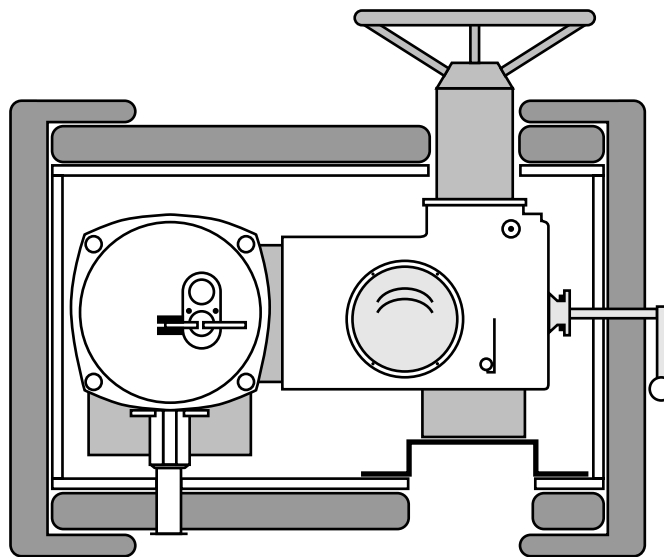


The Firetex flexible enclosure system has been developed to provide fire protection for emergency shutdown valves, actuators, control stations, electrical junction boxes, marshalling cabinets and other critical equipment located in hazardous environments.

Design of the system is based on the industry approved hydrocarbon fire time versus temperature curve. Equipment surface temperature constraints may vary over a range of 70°C to 350°C and time factors between 15 and 120 minutes. The Firetex system has been tested at the Loss Prevention Council's test house at Borehamwood where an electrical type actuator and cast iron gate valve enclosure were proved to provide protection for periods of 30 minutes and 90 minutes respectively.

The actuator surface temperature was held to 90°C and the valve to 300°C. Physical integrity of the enclosures was maintained throughout the test programme.



A Typical Actuator Enclosure System

The Firetex Flexible Enclosure System has an overall thickness of typically 66mm and is comprised of a multi-layer construction of elastomeric coated ceramic cloth, silicate fibre blankets separated by metallic foil and elastomeric coated glass cloth. The enclosure may be tailored to fit directly onto the body of the protected equipment or may be supported by a space frame system where physical configuration dictates.

Special collars are incorporated into the system to accommodate cabling or hydraulic lines and a similar arrangement is provided where handwheels and/or declutch levers are required to be external to the enclosure.

All materials used in the construction of the Firetex enclosure system are unaffected by normal working conditions and as such, the enclosures are virtually maintenance free. No special tools are required in order to quickly and easily dismantle or reassemble the enclosure and thus maintenance routines may be carried out speedily.

Unlike pipe penetration fire seal systems and jet fire rated enclosure systems, at the time of this data sheet going to press, there is no national or international recognised standard describing test methods for this type of product.

In the absence of such a standard, the Firetex Enclosure System was subjected to the most arduous furnace testing available in accordance with the hydrocarbon fire time versus temperature curve given in the Department of Energy Specification - Issue 1:1990.

Study of the test report, prepared by the Loss Prevention Council, resulted in Lloyds Register issuing a Letter of Compliance for the system, a copy of which is available on request together with a copy test report if required.

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CSD/SAS/PB/FIRE/2249

24 June 1996

Letter of Compliance

Dear Sirs

Fire Proof Enclosures

With reference to your letter of 27 March 1996.

This is to certify that at the request of MCL Unitex Limited a furnace fire test was carried out at the Loss Prevention Council Laboratories on 6 November 1995, on a specimen described as a 'Flexible Firetex Enclosure System'.

The proceedings have been documented by the Loss Prevention Council Laboratories in their report TE 86350 dated 6 December 1995 which has been examined by Lloyd's Register.

1. Test Method

At the time of the test there was no national or international recognised standard describing test methods for this type of product. The following method was therefore, adopted;

A gate valve, including actuator and 850 mm of 6" bore pipe attached to either end of the valve body was protected by a 'firetex soft enclosure' and subjected to a fire test in accordance with the hydrocarbon time/temperature curve given in the Department of Energy Specification - Issue 1:1990.

The temperature on the surface of the valve and valve actuator were monitored using thermocouples positioned beneath the fire enclosure, for a period of 91 minutes. The total mass of the actuator and valve was 120 kgs.

The actual design and construction of the actuator and valve are not considered significant factors in assessing the validity of the test as a basis for acceptance of the protection system on future applications. For this reason the actuator performance during and after the test was not examined.

The application of this Letter of Compliance is limited to the protection system being employed for a valve and actuator assembly of a limited total mass, where the valve actuator assembly is proven to be able to operate up to the temperature stated in this 'Letter of Compliance'.

2. **Description of the Product and Test Specimen**

The Flexible Firetex Enclosure System is constructed around a mild steel framework attached to the valve body and actuator. The enclosure is protected by a multi-layer arrangement of fire resisting materials of minimum thickness 66mm. The layers are to be arranged as shown in Drawing No. MC-TE86350-01 date 11 July 1996.

The construction of the enclosure was as given by Manufacturer's drawings;

- MC-TE86350-01 date 11 July 1996
- MC-T/700/CA/S date 16 October 1995
- MC-T/700/AEF/S date 12 October 1995
- MC-T/700/AE/S date 17 October 1995
- MC-T/700/VEF/S date 12 October 1995
- MC-T/700/VE/S date 17 October 1995
- MC-T/700/PE/S date 24 October 1995

Drawings for each application, however, are to be submitted to Lloyd's Register for consideration at the design stage.

The pipe adjoining the valve body was insulated with ceramic fibre blanket for a distance of 915mm from the connection to the valve.

The enclosure is held in position with a series of turn buttons, fire resisting velcro and fire resisting straps.

3. **Test Results** The following thermocouple readings were reported

LOCATION	MAXIMUM TEMPERATURE °C	
	30 Minutes	60 Minutes
Surface of Valve	109	-
Surface of Actuator	74	195

After testing no gaps were found in the enclosure. For full details of the test results refer to the LPC test report.

It should be noted that leakage from protected valves if unchecked may have detrimental effect on the performance of the fire enclosure. In order to counter this problem regular opening of the enclosure for inspection is necessary. Replacement of the enclosure is to be in accordance with the Manufacturer's instructions.

4. Compliance

In view of the fact that there is no recognised or international standard, and no defined pass or fail criteria for the test method used, no Fire Approval Certificate may be issued by Lloyd's Register. Nevertheless, this Letter of Compliance is issued as a substitute for such a certificate.

Provided it's construction and constituent material are manufactured in strict conformity with the prototype as tested in the LPC Laboratories test report No. TE 86350 dated 6 December 1995, Firetex Flexible Enclosure Systems will be accepted for compliance with the applicable Lloyd's Register's Classification Rules and Regulations for use on offshore installations when authorised by contracting governments to issue the relevant certificates, licences, permits etc. as a:

Passive Fire Protection System for Valves and Valve Actuator Assemblies

- 4.1 The Actuator/Valve Assembly's mass as tested was 120kg. The mass of each assembly proposed is to be submitted for consideration in each case.
- 4.2 The Actuator is proven to remain operational up to a working temperature of 80°C for a period of at least 30 minutes.
- 4.3 The Valve is proven to remain operational up to a working temperature of 180°C for a period of at least 60 minutes.
- 4.4 The Pipe attached to the valve is insulated with ceramic fibres of minimum thickness 60mm with density 110kg/M³ for a distance of at least 900mm from the valve body.

4.5 Thickness and arrangement of the insulation elements are to be as shown in the test report.

Yours faithfully



P. J. Burbage (Direct Ext. 0171 423 2785)
Surveyor
Statutory Approval Services
Construction Services Department

JUN/022/ces