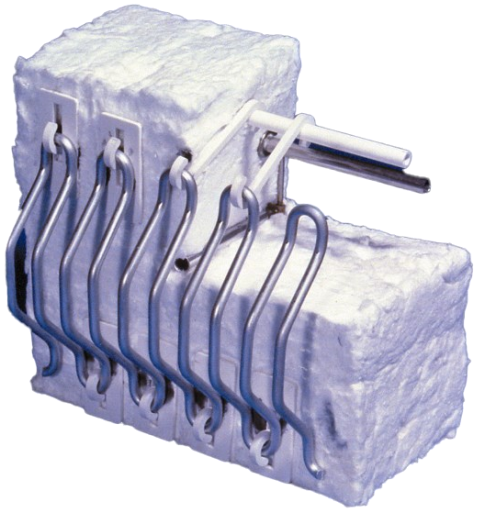
Superwool® Prime Pyro-Bloc EES System



Product Data Sheet

Product Description

The Pyro-Bloc Electric Element Support (EES) System is a complete engineered package which includes Superwool Prime Pyro Bloc modules, heating elements, advanced ceramic hanging components, 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. This new product utilizes the newly innovated Superwool Prime low biopersistent fibre (exonerated from classification and labelling as hazardous in Europe).

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 resistance alloy - the alloy selection is determined by the atmosphere and temperature of the furnace. Resistance alloys available include NiCr and FeCrAl.
- 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.

For more information about Superwool Prime Pyro-Bloc Modules, please see the dedicated datasheet.

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.

Environmental & Health Safety

Superwool low biopersistent fibres manufactured by Morgan Advanced Materials are not classified as carcinogenic by IARC or under any national regulations on a global basis. They have no requirements for warning labels under GHS (Globally Harmonised System for the classification and labelling of chemicals).

In Europe, Superwool fibres meet the requirements specified under Note Q of European Regulation EC/1272/2008 (on Classification, Labelling and Packaging of substances and mixtures). All Morgan Advanced Materials Superwool low biopersistent fibre products are therefore exonerated from classification and labelling as hazardous in Europe.

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Product Data Sheet

Properties	Superwool Prime Pyro-Bloc EES System
Colour	White
Maximum Element Service Temperature, °C (°F)	1200 (2200)
Fibre Classification Temperature, °C (°F), EN 1094-1 (2008)	1300 (2370)
Density, kg/m³ (pcf), EN 1094-1 (2008)	192, 240 (12, 15)
Specific Heat Capacity, kJ/kg•K	
@1000°C (1832°F)	1.20
Loss on Ignition, %, EN 1094-1 (2008)	
2 hours @ 800°C (1472°F)	1
Linear Shrinkage, %, after 24 hours, EN 1094-1 (2008)	
1300°C (2370°F)	2.2
Chemical Analysis, %	
Silica, SiO_2	64-70
Calcium Oxide, CaO	29-35
Other	<3

Thermal Conductivity, W/m•K, ASTM C201		
Density, kg/m³	192	240
200°C	0.07	0.07
400°C	0.10	0.10
600°C	0.14	0.14
800°C	0.21	0.20
1000°C	0.29	0.28
1200°C	0.40	0.38
Thermal Conductivity, BTU•in/hr•ft²•°F, ASTM C201		
Density, pcf	12	15
500°F	0.55	0.54
1000°F	0.88	0.88
1500°F	1.48	1.45
1832°F	2.04	1.96
2000°F	2.36	2.26
2200°F	2.80	2.65

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