



Certificate Of Fire Approval

This is to certify that the product(s) detailed below will be accepted for compliance with the applicable Lloyd's Register Rules and Regulations for use on offshore units classed with Lloyd's Register, and for use on offshore units and onshore facilities when authorised by contracting governments to issue the relevant certificates, licences, permits etc.

Manufacturer	MCT Brattberg AB
Address	Lyckeåborgsvagen 63, Karlskrona, 371 92, Sweden
Type	Cable Penetration (Jet Fire Test)
Description	Jet Fire Resisting Assembly (Cable Transits) – Type: “RGS-8+8 BTB”, Cable Transits for jet fire exposures up to 120 minutes.
Trade Name	“RGS-8+8 BTB” Cable Transits
Specified Standard	International Standard ISO 22899-1:2007 "Determination of the Resistance of Jet Fires of Passive Fire Protection Materials, Part 1: General Requirements"

This certificate is not valid for equipment, the design or manufacture of which has been varied or modified from the specimen tested. The manufacturer should notify Lloyd's Register North America, Inc. of any modification or changes to the equipment in order to obtain a valid Certificate.

The Design Appraisal Document and its supplementary Type Approval Terms and Conditions form part of this Certificate.

This certificate remains valid unless cancelled or revoked, provided the conditions in the attached Design Appraisal Document are complied with and the equipment remains satisfactory in service.

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A member of the Lloyd's Register group

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ATTACHMENT TO CERTIFICATE OF TYPE APPROVAL No. LR23398477SF

The undernoted documents have been appraised for compliance with the relevant requirements of International Conventions, and this Design Appraisal Document forms part of the Certificate.

This Certificate Supersedes and is a Renewal of Certificate Number: **SAS F160298**

APPROVAL DOCUMENTATION

TEST REPORTS

Health & Safety Laboratory (HSL), Harpur Hill, Buxton, Derbyshire, SK17 9JN, United Kingdom, Fire Test Report No: MH/15/191 dated 7th January 2016.

CONDITIONS OF CERTIFICATION

1. The Cable transit tested was mounted into a 10mm thick steel plate, fitted flush with the exposed face. In all cases the cable transit shall be incorporated into a suitably rated steel plating of equal fire risk and rating.
2. Applications to be based on a flat panel internal configuration jet fire test incorporating two cable transit back-to-back (BTB) assemblies Type: RGS-8+8 BTB with insulation fitted on the unexposed side of the plate and transit and with each steel transit frame fitted flush with the exposed face.
3. The "MCT Brattberg" insulated Panel jet fire test specimen incorporated two cable transit assemblies, Types: "RGS-8+8 BTB - 300mm long" and "RGS-8+8 BTB - 400mm long" consisting of:
 - Steel plating 10mm thick.
 - Double frame packed from both sides with machined groves for stay plates and compression plate manufactured from mild steel, frame thickness for both models 10mm thick in the bottom and top, and 12mm on the sides. The exposed edge of the transit frame installed flush with the bulkhead panel.
 - Stay plates are placed between each layer of insert block to ensure mechanical anchorage made of mild steel.
 - Blocks are installed from both sides of the transit to a depth of 300mm and 400mm respectively. Insert blocks are manufactured from "Lycron" (EPDM) rubber. Blocks are provided in differing dimensions to ensure Lycron blocks seal the services passing through the transit. All blocks 60mm thick.
 - The cavity between the two packing sets, inside the frames, was filled with 'thermal ceramics insulation type H Class' 128kg/m³.
 - Compression plates installed after blocks installed to ensure transit is sealed gas, smoke, and water tight and to ensure blocks are put under pressure. Compression plates made of mild steel constructed with telescopic bolt.
 - End packing type STG 1 (M8 bolts tightened until free length of thread is 10 -12mm) or press wedge type PTG 120 (allen key threads or hex bolts tightened until thread visible) installed to secure the final assembly.



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- All the unexposed side of the cable transit assembly including the penetrations, was fully insulated with a “Thermal Ceramics” fire resistant multi-layer insulation system (150mm total thickness, 128kg/m³ density) produced by MCT Brattberg, retained by steel wire mesh and welded steel pins to the specimen.
- Cables and arrangements were tested in each cable transit, but were mirror image, to provide the same jet fire conditions to each cable size/type in each transit. The sizes and types of the cables were varied, and 4 larger cables were fitted in the upper part and 14 medium to small cables were fitted in the lower part. The largest cable was 110mm in diameter. The test results obtained from a given configuration are generally valid for cables of size equal to or smaller than those tested.
- The range of cable transits described below may be assigned a Jet Fire Classification based on ISO 22899-1: 2007(E), Section 15, for example, “RGS-8+8 BTB - 300mm long” (Table 1) may be classified: “JF/Cable transit system/145/120” and “RGS-8+8 BTB - 400mm long” (Table 2) may be classified: “JF/Cable transit system/105/120”, depending on type of application and maximum cable temperatures specified, in accordance with ISO 22899-1:2007(E) Section 15.4 Critical Temperature Rise.
- The approved size of single and multiple frame combinations shall be in accordance with the applicable H rated certificate LR21189182SF-02 as amended.
- Production items are to be manufactured in accordance with a quality control system which shall be maintained to ensure that items are of the same standard as the approved prototype.
- The certificate holder is solely responsible for the products supplied under this Certificate and to ensure that their products, are fully compliant with the relevant statutory regulations as applicable and are designed, manufactured and installed to the same quality and specifications as the prototype tested, including components that are designed and manufactured by third parties.

NOTES

TEST RESULTS FOR JET FIRE TESTED PANEL SPECIMEN

Test Results for insulated Panel Specimen penetrated by two cable transit assemblies (RGS-8+8 BTB) 300mm long (Table 1) and 400mm long (Table 2) with same cable arrangements.

Table 1 - 300mm long specimen

Integrity:	120 minutes (back face block system protection remained intact for duration of test, but significant damage to the exposed face block system was reported).	
Insulation:	The following maximum temperature rises were recorded from the specimen cables and transit:	
Cables:	Thermocouple No. 11	after 30 minutes of exposure 19°C



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	Thermocouple No. 11	after 60 minutes of exposure 69°C
	Thermocouple No. 11	after 90 minutes of exposure 101°C
	Thermocouple No. 11	after 120 minutes of exposure 143°C
Classification:	“JF/Cable transit system/145/120” (assessed from maximum temperature rise of the RGS 8+8 BTB specimen in jet fire test).	

Table 2 - 400mm long specimen

Integrity:	120 minutes (back face block system protection remained intact for duration of test, but significant damage to the exposed face block system was reported).	
Insulation:	The following maximum temperature rises were recorded from the specimen cables and transit:	
Cables:	Thermocouple No. 2	after 30 minutes of exposure 10°C
	Thermocouple No. 2	after 60 minutes of exposure 42°C
	Thermocouple No. 2	after 90 minutes of exposure 74°C
	Thermocouple No. 2	after 120 minutes of exposure 100°C
Classification:	“JF/Cable transit system/105/120” (assessed from maximum temperature rise of RGS 8+8 BTB specimen in jet fire test).	

SCOPE OF TEST

The test described in the procedure ISO 22899: Part 1 is one in which some of the properties of passive fire protection materials can be determined and is designed to give an indication of how passive fire protection materials will perform in a jet fire. The dimensions of the test specimen may be smaller than typical items of structure and plant and the release of gas may be substantially less than that which might occur in a credible event. However, individual thermal and mechanical loads imparted to the passive fire protection material, from the jet fire defined in the procedure described in ISO 22899: Part 1, have been shown to be similar to those by large-scale jet fires resulting from high pressure releases of natural gas.

Although the test method has been designed to simulate some of the conditions that occur in an actual jet fire, it cannot reproduce them all exactly and the thermal and mechanical loads do not necessarily coincide. The results of this test do not guarantee safety but may be used as elements of a fire risk assessment for structures or plant. This should also take into account all the other factors that are pertinent to an assessment of the fire hazard for a particular end use.

Jet fire testing is not intended to replace hydrocarbon resistance testing (ISO/TR 834-3/EN 1363-2 or equivalent) but is seen as a complimentary test. Hydrocarbon test performance is outside the scope of this certificate. Hydrocarbon carbon fire resistance testing shall be separately performed and certified. This certificate may be assessed separately to determine the relationship between hydrocarbon and jet fire test results for variations in time/temperature criteria.

The scope of the tests performed, and this certificate does not include an assessment of other properties of the passive fire protection material such as weathering, ageing, shock resistance, impact or explosion resistance or smoke production.

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PLACE OF PRODUCTION

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Lloyd's Register Americas

Supplementary Type Approval Terms and Conditions

This certificate and Design Appraisal Document relates to type approval, it certifies that the prototype(s) of the product(s) referred to herein has/have been found to meet the applicable design criteria for the use specified herein, it does not mean or imply approval for any other use, nor approval of any products designed or manufactured otherwise than in strict conformity with the said prototype(s)