

KANDI ENGINEERING PVT. LTD.
An ISO 9001 : 2015 CERTIFIED COMPANY

WHY WE

- ISO 9001:2015 certification
- Over 2 decades of manufacturing
- Well conversant with Steel & Non-ferrous Mills
- Electrical connected load of 90HP
- Standby DG Set with 65HP
- 15,000 sq. ft. of manufacturing shed
- Clean & Spacious space availability
- Eco-friendly
- Cost effective products
- Competitive & Effective Organisation

GLOBAL PRESENCE

- U.S.A.
- GERMANY
- TAIWAN
- U.A.E.
- TUNISIA
- BAHRAIN
- MYANMAR

MANAGEMENT TEAM

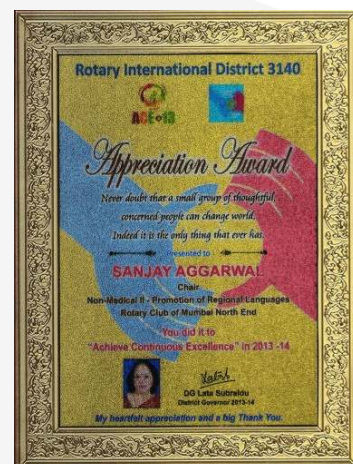
- Sanjay Aggarwal
- Pranay Aggarwal
- Nipun Aggarwal



SANJAY AGGARWAL
DIRECTOR

KANDI ENGINEERING PVT. LTD. was incorporated in 1982 and started initial trading activities at Manor (Maharashtra), an Industrial Area just 85 kms from Mumbai, INDIA. Cost saving and good quality being the motto of the Management, the production started in 1995 for manufacture of industrial products related to Steel & Metallurgical Industry, for products namely:

1. Calorised & Ceramic Coated Oxygen Lancing Pipes
2. Burning / Thermal Lances for scrap, scull, non-ferrous cutting and cleaning of tap holes, launders, etc.
3. Refractory / Monolithic Injection Lance
4. Manually Operated Slide-Gate System for pouring of liquid steel (upto 30 MT ton capacity)
5. Powder Coated Pipes for Oil and Gas applications
6. M.S. ERW Steel Pipes from sizes 6NB to 100NB for general usage.
7. Coated Graphite Electrodes for EAF & LF/VOD



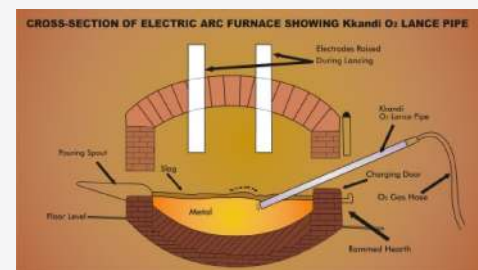
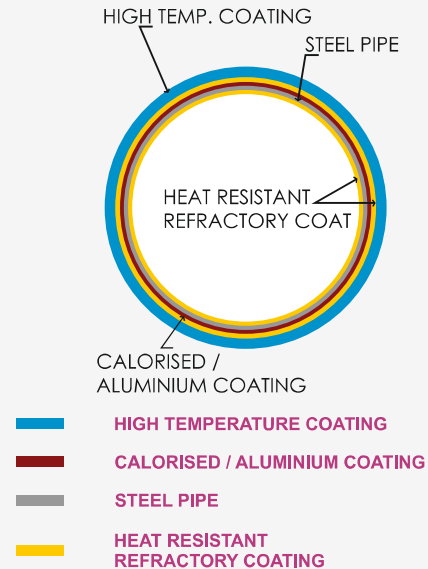
KANDI introduced **CALORISED & CERAMIC COATED PIPES (CCCP)** for Indian & Global Steel Making Shops to increase the lance life beyond conventional black steel pipes and coated pipes.

Calorised lance pipe is made up of 5 layers, At the core is a high quality mild steel lance pipe. By calorisation, a thickness of 100 - 150 microns is imparted on outer surface, and further coating with refractory materials in 200 - 300 microns thickness on both inner and outer surfaces, the diffusion is an inter-metallic bond, which doesn't get damaged either by mechanical working like bending or straightening or by high temperatures. In the case of metal diffused pipes, the metal existing at the surface of the diffused zone is oxidised to the respective oxide, which prevents the further progress of oxidation and also melting. For instance, by calorisation, aluminium is oxidised to alumina, which has a **very high melting point of 2050°C** compared to the melting point of aluminium, which is mere 658°C.

Why Calorised Lance Pipes were developed for oxygen steel making?

In the process of steel manufacturing by open hearth or electric furnace, the consumption rate of lance pipes for oxygen injection slows rather high ratio owing to high temperature and severe oxidation. In general, steel pipes are used as lance pipes for oxygen injection. **If MS pipes are treated by Calorisation process, consumption rate of lance pipes will decrease 5~8 times.** Research conducted over many years revealed that the most effectual method is to diffuse aluminium into the pipe's surface, so as to promote wear proof properties on steel pipe. **Calorising is carried outside of the steel pipe to promote wear and fire proof properties of the pipe.** To enumerate, the advantages of these pipes in oxygen steel making process are:

1. The exothermic reaction and agitation promote decarbonisation and heat rise in the furnace, while foaming slag can be eliminated.
2. Fusion of sub material can be accelerated.
3. Quality of steel will be improved.
4. As the process raises the temperature.
5. Selection of raw materials to be charged becomes easy.
6. The process raises the production capacity of an electric furnace.
7. Hydrogen, Nitrogen and non-metallic inclusions can be eliminated through oxidation.
8. It makes it possible to recover chrome with the use of high chrome steel scrap.



When Calorised pipe is exposed to high heat, the refractory material and the Calorised layer form an Aluminium Oxide Film which increases the melting temperature to **2050°C (3750°F)**. **Bare lance pipe melts at temperatures of 1300 to 1500°C (2400 to 2800°F)**

Calorisation on Ceramic Coated Pipe

MS pipes are **calorised** on outer surface, and are thereafter given **Ceramic Coating** on both inner and outer surface after the calorising treatment. Ceramic coating gives an extra ordinary higher life and resistance to corrosion at high temperature than ordinary MS pipes and expensive stainless and alloy steel pipes normally used in oxygen lancing in electric arc furnaces and chemical factories and refineries. **The average life of calorised with ceramic coated pipes is 5~8 times more than that of ordinary MS pipes and stainless steel pipes.**

Comparison chart between MS pipe & Calorised pipe :-

Oxygen Charge Pressure Kg/cm ²	Oxygen flow rate m ³ /min	Charge Time (min.)	Length of consumption mm	Consumption rate mm/min.	Type of Pipe	Rate of MS Pipe to Calorise Lance
6.5-7	6.5-5	3	1950	650	MS	1
6.5-7	6.5-5	15	1420	94	CCCP	6.91
6	6	3	2430	809	MS	1
6	6	10	1150	115	CCCP	7.03
5.5-6	5.5	3	1860	620	MS	1
5.5-6	5.5	10	840	84	CCCP	7.38

MS : MILD STEEL
CCCP : CALORISED & CERAMIC COATED PIPES

Some of the various USES of CCCP include the following:

- Cutting scrap, raising bath temperatures and decarburizing
- Opening nozzles in tundish and ladles
- Injecting carbon and other powders into the electric furnace and ladle
- Opening the iron notch of a blast furnace
- Injecting argon into ladles
- Injecting argon and oxygen into the A.O.D. furnace
- Injecting flux for degassing in aluminum melting furnaces



CALORISED & CERAMIC COATED PIPES (CCCP)

STANDARD SIZES AND PACKING



FULLY LOADED CONTAINER

NOMINAL BORE SIZE (mm)	PACKING* (per bundle)	LENGTH* (mm)
15 (1/2")	100 Pcs	5500 mm OR 2750 mm
20 (3/4")	100 Pcs	
25 (1")	100 Pcs	
32 (1 1/4")	50 Pcs	
40 (1 1/2")	50 Pcs	



LOOSE CARGO

* And / or as Per customer's requirement

SPECIFICATION

TYPE	Description	Diagram
TYPE 1	Both ends threaded with one coupling & one plastic cap.	Diagram showing a pipe with 'Threads' at both ends, a 'Screw Coupling' in the middle, and a 'Plastic cap' at the right end.
TYPE 2	Both ends threaded with one coupling & one plastic cap.	Diagram showing a pipe with 'Threads' at both ends, a 'Screw Coupling' in the middle, and a 'Plastic cap' at the right end. A section of the pipe is labeled '150 - 170 mm uncoated'.
TYPE 3	No threads, plain ends	Diagram showing a pipe with plain ends and a '200 mm.' section of uncoated pipe.
TYPE 4	No threads with pressed coupling	Diagram showing a pipe with a 'Press Coupling' in the middle.



To summarize, Calorised & Ceramic Coated Pipe (CCCP) is carbon steel pipe with calorisation on outer surface of pipe, and thereafter multiple, thin layers of ceramic coating both exteriorly and interiorly. The outer surface of ceramic coating on pipe is resistant to slag attack and extends the life of the pipe when it is immersed into molten metal or in high temperature atmospheres. The CCCP applications include powder injections, tap-hole cleaning and opening nozzles in ladles, tundish and launders.

N.B & SERIES	OD	WALL THICKNESS	STD LENGTH*	COATING THICKNESS COVERED
mm	mm	mm	mm	MICRONS
08	13.4	1.7 - 1.8	5500	250 avg.
10	16.9	1.8 - 1.9	5500	250 avg.
15	21.2	2.0 - 2.1	5500	300 avg.
20	26.9	2.3 - 2.4	5500	350 avg.
25	33.8	2.5 - 2.6	5500	400 avg.
32	42.5	2.5 - 2.7	5500	400-450 avg.
40	48.4	2.8 - 3.0	5500	400-450 avg.

* OR AS PER CUSTOMER'S REQUIREMENT

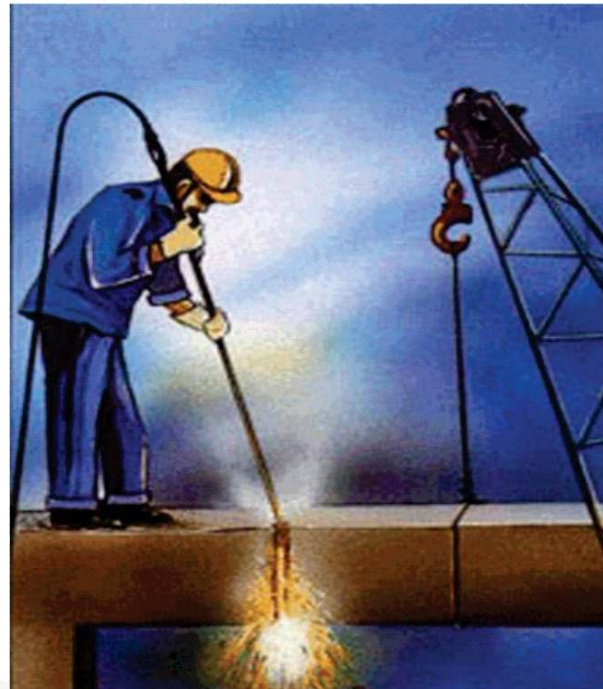
Characteristics of KANDI Lance Pipes

- **EXCELLENT REFRACTORINESS**
- **SPEEDY DE-CARBURISATION** for optimal metal oxygen interaction
- **GREATER EFFICIENCY** of reaction
- **COST REDUCTION** in Steel making

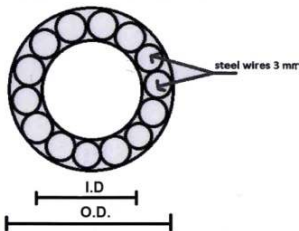
Burning Lance is the product developed for the purpose of increasing the heat quality generated from the lance, by improving the cutting efficiency with the cutting core wires of several pieces built in the combustion steel pipe. The difficult to - cut materials in gas cutting and mechanical cutting is not limited to iron and steel, stainless steel, alloys such as brass, nonferrous metal, ceramic etc., These can be simply and quickly cut off and board without noise and vibration at the high temperature approx 3,600°F. It is optimum for cutting and boring concrete, special steel, cast steel, pig iron, slag, and refractory. **Oxygen gas is the only heat source required for the equipment.**

APPLICATIONS

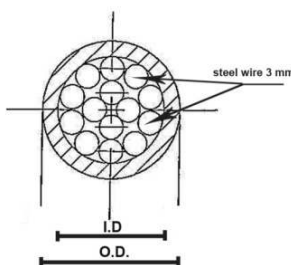
- Defence and Naval organisations
- Non- Ferrous & Ferrous Foundries and Steel Mills
 - For Cleaning Up Spills
 - Opening Tap Holes
 - Cutting Refractory Brick, Skulls and Slag
 - Removing Solidified Material from Vessels, Ladles, and Moulds
- Aluminum, Copper, Lead, Zinc and Nickel Smelters, Ferro - Alloy Plants
- Demolition : Cement / Concrete Removal - Piling and Slabs



SPECIAL JET LANCE



NORMAL THERMAL LANCE



Size of Pipe	O.D.	I.D.	Size of Wire
10 N.B.	17 mm	11 mm	3 mm
15 N.B.	21.5mm	15 mm	3 mm
20 N.B.	27.5mm	21 mm	3 mm

Standard Length - 3 Mtr, 4.5 Mtr, 5.5 Mtr or as per Customer requirement
 Tolerances - 0.5 mm +/-
 End Finish - Plain End, Threaded and Coupled
 Packing - As per Customer Requirement

Size of Pipe	O.D.	I.D.	Size of Wire
8 N.B.	13 mm	9 mm	3 mm
10 N.B.	17 mm	13 mm	3 mm
15 N.B.	21.5mm	17 mm	3 mm
20 N.B.	27.5mm	23 mm	3 mm



REQUIRED EQUIPMENT

- Oxygen Cutting Lance/Rods & Lance Holder
- Sufficient oxygen supply (35 cubic feet per minute, each rod burns 4 1/2 minutes approximately 160 total cubic feet)
- Oxygen hose: 25' - 50' of 3/8" or 1/2" (smaller than 3/8" hose will reduce the flow of oxygen beyond effective operation)
- Oxygen high volume regulator (head pressure of 200 PSI required)
- Ignition equipment required for Oxy - Acetylene Torch
- Flame resistant protective clothing



ALUMINIUM LANCE HOLDER



BRASS LANCE HOLDER

WHAT IS THE DIFFERENCE BETWEEN THERMAL AND EXOTHERMIC CUTTING?

The Thermal cutting torch uses a preheat flame to elevate the temperature of the material to be cut to 1500° to 1900°C. When the steel becomes cherry red, a high pressure jet of oxygen is directed at the pre-heated metal. The result is the metal is rapidly oxidized or it burns. This process works on material that will oxidize. If it will not rust, it cannot be readily cut with an Thermal system.



Cutting steel with an exothermic torch requires no preheat or cleaning.

Exothermic process also utilizes oxidation. However, the exothermic process uses alloys in the material in the Burning Lance as the fuel and produces temperature of 7,200° F. Burning Lance consists of an outer steel tube filled with special alloy wire. The Exothermic reaction (Oxidation) occurs when the tip of the rod is heated to its kindling temperature (2,800° F) and pure oxygen is introduced through the lance. The chemical reaction will continue until the lance is consumed or the oxygen flow is turned off. **The only gas required for this cutting operation is pure oxygen.**

WHAT IS THE MOST CRITICAL PART OF THE PROCESS?

The exothermic process relies on OXYGEN VOLUME and PRESSURE. Without proper volume of oxygen the cutting process will not work and creates hazards to the operator. Minimum and maximum volumes and pressures are listed with each size Burning Lance. You **MUST** supply the minimum volume and pressure for safe efficient operation. For all of the large Burning Lance you **CAN NOT** operate them with a single liquid oxygen tank.

CUTTING OPERATION OF RCC BEAM



BEFORE CUT



DURING CUT



AFTER CUT

Refractory Lance, offered by us, is widely used in varied steel industries for strength and performance. Composite constructions is available in thermally stable and slag resistant vibrocast refractory materials having high density, strength and structural integrity with divergent outlets.

We CUSTOMIZE REFRACTORY LANCE DESIGN keeping in mind the requirements of various clients.

The **TOP REFRACTORY MONOLITHIC LANCE** technology integrates a variety of functions which expand the metallurgical and operational capabilities.

FOLLOWING MEDIA CAN BE BLOWN:

Oxygen for :

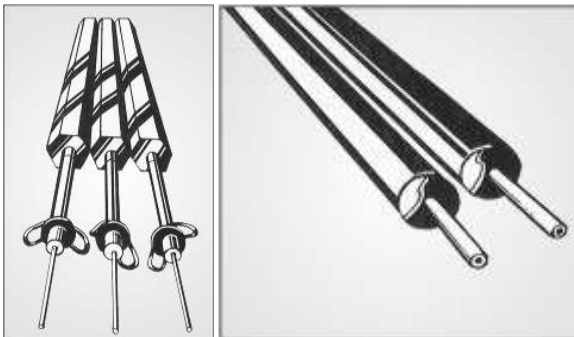
- Decarburization at high initial Carbon level
- CO post combustion
- Chemical heating of liquid steel by aluminothermic reaction

Gaseous Fuels (Nitrogen, Argon, Oxygen, etc.) for :

- Refining/ Homogenisation of liquid Steel
- Compensation of thermal loss

Metallurgical Powder (Lime, Alumina, Synthetic Slag, Iron oxide) for :

- Desulfurization
- Decarburization



SUMMARY:

- Provides various additional functions
- Extended metallurgical degree of freedom
- Reduced temperature loss of steel
- Extended refractory lifetime
- Improved plant availability
- Improved sequence casting capability

Sizes Available :

All international shapes & Tailor made

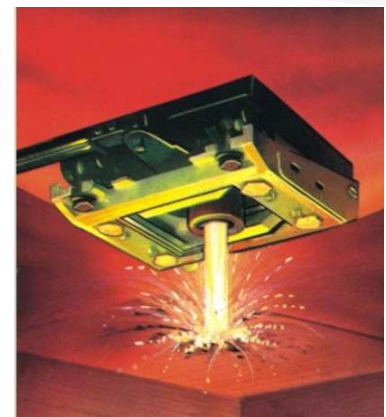
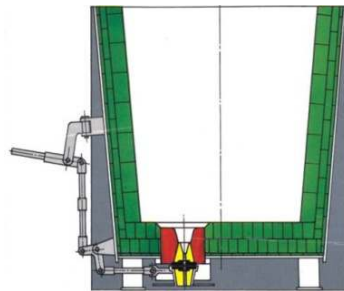


KANDI Slide - Gate System was successfully designed and developed indigenously to suit the INDIAN STEEL INDUSTRY's condition, where most of steel plants were using the conventional STOPPER-ROD mechanism. **KANDI has been successful in substituting the conventional system by new pouring technique known as SLIDEGATE SYSTEM for pouring liquid steel from ladle to tundish by manual operation.**

Slide-gate technology has proved its worth in handling a large tonnage with minimum losses, the basic benefit of the mechanism. **More than 70 steel plants have opted for KANDI system.**

KANDI Slide-gate system is easy to operate, and does not require any intricate, electrical or hydraulic mechanism. The high degree of reliability in the system makes it more adaptable for **ladles up to 30 tonnes.** The essential nature of the constructional and operating features means that normal maintenance can be performed with very simple spare parts management, which enables easy replacement of refractory nozzles and slide plates quickly. Use of high quality of refractory materials ensures safety and operating economies.

KANDI device can be operated through a central oleodynamic unit, and the various pouring flow regulation phases can be controlled. The operating lever with its relatively simple construction can be compared amongst the leaders of existing manually operated systems. The lever and device is designed and constructed so as to enable the operator to open, close and regulate the casting flux from the ladle nozzle with minimum effort which corresponds to appx. 10-20 kg. maximum, calculated from the uppermost end of the operating lever.



Choice of nozzle flow diameter for optimal operation is based on assessment of all the technical studies. Also available are ladle nozzles prolonged by the application of a protective tube for casting.

KANDI has developed special Epoxy / Polyester Powder Coated Gas - line & Water - line Pipes for inside and outside applications, which have the following advantages:

- Precoated M. S. / G.I. Pipes in different attractive Powder coated colors.
- Smooth & Customized finish.
- More lasting due to protective Powder coated colors, making it Corrosion resistant to weather, Chemicals i.e. Acids, Alkalis, Solvents, Seawater, etc. as per customers requirements.
- Having very good visual appeal.
- The M. S. Pipes are epoxy coated for additional protection from inside.
- Shades available as per RAL standards.
- 9,000 mtrs of Powder coated pipes can be supplied on daily production basis.

Usages:

- Gas/ Oil Pipe Lines
- Petrochemicals
- Fertilizers
- Scaffoldings
- Railings - Trusses
- Differentiating various materials carried in different pipe lines
- Children Play Ground
- Green Houses
- Conduit M. S. Pipe

Parameters	Specification
Powder material	Pure Polyester / Epoxy
Application	Electrostatic Spraying
Baking Schedule	180 - 200° C for 10 min
Coating Thickness	50 - 80 microns

APPROVED VENDORS FOR MAHANAGAR GAS LTD. OVER A DECADE

Sizes:

Coated Pipes are available in diameters ranging from 15 mm. to 100 mm. The lengths shall be maximum 6.00 meters long, or as per customer's requirements

Pure Polyester Powder Coatings are recommended for structure & pipe lines which are exposed to weather and sunlight

Epoxy Powder Coatings are recommended for concealed and underground pipe lines & structures, and items which are not exposed directly to sunlight



KANDI sophisticated Coating gives excellent antioxidation properties to graphite electrodes and reduces the specific consumption of graphite considerably. Coated electrodes are used for the production of electric steel as well as for manufacturing non-metallic products in electric arc processing.

BENEFITS:

Reduction of the specific Graphite Consumption up to 25 %, by Reducing Side Oxidation, Reduced Oxidation Cone, & Increased Tip Diameter, Reduced Tip Consumption, Reduced Number of Electrode Connections, & Reduced Tip Losses

Improved Conductivity of the Electrodes, by the use of high conductive aluminium, and by a redistribution of the electrical current flow

Increased Electrical Loading Capacity of the electrodes, by relieving the electrical strain to the electrode centre and the nipples, and by increasing the electrical conductivity by 20-25%

Time saving, by reduced number of electrode connections, improved working conditions for the furnace staff, and reduced crane times



M S ERW STEEL PIPES

MS PIPES / BLACK PIPES are formed from low - carbon mild steel on Automatic Tube mill by High Frequency Induction Welding process .

END USES

Transmission of Water, gas, oil, and air .

SIZE

Outside diameter : From 8.4 mm (1/8") to 115 mm (4")

Wall thickness: 1.8 mm to 5.4 mm

Length: 3 to 7 meter

PIPE END

Splain, Screwed and Socketed.

SURFACE FINISH

Black (Self - colored) , Outside mill protective coating .

PRODUCTION STANDARDS

IS - 1239 (Part 1):1990 , equivalent BS - 1387 , ATSM A53 Grade A, AND/OR IS - 10577:1982

PACKING

Bare Bundles

INSPECTION

Mill's certificate or inspection by an independent organization, as authorized by the customer.

TESTS PERFORMED

Chemical test, mechanical test, Hydrostatic Test, Other as required by the standards.

SPECIFICATION FOR MILD STEEL PIPES / TUBES

NOMINAL BORE (NB)		Class	Outside Diameter	Thickness	SWG	
mm	inches					
6	(1/8")	L	9.85	9.65	1.8	15
		M	9.85	9.65	2.25	13
		L	13.35	13.1	1.8	15
8	(1/4")	M	13.6	13.1	2.28	13
		H	13.6	13.1	2.9	11
		L	16.85	16.6	1.8	15
10	(3/8")	M	17.1	16.6	2.25	13
		H	17.1	16.6	2.9	11
		L	21.4	21	2	14
15	(1/2")	M	21.8	21	2.6	12
		H	21.8	21	3.2	10
		L	26.9	26.4	2.3	13
20	(3/4")	M	27.3	26.5	2.6	12
		H	27.3	26.5	3.2	10
		L	33.8	33.2	2.6	12
25	(1")	M	34.2	33.3	3.2	10
		H	34.2	33.3	4	8
		L	42.5	41.9	2.6	12
32	(1 1/4")	M	42.9	42	3.2	10
		H	42.9	42	4	8
		L	48.4	47.8	2.9	11
40	(1 1/2")	M	48.8	47.9	3.2	10
		H	48.8	47.9	4	8
		L	60.2	59.6	2.9	11
50	(2")	M	60.8	59.7	3.6	9
		H	60.8	59.7	4.5	7
		L	76	75.2	3.2	10
65	(2 1/2")	M	76.6	75.3	3.6	9
		H	76.6	75.3	4.5	7
		L	88.7	87.9	3.2	10
80	(3")	M	89.5	88	4	8
		H	89.5	88	4.8	6
		L	113.9	113	3.6	9
100	(4")	M	115	113.1	4.5	7
		H	115	113.1	5.4	5

Tolerance:

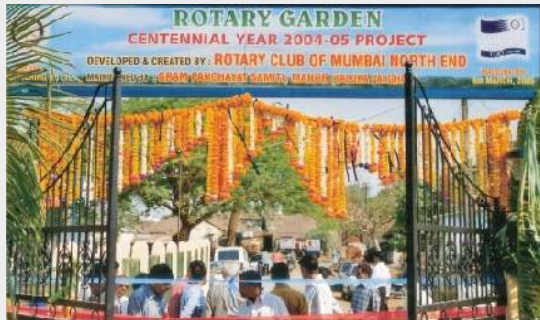
Thickness : light : + Not limited - 8%

Medium & heavy : + Not limited - 10%

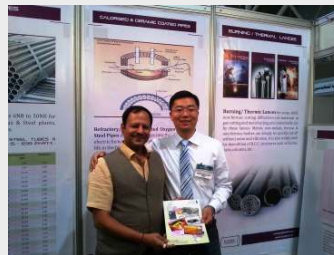
Length : light - medium - Heavy Tubes : Random length of 3.0 to 6.0 mtrs. or as Specified.



CSR Activities



Global Participation & Visitors



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