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ACTUATOR'S FIREPROOFING

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INDEX

- The actuators
- Hydrocarbon fire
- Typical loss due to fire
- Regulations
- Different types of fire protection
- K-Mass®
  - The origins
  - How it works
  - How it is applied
  - How it works in reality
  - Performances
  - K-Mass in offshore platforms
  - Comparisons

THE ACTUATORS

AUMA actuators will remain fully operable for 30 minutes at temperatures up to 1,100 °C.

HYDROCARBON FIRE

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WHAT EFFECT DOES IT HAVE ON EQUIPEMENT?

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TYPICAL LOSS DUE TO FIRE

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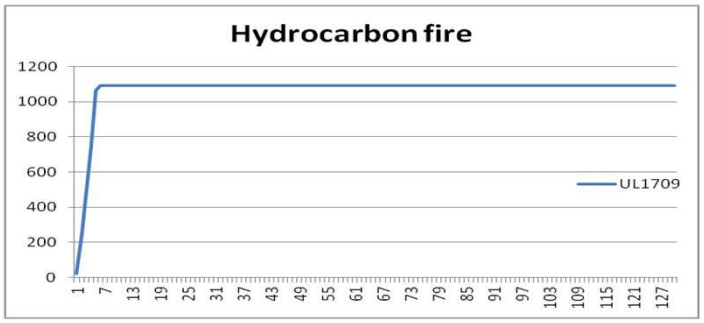
Buncefield fire

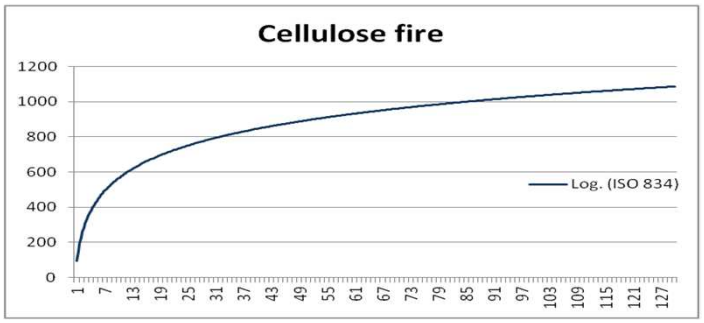
▪ Fire operators (compensation claims)	801M€
▪ Aviation	314M€
▪ Competent authority and Government response	19M€
▪ Emergency response	9M€
▪ Environmental impact	2,5M€
TOTAL	**1245,5M€**

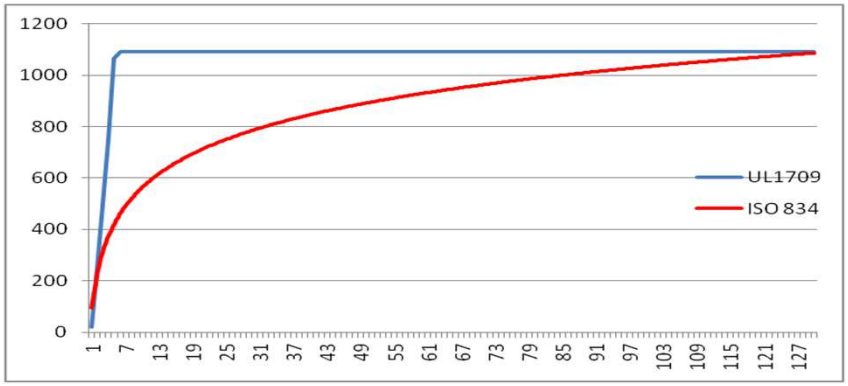
UK government calculated that to protect the whole UK from this type of accident would cost 32M€ or 2.57% of the losses from this one incident.

Source: Buncefield UK GOV report

TYPES OF FIRE







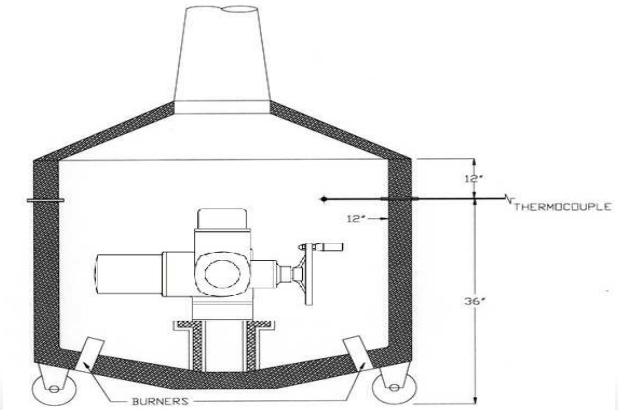
Of all the fire tests available UL 1709 is the most demanding, with the fastest temperature rise coupled with one of the highest heat fluxes. This is why UL1709 has been adopted by the petrochemical industry.

UL1709 TEST

- UL1709 has been adopted by the petrochemical Industry as the de-facto standard for safety critical equipment as it is the most demanding .

- UL1709 states that the temperature in the test should reach 2000°F (1093°C) within five minutes and be maintained at this level throughout the test.

- Crucially during this period the equipment must maintain structural integrity and operate for the period of time specified by the engineer or end user – typically this is 30 minuets



TYPES OF FIRE PROTECTION

- Basically 3 types of fire protection are available
  - Insulating bags or blankets
  - Fire box
  - Intumescent coatings

TYPES OF FIRE PROTECTION: INSULATING BLANKETS

FEATURE:
This use insulation to prevent the migration of heat from reaching the critical item.
The fire blankets are usually made of several layer of ceramic fibre with alluminium foils between the layer tailored stitched on the actuator.

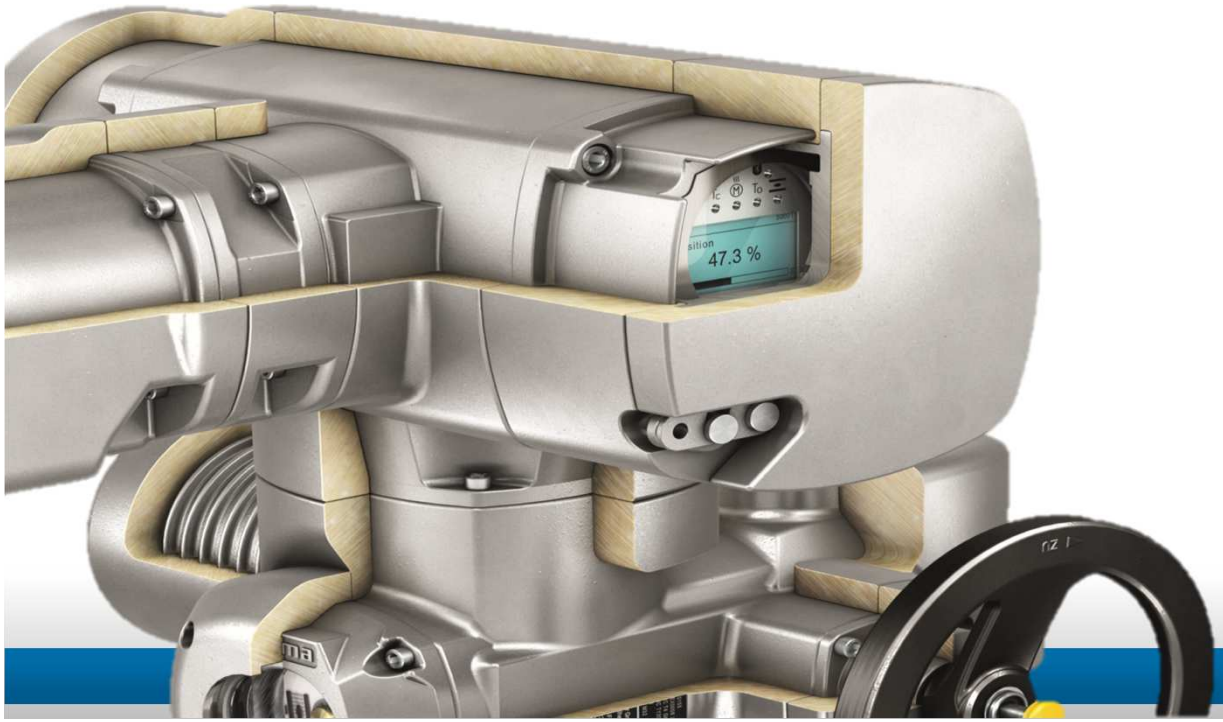
ASSEMBLE:
Prefabricated jackets are installed onsite on the actuator body. These jackets are fixed and secured with velcro and steel band.

TYPES OF FIRE PROTECTION: FIRE BOX

FEATURE:
This uses both the insulation from the wall structure as well as the air gap to prevent the migration of heat from reaching the critical item . The fire box are usually designed with a stainless steel casing filledwith ceramic fibre.

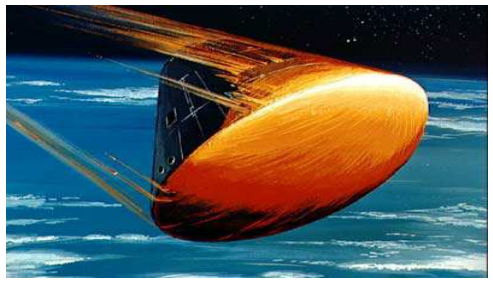
ASSEMBLE:
The fireproofing box consist of differents panel and accessories. Each panels is assembled and secured by engineered clamps or welded onsite.

- Intumescent coating

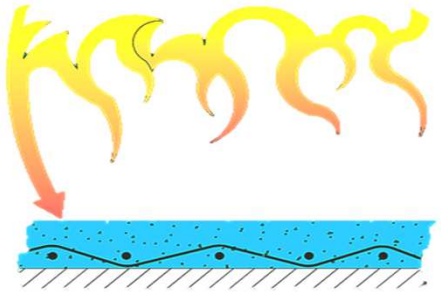


K-MASS®: THE ORIGIN

- Thermal Designs bought the rights to a product from NASA. NASA used this product to protect the Apollo capsule from the heat of re-entry. We now call the product K-Mass®
- K-Mass® is currently in version 3, as are continually improving the chemistry to enhance the performance as well as looking at new ways of improving fire safety.

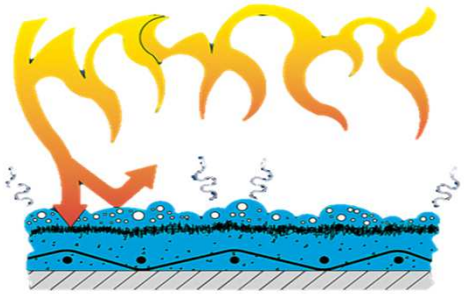


K-MASS®: HOW IT WORKS



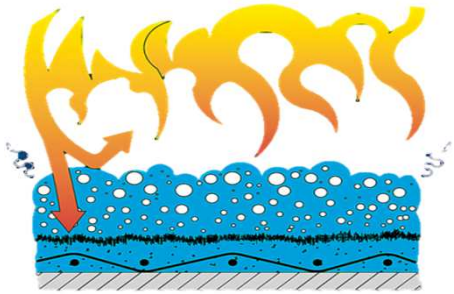
As the fire starts

- K-Mass® starts to react at 85.6°C .
- A chemical process causes the coating to expand (intumesce). Evaporation on the surface then takes place which also has a cooling effect.
- The outside surface then starts to char.



During the fire

- The surface char deepens reflecting 80-90% of the heat back into the fire.
- More intumescing takes place which forms a barrier which both insolates and has a cooling effect.



Long term exposure

- The 1093°C heat will penetrate the first layer so that the K-Mass® below will start to react.
- The next layer reacts as before.
- The layers react until the fire is extinguished or the material is consumed.

Source: Thermal Design

K-MASS®: HOW IT IS APPLIED

Parts arrive

Surface praparation

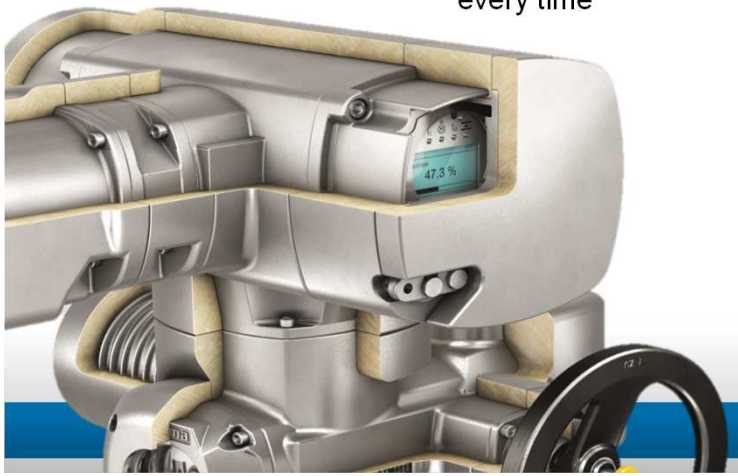
All parts are shot blasted and primed this ensures that the kmass adherers perfectly every time

Moulding

- Parts are assembled into moulds allowing a coating of between 12.7 -19mm min.
- K mass is pumped under pressure into the moulds.

Sanding

Every part is finished by hand then trial fitted to ensure easy assembly.



Final paint and dispatch

Every part is finished by hand then trial fitted to ensure easy assembly.

K-MASS®: HOW IT WORKS IN REALITY

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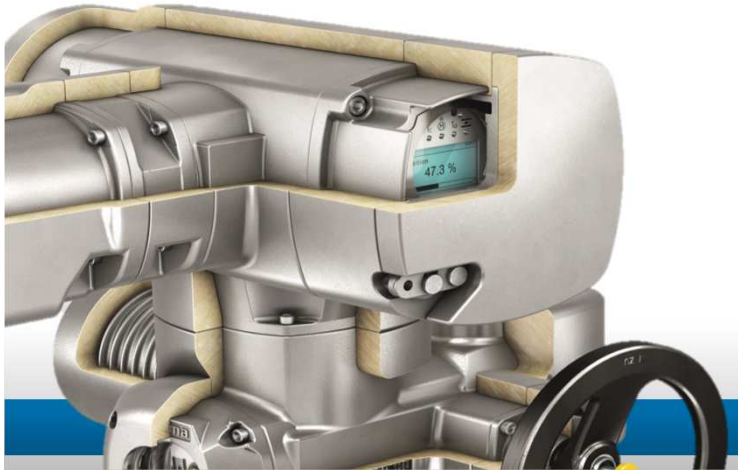
Test UL1709

Local command board

Logic board

K-MASS®: PERFORMACES

- Impossible to be left off.
- No fitting required.
- High corrosion protection.
- Full access to equipment.
- No chemical store
- Compliant to EN60079-14:2008
- Blast resistant.
- Will last the life of the actuator.
- No insulation effect on the motor.



K-MASS®:WHY IS IT SUITABLE FOR OFFSHORE PLATFORMS?

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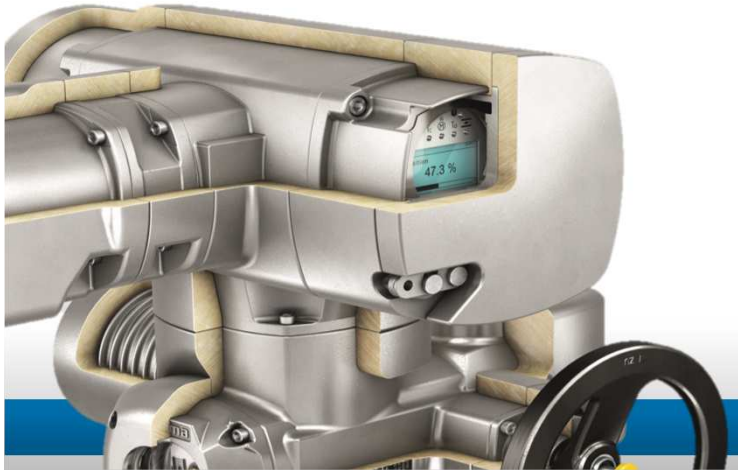
- UL1709 certified
- No on-site installation required
- Additional corrosion protection
- Long life span
- Light and compact



K-MASS®: COMPARISONS

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Safety Features for passive fire-protection types			
Safety feature	Bag or blanket	Box enclosure	K-Mass®
UL 1709	✓	✓	✓
ISO 834	✓	✓	✓
BS 476 pt 20	✓	✓	✓
ASTM E1529	✓	✓	✓
Jet fire ISO 22899 Part 1.	✓	✓	✓
Operational testing (done with the item working inside)	✓	✓	✓
Compliance with EN 60079-14:2008 (ATEX)			✓
Prevents storage of gases or liquid			✓
Prevents build-up of the heat in equipment			✓
Easy maintenance			✓

THANK YOU FOR YOUR TIME!

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