



Thermcraft

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eXPRESS-LINE Laboratory Furnaces



- Wide range of operating temperatures
- Rapid heat up and quick cool down
- Excellent temperature uniformity
- SmartControl touch screen control system
- Long life thermocouple
- Wide range of sizes and configurations
- Can be controlled individually or linked
- Shipped fully assembled

THERMCRAFT THERMAL PROCESSING EQUIPMENT

Since 1971, Thermcraft has been manufacturing high quality heating elements, custom furnaces, recirculating ovens, tube furnaces, box furnaces, high temperature heaters, diffusion furnace heaters along with electronic temperature sensors and controls, vacuum formed insulation and vacuum formed ceramic fiber heaters. Using knowledge gained from all aspects of thermal engineering, our team has supplied heating solutions to global manufacturers in industries including Crystal Growing, Nano Technology, Heat Treating, Metal Treating, Ceramics, Wire, Glass, Chemical, Nuclear, R&D/Laboratory and Universities, Aerospace, Pharmaceutical, Government, Military, Solar, and Semiconductors.

Thermcraft manufactures a complete line of high quality thermal processing equipment:

- Furnaces
- Ovens
- Express-Line Laboratory Furnaces
- Transparent Tube Furnaces
- High Temperature Heaters and Insulation
- Semiconductor Heating Elements
- Materials Testing Furnaces and Ovens
- Control Systems
- Parts and Service



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PROTÉGÉ 1100°C SPLIT TUBE FURNACE

XST - 1100°C Compact Split Tube Furnace, 1-Zone



The Protégé XST split tube furnace has a compact, lightweight, space saving design. This model is an excellent choice to begin thermal processing in a laboratory environment. The hinged body which is split along its length allows for easy process tube changes and simple installation of process tubes with end seals attached.

The Protégé has Fibercraft™ vacuum formed ceramic fiber heating elements with free radiating wire embedded into the body of the heater and tube adapters integrated into the ends.

Excellent temperature uniformity and a programmable control system make the Protégé a valuable addition to any lab.

Standard Features

- 1100°C maximum operating temperature
- Vacuum formed ceramic fiber heating elements ensure rapid heat up, excellent temperature uniformity and quick cool down
- Compact, lightweight design
- Safety switch disconnects power to heating elements when opened
- Integrated Thermcraft P91 PID control system, includes 288 program segments (see control system descriptions)
- Long life Inconel sheathed Type K thermocouple
- Accepts process tube outer diameters up to 1.25" (31mm)
- Heated length 12" (304mm)
- Furnace and controller ship fully assembled and ready for connection to incoming power supply
- Can be used in horizontal or vertical orientation



Options and Upgrades

- Choice of two different programmable controllers with optional communications
- Process tubes in various sizes and materials
- Process tube end seals for gas and vacuum
- Custom sized tube adapters available upon request, up to 1.75" (44mm) (may extend delivery time)

PROTÉGÉ 1100°C SPLIT TUBE FURNACE

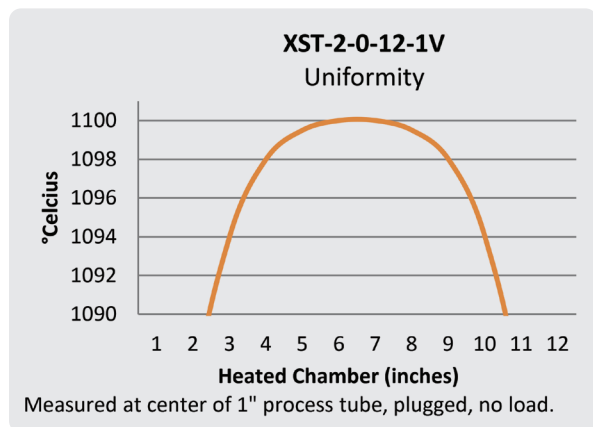
XST - 1100°C Compact Split Tube Furnace, 1-Zone

Specifications

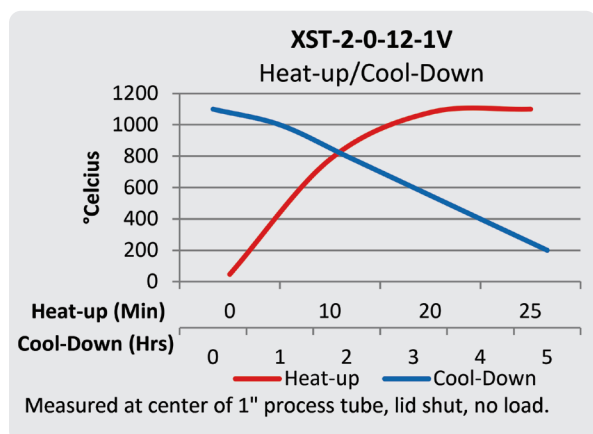
Model	Max Temp (°C)	Heat Zones	Heat Up Time (mins)	Max OD Process Tube in. (mm)	Heated Length in. (mm)	External Dimensions HxWxD in. (mm)	Max Power (Watts)	Volts	Amps	Thermo couple Type	Weight lbs (kg)
XST-2-0-12-1V1	1100	1	20	1.25 (31)	12 (304)	14x16x11 (355x406x279)	1200	120	10	K	32 (15)
XST-2-0-12-1V2	1100	1	20	1.25 (31)	12 (304)	14x16x11 (355x406x279)	832/1200	208/240	4/5	K	32 (15)

Notes
 -Continuous operating temperature is 100°C below maximum temperature
 -Heat up times are measured with an empty chamber to 100°C below maximum temperature

Temperature Profiles



- Uniformity profile taken at a set-point of 1100°C
- $\pm 5^{\circ}\text{C}$ over 8" (203mm), $\pm 1^{\circ}\text{C}$ over 4" (76mm)



- Heat-up time measured from ambient to 1100°C at 100% power output
- Cool-down rate measured with top closed and power shut off
- Faster cool-down rates can be achieved with forced cooling and top open (reduces heater life)

1200°C SPLIT TUBE FURNACES

XST - 1200°C Split Tube Furnaces 1-Zone & 3-Zone



XST-3-0-12-1V2-FO5

The XST split tube furnaces have a hinged body which is split along its length. This design allows for easy process tube changes and simple installation of process tubes with end seals attached.

These furnaces use Fibercraft™ vacuum formed ceramic fiber heating elements with free radiating wire embedded into the body of the heater. The tube adapters are removable and interchangeable so that multiple process tube sizes can be used with one furnace.

Single zone models have excellent temperature uniformity and the three zone models can extend the uniform flat zone by independently controlling the end zones.

Standard Features

- 1200°C maximum operating temperature
- Vacuum formed ceramic fiber heating elements ensure rapid heat up, excellent temperature uniformity and quick cool down
- Thermcraft SmartControl touch screen PID control system (see control system descriptions)
- Long life Inconel sheathed Type K thermocouple
- Accepts process tube outer diameters up to 6" (152mm)
- Heated lengths up to 36" (914mm)
- Includes 1 set of tube adapters sized to desired internal diameter
- 10' (3m) interconnecting and power cables
- Three zone models can be controlled individually or in master/slave configuration
- Furnace and controller ship fully assembled and ready for connection to incoming power supply
- Can be used in horizontal or vertical orientation (vertical mounting brackets included)

1200°C SPLIT TUBE FURNACES

XST - 1200°C Split Tube Furnaces 1-Zone & 3-Zone



XST-3-0-36-1V2-FO5

Options and Upgrades

- The SmartControl can be upgraded to include profile programming, data acquisition and communications. These options can be purchased individually or separately and can also be purchased as an upgrade after the unit has been shipped and installed
- Independent over temperature control
- Additional sets of tube adapters
- Process tubes in various sizes and materials
- Process tube end seals for gas and vacuum
- Eurotherm 3004 series controls and communications upgrades
- Available without control system
- Custom options and upgrades available upon request, such as output control of external devices, actuators, flow controllers, etc. (extends delivery time)
- Includes 1 set of tube adapters sized to desired internal diameter



SmartControl Touch Screen
with Icon Navigation

1200°C SPLIT TUBE FURNACES

XST - 1200°C Split Tube Furnaces 1-Zone & 3-Zone

Specifications

Model	Max Temp (°C)	Heat Zones	Heat Up Time (mins)	Max OD Process Tube in. (mm)	Heated Length in. (mm)	Furnace External Dimensions HxWxD in. (mm)	Control External Dimensions HxWxD in. (mm)	Max Power (Watts)	Volts	Amps	Thermo couple Type	Weight lbs (kg)
XST-3-0-12-1V2	1200	1	30	3 (76)	12 (304)	18x21x20 (457x533x508)	9x14x14 (229x356x356)	1700	230	8	K	80 (36)
XST-3-0-18-1V2	1200	1	32	3 (76)	18 (457)	18x27x20 (457x685x508)	9x14x14 (229x356x356)	2550	230	12	K	110 (50)
XST-3-0-24-1V2	1200	1	35	3 (76)	24 (609)	18x33x20 (457x838x508)	9x14x14 (229x356x356)	3400	230	15	K	141 (64)
XST-3-0-36-1V2	1200	1	40	3 (76)	36 (914)	18x45x20 (457x1143x508)	9x14x14 (229x356x356)	5100	230	23	K	203 (92)
XST-3-0-18-3V2	1200	3	32	3 (76)	18 (457)	18x27x20 (457x685x508)	11x20x17 (279x508x432)	2550	230	12	K	128 (58)
XST-3-0-24-3V2	1200	3	35	3 (76)	24 (609)	18x33x20 (457x838x508)	11x20x17 (279x508x432)	3400	230	15	K	159 (72)
XST-3-0-36-3V2	1200	3	40	3 (76)	36 (914)	18x45x20 (457x1143x508)	11x20x17 (279x508x432)	5100	230	23	K	221 (100)
XST-4-0-12-1V2	1200	1	35	4 (101)	12 (304)	18x21x20 (457x533x508)	9x14x14 (229x356x356)	2350	230	11	K	86 (39)
XST-4-0-18-1V2	1200	1	37	4 (101)	18 (457)	18x27x20 (457x685x508)	9x14x14 (229x356x356)	3550	230	16	K	119 (54)
XST-4-0-24-1V2	1200	1	39	4 (101)	24 (609)	18x33x20 (457x838x508)	9x14x14 (229x356x356)	4700	230	21	K	136 (62)
XST-4-0-36-1V2	1200	1	43	4 (101)	36 (914)	18x45x20 (457x1143x508)	9x14x14 (229x356x356)	7050	230	31	K	205 (93)
XST-4-0-18-3V2	1200	3	37	4 (101)	18 (457)	18x27x20 (457x685x508)	11x20x17 (279x508x432)	3550	230	16	K	137 (62)
XST-4-0-24-3V2	1200	3	39	4 (101)	24 (609)	18x33x20 (457x838x508)	11x20x17 (279x508x432)	4700	230	21	K	154 (70)
XST-4-0-36-3V2	1200	3	43	4 (101)	36 (914)	18x45x20 (457x1143x508)	11x20x17 (279x508x432)	7050	230	31	K	223 (101)
XST-6-0-24-1V2	1200	1	40	6 (152)	24 (609)	20x33x23 (508x838x584)	9x14x14 (229x356x356)	6800	230	30	K	160 (73)
XST-6-0-36-1V2	1200	1	45	6 (152)	36 (914)	20x45x23 (508x1143x584)	9x14x14 (229x356x356)	10200	230	45	K	243 (110)
XST-6-0-24-3V2	1200	3	40	6 (152)	24 (609)	20x33x23 (508x838x584)	11x20x17 (279x508x432)	6800	230	30	K	178 (81)
XST-6-0-36-3V2	1200	3	45	6 (152)	36 (914)	20x45x23 (508x1143x584)	11x20x17 (279x508x432)	10200	230	45	K	261 (119)

Notes

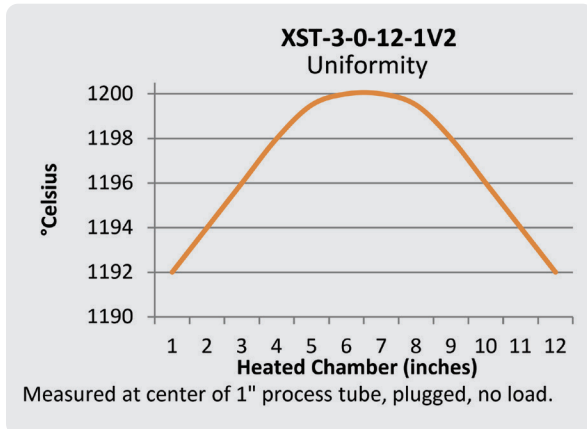
-Continuous operating temperature is 100°C below maximum temperature

-Heat up times are measured with an empty chamber to 100°C below maximum temperature

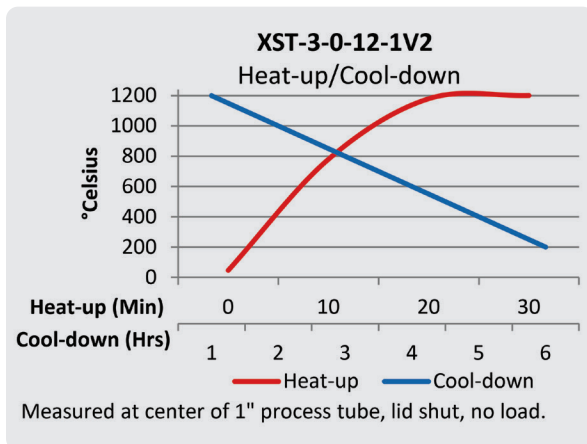
1200°C SPLIT TUBE FURNACES

XST - 1200°C Split Tube Furnaces 1-Zone & 3-Zone

Temperature Profiles



- Uniformity profile taken at a set-point of 1200°C
- $\pm 5^{\circ}\text{C}$ over 8" (203mm), $\pm 1^{\circ}\text{C}$ over 3" (76mm)
- Uniform length increases respectively in furnace models with longer heated lengths
- $\pm 5^{\circ}\text{C}$ can be achieved over 90% of the entire length of 3-zone models



- Heat-up time measured from ambient to 1200°C at 100% power output
- Cool-down rate measured with top closed and power shut off
- Faster cool-down rates can be achieved with forced cooling and top open (reduces heater life)

1200°C SOLID TUBE FURNACES

XSL - 1200°C Solid Tube Furnaces 1-Zone



XSL-3-0-12-1C-F05

The XSL solid tube furnaces have a continuous solid body design. Process tubes can be inserted through the furnace chamber before attaching end seals.

These furnaces use ceramic refractory heating elements with embedded resistance wire. The tube adapters can be changed by removing the end caps so that multiple process tube sizes can be used with one furnace.

Temperature uniformity is excellent due to the heavy ceramic refractory heating elements and continuous solid tube heated chamber.

Standard Features

- 1200°C maximum operating temperature
- Ceramic refractory with embedded wire heating elements ensure excellent temperature uniformity
- Thermcraft SmartControl touch screen PID control system (see control system descriptions)
- Long life Inconel sheathed Type K thermocouple
- Accepts process tube outer diameters up to 2.75" (69mm)
- Heated lengths up to 24" (609mm)
- Includes 1 set of tube adapters sized to desired internal diameter
- 10' (3m) interconnecting and power cables
- Furnace and controller ship fully assembled and ready for connection to incoming power supply
- Can be used in horizontal or vertical orientation

Options and Upgrades

- The SmartControl can be upgraded to include profile programming, data acquisition and communications. These options can be purchased individually or separately and can also be purchased as an upgrade after the unit has been shipped and installed
- Independent over temperature control
- Additional sets of tube adapters
- Process tubes in various sizes and materials
- Process tube end seals for gas and vacuum
- Eurotherm 3004 series controls and communications upgrades
- Available without control system
- Custom options and upgrades available upon request, such as output control of external devices, actuators, flow controllers, etc. (extends delivery time)
- Includes 1 set of tube adapters sized to desired internal diameter

1200°C SOLID TUBE FURNACES

XSL - 1200°C Solid Tube Furnaces 1-Zone



XSL-3-0-18-1C-FO5

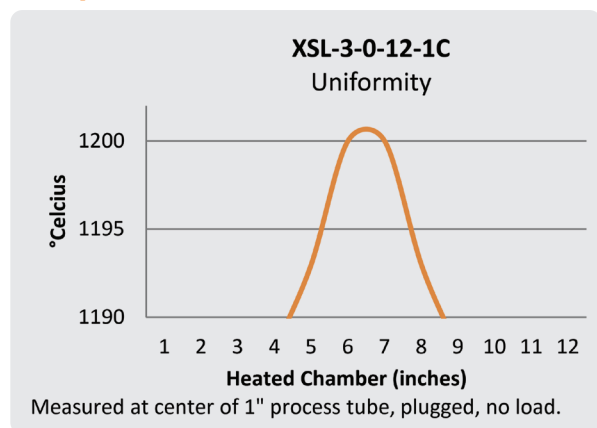
Specifications

Model	Max Temp (°C)	Heat Zones	Heat Up Time (mins)	Max OD Process Tube in. (mm)	Heated Length in. (mm)	Furnace External Dimensions HxWxD in. (mm)	Control External Dimensions HxWxD in. (mm)	Max Power (Watts)	Volts	Amps	Thermo couple Type	Weight lbs (kg)
XSL-3-0-12-1C	1200	1	60	2.75 (69)	12 (304)	15x15x18 (381x381x457)	9x14x14 (229x356x356)	2260	230	10	K	53 (24)
XSL-3-0-18-1C	1200	1	65	2.75 (69)	18 (457)	15x21x18 (381x533x457)	9x14x14 (229x356x356)	3440	230	15	K	71 (33)
XSL-3-0-24-1C	1200	1	70	2.75 (69)	24 (609)	15x27x18 (381x686x457)	9x14x14 (229x356x356)	4520	230	20	K	89 (41)

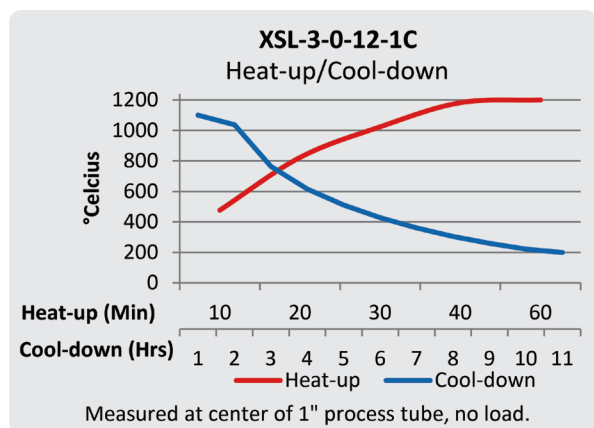
Notes

-Continuous operating temperature is 100°C below maximum temperature
-Heat up times are measured with an empty chamber to 100°C below maximum temperature

Temperature Profiles



- Uniformity profile taken at a set-point of 1200°C
- $\pm 5^{\circ}\text{C}$ over 5" (127mm), $\pm 1^{\circ}\text{C}$ over 2" (51mm)
- Uniform length increases respectively in furnace models with longer heated lengths.



- Heat-up time measured from ambient to 1200°C at 100% power output
- Cool-down rate measured with power shut off
- Faster cool-down rates can be achieved with forced cooling (reduces heater life)

1200°C BOX FURNACES

XSB - 1200°C Box Furnaces 1-Zone

The XSB box furnaces have a hinged vertical lift door that keeps the hot door insulation always facing away from the operator. A door safety switch interrupts power to the heating elements when the door is opened.

These furnaces use Fibercraft™ vacuum formed ceramic fiber heating elements with free radiating wire embedded into the body of the heater. The furnace chamber, heating elements, hearth plate and chamber threshold are designed to be easily replaced if they become worn out.

An air gap between the heated chamber exterior and furnace exterior surface is designed to minimize the external surface temperature of the furnace.



XSB-6-6-9-1V-F05

Standard Features

- 1200°C maximum operating temperature
- Vacuum formed ceramic fiber heating elements ensure rapid heat up, excellent temperature uniformity and quick cool down
- Thermcraft SmartControl touch screen PID control system (see control system descriptions)
- Long life Inconel sheathed Type K thermocouple
- Heated chamber volume up to 42L
- 10' (3m) power cables
- Furnace and controller ship fully assembled and ready for connection to incoming power supply

Options and Upgrades

- The SmartControl can be upgraded to include profile programming, data acquisition and communications. These options can be purchased individually or separately and can also be purchased as an upgrade after the unit has been shipped and installed
- Independent over temperature control
- Inlet and outlet fittings for gas purging
- Forced exhaust fan and duct
- Sealed atmosphere retort
- Exhaust pipe for fume extraction
- Eurotherm FO5 series controls and communications upgrades
- Custom options and upgrades available upon request, such as output control of external devices, actuators, flow controllers, etc. (extends delivery time)

1200°C BOX FURNACES

XSB - 1200°C Box Furnaces 1-Zone

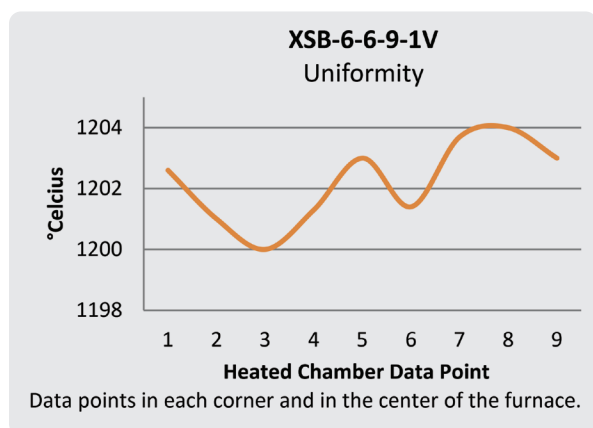
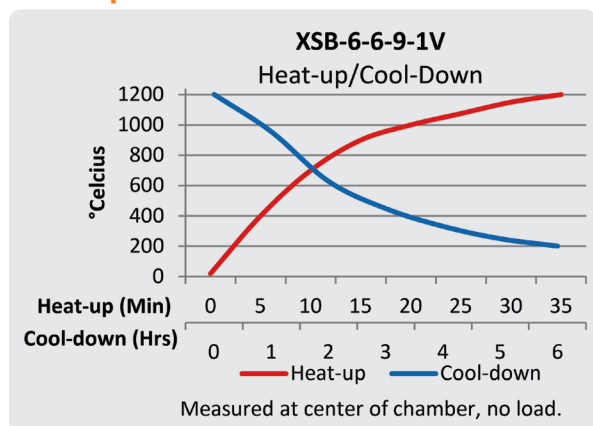
Specifications

Model	Max Temp (°C)	Heat Zones	Heat Up Time (mins)	Chamber Volume (L)	Chamber Internal Dimensions HxWxD in. (mm)	Furnace External Dimensions HxWxD in. (mm)	Height with Door Open in. (mm)	Max Power (Watts)	Volts	Amps	Thermo couple Type	Weight lbs (kg)
XSB-6-6-9-1V	1200	1	35	5	6x6x9 (152x152x228)	22x18x26 (558x457x660)	32 (812)	2700	230	12	K	88 (40)
XSB-8-8-12-1V	1200	1	40	12	8x8x12 (203x203x304)	24x20x29 (610x508x737)	38 (965)	5500	230	24	K	132 (60)
XSB-12-12-18-1V	1200	1	50	42	12x12x18 (304x304x457)	29x24x34 (737x610x864)	44 (1118)	11000	230	48	K	176 (80)

*****Notes*****

- Continuous operating temperature is 100°C below maximum temperature
- Heat up times are measured with an empty chamber to 100°C below maximum temperature

Temperature Profiles



1400°C-1600°C BOX FURNACES

XSB - 1400°C-1600°C Box Furnaces 1-Zone

The XSB box furnaces have a hinged vertical lift door that keeps the hot door insulation always facing away from the operator. A door safety switch interrupts power to the heating elements when the door is opened.

These furnaces use spiral type silicon carbide (SiC) heating elements to ensure rapid heat up, excellent temperature uniformity, and quick cool down. The furnace chamber, heating elements, hearth plate and chamber threshold are designed to be easily replaced if they become worn out.

An air gap between the heated chamber exterior and furnace exterior surface is designed to minimize the external surface temperature of the furnace.



XSB-6-6-9-1SS-F01-H

Standard Features

- Up to 1600°C maximum operating temperature
- Double helix, free radiating Silicon Carbide (SiC) heating elements ensure rapid heat up, excellent temperature uniformity and quick cool down
- Thermcraft SmartControl touch screen PID control system (see control system descriptions)
- Independent over temperature control
- Long life Type R thermocouple
- Silicon Carbide hearth plate
- Heated chamber volume up to 42L
- 10' (3m) power cables
- Furnace and controller ship fully assembled and ready for connection to incoming power supply

Options and Upgrades

- The SmartControl can be upgraded to include profile programming, data acquisition and communications. These options can be purchased individually or separately and can also be purchased as an upgrade after the unit has been shipped and installed
- Inlet and outlet fittings for gas purging
- Forced exhaust fan and duct
- Exhaust pipe for fume extraction
- Eurotherm 3004 series controls and communications upgrades
- Custom options and upgrades available upon request, such as output control of external devices, actuators, flow controllers, etc. (extends delivery time)

1400°C-1600°C BOX FURNACES

XSB - 1400°C-1600°C Box Furnaces 1-Zone

Specifications

Model	Max Temp (°C)	Heat Zones	Heat Up Time (mins)	Chamber Volume (L)	Chamber Internal Dimensions HxWxD in. (mm)	Furnace External Dimensions HxWxD in. (mm)	Height with Door Open in. (mm)	Max Power (Watts)	Volts	Amps	Thermo couple Type	Weight lbs (kg)
XSB-6-6-9-1S	1400	1	22	5	6x6x9 (152x152x228)	22x20x26 (558x508x660)	32 (812)	5877	230	26	R	150(68)
XSB-8-8-12-1S	1400	1	35	12	8x8x12 (203x203x304)	25x24x31 (635x610x787)	41(1041)	7943	230	35	R	200(91)
XSB-12-12-18-1S	1400	1	42	42	12x12x18 (304x304x457)	31x26x37 (787x660x940)	48 (1220)	16000	230	70	R	270(123)
XSB-6-6-9-1SS	1600	1	37	5	6x6x9 (152x152x228)	22x20x26 (558x508x660)	32 (812)	5877	230	26	R	200(91)
XSB-8-8-12-1SS	1600	1	59	12	8x8x12 (203x203x304)	25x24x31 (635x610x787)	41(1041)	7943	230	35	R	150(68)
XSB-12-12-18-1SS	1600	1	114	42	12x12x18 (304x304x457)	31x26x37 (787x660x940)	48 (1220)	16000	230	70	R	270(123)

Notes
 -Continuous operating temperature is 100°C below maximum temperature
 -Heat up times are measured with an empty chamber to 100°C below maximum temperature



XSB-6-6-9-1SS-F01-H

Temperature Profile

- Heat-up time measured from ambient to maximum temperature at 100% power output with empty chamber
- Cool-down to 200°C is 6 hours, measured with power shut off, door closed
- Faster cool-down rates can be achieved with forced cooling and door open (reduces heater life)
- Uniformity $\pm 5^{\circ}\text{C}$ over 9 data points, profile taken at a maximum temperature
- Temperature stability of $\pm 1^{\circ}\text{C}$ across entire temperature range

1700°C-1800°C BOX FURNACES

XSB - 1700°C-1800°C Box Furnaces 1-Zone

The XSB box furnaces have a hinged vertical lift door that keeps the hot door insulation always facing away from the operator. A door safety switch interrupts power to the heating elements when the door is opened.

These furnaces use Molybdenum Disilicide (MoSi₂) heating elements with free radiating u-shaped design, suspended from the roof of the chamber. The high temperature ceramic fiber furnace chamber, heating elements, hearth plate and chamber threshold are designed to be easily replaced if they become worn out.

An air gap between the heated chamber exterior and furnace exterior surface is designed to minimize the external surface temperature of the furnace.



XSB-6-6-9-1MM-F01-H

Standard Features

- Up to 1800°C maximum operating temperature
- Molybdenum Disilicide (MoSi₂) heating elements with free radiating u-shaped design ensure rapid heat up, excellent temperature uniformity and quick cool down
- Thermcraft SmartControl touch screen PID control system (see control system descriptions)
- Independent over temperature control
- Long life Type B thermocouple
- Alumina hearth plate
- Heated chamber volume up to 12L
- 10' (3m) power cables
- Furnace and controller ship fully assembled and ready for connection to incoming power supply

Options and Upgrades

- The SmartControl can be upgraded to include profile programming, data acquisition and communications. These options can be purchased individually or separately and can also be purchased as an upgrade after the unit has been shipped and installed
- Inlet and outlet fittings for gas purging
- Exhaust pipe for fume extraction
- Eurotherm 3004 series controls and communications upgrades
- Custom options and upgrades available upon request, such as output control of external devices, actuators, flow controllers, etc. (extends delivery time)

1700°C-1800°C BOX FURNACES

XSB - 1700°C-1800°C Box Furnaces 1-Zone

Specifications

Model	Max Temp (°C)	Heat Zones	Heat Up Time (mins)	Chamber Volume (L)	Chamber Internal Dimensions HxWxD in. (mm)	Furnace External Dimensions HxWxD in. (mm)	Height with Door Open in. (mm)	Max Power (Watts)	Volts	Amps	Thermo couple Type	Weight lbs (kg)
XSB-6-6-9-1M	1700	1	52	5	6x6x9 (152x152x228)	23x33x26 (584x838x660)	37 (940)	5835	230	26	B	310 (141)
XSB-8-8-12-1M	1700	1	56	12	8x8x12 (203x203x304)	23x33x26 (584x838x660)	37 (940)	8423	230	37	B	350 (160)
XSB-6-6-9-1MM	1800	1	65	5	6x6x9 (152x152x228)	23x33x26 (584x838x660)	37 (940)	8000	230	35	B	310 (141)
XSB-8-8-12-1MM	1800	1	67	12	8x8x12 (203x203x304)	23x33x26 (584x838x660)	37 (940)	8600	230	38	B	350 (160)

Notes

-Continuous operating temperature is 100°C below maximum temperature

-Heat up times are measured with an empty chamber to 100°C below maximum temperature



XSB-6-6-9-1MM-F01-H

Temperature Profile

- Heat-up time measured from ambient to maximum temperature at 100% power output with empty chamber
- Cool-down to 200°C is 8 hours, measured with power shut off, door closed
- Faster cool-down rates can be achieved with forced cooling and door open (reduces heater life)
- Uniformity $\pm 5^{\circ}\text{C}$ over 9 data points, profile taken at a maximum temperature
- Temperature stability of $\pm 1^{\circ}\text{C}$ across entire temperature range

1100°C ASHING FURNACES

XSB - 1100°C Ashing Furnaces 1-Zone

The XSB ashing furnaces are designed to provide ideal conditions for complete combustion of test samples. They have a hinged vertical lift door that keeps the hot door insulation always facing away from the operator. A door safety switch interrupts power to the heating elements when the door is opened.

These furnaces use wound wire heating elements that are protected by hard ceramic plates. The furnace chamber, heating elements, hearth plate and chamber threshold are designed to be easily replaced if they become worn out. An air gap between the heated chamber exterior and furnace exterior surface is designed to minimize the external surface temperature of the furnace.



XSB-5-8-7-1C-F05-P

Standard Features

- 1100°C maximum operating temperature
- Perfect for ashing petrochemicals, coal, food, plastics and other hydrocarbons
- Conforms to ASTM specifications D874, D482, D5184, D3174 and ISO specifications 3987, 6245, 10478, 1171
- Air is preheated before entering chamber
- Air inlet and exhaust chimney provide 6 air changes per minute.
- Optional air flow metering allows for 2-10 air changes per minute
- Thermcraft SmartControl touch screen PID control system (see control system descriptions)
- Long life inconel sheathed Type K thermocouple
- Heated chamber volume up to 40L
- 10' (3m) power cables
- Furnace and controller ship fully assembled and ready for connection to incoming power supply

Options and Upgrades

- The SmartControl can be upgraded to include profile programming, data acquisition and communications. These options can be purchased individually or separately and can also be purchased as an upgrade after the unit has been shipped and installed
- Adjustable air flow meter to reduce or increase air flow rate
- Sample trays and crucibles
- Eurotherm 3004 series controls and communications upgrades
- Custom options and upgrades available upon request, such as output control of external devices, actuators, flow controllers, etc. (extends delivery time)

1100°C ASHING FURNACES

XSB - 1100°C Ashing Furnaces 1-Zone

Specifications

Model	Max Temp (°C)	Heat Zones	Heat Up Time (mins)	Chamber Volume (L)	Chamber Internal Dimensions HxWxD in. (mm)	Furnace External Dimensions HxWxD in. (mm)	Height with Door Open in. (mm)	Max Power (Watts)	Volts	Amps	Thermo couple Type	Weight lbs (kg)
XSB-5-8-7-1C-F01-P	1100	1	60	5	5.1x7.9x6.7 (130x200x170)	22x18x26 (558x457x660)	32 (812)	2400	230	11	K	88 (40)
XSB-7-9-13-1C-F01-P	1100	1	80	13	6.7x9x13.4 (170x230x340)	24x20x32 (510x508x813)	38 (965)	3500	230	15	K	132 (60)
XSB-10-13-19-1C-F01-P	1100	1	100	40	9.8x12.6x19.3 (250x320x490)	29x24x38 (737x610x965)	44 (1118)	6000	230	26	K	176 (80)

*****Notes*****

- Continuous operating temperature is 100°C below maximum temperature
- Heat up times are measured with an empty chamber to 100°C below maximum temperature



XSB-5-8-7-1C-F01-P

Temperature Profile

- Heat-up time measured from ambient to 1000°C at 100% power output with empty chamber
- Cool-down to 200°C is 6 hours, measured with power shut off, door closed
- Faster cool-down rates can be achieved with forced cooling and door open (reduces heater life)
- Uniformity $\pm 5^{\circ}\text{C}$ over 9 data points, profile taken at a set-point of 1000°C

CONTROL SYSTEM DESCRIPTIONS

SmartControl

SmartControl Standard Controller

The SmartControl System combines all of the features of typical PID controllers, video/chart recorders and data logging systems into a single, intuitive device. The SmartControl provides a 4.3" color touch screen interface with standard, user configurable, runtime features for 1-10 zone control applications. All loop configuration and runtime user access is configurable at the device with no PC software required. SmartControl supports 1-10 control zones, offering up to 4 control outputs per zone, powerful profiling capabilities including up to three event outputs and more.

Optional LAN features include e-mail, SMS (text messaging) on alarm, FTP (file transfer protocol for automated file transfer/data backup), remote access (web and VNC embedded servers) and national timeserver time synchronization are standard. The web and VNC servers allow remote access using a PC, tablet or other smart phone devices.

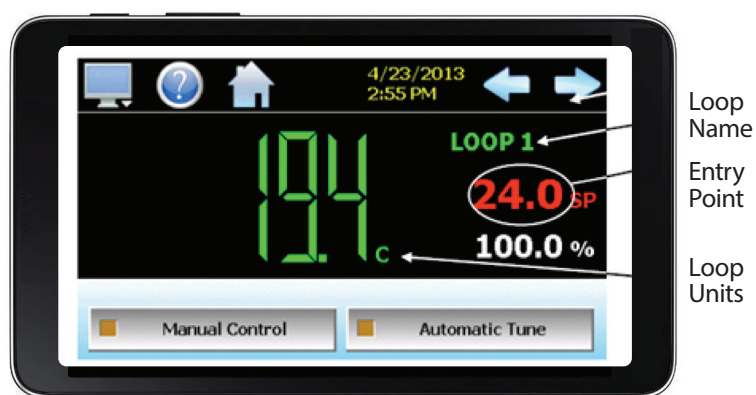
If you can use a "smart device" (iPhone, Android, etc.), you can use SmartControl!

User configurable with "slide nav" finger navigation similar to "smart devices" or with a traditional drop down menu system, SmartControl is intuitive to operate and use. With one touch language configuration for all icons, menus and help screens, SmartControl provides ease of use in any one of 28 languages.

Up to 10 Zones Controlled Through One SmartControl Interface



1-10 Zone SmartControl System

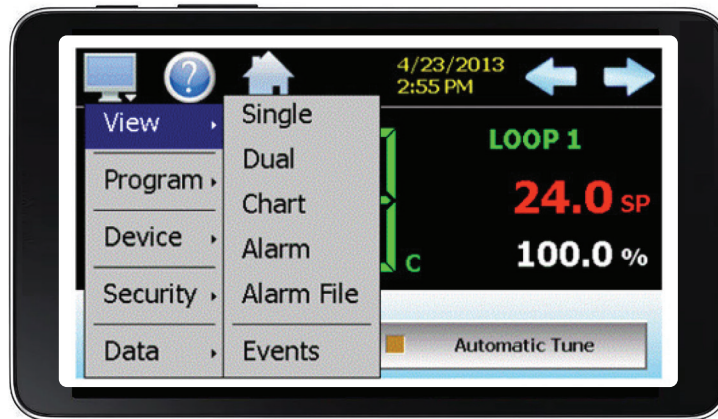


Single Zone View

CONTROL SYSTEM DESCRIPTIONS

SmartControl

Menu System: User Selectable as Icon or traditional drop down text menu



Text Based Navigation



Touch Screen Menu

Active Page Indicator

Icon Based Slide Page Navigation

SmartControl Intuitive Operation

User configurable with "slide nav" finger icon navigation similar to smart phones or tablets or as a traditional drop down menu system. The SmartControl display is split into two sections; the icon bar and main display area.

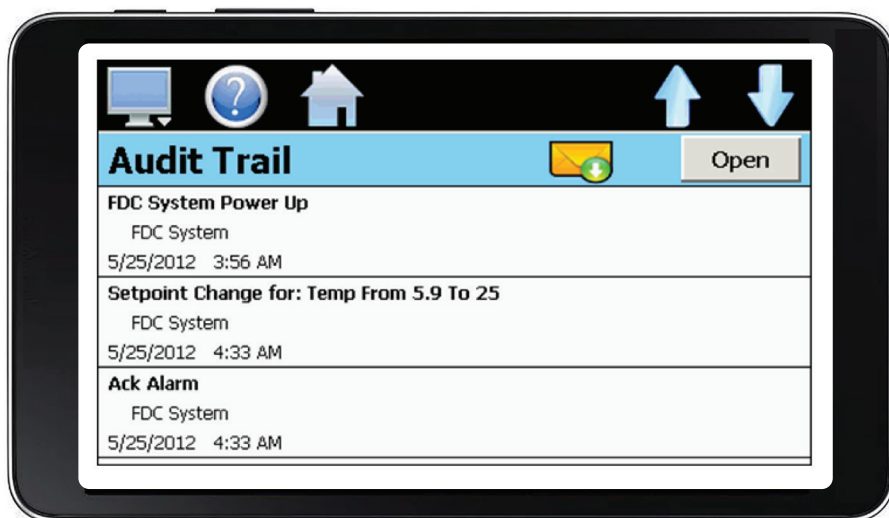
- The Main display area is used to view loop information with configurable tag names, active PV, SP & PID % values, navigation icons and appropriate functions selected; i.e. chart view, PID tuning, profiling, data logging, etc.
- The icon bar is visible at all times providing one touch selection of the Menu (navigation), Help, Home, Alarm (flashes when an alarm occurs) icons, Data/Time field, Notification Window when date/time selected and Navigation Arrows.
- The Help icon provides the user content sensitive information for every function.
- The date/time field provides the current date/time and when depressed a Notifications window is opened. The Notification window provides a one-touch snapshot of current SmartControl activity; i.e. PV/SP values, Alarm, Data Logging, Profile, Security activity and more.

CONTROL SYSTEM DESCRIPTIONS

SmartControl

Optional Program Profile Ramp/Soak:

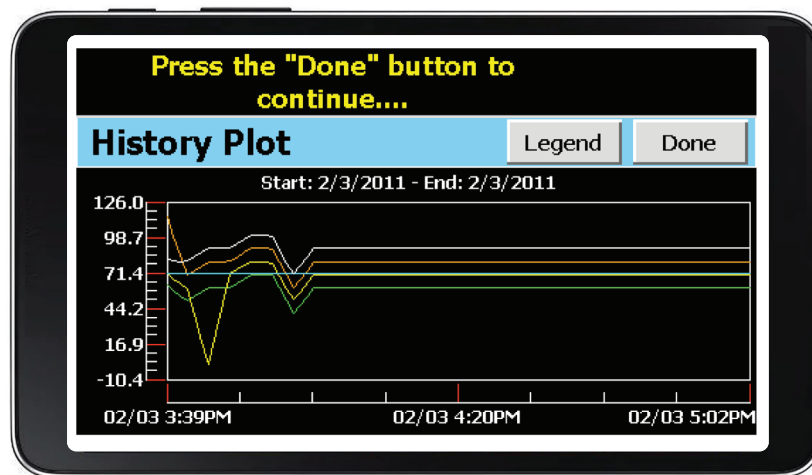
- Profiles: Virtually an unlimited number of program profiles in system memory with up to 64 program steps per program
- Profile Type: System configurable for separate profiles per loop.
- Profile Start: via touch screen or via Event input.
- Profile Name: Free form 16 character (max) naming convention with auto append time/date stamp.
- Global Profile Configuration
- Profile Time Base: Time Ramp (hh:mm or mm:ss)
- Ramp Rate (degrees/minute or hour)
- Starting and Ending SP values (may be individually active or not).
- Guaranteed Soak & Ramp (GS).
- Power Fail / Recovery when Profile is active:
 - Continue from last SP value.
 - Continue from last PV value.
 - Static mode (abort profile) with last static SP entered.
- Jump to Segment: configurable by segment (also nested looping)
- Events: up to 3 events per segment.
- Guaranteed Soak & Ramp: Configurable active or not by segment.
- Configurable functions (mutually exclusive to each other)
 - Profile Run (momentary)
 - Profile Hold (closed profile hold, open profile run)
 - Profile Run/Hold (closed profile run, open profile hold)
 - Step Advance (momentary)
 - Profile Abort (momentary)
- PID Selection: Select PID #1 or #2



CONTROL SYSTEM DESCRIPTIONS

SmartControl

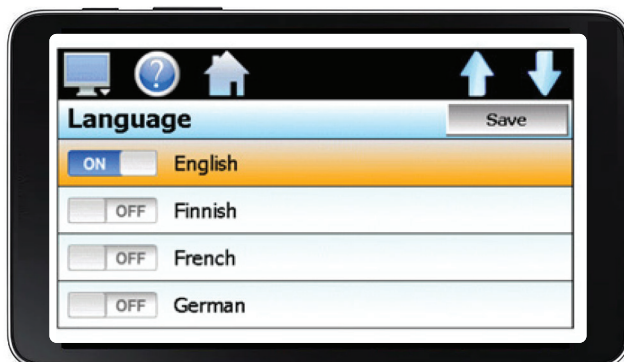
Data Log Historical Data file View



Optional Data Acquisition:

- Data log PV, SP and PID Percent.
- Log interval: configurable 6 seconds to 31 minutes with configurable number of days to auto start & name next file (1 to 31 days).
- File Start/Stop: Configurable; operator on-demand, on system boot, profile ramp-soak start/end or digital inputs
- File Interval: Once started a data log file is configurable to auto end and start new file with the same name as previous file with an appended time/date name. Configurable time interval is from 1 to 31 days.
- File name: Operator entered file name, batch & lot number or if running a profile, file name same as profile name. (all file names appended with date-time to file name)
- Operator Comments/Events: Unlimited operator comments/events linked to each file entered manually or via Bar Code Scanner.
- Digital Signatures: full support for user based digital signatures for each data file (data encryption).
- Historical Data File: View & print the data directly from the display (auto scale on X & Y axis with each channel selectable for right or left axis values), from a PC after data is copied/moved via LAN (FTP or e-mail) or USB Flash Memory card provided

Language Selection:



SmartControl provides a one-button language configuration for the following languages:

Afrikaans, Albanian, Arabic, Basque, Belarusian, Czech, Danish, Dutch, English, Finnish, French, Greek, German, Hebrew, Hungarian, Icelandic, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Turkish, Chinese, Simplified Chinese, Traditional Chinese

CONTROL SYSTEM DESCRIPTIONS

DIN Sized Controllers

Eurotherm 3004 Series Controllers

These 1/4 DIN size PID controllers offer up to 64 segments of programmable control. Each program segment can be a ramp, step or dwell.

- 3004CP offers 1 program with 8 segments
- 3004P1 offers 1 program with 24 segments
- 3004P10 offers 10 programs with 24 segment
- Profile Run/Hold (closed profile run, open profile hold)
- Step Advance (momentary)
- Profile Abort (momentary)
- PID Selection: select PID #1 or PID#2
- Historical Audit Trail
- Audit Trail File View

Options and Upgrades

- The 3004 series controllers can be upgraded to include EIA485 2-wire, 4 wire or EIA232. With industry-standard protocols including: Modbus, DeviceNet®, Profibus DP, and Eurotherm® Bisync
- Custom options and upgrades available upon request (extends delivery time)

Thermcraft P91 and Eurotherm 2416 Controllers

These 1/16 DIN size PID controllers offer up to 288 segments of programmable control.

- P91 offers 9 programs with a total of 288 programmable segments

Options and Upgrades

- The P91 controller can be upgraded to include either RS485 or RS232, 2-wire, with industry-standard Modbus protocol
- The 2416 controller can be upgraded to include EIA485 2 wire or 4 wire or EIA232. Industry-standard protocols including: Modbus®, Eurotherm Bisync, and SPI
- Custom options and upgrades available upon request (extends delivery time)

CONTROL SYSTEM DESCRIPTIONS

Independent Over Temperature Controllers, 1/16 DIN Size

Independent over temperature controllers, sometimes referred to as “high limit controllers”, are independent of the main temperature controller. The over temperature controller has its own thermocouple and power relay that will break the power circuit to the heating elements if the temperature should rise above the over temperature control setpoint.

The over temperature controller must be manually reset if the power to the heating elements is interrupted.

All control systems have the option of adding an over temperature controller.

All control systems for furnaces with maximum operating temperatures above 1200°C will come standard with an independent over temperature controller.

Control System Software SmartControl Standard Control System

Free optional PC software for the SmartControl includes:

- **EnVision** is a FREE SCADA (Supervisory Control and Data Acquisition) package allowing users to assemble a control and data acquisition system for up to 128 devices, each with their own data log file as well as one system data log file of any combination of devices (up to 129 concurrent data log files). Data files include Operator Events (messages) with Digital Signature capability to provide data integrity. Other features include Alarm Logs, operator Audit Trails, General and Service Notes per device, LAN capability (email/text on alarm & Web Page) and more, all standard without the need for programming.
- **DataViewer** is FREE PC Software to View, Graph, Print, export Historical Data, Audit Trail, Alarm & Operator Event Files, validate Data File Digital Signatures and more. The application opens in a spreadsheet type window that displays saved data in cells. These cells can be selected for printing or plotting without additional setup. The data viewer is the main window displayed when the application starts. The data viewer is separated by tabs for the following functions: Data, Operator Events, Audit Trail, Alarm History and Trend Data

Eurotherm Controllers

Free optional PC software for Eurotherm Controllers includes:

- iTools is a versatile suite of software tools to allow configuration and monitoring of all Eurotherm 3000 series controllers.



OPTIONS

Options for all Furnaces and Control Systems

SmartControl (Standard Control System)

Optional SmartControl Features

Profile Programming - 99x64 Program Segments

Communications - Includes Ethernet and RS232 (adaptable to RS485)

Data Acquisition

Independent Over Temperature Controller (1 per zone required)

Eurotherm Controller (Optional Controllers) (1 per zone required)

3004CP offers 1 program with 8 segments

3004P1 offers 1 program with 24 segments

3004P10 offers 10 programs with 24 segments

Protégé Compact Split Tube Furnace

Thermcraft P91 - 9 Programs, 288 Segments (Standard Controller)

Communications - RS232 or RS485 (Optional)

Communications - RS232 or RS485 (Optional)

XSB Box Furnace

Inlet and Outlet Ports for Gas Purging (for 1/4" (6mm) pipe insertion)

Forced Exhaust Fan and Duct

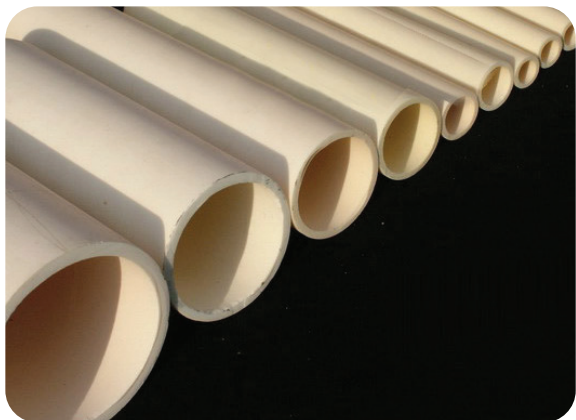
Sealed Atmosphere Retort

Exhaust Chimney for Fume Ventilation

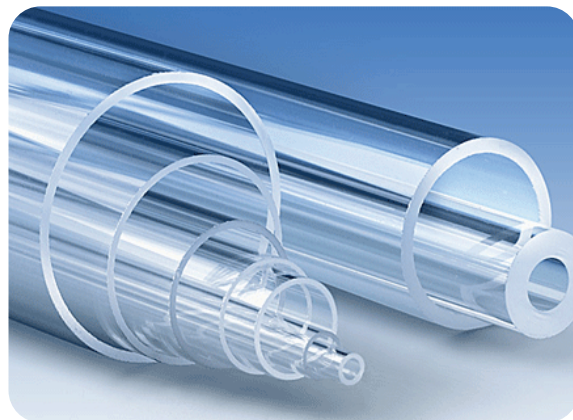
Custom options available upon request (extends delivery time)

ACCESSORIES

Accessories Available for all Furnaces



Alumina Process Tubes



Quartz Process Tubes



Alumina Boats and Crucibles



Process Tube Flanges for Gas
and Vacuum

OPTIONS

Options for all Furnaces and Control Systems

Other Thermcraft Products:

Tube FurnacesTube Furnaces
Box FurnacesBox Furnaces
Ceramic Heating ElementsCeramic Elements
Ceramic Fiber Insulation & Insulation PackagesCeramic Packages
Control SystemsControl Systems
Custom OvensCustom Ovens
Diffusion Heating ElementsDiffusion Elements
Fibercraft Vacuum Formed Heating ElementsFibercraft Elements
LAB-TEMP
TransTransTempTemp FurnacesFurnaces
MarshallMarshall FurnacesFurnaces
eXPRESSeXPRESS-LINE-LINE Furnaces & OvensFurnaces Ovens
Contemporary KilnsContemporary Kilns
ThermocouplesThermocouples
Vestibule BlocksVestibule Blocks