



# FireMaster<sup>®</sup> Instrument cable tray fire protection

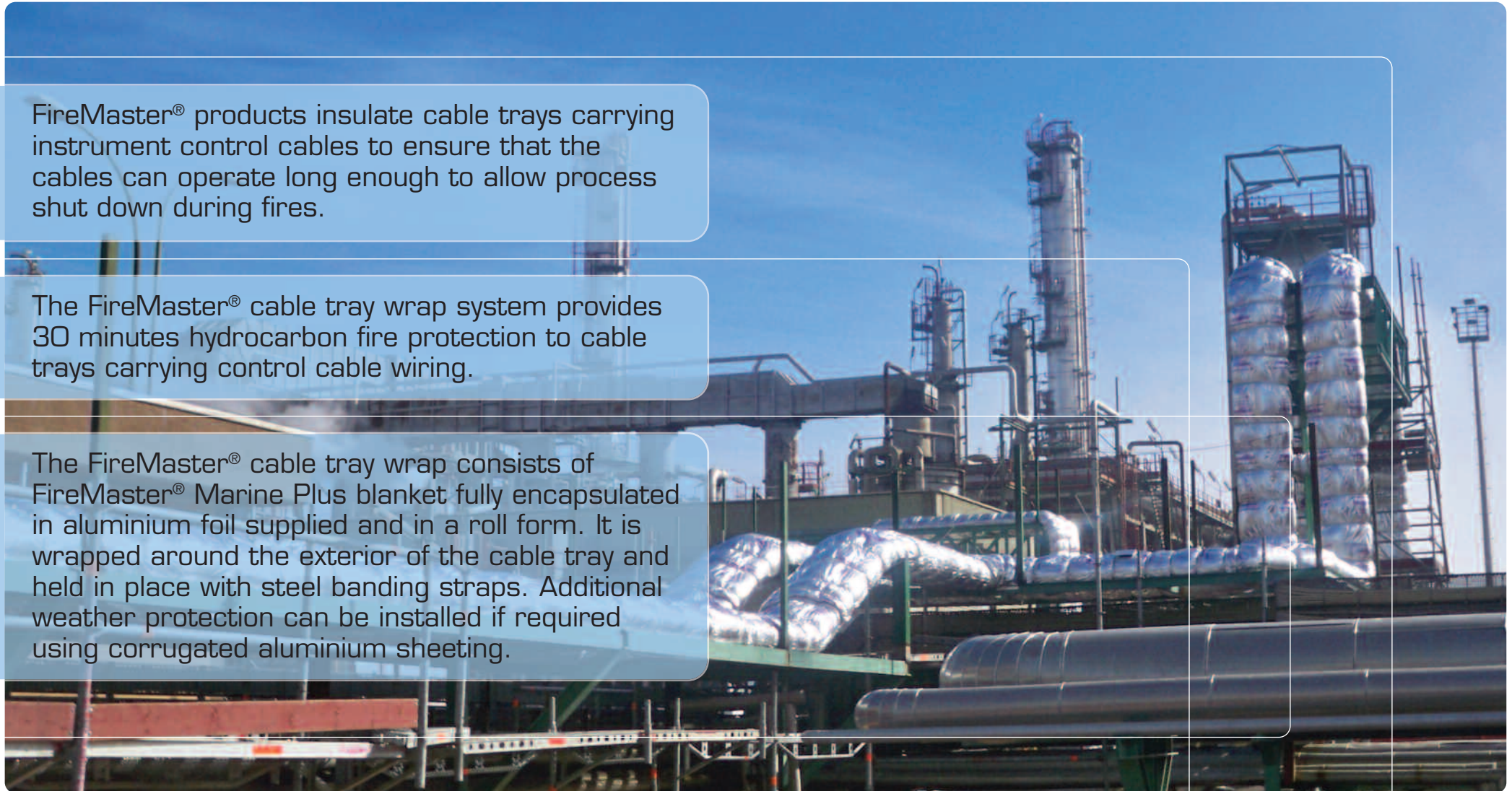
# Instrument cable tray fire protection

30 minute hydrocarbon fire protection

FireMaster® products insulate cable trays carrying instrument control cables to ensure that the cables can operate long enough to allow process shut down during fires.

The FireMaster® cable tray wrap system provides 30 minutes hydrocarbon fire protection to cable trays carrying control cable wiring.

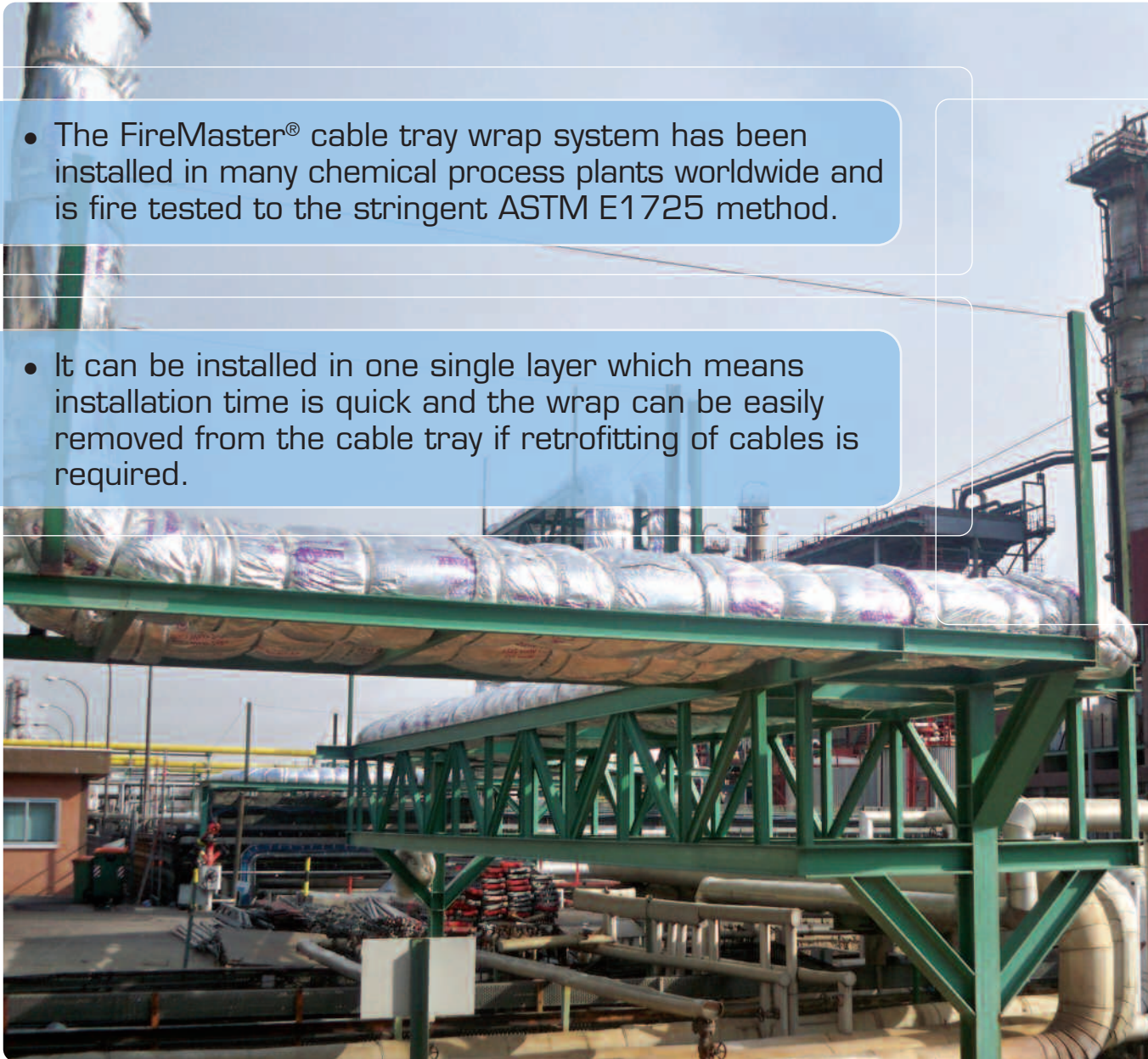
The FireMaster® cable tray wrap consists of FireMaster® Marine Plus blanket fully encapsulated in aluminium foil supplied and in a roll form. It is wrapped around the exterior of the cable tray and held in place with steel banding straps. Additional weather protection can be installed if required using corrugated aluminium sheeting.





- The FireMaster® cable tray wrap system has been installed in many chemical process plants worldwide and is fire tested to the stringent ASTM E1725 method.

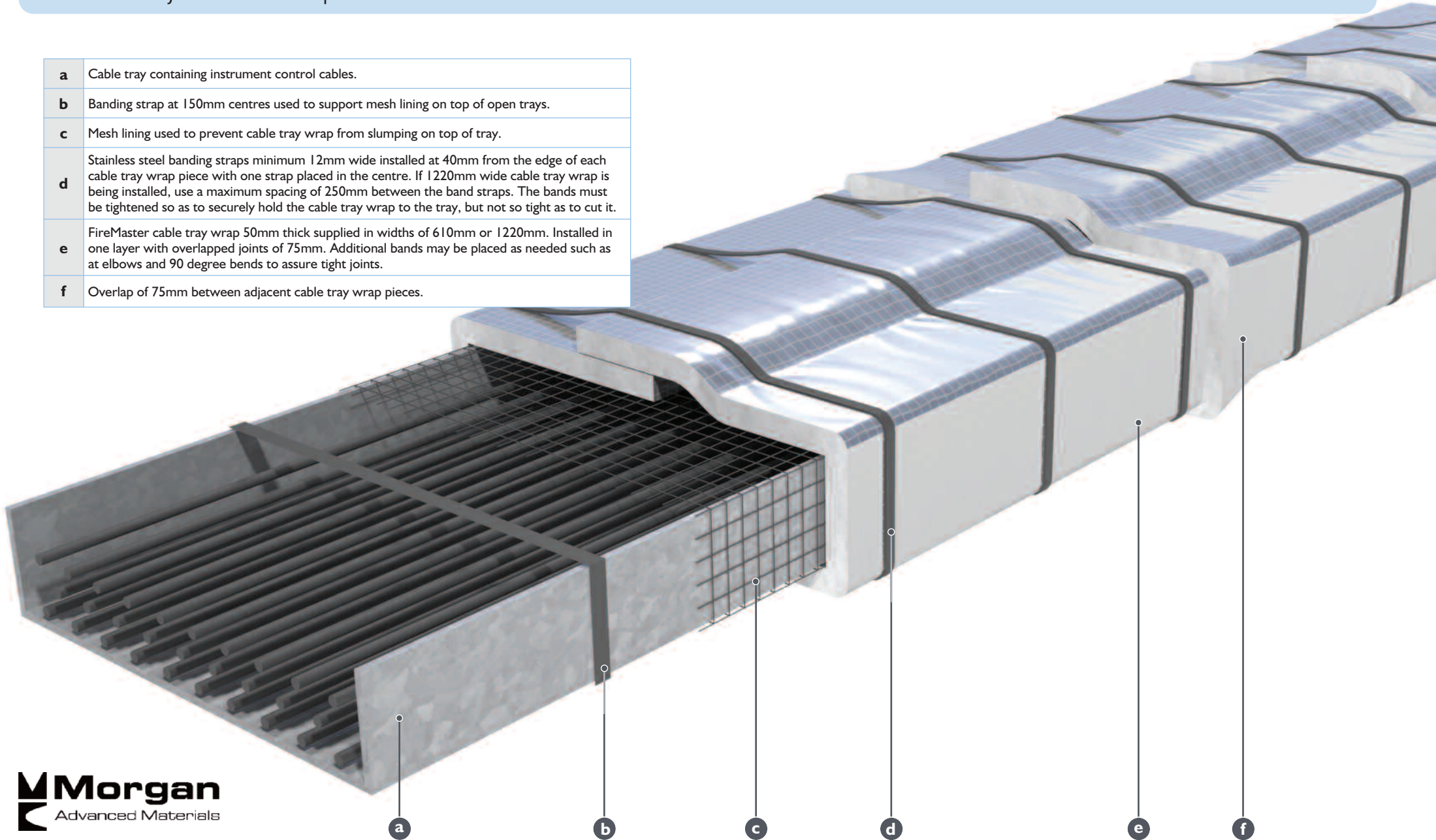
- It can be installed in one single layer which means installation time is quick and the wrap can be easily removed from the cable tray if retrofitting of cables is required.



# Instrument cable tray fire protection

30 minute hydrocarbon fire protection

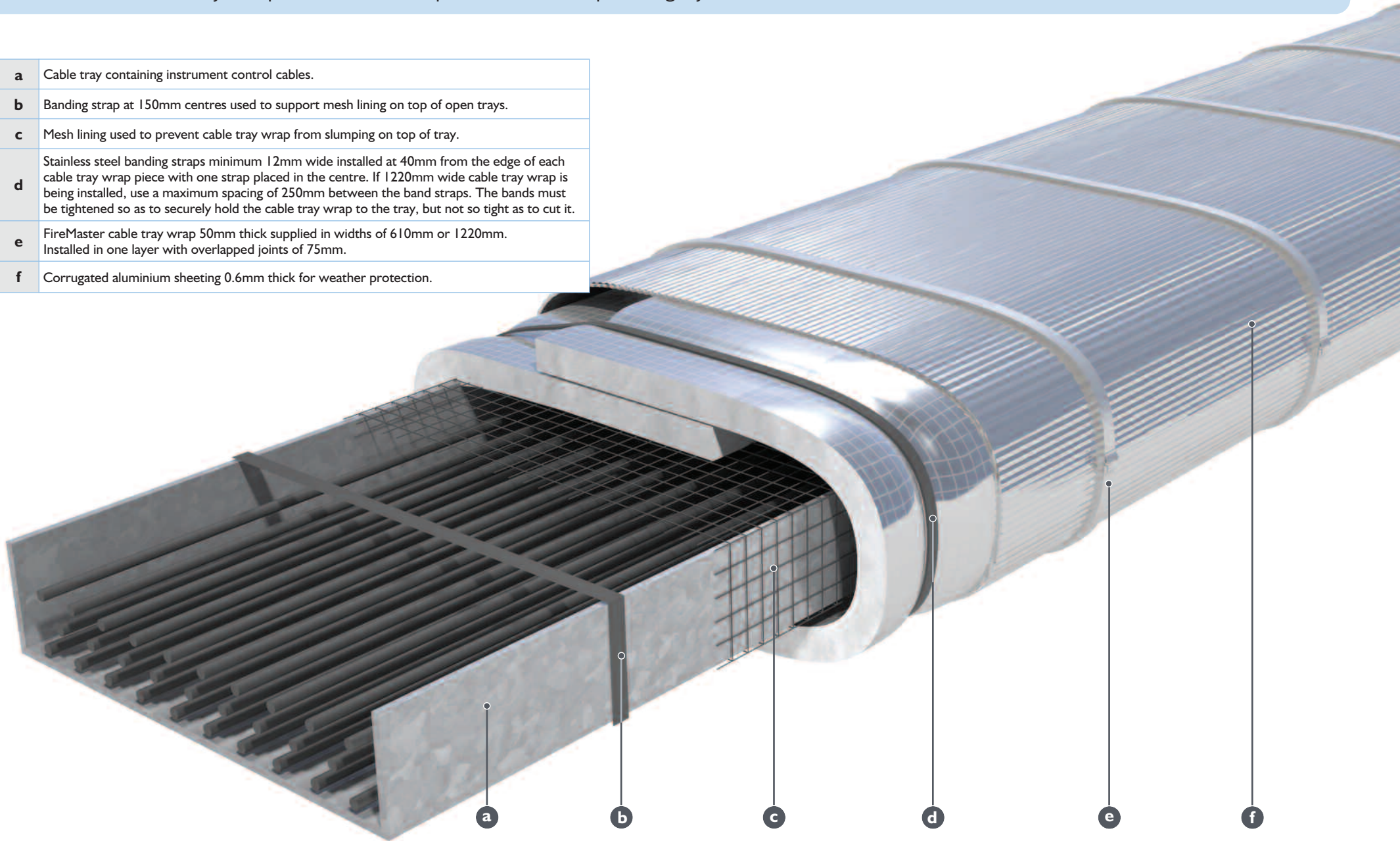
<b>a</b>	Cable tray containing instrument control cables.
<b>b</b>	Banding strap at 150mm centres used to support mesh lining on top of open trays.
<b>c</b>	Mesh lining used to prevent cable tray wrap from slumping on top of tray.
<b>d</b>	Stainless steel banding straps minimum 12mm wide installed at 40mm from the edge of each cable tray wrap piece with one strap placed in the centre. If 1220mm wide cable tray wrap is being installed, use a maximum spacing of 250mm between the band straps. The bands must be tightened so as to securely hold the cable tray wrap to the tray, but not so tight as to cut it.
<b>e</b>	FireMaster cable tray wrap 50mm thick supplied in widths of 610mm or 1220mm. Installed in one layer with overlapped joints of 75mm. Additional bands may be placed as needed such as at elbows and 90 degree bends to assure tight joints.
<b>f</b>	Overlap of 75mm between adjacent cable tray wrap pieces.





## Instrument cable tray fire protection with optional weather proofing system

<b>a</b>	Cable tray containing instrument control cables.
<b>b</b>	Banding strap at 150mm centres used to support mesh lining on top of open trays.
<b>c</b>	Mesh lining used to prevent cable tray wrap from slumping on top of tray.
<b>d</b>	Stainless steel banding straps minimum 12mm wide installed at 40mm from the edge of each cable tray wrap piece with one strap placed in the centre. If 1220mm wide cable tray wrap is being installed, use a maximum spacing of 250mm between the band straps. The bands must be tightened so as to securely hold the cable tray wrap to the tray, but not so tight as to cut it.
<b>e</b>	FireMaster cable tray wrap 50mm thick supplied in widths of 610mm or 1220mm. Installed in one layer with overlapped joints of 75mm.
<b>f</b>	Corrugated aluminium sheeting 0.6mm thick for weather protection.



# Cable tray fire protection fire testing and certification

Instrument cable tray fire protection has several purposes. These are:

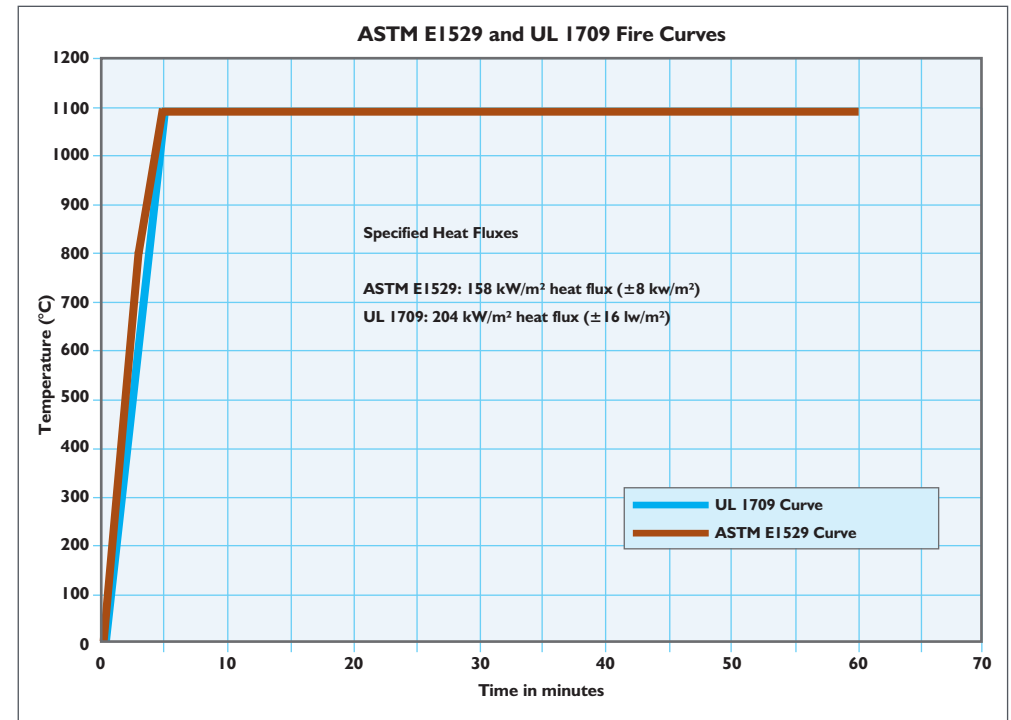
- Maintain cable function in a fire
- Prevent corrosive/toxic gas emission when cable burns
- Protect fire fighters
- Aid evacuation
- Minimise long-term damage to cable facilities

ASTM E1725-95 'Standard Test Methods for Fire Tests of Fire Resistive Barrier Systems for Electrical System Components' is designed to measure and describe the response of electrical system materials, products or assemblies to heat or flame under controlled conditions. This test can be carried out using either cellulosic or hydrocarbon fire curves (ASTM E119 and E1529 respectively).

API 2218 'Fire Proofing Practices in Petroleum and Petrochemical Processing Plants' references ASTM E1725-95 test method and states that for applicability to petroleum and petrochemical processing plants, the fire test should be carried out using a hydrocarbon fire temperature/time curve.

API 2218 considers the ASTM E1529 and UL 1709 hydrocarbon fire curves to be functionally equivalent. These fire curves are similar. The ASTM E1529 curve is slightly higher in temperature than UL 1709 and specifies a heat flux taken from measurements of hydrocarbon pool fires (see Appendix I of ASTM E1529 for further information).

The two fire curves are shown on the graph opposite.



The ASTM E1725-95 test method has stringent requirements for performance of cable tray fire insulation systems. The key features of the test are:

- The test is run at positive pressure over at least ½ the test assembly
- Thermocouples are arranged in sets, fixed into the tray every 150mm on both rails of the cable tray, and every 150mm on a bare copper wire centered in the tray
- The cable tray is intended to be run empty of cables, providing approval for 0% to 100% cable loading
- Failure is determined when one thermocouple 'set' reaches an average temperature rise of 250°F, (121°C) or any single thermocouple reaches 325°F (163°C)

### **Assessing the performance of cable tray fire insulation systems using cable temperature versus circuit integrity**

ASTM E1725 uses cable tray temperature as the failure criterion because circuit integrity has been shown to be unreliable as an indicator of failure of a cable.

This is the result of research that indicated cables believed to be of identical composition and rating had different functional failure temperatures.

This means that circuit integrity failure cannot be assumed to reliably occur at the same time point in a fire. Therefore, it is more reliable to establish a maximum temperature beyond which any cable can be considered to be at risk of failure.

Using cable temperature as the failure criterion ensures that the maximum temperature at which functionality of any cable can be assumed to be maintained is not exceeded, even if circuit integrity can be maintained by the sample cable used in the fire test. Furthermore, the measurement of tray rather than cable temperature, with an empty tray, allows any cable loading to be used in practice.

### **Certification approval**

The FireMaster instrument control cable tray system is Factory Mutual Approved for 30 minute hydrocarbon fire protection of instrument control cable trays in accordance with ASTM E1725-95 method using the ASTM E1529 hydrocarbon fire curve.

The FM Approval is valid for manufacture of FireMaster cable tray wrap at a number of Morgan Thermal Ceramics factories worldwide.