The AFC-Holcroft Advantage
AFC-Holcroft’s integral quench furnaces are designed for neutral hardening, carburizing, carbonitriding, normalizing, and annealing where a controlled environment is required during the heating and quenching portions of the cycle. An optional atmosphere cooling chamber can be provided in addition to our integral oil, salt, water, or polymer quench systems. The furnaces are designed for a normal operating temperature range of 1450-1750°F (790-955°C) with a maximum of 2000°F (1100°C).

Objectives
In developing the modularly constructed universal batch system, our objective was to build a system with state-of-the-art technology which is easily serviceable, delivers the highest production as compared to other commercially available systems, delivers consistently high quality with predictable and repeatable results, and is able to perform a large variety of metallurgical processes. After you have examined our brochure, talk to one of our satisfied customers or visit one of AFC-Holcroft’s installations in your area.

Quality
Universal batch systems are designed to provide excellent temperature uniformity and uniform distribution of atmosphere in the entire work area. Our patented “upflow” quench agitation provides high volume and velocity for uniform quenching of work. Reliability, predictability and repetitiveness are a trademark of our systems. Our systems produce consistently high-quality product with close metallurgical tolerances, day after day.

Productivity
In a typical batch system, productivity is measured in terms of gross load, recovery rates, and ability to quench or uniformly cool these large loads. Our universal batch systems handle gross loads of 1100 to 6000 pounds (500 to 2730 kg). In all sizes, we maintain a ratio of 3:1 in internal chamber radiating area to work surface area, and provide larger 8-inch (203mm) diameter radiant tubes to effectively and uniformly heat the products at a faster heat-up rate than other comparable systems. In our UBQ 36-48-36 system, the 12,640 sq.in. (81.6 m2) surface area of the radiant tubes delivers a large number of BTUs to the product at an optimal rate.

Our quench capacity is approximately 1 gallon of quenchant per pound (3.78 liters of quenchant per kg) of quench load. This, coupled with our upflow quench agitation system, not only provides uniform quench severity, but also minimizes instantaneous temperature rise of the quench media.

Serviceability
Universal batch systems are designed and built to perform reliably for long periods with minimal maintenance. Of course, if any component has to be repaired or replaced, our modular plug-style construction enables quench and easy replacement from outside with minimal downtime.

Flexibility
Universal batch systems are developed to provide the flexibility of metallurgical processes and layout. Our systems can be arranged close to plant walls to provide the most effective use of floor space. They can be fully automated to minimize operator interaction and installed in line with modern “flex” production centers.

Companion Equipment
AFC-Holcroft’s universal batch systems are offered complete with all companion equipment such as tempering furnaces, pre-oxidation furnaces, spray-dunk washers, forced air cool stations, scissors lifts, stationary tables, and our complete line of fully automated transfer cars designed for maximum reliability. Our universal batch systems can be fully integrated into “production cells” with automatic transportation and controls.

Innovative features and technologies make the AFC-Holcroft difference
Universal Batch Furnace
The AFC-Holcroft universal batch furnace casing is fabricated of 3/16 inch and 1/4 inch steel plates suitably reinforced with structural steel to form a gas-tight chamber. The walls of the furnace are insulated by 9 inches of insulating firebrick backed by 4-1/2 inches of insulating block. Ceramic fiber modules are utilized in the roof of the furnace and the floor is lined with insulating firebrick. The hearth consists of two cast alloy piers for superior atmosphere circulation under the load. These heavy-duty roller rails are provided in super alloy materials to minimize maintenance.

AFC-Holcroft offers both gas-fired and electric heating systems. The gas-fired heating system consists of alloy U-tube assemblies mounted vertically in the roof to provide more effective utilization of available tube heating area. We offer optional high-efficiency
recuperators for further energy savings. Our electric heating system consists of vertical tubes containing bayonet-type elements on either side of the work load. This design permits external element maintenance without the necessity of completely cooling the furnace chamber. All of our radiant tubes are bung mounted for easy removal and replacement.

A high-capacity recirculating fan is provided in the heating chamber to provide sufficient atmosphere circulation to obtain uniform atmosphere consistency within the furnace chamber. The fan is supplied with an air-cooled insulated bearing housing and is bung mounted so it can be removed as a complete assembly without entering the furnace chamber. No water piping is required to the fan, reducing utility costs.

The quench tank is fabricated of 1/4-inch (6.35mm) plate and reinforced with structural members to form a rigid, liquid-tight and gas-tight chamber. The AFC-Holcroft quench systems are designed to obtain an upward flow of recirculated quenchant through the work load area. Vertically mounted propeller-type agitators are mounted on the sides of the vestibule. Our space-saving narrow quench tank design has a capacity of approximately 1 gallon per pound (3.78 liters per kg) pit to obtain the 50-inch (1270mm) hearth height. A double deck elevator system is provided to minimize reloading times.

The universal furnace is designed to operate with an external handler to minimize internal furnace mechanisms. The rear handler drive is mounted in the back wall of the furnace to provide for automatic transfer of the work load from the furnace to the quench tank after a completed cycle.

Pioneering Technologies

Austempering – UBQA
AFC-Holcroft is the clear leader of integral molten salt quench furnace design. Our integral austemper quench systems operate in a temperature range of 350-800°F (180-430˚C). Our exclusive water injection system can provide quench severities similar to a water quench and can through harden up to 6-inch (152mm) thick cross sections. Our universal batch quench austemper furnaces are designed for neutral hardening, carburizing, carbo austempering, normalizing, annealing, austempering steel, and austempering ductile irons (ADI).

Intensive Quenching – UBQI
A spin-off of our successful UBQA furnace design, the UBQI was developed for the growing IntensiQuench® market. Intensive quenching is a very rapid and uniform cooling of steel parts that causes the simultaneous formation of martensite throughout the whole part surface, creating a firm shell. IntensiQuench martensite is characterized by finer structure with higher dislocation density and improved mechanical properties — “micro-hammered” — through higher residual compressive stresses. This strong martensite case or shell minimizes part distortion.

IntensiQuench® is a registered trademark of IQ Technologies.

BatchMaster
AFC-Holcroft’s popular BatchMaster INDIVIDUAL batch furnace management package is based upon a subset of our highly successful ProcessMaster® heat-treating supervisory system. The main operator HMI interface is a NEMA 4 industrial panel PC with color LCD touch screen. This HMI communicates directly to the batch furnace PLC controller for complete operational control. A variety of standard screens are provided for viewing mechanism and recipe status, control loops, process trending and other analog and digital status. All process parameters are read every second and recorded every minute. The built-in disk storage will handle 10 years of process data.

The BatchMaster HMI communicates directly with the PLC for temperature and carbon control.
Standard UBQ Arrangement and Components

Join the next generation today!
To learn more about how the Universal Batch Quench Furnace can give you the edge over the competition, contact us. Wherever your business is located, AFC-Holcroft can provide you access to an unparalleled level of consultation and support that ensures you get the maximum value from your investment dollar.

UNIVERSAL BATCH QUENCH (UBQ)

<table>
<thead>
<tr>
<th>Model</th>
<th>Effective Load Size</th>
<th>Gross Load Capacity (pounds) @ 1750 F</th>
<th>Heating Rates (lbs/hr) 1550 F 1700 F</th>
<th>Energy Requirements BTU x 1000 HPKW</th>
<th>Atmosphere Required (CFH)</th>
<th>Quench Tank Volume (Gallons)</th>
<th>Agitation (GPM)</th>
<th>Dimensions L W H</th>
</tr>
</thead>
<tbody>
<tr>
<td>UBQ-364836</td>
<td>36” x 48” x 36”</td>
<td>3500</td>
<td>2700 2400</td>
<td>1200 144 30</td>
<td>750</td>
<td>3500</td>
<td>16000</td>
<td>20’0” 13’0” 17’11”</td>
</tr>
<tr>
<td>UBQ-367236</td>
<td>36” x 72” x 36”</td>
<td>6000</td>
<td>2875 2560</td>
<td>1800 216 40</td>
<td>1000</td>
<td>5950</td>
<td>24000</td>
<td>22’0” 13’0” 17’11”</td>
</tr>
</tbody>
</table>

AFC-HOLCROFT
World Headquarters
49630 Pontiac Trail
Wixom, MI 48393 USA
Phone: +248 624 8191
Fax: +248 624 3710
sales@afc-holcroft.com

AFC-HOLCROFT
Europe
Route de France 17
2926 Boncourt
Switzerland
Phone: +41 32 475 5616
europe@afc-holcroft.com

AFC-HOLCROFT
Asia
Unit 1912-1913, Founder Tower
No. 1122 Xin Jin Qiao Road
Pudong, Shanghai 201206, P. R. China
Ph. +86 21 5899 9100
asia@afc-holcroft.com

ProcessMaster is a registered trademark of AFC-Holcroft. Bulletin No. TB UBQ-1215