Titanium

Metal production

Electric beam furnace production

Production of hollow ingots for seamless pipes
Technology and equipment for electric beam melting is science intensive technology and at the present day well developed only in six countries: Ukraine, USA, Germany, Japan, Great Britain and China.

Volume of metal, processed by electric beam method of melting, constantly grows every year and equals this days about 50000 ton per year, due to high quality of metal, which could not be obtained by different melting methods.
Electric beam furnace

- Furnace consists of well tested units, that allows to operate for a decades in high temperature environment. Unique engineering technology is the base of furnace reliability.

- High voltage glow discharge electron beam gun is low sensitive to pressure changes in a processing chamber, vapor exposure, even metal splatter during the melting process. Electron beam furnaces are noted for simple design, use of accessible materials, they are durable in operations and don’t need additional high vacuum pumps.
Performance capabilities of electric beam melting technology

- Implementation of cold-hearth melting process with maximum refinement effect;
- Cost efficient melting process based on opposite horizontal feeding with simultaneous melting of consumable materials;
- Melting of non compact (spongy titanium, scrap), pallet or bar batch with minimum expenditure for pretreatment;
- High efficient melting process of chemically active and refractory metals due to operation of high voltage glow discharge electric beam guns, which operate stable at 1,33…0,133 Pa pressure;
- Simultaneous formation of two and more ingots;
- Ability to control metal solidification process for specified structure of ingots;
- Minimum waste, ability to use low grade spongy titanium without pretreatment process.
Technical characteristics of melting furnace VTO 1

- Mains supply voltage, 50 Hz 380 V
- Installed capacity of electron heating, 2800 kWt
- Accelerated potential, 30 kV
- Number of electron guns, 7 pcs.
- Vacuum pump capacity, 75 m³/s.
- Operating vacuum, 1,33…0,133 Pa
- Cooling water consumption, 120 m³/hr.
- Maximum size of loading container (h x w x l), m 0,6 x 0,8 x 2
- Number of loading devices, 2 pcs.
- Number of containers for one load, 6 pcs.
- Furnace dimensions (h x w x l), m 17,5x20x16
- Final ingot dimensions:
  - round (d x l), m 0,37 … 0,82 x 4
  - rectangular (w x t x l), m 1,1…1,35 x 0,18…0,4 x 4
УЧАСТОК ПЛАВИЛЬНОГО ПРОИЗВОДСТВА
MELTING DEPARTMENT

Камера слитка в зоне выгрузки
Ingot chamber in unloading zone

Выгрузка слитка
Extraction of an ingot
Характеристика портально-фрезерного станка
Максимальная длина обрабатываемого слюба — 5 метров
Максимальная ширина обрабатываемого слюба — 1600 мм
Максимальная толщина обрабатываемого слюба — 1400 мм

 Characteristics of a portal-milling machine
Maximum length of a machined slab is — 5 meters
Maximum width of a machined slab is — 1600 mm
Maximum thickness of a machined slab is — 1400 mm

Характеристика токарного станка
Максимальная длина слитка — до 8 метров
Максимальный диаметр слитка — 900 мм

 Characteristics of a turning lathe
Maximum length of an ingot is — up to 8 meters
Maximum diameter is — 900 mm

Характеристика ленточнопильного станка
Eversing H-1300
Зона резки: 1350 × 1350 мм
Ширина реза: 2 мм
Production

Company supplies titanium ingots by the order:

- **Round** - diameter from 370 to 800 mm and length up to 4 m.
- **Rectangular** - (slabs) width 1300 mm, thickness from 190 mm to 400 mm and length up to 4 m.
- Development of specific alloys according to the customers need.
Round and rectangular ingots obtained using electric beam melting technology
New inventions

Изготовление узлов установки ВТО2 для ЭЛП титановых и жаропрочных сплавов
Manufacturing of VTO2 installation components for EBF for titanium and superalloys
Technical characteristics of melting furnace VTO 2

- Mains supply voltage, 50 Hz, 380 V
- Installed capacity of electron heating, 3200 kWt
- Accelerated potential, 30 kV
- Number of electron guns, 7 pcs.
- Vacuum pump capacity, 100 m³/s
- Operating vacuum, 1,33…0,133 Pa
- Cooling water consumption , 180 m³/hr.
- Maximum size of loading container (h x w x l), m 0,68 x 0,91 x 2
- Number of loading devices, 2 pcs.
- Number of containers for one load, 4 + 2 pcs.
- Furnace dimensions (h x w x l), m 17,5x20x16
- Final ingot dimensions :
  - round (d x l), m 0,64 … 1,1 x 5
  - rectangular (w x t x l), m 1,1…1,35 x 0,18…0,4 x 5
Currently brand new technology is been developed. This technology allows to obtain work piece for pipe production in the form of hollow ingot.

Use of hollow ingots in pipe production reduces the number of process steps, which leads to energy consumption improvement by 30% in the industrial production of pipes.

Ability to design and install electric beam furnaces and equipment for hollow ingot production according to customer need.
Hollow ingot for titanium pipes production
Terms and service

Period of design and assembly for a furnace capacity 3000 t per year – 18 months. For hollow ingots, which could be used as work piece for pipe production, additional equipment for VTO 2 furnace is required, or new special furnace could be assembled.

Additional transfer of technology, personnel training, after sales service provided based on agreement with customer.