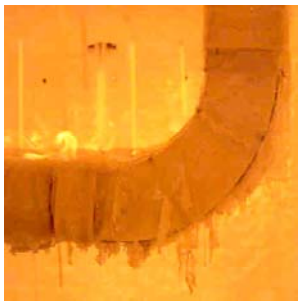
Interam ™ E-50 Series Flexible Wrap Systems

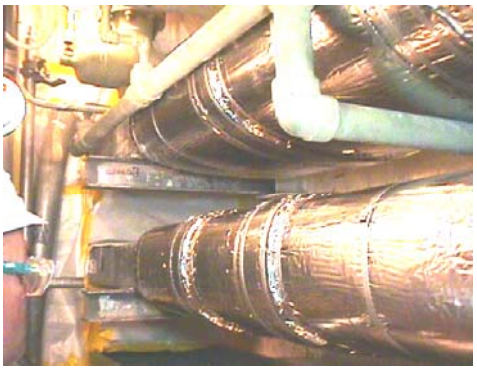
E-50 Series Flexible Wraps are qualified to the stringent requirements of Supplement 1 to USNRC Generic Letter 86-10 and are UL Classified 1 and 3 -hour fire protection systems. They are designed to meet USNRC 10 CFR Part 50 Appendix R requirements for the fire protection of safety related electrical raceways.



These flexible wraps have also been utilized to comply with USNRC Regulatory Guide 1.75.

Tested with zero cable fill, these systems are qualified for all cable types and fills.

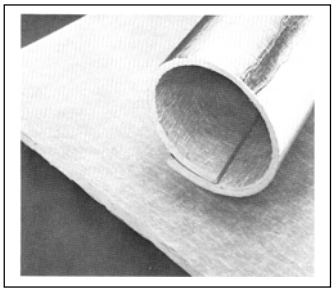
Considered noncombustible, they have been employed as radiant energy heat shields inside containment using a stainless steel faced version.



Shown above, the Interam™ installed as a radiant energy heat shield (RES)

Designs also include structural steel members with UL Classification of 1, 2 or 3-hour ratings.

More than thermal insulation, E-50 Series Mats, when exposed to fire, prevents heat penetration by chemically absorbing heat energy. Installation is fast and easy.



The flexible nature and thin profile of E-50 Series Wraps make them ideal for complex shapes, difficult airdrops and close tolerance areas.

Simply wrap the E-50 Series Mat around the item to be protected, tape and secure the outer layer with stainless steel bands. Can be easily and quickly field fabricated avoiding problems associated with prefabricated systems. No mixing or trowel application, and the multiple layer-offset designs avoid catastrophic failures that can occur with single layer systems when a joint or seam fails.

Fire, ampacity, combustibility, flame spread, radiation exposure, design basis accident (LOCA), seismic, accelerated aging, environmental exposure, jet fire and explosion test results are available upon request.

Shown above, the Interam™ installed as a one-hour fire barrier.

Mat Features

- Heat absorbing
- Non-flame supporting
- Low smoke evolution
- Noncombustible
- Flexible; easily formed around complex shapes
- Easily cut to size using utility knife
- Moisture resistant
- Rapid installation
- Immediately functional

Fire Protection Applications

- One and three-hour fire protection for:
  - Cable trays
  - Wireways
  - Conduits
  - Electrical raceway supports
  - Cable dropouts (free cable)
  - Junction boxes
  - Equipment enclosures w/removable access

Special Applications

- Radiant energy heat shields (RES) (inside containment)
- USNRC Regulatory Guide 1.75 (separation)
- Structural steel
- Steel bulk heads

Test Data

- **Fire Tests:**
  - The E-54A Mat makes up the one and three-hour systems, both of which are qualified to USNRC GL 86-10 Supplement 1.
  - The E-50 series Mats are part of 3M's one, two and three-hour structural steel fire protection systems. These systems are UL Classified.
  - The E-50 series Mats have also been successfully qualified for HIFT steel bulkhead protection.
- **Design Basis Accident (LOCA)**
  - Remains intact and does not dissolve or disintegrate when subjected to loss of coolant accident (LOCA) conditions when the E-54C stainless faced version is used for radiant energy heat shields inside containment.
- **Weatherability**
  - E-50 Series Mats have undergone accelerated aging and weathering conditions. There was no change in the endothermic properties of these materials.
- **Radiation Exposure**
  - E-50 Series Mats have been exposed to cumulative radiation of 2×10^8 rads gamma and have shown no degradation in physical properties.
- **Seismic**
  - E-50 Series Mats have successfully passed seismic testing to 2x safe shutdown earthquake levels. The shake tests were designed to comply with IEEE 381-1977 test of Class 1E modules used in nuclear power plants in addition to the level specified in IEEE 344-1975 and NRC Regulatory Guide 1.60/IEEE 323-1974.

Layer Requirements

- **Electrical Raceway**

Item	E-50 Series 1-hour	E-50 Series 3-hour	Radiant Energy Heat Shield
Conduit	3 layers	5 layers*	2 Layers
Cable Tray	3 layers	6 layers*	2 Layers
Cable Bundles	3 layers	6 layers*	2 Layers
Junction Boxes	3 layers	6 layers*	2 Layers
Equipment Enclosures	3 layers	5 layers*	2 Layers
Supports**	1 layer for 12"; 2 layers for 2"	5 layers for 12"	N/A

*With spacers **Up to 4.1 lbs/linear ft.

- **Structural Steel**

Member Weight lbs./ft.	ASTM E119			UL 1709	
	1 hr.	2 hr.	3 hr.	1½ hr.	2½ hr.
49 lbs. and greater	1 E-54A	2 E-54A	3 E-54A	2 E-54A	3 E-54A
20 lbs. to 48 lbs.	1 E-54A	2 E-54A	3 E-54A	3 E-54A	3 E-54A
Less than 20 lbs.	2 E-54A	3 E-54A	3 E-54A	3 E-54A	3 E-54A

Objective: Average beam and column temperature [1000°F (537°C)

Physical Description

Physical Characteristics	E-54A
Mat Thickness in.	0.4
Roll Width in.	24.5
Roll Length ft.	20
Mat Area/Roll ft²	40.8
Roll Weight lbs.	73.8
Weight/Unit Area lb./ft²	1.81
Bulk Density lb./ft^3	54.3
Color	White

- **Thermal Conductivity**

0.083 BTU/ft.-hr.- F @ 100 F (0,143 W/m- k @ 311°k)
0.090 BTU/ft.-hr.- F @ 200 F 0,155 W/m- k @ 366°k)
0.101 BTU/ft.-hr.- F @ 350 F (0,175 W/m- k @ 450°k)
0.058 BTU/ft.-hr.- F @ 600 F (0,100 W/m- k @ 589°k)
0.068 BTU/ft.-hr.- F @ 750 F (0,118 W/m- k @ 672°k)
0.081 BTU/ft.-hr.- F @ 900 F (0,140 W/m- k @ 755°k)

- **Mean Specific Heat**

0.331 BTU/lb.- F @ 75-400 F (1385J/kg-°C @ 24-200°C)
0.276 BTU/lb.- F @ 75-1650 F (1155J/kg-°C @ 24-900°C)

- **Tensile Strength** ..... 110 psi (758 Kpa)

Other Interam™ Endothermic Products

- E-54C Stainless Steel

3M Fire Barrier Products

- Intumescent Products
  - CP-25WB+ Caulk
  - CS-195+ Composite Sheet
  - CS-195C Composite Sheet Stainless Steel
  - FS-195 Strips
  - MPP-1 & 2 Moldable Putty Pads
  - MPS-2 Moldable Putty Stix
  - PS Series Penetration Sealing Systems
  - RC-1 Restricting Collars
- Other Products
  - T-49 Aluminum Foil Tape
  - 898 Fiberglass Reinforced Filament Tape
  - Stainless Steel Tape (for use with RES Systems)