

REVOLUTION IN ELECTRICALLY HEATED WIRE ANNEALING FURNACE

DESCRIPTION:

Electric Resistance Furnaces are widely used in Wire Industry. In Wire Industry Annealing Furnace is used to normalize the drawn wires for redrawing process. Due to cold drawing process, the outer surface area of wire would be more heated than core diameter. This difference in temperature develops stress in the wire, becomes hard & brittle in nature. To soften the material for redrawing process, proper Annealing is required in Furnace.

Annealing Process

Bundle of drawn wires to be heated up to 750°C , inside a totally heat insulated closed Chamber and then cools slowly to get normal structure of Steel. Total process takes 5 to 6 hours per batch.

Constructional Features & Advantages:

The Electric Resistance heating Annealing Furnace consists of a) Under-ground furnace chamber, b) Stainless steel Inner shell, c) Insulation Lining, d) Heating Coil Zones, e) Cooling Pit, f) Coil Charging Hook, and g) Control Panel & Buss Bar.

a) Furnace chamber is basically of cylindrical mild steel Shell with detachable plate fabricated top cover. But we have designed the Furnace Chamber in form of Hexagonal type. The hexagonal structure makes the chamber more rigid. Bottom cover plate is detachable type, fixing by nut-bolts. Total structure of furnace is resting over five heavy footing to maintain minimum 8" inch gap from floor. This bottom gap save the structure on long run from under-ground moisture & unwanted heat loss. Hexagonal type structure makes easier to locate coil setting direction to the Buss bar & Panel connections. In this planning we can decide to make under-ground concrete chamber.

b) In the Electric Resistance Furnace the Wire coils (to be annealed) are not allowed to be heat directly. One Stainless Steel inner cylindrical shell is provided to transfer heat indirectly to the wire coils. At first the S. S. Shell will be red hot and radiate the heat to the coils uniformly. So the material quality after annealing would be better than any other Furnace. But Annealing charges are more, depends upon the Electric unit rates.



Hexagonal Furnace Structure



Electric Annealing Furnace



Red Hot Coil In The Furnace



18 Nos. Heating Coils



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c) Usually Insulation Lining was mainly done by hot face, cold face, and arch bricks so and so in early days. But technology changes, total insulation lining concept changes for cost effectiveness, light weight for transporting, long lasting, easily maintained. Now we use Ceramic Blanket of high grade (Resist 1200 deg. Centigrade) of 7 to 8 layers. In this Pit type furnace maximum temperature is used 750' C. So, easily we have reached success in Insulating the inside temperature. Another important advantage here, that we make total blanket insulation at our works and transporting the Furnace in complete in all respect.



Ceramic Blanket Insulation

d) Resistance Heating Coils are made from 10 to 12 gauge Nicrome or Kanthal wires. These heating coils are set in circular (Hexagonal way, as shown in picture) path, outside the S. S. Shell. We have used Ceramic Tubes and ceramic brackets to hold in Heating Coils in proper position. In one side two ends of Each Coil comes out through ceramic collar tube and connected to the Electrified Buss bar. We have a provision to set 18 nos. coils inside the furnace. Each Coil has 4 Kw.hr rating approximately. Party has been using the Furnace capacity according his Sanctioned Electric Power. Maximum Power required 75 Kw.hr. (Line Voltage should be 440 volt.). The Furnace Capacity can be enhanced to increase the no. of Coils up to 24 nos.. Furnace capacity will be increased and Power consumption also increased.



Insulation Arrangement

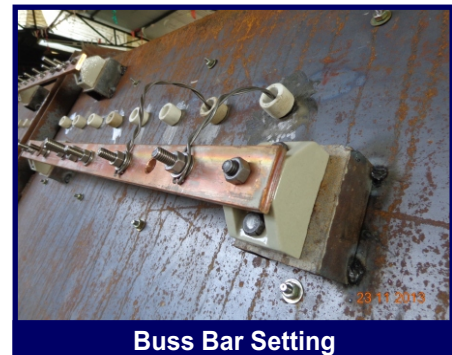
e) Cooling Pit is very important to cool the heated material slowly. Cooling Pit can be made of Red or Fire bricks lined cylindrical chamber with cover. Mainly 12 gauge Wire Bundles are required to cool slowly for easy redrawing purpose after Annealing properly.



Heating Coil Setting

f) Coil Charging Hooks are used to loading and unloading wire coils in to Furnace Chamber. We have made the loading hook very simple and rigid for long lasting. Hooks are different for 12 gauge wire bundle and 22 gauge wire bundle. Hook is designed in such a way; the heat can flow easily in to the Coils.

g) To facilitate measurements and control of Temperature within the Furnace. provides a Control Panel with necessary measuring instruments. The Temperature Control Panel is fully automatic.



Buss Bar Setting

TECHNICAL DATA

1. Furnace Capacity: 1.5 / 2.0 Tons 12 gauge Wire Bundle per Batch.
2.0 / 2.5 Tons 22 gauge Wire Bundles per Batch.
2. Outside Diameter: 2.5 Meter or 8'-0" Feet.
3. Inside Diameter: 1.2 Meter or 4'-0" Feet.
4. Effective Depth: 2.0 Meter or 6'-6" Feet
5. Max. Temperature: 750 Degree Centigrade
6. Power Rating: 60 Kw.Hr. to 100 Kw. Hr.
7. Mat'l Loading: 3 Ton Electric Hoist
8. Power Supply: 440 Volt, 3 Ph, AC.
9. Batch Time: 5 to 6 Hours.



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