Cerafibre® and Cerachem® Pyro-Bloc EES System

Product Data Sheet

Product Description

The Pyro-Bloc Electric Element Support (EES) System is a complete engineered package which includes Pyro Bloc Y and T-type modules, heating elements, hanging systems, and detailed drawings, that are a cost-effective method of hanging electric heating elements from Pyro-Bloc modules. Pyro-Bloc modules effectively lower energy input, eliminate thermal spalling, and permit rapid furnace cycles.

EES systems have been provided for:

- Melting, holding, and annealing furnaces for non-ferrous metals
- Continuous strip and coil annealing furnaces for the steel industry
- A wide variety of heat treatment furnaces

Design

Each system is designed to the requirements of the customer's specific application. Designs include:

- Determining alloy - the alloy selection is determined by the atmosphere and temperature of the furnace.
- Wall loading - depending on the wattage requirements, our engineering team will determine the appropriate dimensions and shapes of the rod overbend. Rod overbend is by far the preferred configuration due to long life and excellent heat radiation.
- Wiring design - in a 3-phase circuit, which is standard for industrial furnaces, the amperage determines whether the elements should be wired in a "wye" or "delta" connection.
- Watt density - watt density is the power loading in watts per unit area of the heating element and indicates the potential for the surface to transmit heat energy. This is a basic factor of element operating temperature and overall element life. Thermal Ceramics' watt density designs have historically provided a more robust system than industry standards.

There are a number of factors which must be considered when designing a Morgan Thermal Ceramics Pyro-Bloc EES System, including temperature, atmosphere, contaminates and type of furnace.

Typical Applications

- Non-ferrous metal melting
- Annealing electrical steels
- Glass tempering/annealing
- Aluminium homogenizing
- Ferrous tempering
- Preheating
- Enameling
- Forging
- Vacuum heat treating
- Heat treating exotic metals
- Ceramic whiteware firing
- Nitriding/Carburizing

This list is not exhaustive. Please contact your local Thermal Ceramics representative for further information.

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Properties	Cerafibre Grade	Cerachem Grade
Colour	White	White
Maximum Element Service Temperature, °C (°F)	1200 (2200)	1345 (2450)
Fibre Classification Temperature, °C (°F), EN 1094-1 (2008)	1260 (2300)	1430 (2600)
Density, kg/m³ (pcf), EN 1094-1 (2008)	192, 240 (12, 15)	192, 240 (12, 15)
Specific Heat Capacity, kJ/kg•K		
@1100°C (2012°F)	1.28 (0.31)	1.13 (0.27)
Loss on Ignition, %, EN 1094-1 (2008)		
2 hours @800°C (1472°F)	1	1
Linear Shrinkage, %, after 24 hours, EN 1094-1 (2008)		
1200°C (2200°F)	3	1.6
1300°C (2370°F)	-	3.2
Chemical Analysis, %		
Alumina, Al_2O_3	42-48	33-37
Silica, SiO_2	52-58	48-52
Zirconia, ZrO_2	-	13-17
Other	trace	trace

Cerafibre Grade					
Thermal Conductivity, W/m•K, ASTM C201			**Thermal Conductivity, BTU•in/hr•ft²•°F, ASTM C201**		
Density, kg/m³	192	240	Density, pcf	12	15
400°C	0.1	0.1	1000°F	0.92	0.88
600°C	0.15	0.15	1500°F	1.58	1.38
800°C	0.22	0.19	1832°F	2.15	1.73
1000°C	0.31	0.25	2000°F	2.45	2.03
1200°C	0.41	0.34	2200°F	2.87	2.33
Cerachem Grade					
Thermal Conductivity, W/m•K, ASTM C201			**Thermal Conductivity, BTU•in/hr•ft²•°F, ASTM C201**		
Density, kg/m³	192	240	Density, pcf	12	15
400°C	0.1	0.1	1000°F	0.92	0.83
600°C	0.15	0.13	1500°F	1.55	1.27
800°C	0.22	0.18	1832°F	2.08	1.60
1000°C	0.3	0.23	2000°F	2.43	1.82
1200°C	0.41	0.3	2200°F	2.85	2.07

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