

## LOW DEW POINT ALLOY RETORT BATCH FURNACES FOR INERT/COMBUSTIBLE ATMOSPHERES TO 2,200°F (1,200°C)

### APPLICATIONS

The XLC Series Atmosphere Retort Furnaces represent an advanced design that emphasizes process quality and control as well as operator safety. The control system, alloy retort and flow system are completely integrated as one unified array. Any application requiring 100% hydrogen or a mix of hydrogen, carbon monoxide, natural gas or any other combustible atmosphere (as well as any purely inert atmospheres) may be used in the XLC series. Hydrogen brazing and stainless-steel annealing are typical examples. Any batch process that can not tolerate oxygen or that requires a high degree of atmosphere reliability, repeatability and low dew point is a candidate for the XLC series. Maximum temperature is 2,200°F (1,200°C), although lower maximum temperatures are recommended for long retort life. Depending on the purity of the gas used, these furnaces can maintain a dew point as low as -60°F.

### FEATURES

#### FURNACE IS BASED ON XLE SERIES

The heating system is a modified XLE Series electric furnace. See XLE Bulletin for more information.

#### ALLOY RETORT FOR LOW DEW POINT

The XLC features an alloy retort to contain the atmosphere. This prevents oxygen infiltration, providing a very low dew point for cleaner processing and safer operation. Depending on the size and temperature, retorts are "D" shaped or corrugated for extra strength. The alloy normally used is 330 alloy, Inconel 600 or Inconel 601, but other alloys may be engineered for specific applications.



## PLUG RETORT DOOR WITH “O” RING WATER-COOLED SEAL IS EXTREMELY TIGHT

The retort door is a deep plug door (typically 12” deep). The plug is insulated with ceramic fiber inside the alloy plug. The door plug is made of the same alloy as the retort and is completely surrounded with the alloy rather than exposing the refractory to the atmosphere, as in some competitive designs. This ensures that no oxygen gets trapped in the insulation and later reenters the chamber at high temperatures. There is a silicone rubber “O” ring seal around the perimeter of the machined flange of the retort. This is cooled by water that runs in an enclosed channel. A complete water-cooling system with flow switch interrupts power to the furnace if there is no water flow. The door is closed with quick release turn-down latches. This forms an extremely tight seal and allows very low dew point operation. These seals will withstand high pressures. Most doors (except the smallest ones) feature a cart that holds the retort door. On smaller doors, handles on the door plug are included.

## ATMOSPHERE SAMPLE PORT

A sample port is provided. There is a valve to close this off when not in use. This is used to sample the atmosphere for oxygen, hydrogen, dew point, etc.

## ATMOSPHERE CONTROL

A variety of atmosphere control systems can be provided. See Bulletin H2, which describes the hydrogen flow control system, or Bulletin MPH for information on a mixing panel for forming gas. In addition, simple regulators/flowmeters can be provided for inert gas use. Back pressure control, pressure relief and gauge are included.

## DIGITAL PID CONTROL SYSTEM

The standard control is a Honeywell UDC 2500 digital PID 3 mode tuning control. All fuses, transformers, contactors and controls are housed in a NEMA 1 panel. If hydrogen is used, then a purged NEMA 12 control panel is standard. Quiet, long-life solid-state contactors are standard, but the SCR power control option is recommended. The thermocouple is Type K. Thermocouple break protection is included. Limit switches shut off furnace power if the door is opened or the power panel back is removed.

Control voltage is transformed to 120 volts. A NEMA 13 lighted on/off switch is included. The control circuit and each power branch circuit are fully fused. A Honeywell UDC 1200 digital high limit backup control with manual reset, backup contactors and separate thermocouple is included. The thermocouple for the high limit control is located between the retort and elements. NEMA 1 panels must be connected to a fused power supply. NEMA 12 panels have a fused disconnect switch.

## OPTIONS

- **MOST OF THE XLE OPTIONS:** See Bulletin XLE and Options Bulletins. Fans are not available.
- **STARTUP SERVICE:** A factory technician will start up the furnace in your factory, leak test the entire atmosphere system, make all adjustments on site and train the operator. This is required for hydrogen systems.
- **REMOVABLE RETORT SYSTEM:** Removable retorts allow faster cooldown under atmosphere. However, retort life is reduced because of heat shock. This option is available only on the smaller retorts. Includes integrated cart and track.
- **SHELVES:** These can be built into the retort or can be a separate structure that inserts into the retort.
- **POWERED VENTURI VENT:** A 300 or 600 CFH motor powered venturi will shorten the cooldown rate of the furnace, especially in the lower temperature ranges. The venturi pulls cool air around the outside of the retort without disturbing the atmosphere inside.
- **FRONT/BACK ZONE CONTROL:** For gradients of +/-15°F (+/-7°C) ABOVE 1,800°F (980°C): The elements can be divided into front and back zones. This compensates for the higher heat losses near the door. The control output is routed through two input switches that allow adjustment of the total time on to each zone. If the SCR option is ordered, there are two SCRs and these are biased with precision digital voltage dividers. There are thermocouples both front and back inside the retort with a selector switch to read the temperature differential. A separate PID control for each zone is optional. Note that the front 6” of the retort may not be uniform to this extent.

## SPECIFICATIONS

Model Number	Inside Retort Dimensions			Outside Retort Dimensions			Hearth Height	Stand K.W.	High K.W.	Max Load Lbs	Ship Weight
	W	H	D	W	H	D					
XLC 524	10	10	22	34	57	64	32	13.5	18.0	50	1,500
XLC 824	12	12	22	37	60	64	32	17.0	22.0	75	1,800
XLC 836	12	12	34	37	60	76	32	22.5	29.0	100	2,100
XLC 848	12	12	46	37	60	88	32	27.0	36.0	150	2,400
XLC 244	18	18	22	43	66	64	32	24.0	35.0	100	2,600
XLC 246	18	18	34	43	66	76	32	31.5	41.0	175	3,000
XLC 248	18	18	46	43	66	88	32	38.0	49.5	225	3,500
XLC 272	18	18	70	43	66	112	32	51.0	68.0	350	4,000
XLC 3348	24	24	46	49	68	88	28	48.5	65.0	275	3,800
XLC 3372	24	24	70	49	68	112	28	66.5	88.5	400	5,500
XLC 3448	30	18	46	55	62	88	28	48.0	64.0	350	4,000
XLC 3472	30	18	70	55	62	112	28	66.0	88.0	550	6,000
XLC 3648	30	30	46	55	74	88	28	56.0	66.5	350	4,800
XLC 3672	30	30	70	55	74	112	28	82.0	109.0	550	7,000

Other sizes are available. Dimensions are in inches. Weight is in pounds. Working dimensions should be approximately 2” less in each direction than inside dimensions, depending on uniformity requirements. Note that the front 6” tends to be cooler and hence less uniform in temperature because of heat losses. 240 or 480 volts is normal; 208, 380 and 575 volts are optional. Three-phase is normal, although single-phase is available. Add 72” to Outside Furnace Dimension width for required floor space for control panels. Specifications are subject to change without notice.

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