

DARCHEM THERMAL PROTECTION

DARSHIELD™ RIGID ENCLOSURE PASSIVE FIRE PROTECTION SYSTEMS

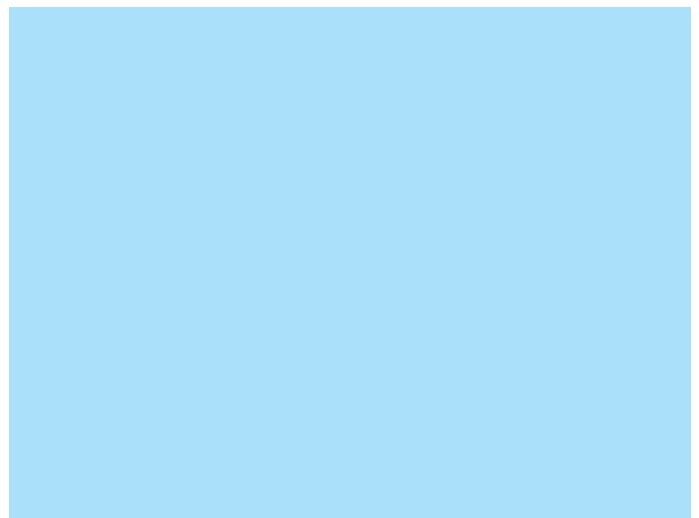
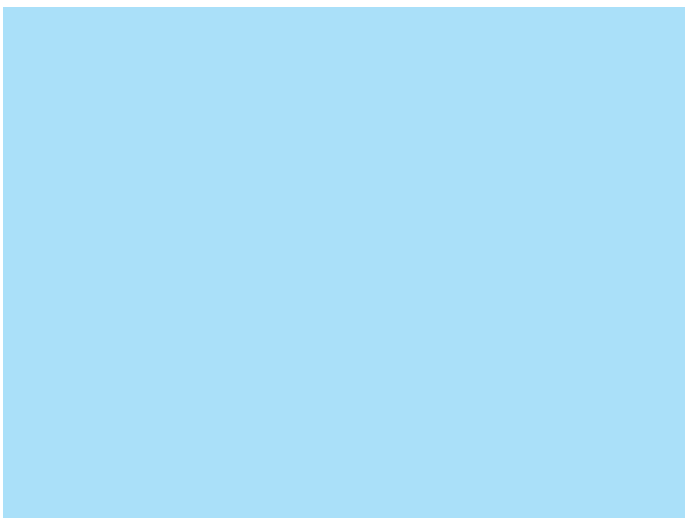
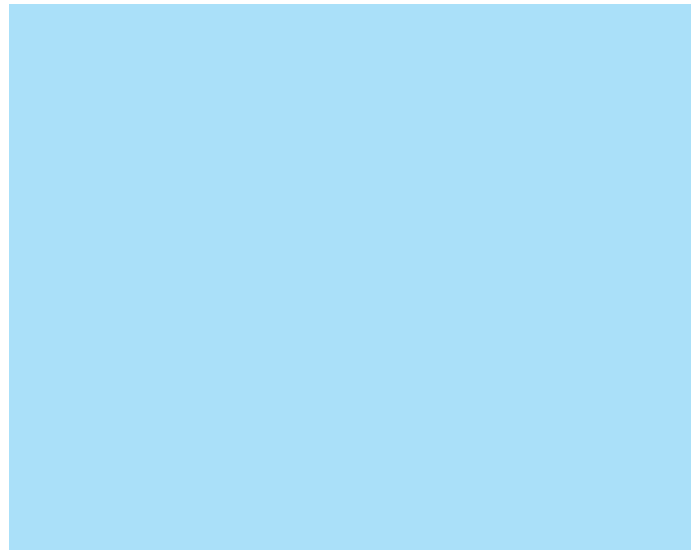
Darchem's Darshield™ rigid Passive Fire Protection system is designed as a high performance solution to meet the most demanding requirements for protection of critical flow and process equipments from Hydrocarbon Pool Fire and Jet Fire conditions.

Offering up to 120 minutes protection, Darshield™ can be fitted to valves, actuators, air tanks, instrument panels and other safety critical equipment to enable a controlled shutdown in the event of a fire.

DARSHIELD™

PFP systems have been supplied extensively worldwide for both Onshore and Offshore Oil & Gas and Petrochemical installations.

Incorporating high performance thermal insulation materials encapsulated by stainless steel skins, Darshield™ is supplied in pre-fabricated panel form for assembly and installation onsite or in the factory. Forming a rigid PFP enclosure, the panels are held together using bolts and captive nuts, with the final construction providing the necessary structural integrity to withstand the specified fire and blast conditions.



Where access to equipment control mechanisms is required, doors are designed within the appropriate panels; or alternatively the panels themselves can be fixed together with quick release clamps. The transition of services (electrical cables, hydraulic or pneumatic pipes etc) into the enclosure is achieved via the use of closure plates and seal bags.

DARSHIELD™

RIGID ENCLOSURE PASSIVE FIRE PROTECTION SYSTEMS

Each Darshield™ system is engineered from equipment manufacturer drawings and checked against potential site conditions to take into account of possible space restrictions. Lloyds Type Approval certification ensures that each Darshield™ installation, inclusive of access hatches and transition points, meets with customer fire specifications.

DARSHIELD™

DESIGN SPECIFICATION

- **Fire Condition** – Hydrocarbon Pool Fire and Jet Fire up to 120 mins
- **Blast Protection** – Up to 1.6 bar
- **Limiting Temperatures** – As per project requirements, with Lloyds approved Offtranp software calculations to be issued to clients for each item of equipment protected.



OPTIMISATION OF INSULATION THICKNESS

Darshield™ rigid enclosures are designed to limit the temperature rise of the protected equipment in the event of a fire and enable operation for a specified time period.

Lloyds approved thermal transient software called 'Offtranp' calculates the optimal insulation thickness for each PFP application; and ensures that the thickness of the insulation is kept to the absolute minimum while still protecting the equipment as per stipulated fire conditions.

Optimisation of Darshield™ enclosures utilising Offtranp takes into account the following criteria, specific to each item being protected:

- Type of fire
- Duration of Fire
- Limiting temperature rise
- Ambient and operating temperatures
- Mass of the equipment to be protected
- Exposed surface area



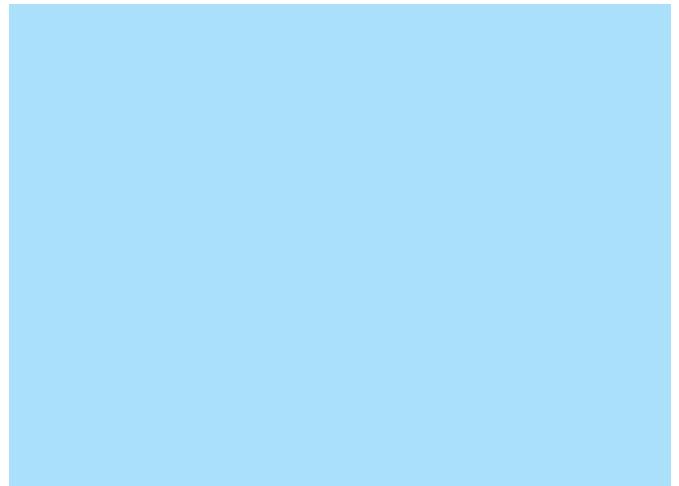
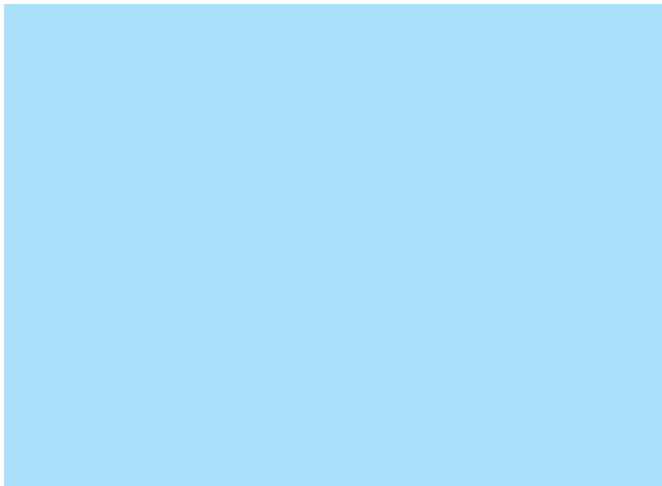
DARSHIELD™

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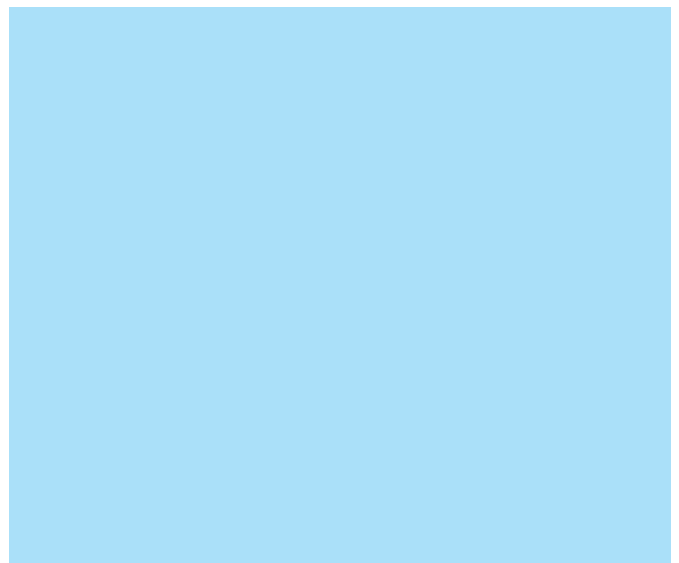
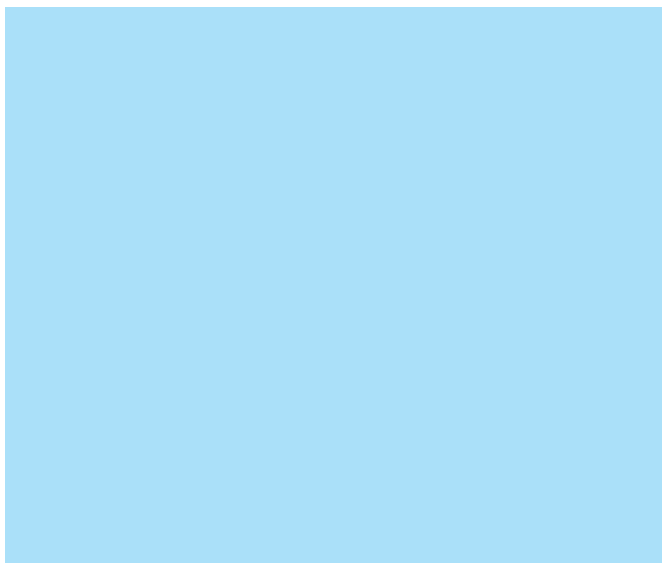
HATCHES AND PENETRATIONS

Inspection hatches can be provided for each Darshield™ PFP system to provide quick access to areas that require regular inspection or maintenance. It is important that the client identifies any requirements for hatches and penetrations as early as possible such that they can be incorporated into the PFP system's design.

Penetrations for operating mechanisms, hydraulic tubing and position indicators etc. can also be provided to facilitate problem-free operation and maintenance of equipment without the need to remove the enclosure. Incorporation of hatches and penetrations are approved within the Lloyds Type Approval certification for Darshield™. The system is designed such that installation at site can be achieved without disconnection of associated cables, piping etc.



Also, Darvent™ intumescent grills can be incorporated at customers request to allow for ventilation and air circulation around the protected equipment.

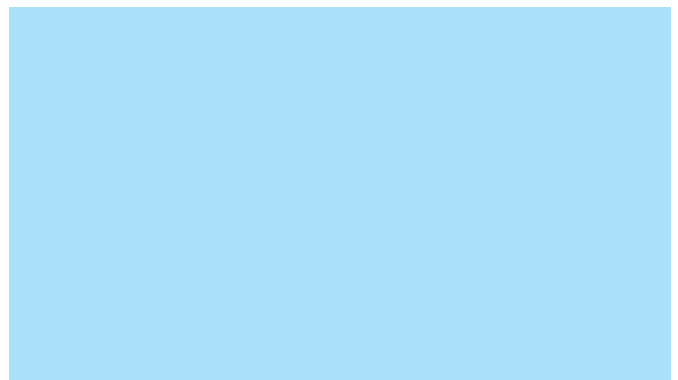
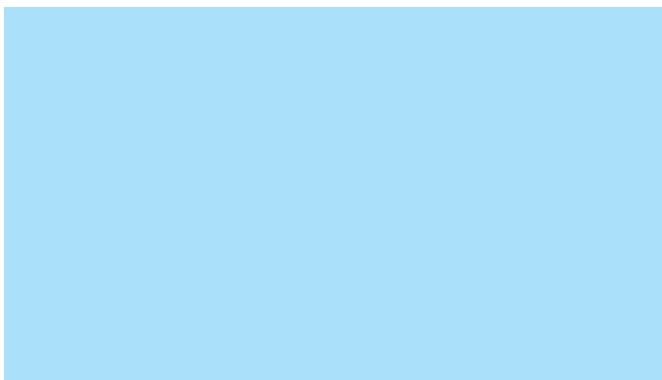


DARSHIELD™

RIGID ENCLOSURE PASSIVE FIRE PROTECTION SYSTEMS

DARSHIELD™ AND DARMATT™ HYBRID SYSTEMS

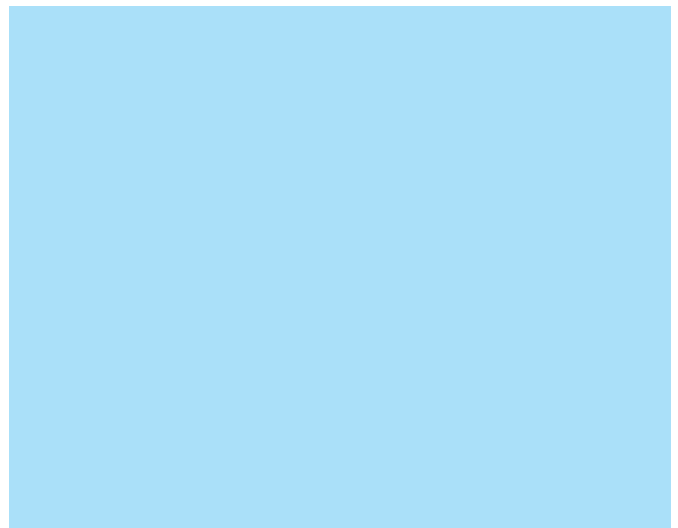
Darshield™ and Darmatt™ flexible jacket PFP systems can be combined to produce a Hybrid enclosure offering the benefits of both designs:



- Darshield™ doors applied to regular access areas and enhance durability
- Darmatt™ jackets used where access is not required and space is at a constraint
- Hybrid combination helps reduce material costs

TESTING & CERTIFICATION

Since its introduction the Darshield™ PFP System has been tested repeatedly to prove its capability as a PFP system. As a minimum Darshield™ enclosures are tested to the requirements of BS476 part 20 for UL 1709 for Hydrocarbon Pool Fires, and the OTI 95 634 standard for “Jet Fire Resistance Test of Passive Protection Materials”.



DARSHIELD™

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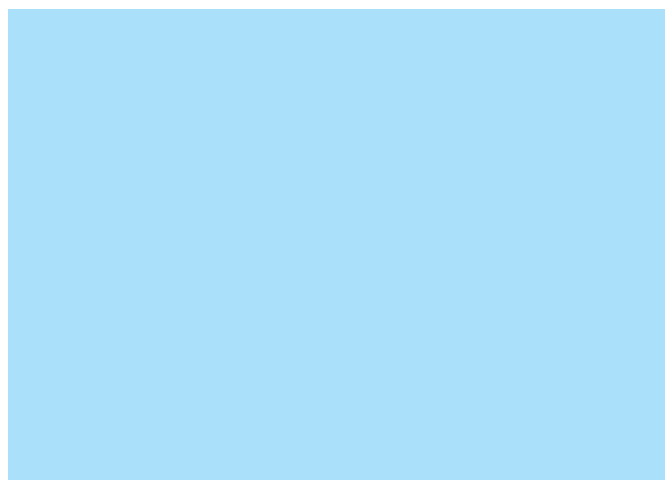
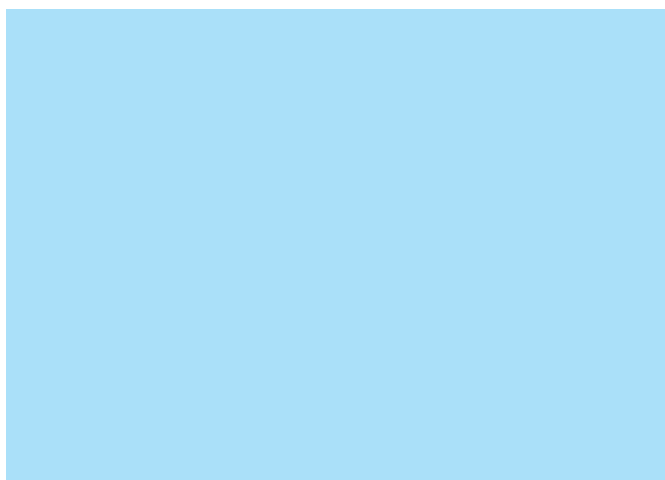
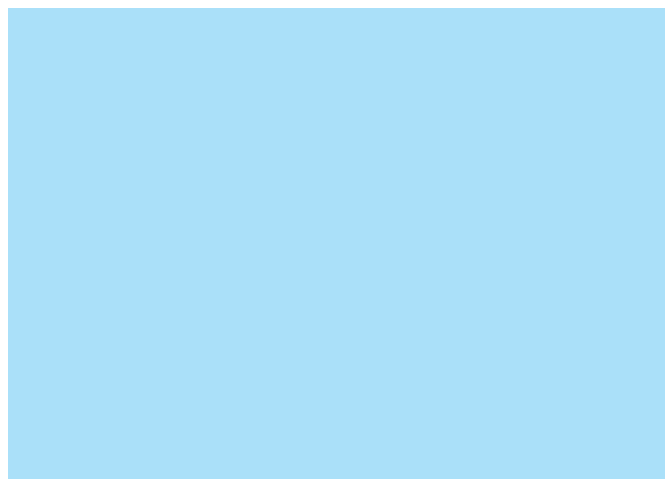
LLOYDS TYPE APPROVAL CERTIFICATE FOR **DARSHIELD™**



DARSHIELD™

RIGID ENCLOSURE PASSIVE FIRE PROTECTION SYSTEMS

DARSHIELD™ APPLICATIONS INCLUDE –
PROTECTION OF VALVES, ACTUATORS, CONTROL BOXES AND INSTRUMENTATION



DARSHIELD™

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PROTECTION OF RIGID RISERS –

DARSPLASH™

Darsplash rigid riser fire protection is a development of Darshield. The Darsplash system is fully seal welded to prevent water ingress, with the completed units being protected using "Anti-Fouling" coats of paint. Designed for a life span of twenty plus years, it is constructed from a rigid Stainless steel 316 construction encapsulating ceramic fibre, and uses standard angle fixings bolting panel to panel together. Neoprene gasket can be incorporated between the riser and the inner skin of the Darsplash and also between bolted joints if required.

Darsplash is designed to withstand a hydrocarbon flame and Jet Fire temperatures in excess of 1200°C for periods up to 120 minutes, controlling the temperature rise of the protected equipment to below its limiting temperature.

DARSPLASH™ EXAMPLES

