Tube Furnaces

1100°C-1300°C

Tube Furnaces

NANO THERM

In need of homogeneous temperature distribution or reliable gas protective atmosphere tube furnaces are the best solution.

- *Specifically enginerred for abosulute accuracy of temperature measurement.*
- *Optional gas inlet and purge systems for protective gas atmosphere.*
- *Thermal shock resistant tubes.*
- *Precise temperature control for a wide range of working temperature.*
- *±1 °C control accuracy*

Product Group	Working Temperature	Tube Inner Diameter [mm]	Hot Zone Length Options [mm]	Software Options
Tube Furnaces	1100 °C, 1200 °C, 1250 °C, 1300 °C	50	300 or 600	B2, E4, U8, S16
		75	400 or 600	
		100	500 or 800	

Control Unit Features

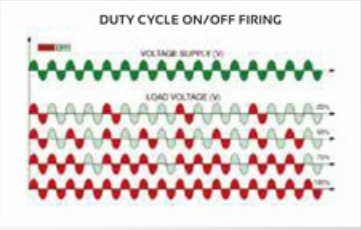
Models / Features	Primary	Primary	BASIC	EXTENDED	ULTIMATE	SCIENTIFIC
Sofware based PID Control	YES	YES	YES	YES	YES	YES
Display	7 Segment	7 Segment	4 lines	4 lines	4 lines	4 lines
Heating Program with	Direct	2 steps	2 steps	4 steps	8 steps	16 steps*
Custom Preset Program	1	2	2	4	6	5
Heating Rate °C/min.	5-25	5-25	3-20	3-20	3-20	3-20
Date & Time	NO	NO	YES	YES	YES	YES
Auto Start at Certain Date	NO	NO	NO	YES	YES	YES
Show Remaining Waiting Time	NO	NO	NO	YES	YES	YES
Skip the Waiting Step	NO	NO	NO	YES	YES	YES
Temperature Calibration via Menu (±10°C)	NO	NO	NO	YES	YES	YES
Sound Warnings at Step Changes	NO	YES	YES	YES	YES	YES
Sound Warning at the End of the Program	YES	YES	YES	YES	YES	YES
Total Working Hour Counter	NO	NO	YES	YES	YES	YES
Calculator for Average Working Temperature	NO	NO	YES	YES	YES	YES
Instantenious Energy Consumption Indicator	NO	NO	YES	YES	YES	YES
Over Heating Cut Off	YES	YES	YES	YES	YES	YES
Open Door Sensor	NO	NO	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL
PC Connection Kit	NO	NO	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL
Warranty Period	2 Years	2 Years	2 Years	2 Years	2 Years	2 Years

* Only 5th memory supports 16 levels **Independent for each level

Techincal Point of View

Furnaces heated by Fe-Cr-Al Resistance Wires

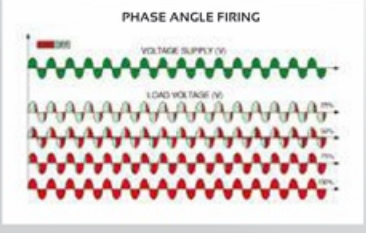
Fe-Cr-Al wires are commonly used for heating furnaces up to 1300°C and below. The power supply for these heating elements has no special requirements. They should be driven by "on/off" control power units. PID algotithm calculates on and off times in a cycle.
Aiging and thermal shock sensitivity is not a common problem for Fe-Cr-Al wires.
Therefore for the furnaces from 1000°C to 1300°C, MagmaTherm uses "duty cycle on/off control with zero crossing switching" via triacs.



Furnaces heated by SiC or $MoSi_2$ Heating Elements

Furnaces from 1400°C to 1550°C are mostly equipped with SiC heating elements. Because of the atypical temperature-resistance characteristics of them, it has always been difficult to control the temperature during heating phase.
When temperature raises, resistance of SiC elements decreases, which is an extraordinary behavior compared to conventional heating elements. Therefore it is very important and complicated to find the right voltage value for the control units.

SiC heating elements have also an aging disadvantage. Thermal shocks are accelerating the aging of the SiC heating element. Because of this reason it's not the right way to use the on/off control method on the SiC heating elements.
To find the best solution for this handicap, it's suggested to use the widely known "Phase Angle Firing Method". Instead of periodically "full power" supplying, this method allows "required power" supplying continuously. This way, thermal shocks are eliminated.



SiC heating elements manufacturers suggest several methods for the control. For example: Voltage control method, current control with limitation method etc. The most advanced suggestion is power output control method. MagmaTherm engineers have decided to achieve more than manufacturers suggestions. Our furnaces are equipped with "Poweroutput" and "Current Limitation" control method together. With this decision, it has been possible to both control the temperature and secure the electrical hardware and cabling against high current damage.

For the furnaces from 1500°C to 1800°C equipped with MoSi2 heating elements, MagmaTherm uses the same "advanced control and drive" method . It has been ensured minimum thermal shocks and long operating life for these heating elements.

Product Overview

PRODUCT OVERVIEW																
Product Groups	Working Temperatures [°C]	Available Chamber Volume Options [Liter]														Softwware options
Primary	1000			5			8			20						P,Px
	1100															
Mid Temp Range	1100															B2, E4, U8, S16
	1200			5		7			10	20	40	60	100			
	1250															
	1300															
High Temp Range SiC	1400															E4, U8, S16
	1500		3		6			9								
	1550															
High Temp Range $MoSi_2$	1500	1														E4, U8, S16
	1600		3		6			9								
	1700															
	1750															

CHAMBER DIMENSIONS				
Nominal Volume	Physical Volume	Width	Height	Depth
1	1,3	100	125	106
3	3	140	130	165
5	5,1	150	150	225
6	6	175	160	215
7	7,5	180	160	260
8	7,5	180	160	260
9	9	200	170	265
10	10,8	200	180	300
15	15	250	200	300
20	19,8	250	200	395
40	40,1	300	300	445
60	59,4	400	300	495
100	99,9	460	365	595

Primary Muffle Furnaces Technical Data Sheet

PRIMARY MUFFLE FURNACES					
Working Temperatures	Heating elements	Nominal Volume [Liter]	Heating Power [Watt]	Current I [Amper]	Electrical connection
1000 °C	Fe-Cr-Al	5	2000	9,1	1 Phase
	Fe-Cr-Al	8	2600	11,9	1 Phase
	Fe-Cr-Al	20	3400	15,5	1 Phase
1100 °C	Fe-Cr-Al	5	2000	9,1	1 Phase
	Fe-Cr-Al	8	2600	11,9	1 Phase
	Fe-Cr-Al	20	3400	15,5	1 Phase

Standard Muffle Furnaces Technical Data Sheet

STANDART MUFFLE FURNACES						
Working Temperatures	Heating elements	Nominal Volume [Liter]	Heating Power [Watt]	Current I [Amper]	Electrical connection	Also available Electric Connection
1100 °C	Fe-Cr-Al	5	2.000	9,1	1 Phase	
	Fe-Cr-Al	7	2.600	11,9	1 Phase	
	Fe-Cr-Al	10	3.000	13,7	1 Phase	
	Fe-Cr-Al	20	4.200	19,1	3 Phase*	1 Phase
	Fe-Cr-Al	40	7.500	34,1	3 Phase	
	Fe-Cr-Al	60	10.200	46,4	3 Phase	
	Fe-Cr-Al	100	14.000	63,7	3 Phase	
1200 °C	Fe-Cr-Al	5	2.000	9,1	1 Phase	
	Fe-Cr-Al	7	2.600	11,9	1 Phase	
	Fe-Cr-Al	10	3.000	13,7	1 Phase	
	Fe-Cr-Al	20	4.200	19,1	3 Phase*	1 Phase
	Fe-Cr-Al	40	7.500	34,1	3 Phase	
	Fe-Cr-Al	60	10.200	46,4	3 Phase	
	Fe-Cr-Al	100	14.000	63,7	3 Phase	
1250 °C	Fe-Cr-Al	5	2.250	10,3	1 Phase	
	Fe-Cr-Al	7	3.500	16	1 Phase	
	Fe-Cr-Al	10	3.500	16	1 Phase	
	Fe-Cr-Al	20	4.500	20,5	3 Phase	
	Fe-Cr-Al	40	7.500	34,1	3 Phase	
	Fe-Cr-Al	60	10.200	46,4	3 Phase	
	Fe-Cr-Al	100	14.000	63,7	3 Phase	
1300 °C	Fe-Cr-Al	5	2.250	10,3	1 Phase	
	Fe-Cr-Al	7	3.500	16	1 Phase	
	Fe-Cr-Al	10	3.500	16	1 Phase	
	Fe-Cr-Al	20	4.500	20,5	3 Phase	
	Fe-Cr-Al	40	7.500	34,1	3 Phase	
	Fe-Cr-Al	60	10.200	46,4	3 Phase	
	Fe-Cr-Al	100	14.000	63,7	3 Phase	

Tube Furnaces Technical Data Sheet

TUBE FURNACES					
Working Temperatures	Tube Diameter [Inner]	Heated Zone Length [mm]	Power [Watt]	Heating Element	Elecrical Connection
1100 °C	50	300	1.500	Fe-Cr-Al	1 Phase
	50	600	1.700	Fe-Cr-Al	1 Phase
	75	400	2.000	Fe-Cr-Al	1 Phase
	75	800	2.750	Fe-Cr-Al	1 Phase
	100	500	2.500	Fe-Cr-Al	1 Phase
	100	800	3.500	Fe-Cr-Al	1 Phase
1200 °C	50	300	1.500	Fe-Cr-Al	1 Phase
	50	600	1.700	Fe-Cr-Al	1 Phase
	75	400	2.000	Fe-Cr-Al	1 Phase
	75	800	2.750	Fe-Cr-Al	1 Phase
	100	500	2.500	Fe-Cr-Al	1 Phase
	100	800	3.500	Fe-Cr-Al	1 Phase
1250 °C	50	300	1.500	Fe-Cr-Al	1 Phase
	50	600	1.700	Fe-Cr-Al	1 Phase
	75	400	2.000	Fe-Cr-Al	1 Phase
	75	800	2.750	Fe-Cr-Al	1 Phase
	100	500	2.500	Fe-Cr-Al	1 Phase
	100	800	3.500	Fe-Cr-Al	1 Phase
1300 °C	50	300	1.500	Fe-Cr-Al	1 Phase
	50	600	1.700	Fe-Cr-Al	1 Phase
	75	400	2.000	Fe-Cr-Al	1 Phase
	75	800	2.750	Fe-Cr-Al	1 Phase
	100	500	2.500	Fe-Cr-Al	1 Phase
	100	800	3.500	Fe-Cr-Al	1 Phase

High Temperature Chamber Furnaces Technical Data Sheet

HIGH TEMP. CHAMBER FURNACES				
Working Temperatures	Heating elements	Nominal Volume [Liter]	Heating Power	Electrical connection
1400 °C	SiC	3	2.700	1
	SiC	6	4.500	3 Phase*
	SiC	9	5.700	3 Phase*
1500 °	SiC	3	2.900	3 Phase*
	SiC	6	3.800	3 Phase*
	SiC	9	4.800	3 Phase*
1550 °C	SiC	3	2.700	3 Phase*
	SiC	6	4.500	3 Phase*
	SiC	9	5.700	3 Phase*
1500 °C	MoSi2	1	1.700	1
	MoSi2	3	3.300	1
1600 °C	MoSi2	1	2.600	1
	MoSi2	3	3.200	1
	MoSi2	6	6.200	3 Phase*
	MoSi2	9	6.900	3 Phase*
1700 °C	MoSi2	3	3.900	3 Phase*
	MoSi2	6	6.600	3 Phase*
	MoSi2	9	7.400	3 Phase*
1750 °C	MoSi2	3	4.400	3 Phase*
	MoSi2	6	7.000	3 Phase*
	MoSi2	9	7.800	3 Phase*
3 Phase*: Heating between two phases				