

FastHeat 1700°C Laboratory Box Furnace

Revision 7.8.05

The 1700°C FastHeat furnaces introduced by Keith Company more than 30 years ago have proven to be extremely versatile and dependable for research and development, small-scale production, and any application requiring special and complex temperature profiles.

These furnaces are ideally suited to produce precise temperature profiles otherwise achieved only in continuous type furnaces. Because of the low thermal mass fiber insulation and the high efficiency of the power control system, very rapid heating rates are also achievable.

TYPICAL APPLICATIONS

- Materials Testing and Research
- High Temperature Processing
- Small Parts Production
- Glass or Metal Melting
- Co-Firing Multilayer Components
- Sintering of Ceramics & Metals

INTERACTION
INNOVATION
INTEGRITY



STANDARD FURNACE SPECIFICATIONS

MODEL	RATING	LOAD DIMENSIONS			OUTSIDE DIMENSIONS			STANDARD VOLTAGE	CONNECTED POWER	FURNACE WEIGHT
		W	H	D	W	H	D			
KSK-9	1700°C	9"	12"	12"	33"	40"	29"	208/240 1 PH	8.4 kW	320 lbs.
KSK-12	1700°C	12"	15"	13"	33"	40"	29"	208/240 1 PH	13.8 kW	420 lbs.
KSK-15	1700°C	15"	18"	16"	36"	40"	32"	208/240 1 PH	16.8 kW	600 lbs.

Load dimensions refer to the actual volume available for setting of material or product for firing. All dimensions are approximate. Custom sizes, higher power ratings, or different voltages are available upon request. *All specifications are subject to change without notice.*

DESIGN BENEFITS

- Heats to 1700°C in less than 1 hour
- Precise repeatable heating control
- Superior temperature uniformity
- Automated venting of VOCs
- Rugged and reliable construction
- Easy operation and maintenance

This bulletin contains the complete technical description for Keith's FastHeat front-loading, high temperature, fiber-lined furnace intended for operation to 1700°C/3100°F in an air atmosphere. The furnace is shipped ready for installation, complete with a high alumina hearth and ready for connection to the buyer's utilities.

MODEL KSK-12 IS AVAILABLE FROM STOCK

CONSTRUCTION

Furnace Structure

An exterior sheet metal furnace shell encloses an inner framework of heavy wall square tubing that supports the fiber refractories. The shell is an integral part of the main support frame. A space between the outer shell and the refractory lining is well ventilated, ensuring comfortable outer skin temperatures. The perforated roof is removable providing easy access to the refractory fiber lining and the heating elements.

Insulation System

The furnace lining features a high purity, lightweight, Rath brand 1700°C rated alumina fiberboard construction designed for maximum energy efficiency and thermal performance. *Keith's* proprietary fiber design allows for the thermal expansion and contraction that the fiber undergoes at elevated temperatures and during cooling. This special construction insures minimum bending stresses for the material while reducing the otherwise destructive cracking of the walls. This means that this durable lining will last longer and need little maintenance.

Furnace Door

The door of the furnace is constructed of the same high alumina fiber as the rest of the furnace lining. On the door the fiber is arranged in a 4" thick butcher-block style construction with stepped fiber edges to insure tight closure and minimize heat loss. The door is hinged on the left.

Hearth Plates

One set of high-density alumina hearth plates and supports is provided with the furnace. This provides a convenient surface for setting the material to be fired and serves to raise your material closer to the center of the chamber for more uniform firing.

HEATING SYSTEM

Heating Elements

Molybdenum-disilicide heating elements are suspended from the sidewalls along three sides of the heating chamber for maximum temperature uniformity. Outside panels of the furnace are easily removed for installing the elements. Our elements have a 6/12-mm diameter, which is twice the diameter used in some competitive furnaces. Larger diameter elements last longer and are easier to install.



TEMPERATURE CONTROL SYSTEM

Control Panel

All control equipment is installed in a ventilated space beneath the furnace chamber. Instrumentation and all control switches are placed for convenient viewing and are well labeled for ease of operation. Solid-state digital indicating PID temperature controllers are used for precise temperature control to within 1°C. All furnaces include overtemperature protection, and the controllers are equipped with broken thermocouple protection. Installation of the furnace involves little more than connecting the main electrical service to the furnace power leads since all other internal wiring is provided fully connected.

Temperature Control

A West model 4400 Programmable Controller is supplied as the standard programmer for these furnaces. The 4400 features 8 totally independent programs each with 16 segments. Programs can be joined to create longer programs with more segments.



KEITH COMPANY

8323 Loch Lomond Drive
Pico Rivera, California 90660

Visit us on the web at www.KeithCompany.com

tel 562.948.3636 • fax 562.949.3696 • info@KeithCompany.com

High-Limit Protection

Furnace over-temperature protection is provided by a West model 6700 controller in order to prevent possible damage to the furnace or your process caused by exceeding a user definable maximum temperature rating.

Thermocouple

One (1) type "B" duplex thermocouple is provided. One leg of the thermocouple is for main temperature control, and the other is for over-temperature protection.

POWER CONTROL SYSTEM

Power Controls

Power to the heating elements is controlled through a phase-angle fired SCR with current limiting. Total connected power and voltages are listed in the chart on the first page of this bulletin. Only one electrical connection is necessary for all power and temperature controls. Furnaces may be designed and quoted for other voltages upon request.

OPTIONS AND MODIFICATIONS

Chart Recorder

A chart recorder will allow you to graph your firing cycles. This option includes chart recorder mounted in the control panel of the furnace, a monitoring thermocouple, and all wiring. We can quote, supply and install the recorder of your choice.

Atmosphere Port

A threaded 1/4" NPT fitting will allow you to introduce an inert gas, such as nitrogen or argon, into the heating chamber. Though the refractory lining is not gas-tight, some applications may be enhanced by the addition of such a protective atmosphere.

Exhaust Port

This will allow you to vent any harmful or corrosive gasses from the heating chamber. It works best when used in conjunction with air or inert gas introduced through the atmosphere port. The exhaust port measures 2 inches in diameter, and has a plug that can be inserted into the hole when venting is not necessary. As an additional option this port can be automated and connected as an event on the temperature controller.

Automated 2-position Damper

The exhaust port can be automated and adapted to operate as an event on the temperature controller allowing the damper to open partially or completely to aid in exhausting binders and accelerating cooling times.

Sight Port

A half-inch diameter optical viewing port can be mounted through the center of the door.

TESTING AND DOCUMENTATION

Testing

The furnace undergoes comprehensive functional testing prior to shipment. No heat is applied to the furnace during these tests to prevent embrittlement of the insulation. A simulated electrical load is used to setup and test the power control system.

Documentation

One complete Operating and Service Manual including installation instructions, drawings of the electrical system, a troubleshooting guide, and a detailed list of replacement parts is provided.

INSTALLATION AND MAINTENANCE

Installation

Simply position the furnace where desired on a good level surface and ensure that the circuit breaker is suitable for the electrical load. Install the heating elements and thermocouple, which are packaged separately to avoid shipping damage. A single electrical connection is made from your circuit breaker to the furnace.

Maintenance

The only maintenance your furnace should require for many years is occasional replacement of heating elements, thermocouples and perhaps some small electrical parts. The *FastHeat* has been designed to make all maintenance simple and quick. Repair parts for your furnace are always available – even a complete refractory lining kit should you need one after many years of satisfactory operation. A complete list of spare parts is included in the Operating Manual for future use. We suggest you include spare heating elements and thermocouples with your furnace order.

KEITH COMPANY

8323 Loch Lomond Drive
Pico Rivera, California 90660

Visit us on the web at www.KeithCompany.com

tel 562.948.3636 • fax 562.949.3696 • info@KeithCompany.com