक की पेनाल्टी लगाई जा सकती है। बिल में पावर सेक्टर में एक बड़े रिफॉर्म के तौर पर कंज्यूमर्स को अपनी पसंद की डिस्ट्रीब्यूशन कंपनी चुनने की सुविधा दी जा सकती है। हालांकि, प्रपोजल को लागू करने के लिए बिल में समयसीमा लागू करने की संभावना नहीं है क्योंकि राज्यों ने इसका विरोध किया है।

हम क्रॉस सब्सिडी चार्ज को खत्म करना चाहते हैं। इसके बजाय राज्यों को टारगेट कंज्यूमर्स को डायरेक्ट बेनेफिट ट्रांसफर देना चाहिए

आर के सिंह
पावर मिनिस्टर

100% तक वसूला जा रहा है चार्ज

- अभी नेशनल टैरिफ पॉलिसी के अनुसार अधिकतम क्रॉस सब्सिडी चार्ज 20 पर्सेंट है
- पावर मिनिस्टर आर के सिंह ने बताया कि कुछ राज्य 100 पर्सेंट तक चार्ज वसूल रहे हैं
- पावर मिनिस्ट्री संसद के बजट सत्र में इलेक्ट्रिसिटी एक्ट अमेंडमेंट बिल लाना चाहती है

SALE & PURCHASE

Induction Furnace Equipment For Sale in Ludhiana

1. Capacity ; 6 Ton 2200 kw
2. Make: Electrotherm, year 2005-06
3. Double converter
4. Complete with transformer and two crucibles
5. Transformer 2500kva 11Kv/850v/850v, T&R make

Furnace in running condition and can be inspected with prior appointment.
Contact:
Sandeep Jain
M: +91-9814021521

Induction Furnace For Sale

1. Capacity: 6 Ton 2200Kw
2. Make: Electrotherm, Year 2005-06
3. Double Converter
4. Complete with transformer and two crucibles
5. Transformer 2500 KVA, 33KV/ 850V/ 850V, T&R make

Furnace in running condition removed and stacked can be inspected with prior appointment.

Contact:
Jitendra P. Gandhi
M: +91-9823071945
Kolhapur, Maharashtra

Required

A steel manufacturing company requires following New / Second Hand / Used equipments in good condition

1) Transformer
11000 to 600 Volt, 12 Pulse , 9200 KVA Suitable for 8000 KW / 25 Ton Induction Furnace of Inductotherm make

2) 20 Ton Crucible (Electrotherm)
For 7500 KW Induction Furnace

3) 20 Ton Crucible (Megatherm)
For 7500 KW Induction Furnace

Contact :
Deepak Arora
M: +91-9911234506
Email: deepak.aroragi@gmail.com

HI-TECH
PIPES LIMITED

Shaping Steel for Life

India's Leading Manufacturer of

- ERW BLACK & G.I. STEEL TUBES
- HOLLOW SECTIONS
- PRE-GALVANISED TUBES
- C.R. COIL

AN ISO 9001 : 2008 CERTIFIED COMPANY

Regd. Office - 505, Pearl Omaxe Tower Netaji Subhash Place, Pitampura, New Delhi - 110034
Tel : +91 - 11 - 48440050, Fax: +91 - 11 - 48440055

Works- Sikandrabad U.P. & Sanand, Ahmedabad

ISO 2001:2002 COMPANY
1239 : 2004
1161 : 2014
4923 : 1997
3589 : 2001

E-mail : info@hitechpipes.in **Website :** www.hitechpipes.in

SARU

Great Results. Ultimate Quality. Right Application.

Aluminium Melting Chemicals:
- Cover Fluxes
- Degassers
- Grain Refiners
- Magremover
- Modifiers
- Diecoats
- Coatings

Master Alloys:
- Aluminium Titanium Boron
- Aluminium Strontium
- Aluminium Titanium

Copper & Alloys, Zinc, Brass Chemicals:
- Cover Fluxes
- Zincover STD - for zinc
- Alremover
- Gasex (Loggas)
- Deoxidising Tubes
- Copprit - for Cu & Brass
- Copprex - for Cu & Brass

Steel Melting:
- Teeming Compound
- Exothermic Powders
- Antipiping Compound
- Mould Coatings

Foundry Solutions at every step

Our wide range of Fluxes includes for:
- Aluminium & Aluminium Alloys
- Zinc & Zinc Alloys
- Copper & Copper Alloys
- For Iron & Steel Foundries
- Iron & Steel, Dycotes, Coating

Foundry Additives and Chemicals for Ferrous & Non Ferrous Foundry

Registered Office & Works
SARU AIKOH CHEMICALS LIMITED
A-2 Industrial Estate,
Partapur Meerut, U.P. 250103. INDIA
Tel.: +91-121-2440641, 2440636 | Fax.: +91-121-2440644
E-mail: info@saruaikoh.com
Web: www.saruaikoh.com

Pune Office & Godown
SARU AIKOH CHEMICALS LIMITED
Gat No.116, Near Om Logistics,
Pune - nashik Highway, Chimbali, Pune - 410 501.
Mob. 08956139453, E.mail Id: saruaikoh@yahoo.com
sales.pune@saruaikoh.com

ISO 9001 : 2000 Quality Management System Cert. No. 1378

In Technical Collabration with M/s. AIKOH Co. Ltd. Japan

step ahead... always

PIONEER®

CRANES & ELEVATORS (P) LTD.

AN ISO 9001 : 2008 CERTIFIED COMPANY

Head Office :
Opp. Arora Palace, Gill Road,
LUDHIANA-141 003 (PB) INDIA

Branch Office :
UG-8, Kirti Shikhar, Distt Centre, Janakpuri,
NEW DELHI-110 058 INDIA

Telefax : +91-161-2491935, 36, 2501937
Mobile : +91-98158-23236, 98724-23236
E-mail : info@pioneercranes.com
Website : www.pioneercranes.com

S.A.ALLOYS
SHREE SALASAR STEEL & TRADERS

S. A. ALLOYS PRIVATE LIMITED
SHREE SALASAR STEEL & TRADERS

(Deals in Ferrous & Non Ferrous Metals, Iron & Steel)

Our Product Range

- Ferro Manganese (Low Carbon)
- Ferro Silicon
- Ferro Manganese (High Carbon)
- Silico Manganese (High Carbon)
- Ferro Chrome
- Ferro Manganese (Medium Carbon)
- Silico Manganese (Medium Carbon)
- Ingots & Billets

Authorised Dealers of :-

• Maithan Alloys Ltd. • Anjaney Ferro Alloys Ltd.
• Castron Technologies Ltd. • Shivam Iron & Steel Co. Ltd.
• Singhal Energy Ltd. • Singhal Enterprises Ltd.
• Times Ferro Alloys Ltd.

Branches : Haryana, Rajasthan, Uttar Pradesh, Tamil Nadu, Delhi

Contact Person:-

Mr Ashwani Daruka - 9899112273
Mr Saket Daruka - 9811599912

Office: 2/103 , ASHISH COMPLEX , NEW RAJDHANI ENCLAVE , VIKAS MARG,
DELHI – 110092. Ph.22444286, 42440412, 43015650. Email : saalloyspvtltd@yahoo.co.in

Our USP : Consistent Quality & Timely Delivery ...

ARS

STEEL

STEEL & ENERGY

ARS ENERGY

ARS STEEL & ALLOY INTERNATIONAL PVT. LTD.

D-109, 2nd & 4th Floor, LBR Complex, Anna Nagar East, Chennai - 600 102.
Phone: 044-4560 6700, Fax: 044-4350 0597
Email: Power: sales.power@arsmetals.com
Steel: sales@arsmetals.co.in Website: www.arsgroup.in

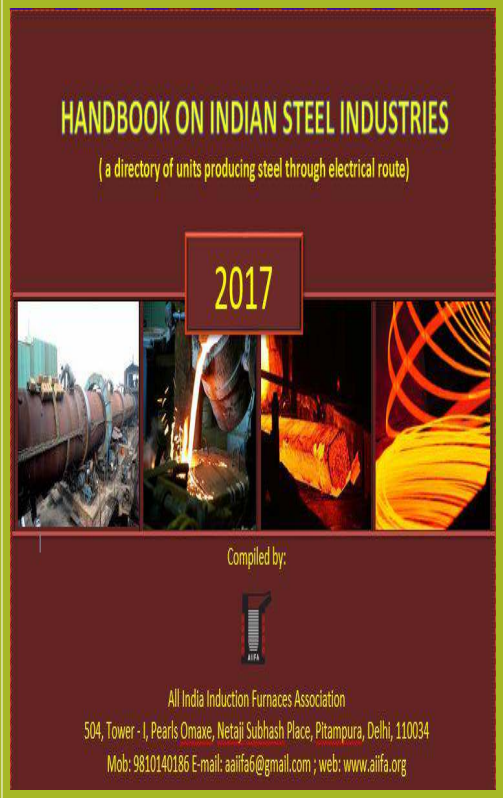
FOR NEW AGE CONSTRUCTIONS

ARS LSP

500D

TMT BARS

NOTHING MATCHES THE PURITY & DUCTILITY



NEW !!!
HANDBOOK ON INDIAN STEEL INDUSTRIES
(a directory of units producing steel through electrical route)

Broadly Covered the following Parameters:

Segment covered:	Electric Arc Furnace, Electric Induction Furnace, Rolling & Re-Rolling Mill, Sponge Iron and Ferro Alloy units
Distribution of Units:	State-wise
Details Covered:	Name of Unit, Factory Address, office Address, Director/ Contact Person with Name, Phone, Mobile No., Email Ids etc.,
Additional Information:	Consultants, Equipment Manufacturers, Experts from individual sector

Details of on line payment is given below :

Axis Bank : 196, Shalimar Bagh, Delhi-88
A/c No. : 263010100094586
RTGS : UTIB0000263

Claim your copy today:

Contact:
All India Induction Furnaces Association
504, Tower-1, Pearls Omaxe, Netaji Subhash Place
Pitampura, Delhi -110034 Mob: 9810140186
Email: aaiifa6@gmail.com; web: www.aiffa.org
Price: Rs. 10,000/ - Plus GST

ELECTROTHERM®

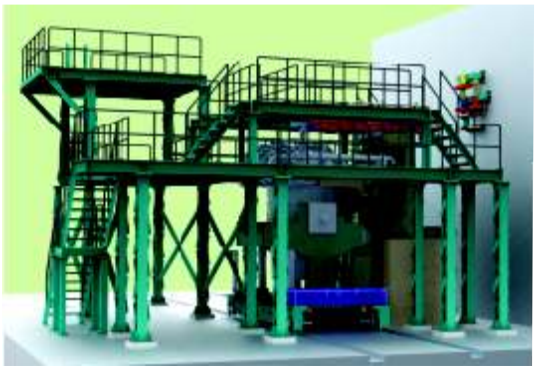
"The most preferred Steel Plant maker up to 1 MTPA capacity through various alternative routes"

ERF® & ELdFOS™ For Dephosphorization and Desuphurization

Dephosphorization up to 105 points (0.105%)

Engineering & Projects (E&P) division of Electrotherm (India), the leader in providing total solutions for mini steel plants, has successfully introduced ERF (Electrotherm Refining Furnace) with ELdFOS process, a special metallurgical equipment for carrying out dephosphorization and desulphurization in the same equipment. Successful development of DEPHOSPHORIZATION by ELECTROTHERM, the first of its kind technology, has strengthened technical and commercial viability of small and medium steel producers using Induction Furnace for melting, who can now produce high quality steel employing this new technology for refining, and can use cheaper raw materials like Direct Reduced Iron / Sponge Iron having higher sulphur and phosphorus. This has not only facilitated steel makers to meet international quality norms for various grades of construction steel, low alloy steel, medium alloy steel and few grades of forging steel, but also has improved profitability.

- Dephosphorization and Desuphurization
- Degassing and inclusion modification
- Trimming / alloying
- Superheating of liquid steel
- Homogenization of chemical composition and temperature
- Buffer between melting and casting equipment to facilitate sequence casting



ELECTROTHERM
ENGINEERING & PROJECTS DIVISION

ELECTROTHERM® (INDIA) LIMITED
72, PALODIA, (VIA THALTEJ) AHMEDABAD, GUJARAT- 382 115, INDIA
Phone: + 91 2717- 660 550, Email: mkt@electrotherm.com
Website: www.electrothermenp.com