

**MELTING FURNACES:**

**IN METALLURGY AND FOUNDRY PRODUCTION**

**Steel**  
low-carbon steel  
alloy steel  
structural steel

**IN SPECIAL ELECTRIC METALLURGY**

**Cast iron**  
grey cast iron  
high-strength  
cast iron  
alloy cast iron

**IN ORE THERMAL INDUSTRY**

**Aluminium  
and alloys**

**Copper  
and alloys**

**IN FERROALLOY INDUSTRY**

**Cobalt  
Nickel  
Manganese**

**Vacuum arc furnaces  
Electroslag remelting furnaces  
Vacuum induction furnaces**

**Ferroalloys**

**Silicon**  
metallurgical-grade silicon  
pure silicon

**Silicoaluminium**

**Refractory materials**  
fused refractories  
mineral cotton  
carbonaceous  
materials (calcination,  
graphitisation)

**Abrasives**  
electro-corundum  
carborundum

**Chemical products**  
calcium carbide  
phosphorus

**Matte**  
copper  
nickel

**Addition alloys**

**Modifiers**

**Deoxidisers**  
calcium silicate  
complex addition alloys

**Industrial**  
waste utilisation  
extraction of ferroalloys  
slag





## ENGINEERING

Computer project for a standard COMTERM's furnace at the customer's shop

## PRODUCTION

Production and ISO 9001-certified quality control  
Control assembly and cold tests

## IMPLEMENTATION

Supervised installation, adjustment  
Implementation of new technologies  
Service maintenance  
Spare parts

### COMTERM supplies the following:

#### I. ELECTRIC ARC FURNACES for foundry production

#### II. ORE THERMAL FURNACES for production of metals and alloys:

1. Direct current furnaces,  
100 kg to 50 tons

- a) Steel melting
- b) Cast iron melting, including synthetic and high-strength cast iron
- c) Aluminium and aluminium alloys melting
- d) Copper alloys melting

2. Alternate current furnaces,  
1.5 to 50 tons

- a) Steel melting
- b) Cast iron melting



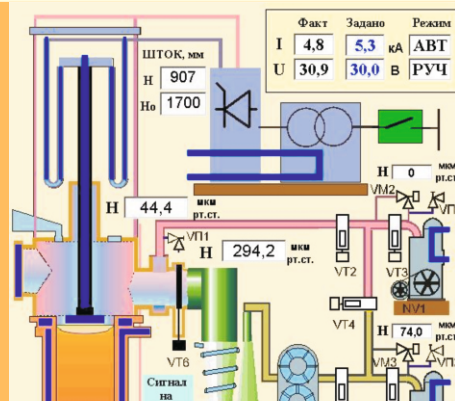
DPS-12 No. 2, VKM-Stal LLC, Saransk, 2007

- Silicon metal
- Silicomanganese
- Silicocalcium
- Silicoaluminium
- Ferrosilicon
- Ferromanganese
- Ferrochrome
- Ferrotitanium
- Ferrovanadium
- Ferronickel, nickel matte
- Calcium carbide
- Silicium carbide
- Corundum, Bacor

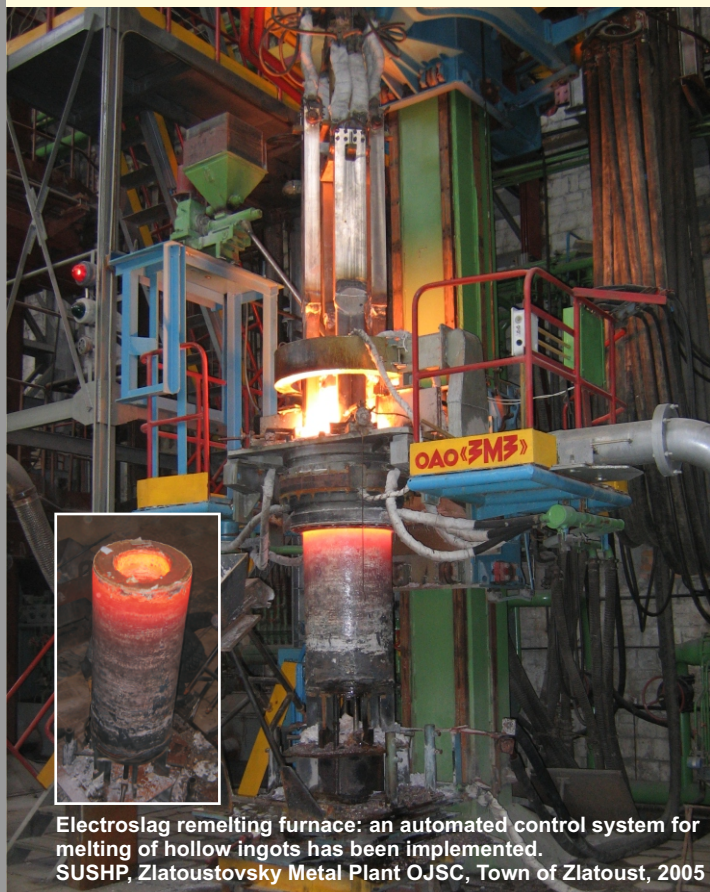
Furnace capacity is significantly increased by using modern hydraulic or electromechanical drives, power sources, control systems. Operating our automated control systems does not require the personnel to have any special knowledge in the field of computers, the information is given in an easy-to-use form (including graphic coloured mnemonic diagrams of the process, dynamic diagrams of changes in the principal parameters of the process, conditioning of melting, diagnostics of the equipment performance).

#### Furnace delivery package:

- Mechanical part of the furnace;
- Hydraulic equipment;
- High-voltage equipment;
- Thyristor and transistor rectifiers;
- Power transformer;
- Low-voltage equipment;
- Furnace automated control system;
- Auxiliary equipment (feeding equipment, ladles, ladle cars, etc.).



#### III. VACUUM ARC FURNACES, ELECTROSLAG REMELTING FURNACES



Electroslag remelting furnace: an automated control system for melting of hollow ingots has been implemented.  
SUSHP, Zlatoustovsky Metal Plant OJSC, Town of Zlatoust, 2005



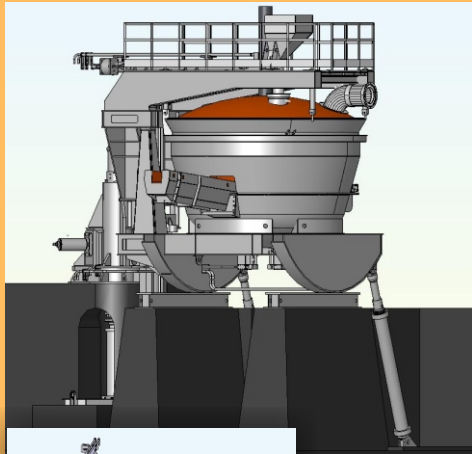
#### Control system functions:

1. Furnace mechanisms monitoring and control;
2. Hydraulic power unit monitoring and control;
3. Technological process parameters control;
4. Power input programmed control;
5. Automated arc ignition and short-circuit clearing;
6. Equipment protection and diagnostics, alarm system;
7. Metal temperature measurement;
8. Automated calculation of melting period termination;
9. Displaying of current information on the screen in an easy-to-use form;
10. Registration of parameters, conditioning, and recording of melting;
11. Smart support of mode selection;
12. Videomonitoring of the process.

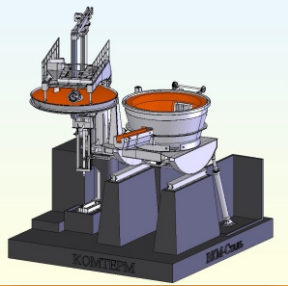
#### IV. АВТОМАТИЗАЦИЯ СУЩЕСТВУЮЩИХ ПЕЧЕЙ (комплексов) поставка комплектных систем управления: Автоматизация дуговых, электрошлаковых, вакуумных дуговых, вакуумных индукционных, вакуумных печей сопротивления



# Engineering Process: Implementation of a standard COMTERM's furnace, creating of a unique installation in accordance with the customer's requirements



First melting on furnace DPS-12 No. 2, VKM-Stal LLC, town of Saransk 2007  
Left to Right: the plant's general director, Elektrovypryamitel's deputy chief engineer, Elektrovypryamitel's engineer, COMTERM's engineer, COMTERM's leading software developer



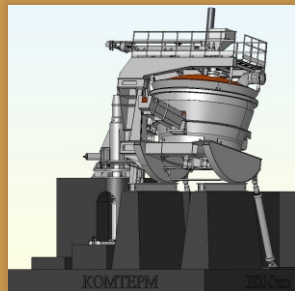
Lifting and rotating of the roof for batch loading



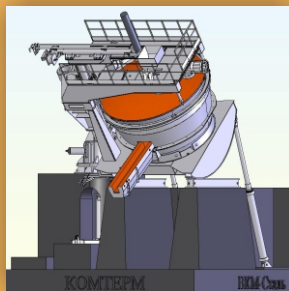
Left to right: COMTERM's head of automation department, COMTERM's general director, representative of the managing company



Prior to delivery, all structures and mechanisms are checked in two steps:  
1. Computer-aided modelling of the entire process;  
2. Control assembly of the performance parts.



Tilting to the working door for slag removal



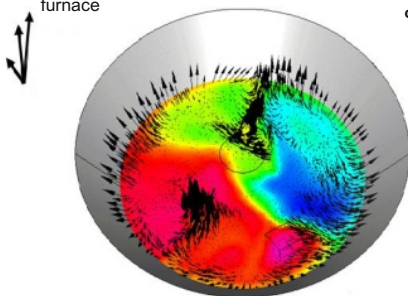
Tilting of the furnace for full metal discharge

The use of modern engineering technologies enables us to produce new high-quality equipment within a short time.

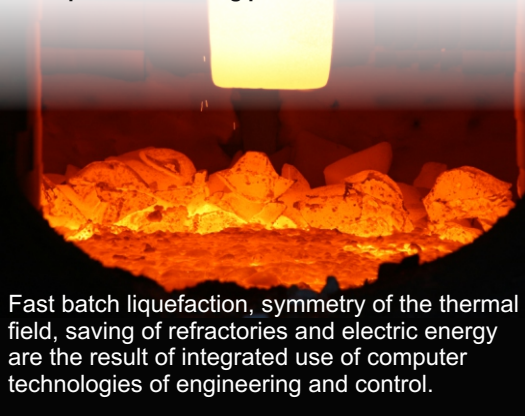
The arrows shows the direction and speed of melting in the DPS-12 furnace

Concentration of alloys

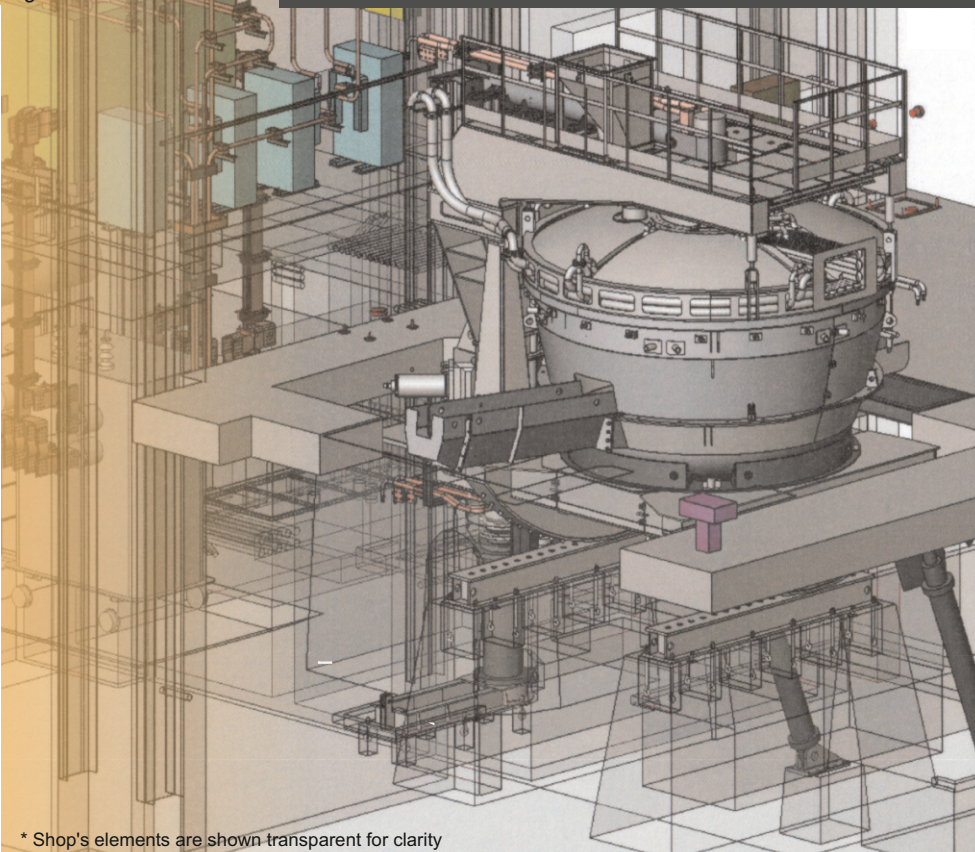
C, %  
0.68  
0.65  
0.60  
0.55  
0.50  
0.45  
0.40  
0.35  
0.30



A specially developed software allows to model the liquid metal mixing process in the arc furnace



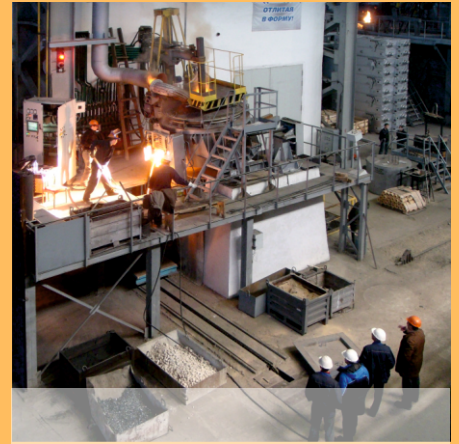
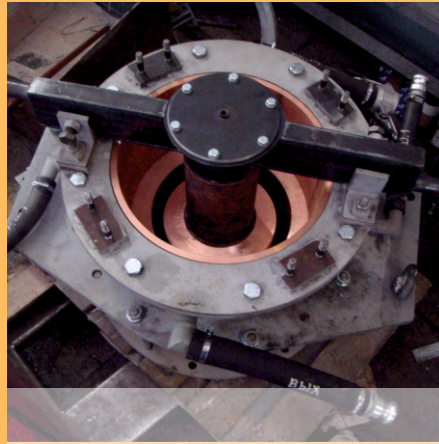
Fast batch liquefaction, symmetry of the thermal field, saving of refractories and electric energy are the result of integrated use of computer technologies of engineering and control.



\* Shop's elements are shown transparent for clarity

Thus, we deliver only checked and tested mechanisms, structures, and furnaces.





## ELECTRIC ARC FURNACES

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