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AFC HOLCROFT

industrial furnace solutions

UBQ: Universal Batch Quench Furnace

Ultimate in Flexibility and Versatility

Reliability at Work

AFC-Holcroft Advantage

Modular System Delivers Consistent High Quality, with Repeatable, Reliable Results

AFC-HOLCROFT'S INTEGRAL QUENCH FURNACES ARE DESIGNED FOR:

Neutral hardening, carburizing, carbonitriding, FNC (ferritic nitrocarburizing), normalizing, and annealing, where a controlled environment is required during the heating and quench 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).

Double-deck elevator system minimizes loading times.

Designed and built to perform reliably for long periods with minimal maintenance.

Objectives
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.

Productivity
In a typical batch system productivity is measured in terms of gross load, recovery rates, and ability to quench or uniformly cool large loads. Our universal batch systems handle gross loads up to 12,000 lbs (5440 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 (203 mm) 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. (8.16 m^2) surface area of the radiant tubes delivers a large number of BTUs to the product at an optimal rate.

Superior Quench Process
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. Our modular plug-style construction enables easy serviceability with minimal downtime when service is required.

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
- Fully automated transfer cars

Our universal batch systems can be fully integrated into “production cells” with automatic transportation and controls.

External rear handler drive can provide automatic transfer of workload from furnace to quench tank after completed cycle.

Innovative Features and Technologies Make the AFC-Holcroft Difference

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 (228 mm) of insulating firebrick backed by 4-1/2 inches (114 mm) 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 hard brick piers for superior atmosphere circulation under the load. The 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. 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 pit capacity of approximately 1 gallon per pound (3.78 liters per kg) to obtain the 50-inch (1270 mm) 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.

Among other unique features, the UBQ features a space-saving, narrow quench tank design.

KEY FEATURES AT A GLANCE

- High/low endo flow
- Multiple speed quench system
- Largest workloads in industry.
- Largest quench tank to accommodate these loads.
- Large burner input for fast heat-up. More loads = more money earned.
- Large chamber vs. load size equates to better temperature uniformity (especially for FNC).
- Tight furnace construction lends itself to FNC operations.
- Most comprehensive standard control system with BatchMaster.
- Modular construction for ease of maintenance.
- Electric bayonet elements run on main voltage without stepdown transformers.
- Most experience with automated batch lines.

Innovations and Leading Technologies

Meet or Exceed Industry Requirements for Complete Process Control

Intensive Quenching – UBQI

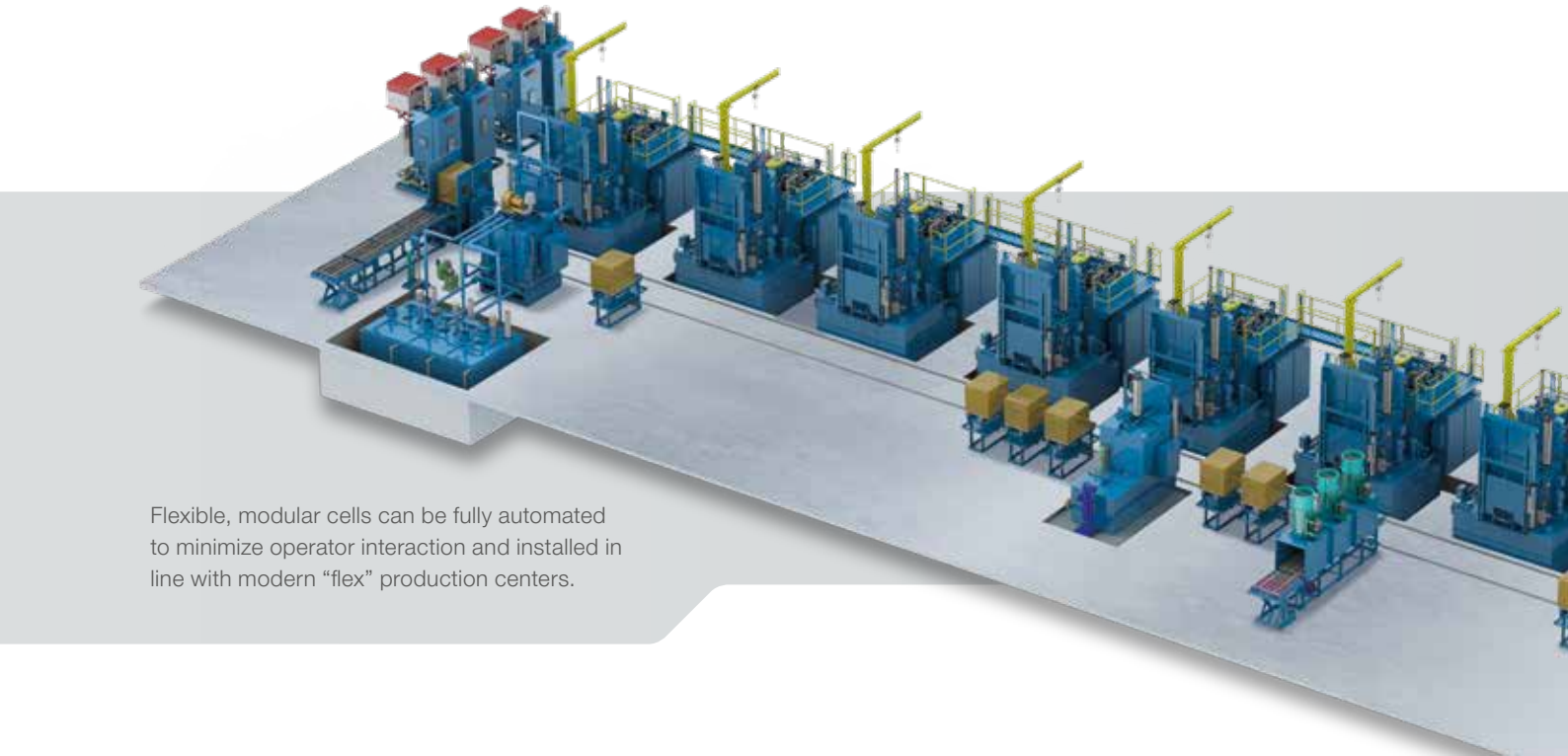
A spin-off of our successful UBQA furnace design, the UBQI was developed for the growing IntensiQuench® market. Intensive quenching is a very rapid and uniform cooling of steel parts that causes the simultaneous formation of martensite thoughout the whole part surface, creating a firm shell. IntensiQuench 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 Inc.

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.

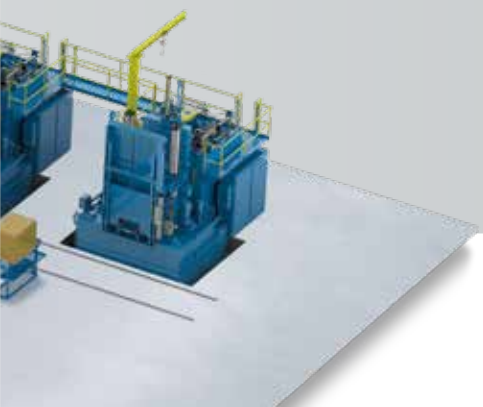


Flexible, modular cells can be fully automated to minimize operator interaction and installed in line with modern “flex” production centers.

TECHNICAL SPECIFICATIONS

	UBQ 364836		UBQ 367236	
Effective Load Size	inches	mm	inches	mm
	36“ x 48“ x 36“	915 x 1,220 x 915	36“ X 72“ x 36“	915 x 1,830 x 915
Gross Load Capacity	Pounds @ 1,750°F	kg @ 954°C	Pounds @ 1,750°F	kg @ 954°C
	3,500	1,600	6,000	2,721
Heating rates	Pounds/hour @ 1,550°F	kg/hour @ 840°C	Pounds/hour @ 1,550°F	kg/hour @ 840°C
	2,900	1,315	3,577	1,622
	Pounds/hour @ 1,700°F	kg/hour @ 927°C	Pounds/hour @ 1,700°F	kg/hour @ 927°C
	2,600	1,180	3,450	1,565
Energy Requirements	BTU	Kcal/hour	BTU	Kcal/hour
	1,200,000	302,400	1,800,000	453,592
	Motors - HP	Motors - kW	Motors - HP	Motors - kW
	30	22	56	42
Atmosphere Required	cfh	m^3/h	cfh	m^3/h
	750	21	1,000	28.3
Quench Tank	Volume - gallons	Volume - liters	Volume - gallons	Volume - liters
	3,500	13,250	6,000	22,712
	Agitation - Gallons/minute	Agitation - liters/minute	Agitation - Gallons/minute	Agitation - liters/minute
	16,000	60,500	32,000	121,133
Dimensions	L x W x H - inches	L x W x H - mm	L x W x H - inches	L x W x H - mm
	20‘0“ x 13‘0“ x 17‘11“	6,096 x 3,962 x 5,461	22‘0“ x 13‘0“ x 17‘11“	6,706 x 3,962 x 5,461

Other sizes and capacities are available.



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