Surface Combustion / British Furnace Super H30 Sealed Quench Hardening And Tempering Furnace Line

Stock Code: MEL200  
Manufacturer: Surface Combustion  
Model: 1 Ton,  
Year of Manufacture: 1990  
New or Used: Used (Second Hand)  
Max Temp: 1100°C  
Other Info: Refurbished in 2005 for £89,000.00

British Furnace Sealed Quench Hardening And Tempering Furnace Line

This plant is coupled with companion equipment of Tempering Furnace, Washing Machine, and automated Charge Transfer Car - all designed for maximum reliability.

Load Size: 760mm (w) x 1220mm (d) x 760mm (h)  
Load Size: 30”(w) x 48”(d) x 30”(h)

Refurbished in 2005 at a cost £89,000.00 (circa 2016 - £120,000.00)  
Not used in production since

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Home > Ovens & Furnaces > Industrial Furnaces >
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Consisting of: 1 Ton British Furnace Gas Fired Sealed Quench Furnace British Furnace Front Loading Tempering Furnace British Furnace Component washing Unit British Furnace Protective Gas Generator Traversing Ride On Charge Cart Spare Retort for Generator Spare Fan and Shaft for Furnace Spare Burner Exchange Tubes for Furnace The Metal Hardening Line

The use of this treatment line will result in an improvement of the mechanical properties, as well as an increase in the level of hardness, producing a tougher, more durable finished product. Alloys are heated above the critical transformation temperature for the material, then cooled rapidly to cause the soft initial material to transform to a much harder, stronger structure. Then products are cooled by quenching in oil. The hardened materials are then tempered or stress relieved to improve their dimensional stability and toughness.

Steel is essentially an alloy of iron and carbon; other steel alloys have other metal elements in solution. Heating the material above the critical temperature causes carbon and the other elements to go into solid solution. Quenching "freezes" the microstructure, inducing stresses. Parts are subsequently tempered to transform the microstructure, to achieve the appropriate hardness and eliminate the stresses.

Metal Quenching
Material is heated up to the suitable temperature and then quenched in oil to fully according to the kind of steels being processed.

Material is heated to the suitable temperature for hardening, then cooled rapidly by immersing the hot part in oil to transform the material to a fully hardened structure. Parts which are quenched usually must be aged, tempered or stress relieved to achieve the proper toughness, final hardness and dimensional stability.

Metal Tempering
Tempering is done to develop the required combination of hardness, strength and toughness or to relieve the brittleness of fully hardened steels. Steels are never used in the as quenched condition. The combination of quenching and tempering is important to make tough durable parts.

Tempering is effective in relieving stresses induced by quenching in addition to lowering hardness to within a specified range, or meeting other mechanical property requirements.

Tempering is the process of reheating the steel at a relatively low temperature leading to precipitation and spheroidization of the carbides present in the microstructure. The tempering temperature and times are controlled to produce the final properties required of the steel. The result is a component with the appropriate combination of hardness, strength and toughness for the intended application. Tempering is also effective in relieving the stresses induced by quenching.

Major installation components:

The British Furnace Super H30 sealed quench furnace was built under licence from Surface Combustion to their Alcase design and then again rebuilt by HT Services with Almor controls in 2005.
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The high build quality, versatility, and thoughtful design of this furnace makes it the premier furnace for all atmospheric heat treatment operations with a large 900 kg gross charge weight.

Furnace applications under endothermic, exothermic or other common protective atmospheres:-

Carbon restoration, Nitemper, Bright hardening, Normalising, Carburisation, Carbon nitriding, Carbon-free bright annealing

The special design features of the furnace include:

- Compact modular design
- Wear resistant flat hearth with high load capacities (900kg)
- Powerful direct atmosphere circulation with large fans directly within the muffle for excellent temperature uniformity
- Gas heating with high heating rates resulting in high hardening capacity
- Internal transfer unit for heavy loads
- Separate control panel with full SSi carbon potential monitoring and adjustment

Advantages:

- Complete treatment cycle takes place in a protective or reactive atmosphere
- No formation of oxide during the entire treatment
- Treatment and transfer of load in furnace is fully automatic within the unit
- Range of application up to 1100°C
- High output with low space requirements
- Minimum effect on the environment
- Low protective gas consumption
- Low outer furnace wall temperatures
- No foundations needed for erection
- Adapts easily to required temperature alterations
- Treatment temperatures and carbon level of endothermic atmospheres can be altered during the cycle without removing the load
- Rapid change from one treatment process to another
- Martempering in oil possible up to 150°C quench bath temperature

This optimised furnace design ensures:
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Even heat transfer, shielding of the charge from direct heat radiation, and transfer of the recirculated furnace atmosphere through a muffle throughout all stages of the heat-treatment process. Good access to heating chamber “burnout” each time door is opened. Furnace is loaded during atmospheric quench. The atmospheric chamber furnace has a modular design and is made of standardised assemblies. The furnace casing consists of a sturdy sheet steel structure. The light-weight refractory lining inside the furnace is designed for temperatures well above the working temperature and has an extremely long service life. The maintenance-friendly, tight-closing door system Easy replacement of the muffle. The double-wall oil bath is in accordance with the requirements of the Water Resources Act.

Features

Suitable for carburising, carbonitriding, normalising, annealing, case hardening with forced gas cooling/oil quenching facility. Gas fired heated. Protective atmosphere can be Endothermic gas, Methanol + N2 or Rapid Carb [LPG + air (in-situ)]. Supplementary washing machine with single chamber/double chamber and tempering furnace to suit also available. Fully automatic with PLC and PC based data logging/Scada software system/O2 probe for furnace atmosphere control. In/out version for carburising/annealing. Straight through version for oil quenching. Data acquisition system. 1000 kg gross loading capacity. Furnace conformance according to API-6A norms.

British Furnace Protective Gas Endothermic Generator

The British Furnace Protective Gas Endothermic Generator is used for carburising processes and other heat treatments under protective gas, where the carbon exchange with the work piece surface plays a role, making high demands on the controllability of the atmosphere.

The carrier gas procedure using endogas, offers the best conditions for:

Exact process control. Reproducibility of the final results. High quality requirements.

The British Furnace Endothermic unit is currently being operated in the 55m³/h nominal capacity range.

British Furnace Tempering furnace

The British Furnace is a front loading batch Tempering furnace which is ideal for stress relieving, normalising and annealing of heat treated general machined components.

The components to be heat treated can be placed in the furnace in the same baskets as that are used in the seal quench. The configuration of the furnace allows direct loading of components from the charge cart.

The design of this furnace is simple and easy to maintain, yet has proven to be very robust even in the most arduous of heat treatment environments.

Features include:-
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West digital temperature controllers
Integrated door safety cut out switch
Thermal brick lining
Vertical uprising door
with easy lift lid mechanism
Long life nickel-chromium heating elements

British Furnace Component Washing Unit

The Washing machine is designed primarily for pre and post washing functions i.e. for pre washing light machine oil before processing and post washing of parts after quenching to remove any residual quench oil.

The Washing Machine is a part of the batch furnace installation for the Sealed Quench Furnace, where under normal circumstances post washing of the components to remove any residual quench oil after quenching is mandatory before processing in the Tempering Furnace. Sometimes, prewashing is also carried out before preheating operation.

The Washer is normally placed in between the Sealed Quench Furnace and Tempering Furnace and charge loading and unloading is carried out by the Unloading/Loading cart.

View Surface Combustion / British Furnace Super H30 Sealed Quench Hardening And Tempering Furnace Line on our web site at https://www.rileysurfaceworld.co.uk/machines/27281.htm

PHOTOGRAPHS TAKEN PRIOR TO REFURBISHMENT.