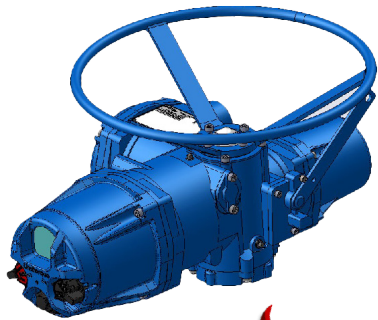
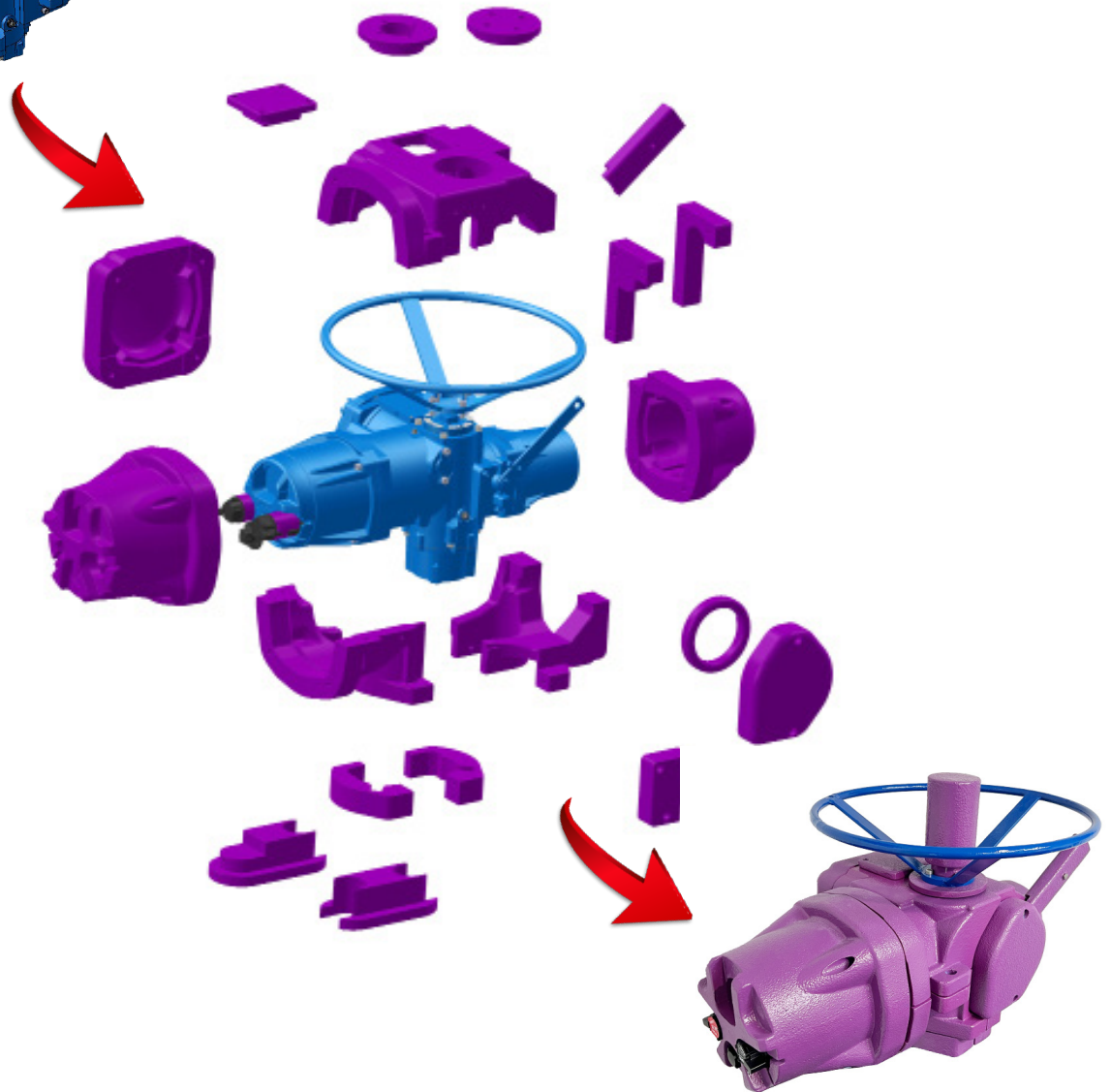


K-MASS[®] FI

Factory or Field Installable Intumescent Epoxy Fireproofing



Making procurement quick and **EASY**



Maintains full **FUNCTIONALITY**

With proven **K-MASS PERFOR-**

EASY - Our goal is to make the procurement of Passive Fire Protection (PFP) quick and simple for Critical Process Control Equipment (CPCE)

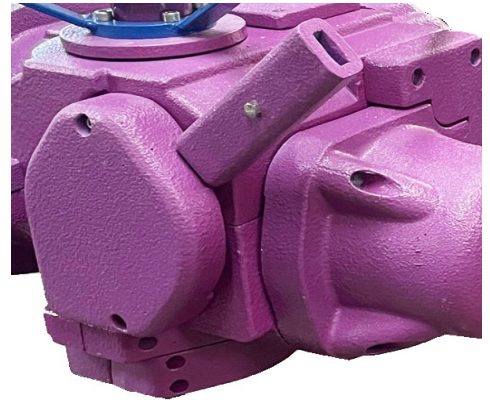
- Initial stocking locations in the US, UK and Canada
- Ships in less than two weeks if not off the shelf
- No need to ship the actuator to us for coating
- You choose when and where to install



- Quick installation, about 30 minutes for one person with no special tools
- Includes additional parts to allow for multiple wiring configurations

FUNCTIONAL - Provides next level Passive Fire Protection that maintains full equipment functionality

- Provides the same premium fire protection as directly bonded **K-MASS**
- Install in the factory or in the field
- Does not affect functionality or useability
- All controls are available on exterior of fireproofing
- Intumescent glass provides visibility and IR device functionality



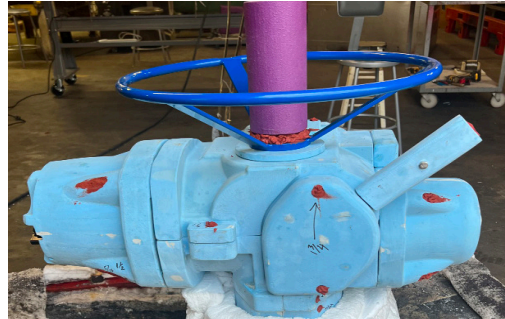
- Custom designed and made for specific actuators
- No doors or hatches to be left open
- Complete kits or individual parts available from stock
- Minimal space required for installation
- Easy to retrofit existing, in-service actuators
- Low maintenance
- Reusable

PERFORMANCE - Industry leading **K-MASS** intumescent epoxy - 35 years of proven performance

- Made with our proven, often specified **K-MASS** intumescent epoxy
- Lifespan of 30+ years
- Uniquely formulated and specifically designed for CPCE fire protection
- Provides superior insulation characteristics in high heat flux, rapid temperature rise hydrocarbon fires
- Complies with API-2218 and UL 1709 fire test curve for a minimum of 30 minutes at 1,093°C (2,000°F) with full functional tests
- Does not interfere with actuator manufacturers ATEX certification



Thermal Designs medium size (4' x 4' x 3') fire test chamber



Actuator before fire test. Mounted on the base of the oven before sides and top of the oven are installed



Actuator after the test showing the black, expanded **K-MASS** char



Electronics cover removed showing undamaged wiring, solder and printed circuit boards

Fire Testing of CPCE

API 2218 - Fireproofing Practices in Petroleum and Petrochemical Processing Plants

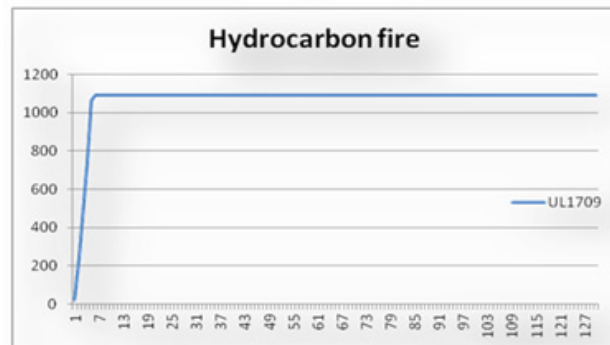
- Defines the minimum requirements for the fire protection of Oil and Gas processing plants. Section 5.1.9 states that “Emergency valves within the fire scenario envelope should be protected to provide a 30-minute rating under UL 1709 (or functional equivalent) conditions”

UL 1709 5th Edition: Rapid Rise Fire Tests of Protection Materials for Structural Steel

- UL1709 fire temperature curve has been adopted for CPCE testing as currently no dedicated test exists for this type of equipment. All **K-MASS** products have been tested to UL1709 and meet the minimum requirements of API 2218
- **K-MASS FI** is tested on functional equipment, removing unknown factors that would otherwise make virtual analysis inaccurate.
- All tests are carried out using one of our three dedicated UL 1709 furnaces
- Each test is witnessed by an independent third party witness



Our three fire test chambers
6'x6'x4' 4'x4'x3' 2'x2'x2'



UL 1709 rapid heat rise hydrocarbon fire curve

Environmental Considerations

- **K-MASS FI** has a Continuous Service Temperature (CST) of 85.6°C (186°F). The CST is the temperature that the coating starts to react. If the CST is too low and it will react in ambient conditions. Too high and the equipment will be damaged before the **K-MASS** has time to react
- Our intumescent epoxy is inert and will not harm the environment

K-MASS Properties

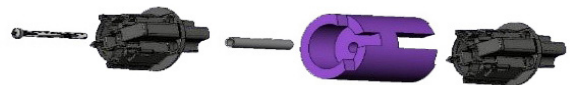
- Coating averages 19.0 mm thickness
- Light blue in color
- Density is 1353.5 kg/m³
- Fully cured **K-MASS** hardness - Shore D \geq 75
- Chemical submersion for 24 hours has little or no effect on fireproofing
- Received a Class I or "A" Rating in ASTM E84 (Standard Test for Surface Burning Characteristics of Building Materials) Smoke/ Fire Spread Test
- Keeps equipment operable for a minimum 30 minutes in a hydrocarbon fire reaching temperatures over 1000° C according to UL 1709
- Non-combustible

Control Knobs and Intumescent Glass

- Intumescent glass leaves indicator lights visible to staff and allows the use of IR controllers for set-up and monitoring
- All controls are on exterior of fireproofing



Electronics cover showing original knobs and intumescent glass



Knob extension showing machined **K-MASS** extension and new knob

Paint System

- For enhanced durability, **K-MASS FI** is overcoated with an epoxy tie-coat primer and a high-build long-chain polymer urethane topcoat. The paint system exceeds the requirements of ISO 12944-5 for C5 high durability environments

Material

- **K-MASS** is a proprietary moldable intumescent epoxy specifically designed for CPCE fireproofing, that becomes reactive in the presence of heat, expanding to several times its original thickness as it develops the insulating char that inhibits CPCE temperature rise. This pyrolytic reaction shields wire insulation, solder connections, circuit boards, terminal blocks, relays and metallurgy allowing the CPCE to remain operational during the fire
- **K-MASS** is the result of more than 35 years of research and development, is currently in Version 3, and we continue to improve the chemistry to enhance the performance as well as new ways to improve fire safety

Maintenance

- A periodic inspection looking for chips, cracks or damage is recommended
- Complete repair kits are available and can be used to fix most small damage
- All repair kits come with a detailed instructional video and manual
- Occasionally repaint if necessary



Thermal Designs
Website



K-MASS FI
Brochure



K-MASS FI
Installation Manual



K-MASS FI
Video



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