megatherm

An ISO 9001 : 2015 Company

Ladle Refining Furnace and Electric Arc Furnace

- **GENERATION 2 Furnaces** ensure optimal energy consumption and minimal down time using extensive PLC based automation and remote access
- **CONDUCTING ELECTRODE ARM AVAILABLE**

WELCOME TO
OUR COMPANY

In 1989 we sparked off, banking on our team of Electro Thermal Processing experts and the capital of experience that we had gathered since 1970. We made our presence felt across Steel, Foundry, Forging and various other Metal Working Sectors, surging forward with spirits held high and the burning within.

Today, Meghatherm is recognized and preferred by its ever - extending list of Domestic and International Clientele. Our installations are spread over 40 countries around the globe. Megatherm is committed to customer delight and performance excellence. We have invested in progressive in-house R & D which in turn has yielded both pro and praise for the company. On an aggregate we are nearing 3000 customers of Electro Heating Equipment till date.

Megatherm is differentiated from other manufactures primarily due to its product innovation & continuous R&D. Over the years, Megatherm has led the way for most major design changes and additions to induction technologies which was later incorporated by the industry. Our research is focused and our systems are incorporated with the best contemporary technologies that ensure optimum utility and comprehensive productivity.

Being certified as an ISO 9001-2015 Company, the name Megatherm today is synonymous to quality.

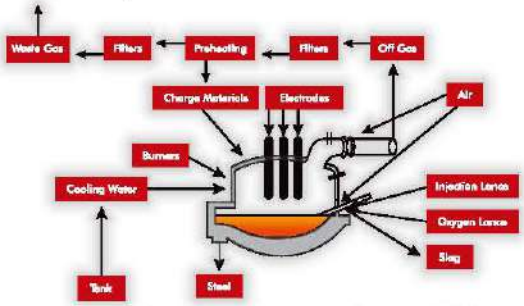
GLOBAL PRESENCE

NEARING 3000 INSTALLATIONS
IN 44 COUNTRIES

- Argentina
- Algeria
- Angola
- Afghanistan
- Azerbaijan
- Bolivia
- Botswana
- Bhutan
- Bangladesh
- Brazil
- Cuba
- Chile
- Ethiopia
- Egypt
- Ecuador
- Fiji
- France
- Ghana
- Georgia
- Iraq
- Iran
- Ivory Coast
- Indonesia
- Jordan
- Kazakhstan
- Kenya
- Kuwait
- Malaysia
- Mauritania
- Mexico
- Nigeria
- Pakistan
- Poland
- Peru
- Saudi Arabia
- South Africa
- Sudan
- Tanzania
- Tunisia
- U.A.E
- Uganda
- Uzbekistan
- Venezuela
- Yemen

ADVANTAGES OF
MEGATHERM

1. 30 year old industry leading design and engineering team
2. Lowest operating cost ensured by in-house proprietary electrode regulation logic
3. Minimal spares requirement spare parts
4. Exhaustive PLC based diagnostics, auto alarms and preventive maintenance
5. Remote access for remote troubleshooting and servicing
6. Availability of conductive electrode arm
7. Tilt-able ladle transfer car (for LRF)
8. Mechanized Slag Raking System (for LRF)



CONDUCTIVE
ELECTRODE ARM

Current conducting electrode arms are a melt-shop proven design that provides efficient cooling as well as reduced electrical loss. The utilization of copper clad (copper and steel) arms combines the high strength of steel while exhibiting the high conductivity and current-carrying ability of copper.

Due to their outstanding design and optimal materials, Megatherm electrode arms deliver lower electric operating costs, low graphite consumption, higher process speed, easy handling, optimal symmetry and maximum efficiency.

ADVANTAGES OF
CONDUCTIVE ELECTRODE ARMS

- Low operating costs
- Minimal shutdown times
- Easy handling
- Optimum symmetry
- Highest electrical efficiency

ELECTRIC
ARC FURNACE

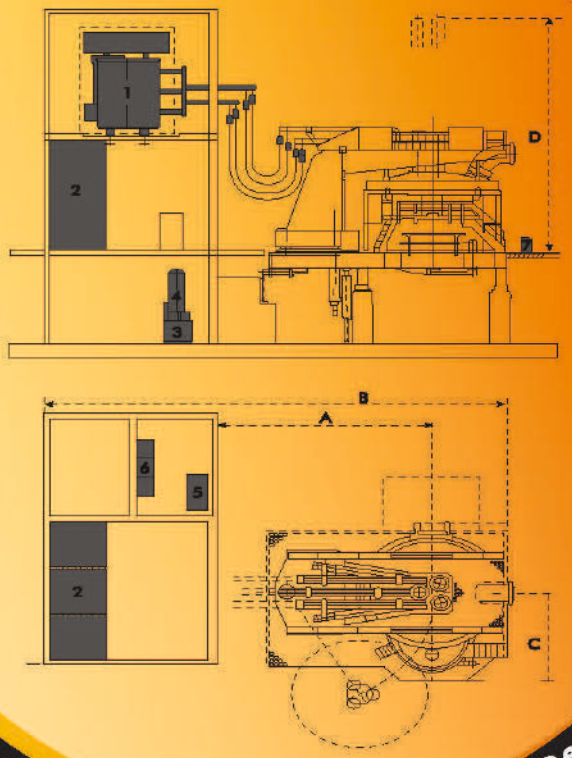
An Electric Arc Furnace is defined in terms of its shell diameter and transformer rating. The shell diameter for a given furnace is largely chosen as a function of tap weight required and the steel making practise to be adopted, the current trend is towards larger shell diameter for a given weight. The choice of tap weight is influenced by such factors as dedication to continuous casting machine, productivity requirement and capital costs.

The transformer size determine the rate at which furnace can melt ferrous raw materials. The following diagram gives the various inputs & outputs in an Electirc Arc Furnace.

Model	Inner Diameter of Furnace Shell (mm)	Nominal Capacity (Ton)	Continuous Rated Capacity of Transformer (KVA)	Electrode Diameter
MT - 2S	2000	2	1500	6"
MT - 5S	2440	5	2000 2500	8"
MT - 10S	3350	10	5000 6000	12"
MT - 15S	3450	15	6000 7500	12"
MT - 20S	3650	20	9000 12000	14"
MT - 25E	4000	25	15000 18000 21000	16"
MT - 30E	4200	30	18000 21000 24000	16"
MT - 35E	4300	35	21000 24000 28000	16" 18" 18"
MT - 40E	4400	40	28000 30000 32000	18"
MT - 45E	4600	45	32000 36000	18"
MT - 50E	4800	50	35000 40000	20"
MT - 60E	5100	60	42000 48000	20"
MT - 70E	5300	70	50000 60000	20"

TYPICAL

LAYOUT



Layout Shows Arc Furnace equipped with Eccentric Bottom Tapping Device

LEGEND

1 Transformer

2 High-Voltage Switchgear

3 Hydraulic Unit

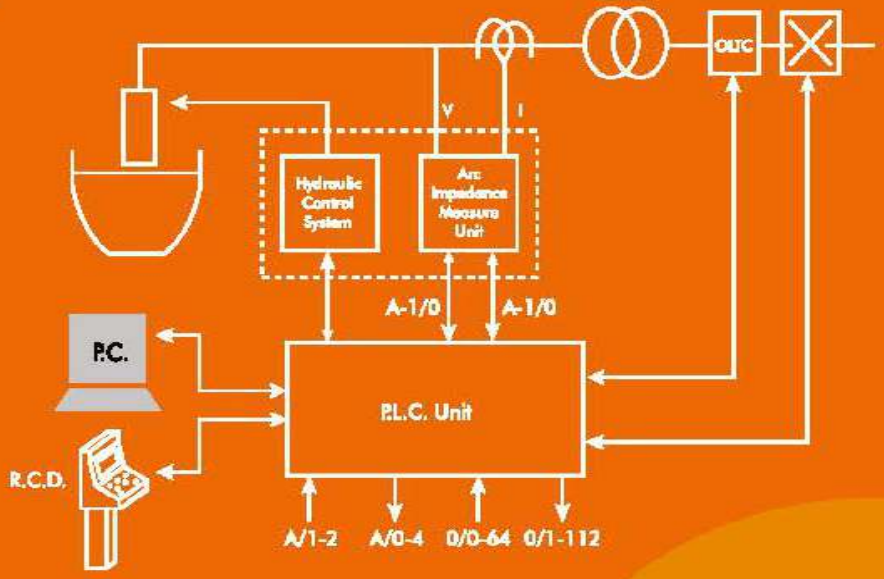
4 Pressure Vessel

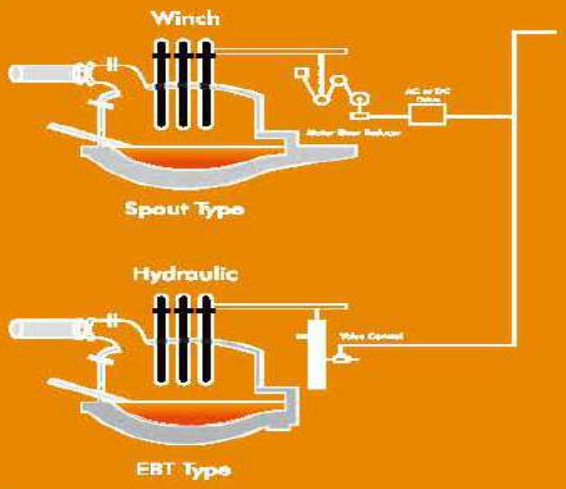
5 Main Control Desk

6 Electric Control

7 Tilting Console

Model	Inner Diameter of Furnace Shell (mm)	A	B	C	D
MT - 2S	2000	2880	4880	2000	5015
MT - 5S	2440	2880	4880	2000	5300
MT - 10S	3350	4318	6325	2007	7470
MT - 15S	3450	4318	6325	2007	8310
MT - 20S	3650	4344	6020	1676	9000
MT - 25E	4000	5327	7848	2521	10000
MT - 30E	4200	5327	7848	2521	10000
MT - 35E	4300	5327	7848	2521	10000
MT - 40E	4400	7848	10363	2515	10000
MT - 45E	4600	7848	10363	2515	10000
MT - 50E	4800	7348	9858	2510	10000
MT - 60E	5100	7060	10310	3250	10000
MT - 70E	5300	6960	10110	3150	10000





ELECTRODE
REGULATION SYSTEM

The heart of Electric Arc and Ladle Refining Furnace is the electrode regulator. The system determines the efficiency of the furnace as it effects the consumption of power, electrodes and refractories.

There are two basic methods of moving the electrode arms, i.e thyristorised controlled Winch unit or Hydraulic regulation. Both are capable of operating efficiently. For bigger furnaces hydraulic regulation is preferred, whereas for smaller units either of the two is employed.

Megatherm also provides "High-Speed Closed Loop Digital Electrode Regulation System". The electrode regulator controls through hydraulic valves manual or automatic movement of electrode arms.

The system is implemented in dedicated standard PLC. The set up, tuning or monitoring is implemented in PC.

To achieve, Impedance Control, a proportion of the arc voltage and a proportion of arc current flowing in the arc are compared thus giving measured impedance value. Measured impedance value is compared with the set value determined based on:

- System Impedance
- Furnace Impedance
- Transformer Impedance
- Primary Voltage
- Tap Changer Position
- Reactor Tap Position
- Current Setting

The resultant gives the error impedance signal. The electrical error signal is amplified and is fed to hydraulically operated proportional control valve to raise / lower the electrode arms thus resulting in auto setting of electrode to operate at set impedance.

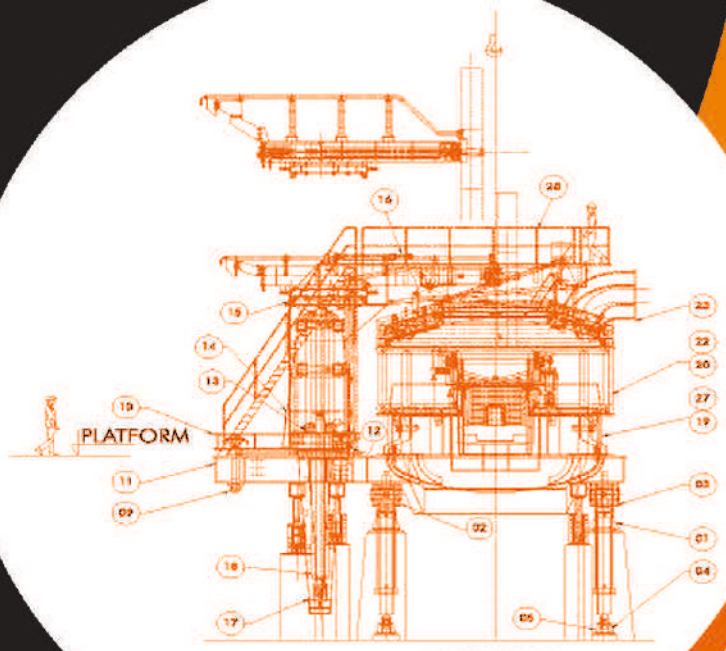
ARC FURNACE
HEAT BALANCE

In an arc furnace energy can be supplied from a variety of sources as shown in the table below. The energy distribution is highly dependent on local material and consumable costs and is unique to the specific melt shop operation. A typical balance for Ultra High Power Furnace and low or medium power is indicated here as under:

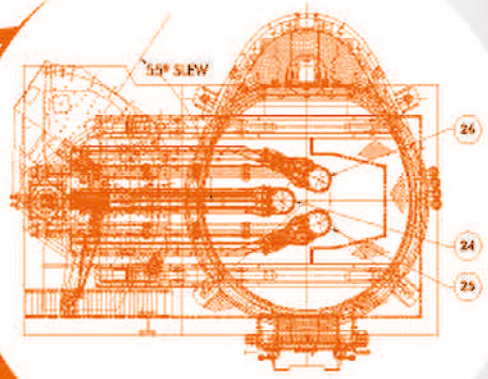
Energy	Area	UHP Furnace Power Furance	Low to Medium
Inputs	Electrical Energy	50 - 60%	75 - 85%
	Burners	5 - 10%	
	Chemical Reactions	30 - 40%	15 - 25%
	Total Inputs	**100%**	**100%**
Outputs	Steel	55 - 60%	50 - 55%
	Slag	8 - 10%	8 - 12%
	Cooling Water	8 - 10%	5 - 6%
	Miscellaneous	1 - 3%	17 - 30%
	Off Gas	17 - 28%	7 - 10%
	Total Outputs	**100%**	**100%**

GENERAL

ARRANGEMENT DRAWING



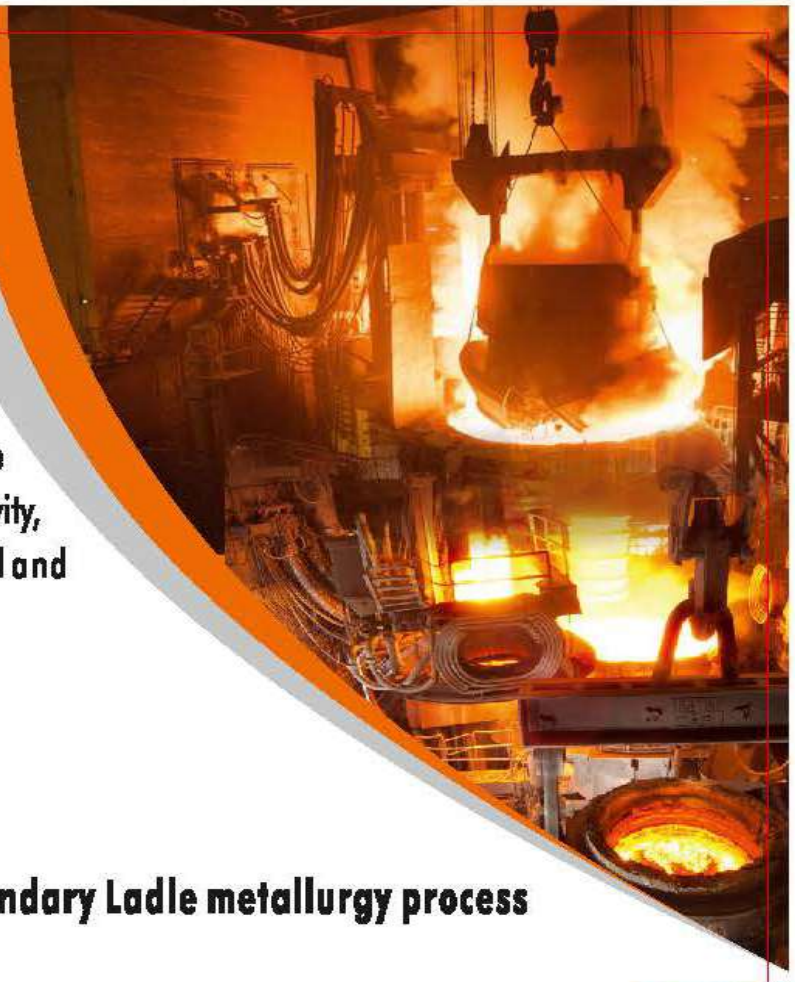
ELEVATION



PLAN

LEGEND

01	Rocker Base
02	Column Side Rocker
03	Far Side Rocker
04	Bracket For Tilt Cylinder
05	Tilt Cylinder
06	Swivel Arrangement
07	Slew Platform
08	Substructure
09	Slew Roller Assembly
10	Column Guide Roller Assembly
11	Back Structure
12	Gantry Arm
13	Roof Lift Assembly
14	Column Cylinder Base Frame Assembly
15	Column Assembly
16	Shell -Bottom Part
17	Shell Top Part
18	Water Cool Panel Assembly
19	Water Cool Roof Assembly
20	Electrode Arm Assembly - Middle
21	Electrode Arm Assembly - Right Hand
22	Electrode Arm Assembly - Left Hand
23	Shell Lining Details
24	Maintenance Platform- Under Client Scope



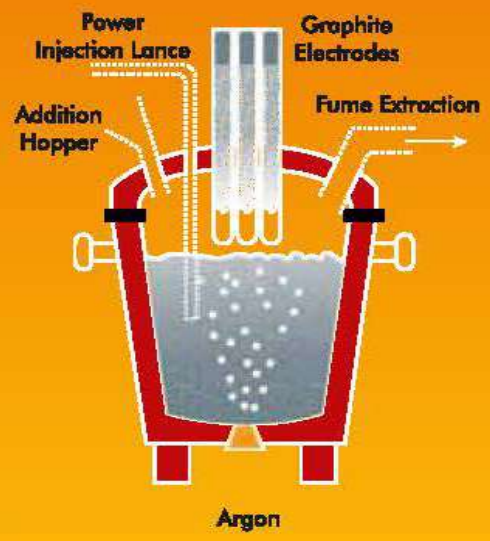
LADLE
REFINING FURNACE

Secondary metallurgy treatment and refining to ensure the precise control of the steel temperature an chemical composition for improved productivity, flexibility and quality. For ordinary, special and stainless steel grades.

BENEFITS

Following are the key purpose of secondary Ladle metallurgy process

- Clean Steel
- Wilde product range
- Improve cast-ablity
- Increase plant production rate
- Buffer between primary & secondary steel making
- Reduction of primary steel making cost
- Increase ferro-alloys yield
- Homogenization
- De- sulfurization
- Gas reduction
- De- carburization
- De- Phosphorization



FURNACE DATA

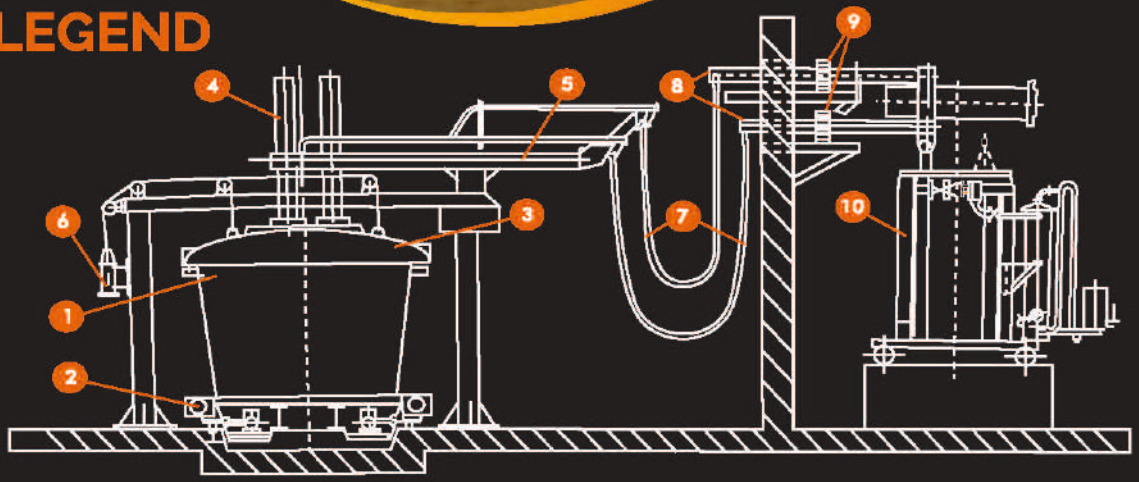
LADLE REFINING

Sl.No.	Capacity	Ladle Dia. At bathlevel (mm)	Capacity of Transformer (Nominal)	Electrode Diameter
1	10	950	2000	8"
2	12	1060	2500	8"
3	15	1160	3000	8"
4	18	1270	3600	10"
5	25	1500	5000	12"
6	30	1630	6000	12"
7	35	1761	7000	12"
8	40	1882	8000	14"
9	45	1996	9000	14"
10	50	2104	10000	16"
11	60	2306	12000	16"
12	70	2491	14000	16"

LADLE FURNACE

WITH COVER ARRANGMENT

LEGEND



1	Ladle
2	Ladle Car
3	Cover
4	Electrode
5	Conducting Arm
6	Cover Lifting Arrangement
7	Water Cooled Cables
8	Busbar Arrangement (L. T. Side)
9	Current Transformer
10	Transformer
11	Conventional Arm
12	Tiltable ladle transfer car
13	Mechanized slag Raking Sytem

1700+ Customers & 3000 installations in 40 countires worldwide

OUR CLIENTS..

....AND MANY MORE

megatherm

An ISO 9001 : 2015 Company

Corporate Office :

Megatherm Induction Limited

Megatherm Tower

Plot L1, Block GP, Sector V, Electronics Complex, Salt Lake City,
Kolkata - 700 091 India,

Works :

Megatherm Induction Limited

Plot No. H1/H2, Vidyasagar
Industrial Park, Vill: Rupnarayanpur PO: Jakpur, Dist: Paschim Mednapur,
Kharagpur - 721 301, India

+91 33 4088 6200

sales@megatherm.com

www.megatherm.com