Guidance on passive fire protection for process and storage plant and equipment

GUIDANCE ON PASSIVE FIRE PROTECTION FOR PROCESS AND STORAGE PLANT AND EQUIPMENT

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A registered charity, the EI serves society with independence, professionalism and a wealth of expertise in all energy matters.

This publication has been produced as a result of work carried out within the Technical Team of the EI, funded by the EI's Technical Partners. The EI's Technical Work Programme provides industry with cost-effective, value-adding knowledge on key current and future issues affecting those operating in the energy sector, both in the UK and internationally.

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FOREWORD

Guidance on passive fire protection for process and storage plant and equipment brings together the knowledge and good practice of many specialists and practitioners within the process and passive fire protection (PFP) industries, including major asset owners, design engineers and consultants, fire protection specialists, competent authorities (CAs) and PFP material manufacturers.

It provides guidance on the use of PFP materials as a fire control and mitigation option across the life cycle of process and storage assets in a fixed location, both for existing assets and new projects, onshore and offshore. The life cycle comprises the initial determination of PFP material requirements, specification of PFP material performance, generic PFP details in selection, installation/application, through to ongoing inspection, maintenance and the effects of changes on PFP duty.

Typical applications covered are use of PFP materials on items such as the main process unit structural steelwork, process vessels, storage vessels, process pipework, emergency shutdown valves (ESDVs), control valves, bolted flanges, and other permanent items whose failure could lead to incident escalation. It also includes the protection of support structures for equipment items (e.g. vessel saddles and skirts, steel pedestals, and lugs).

This technical publication does not provide a prescriptive set of 'rules' that must be followed nor a detailed 'how to' assessment procedure. Instead, it provides background information and guidance to those who select, specify and have ownership of PFP materials as part of fire protection measures.

The information contained in this publication is provided as guidance only. Whilst every reasonable care has been taken to ensure the accuracy of its contents, the Energy Institute (EI) and the representatives listed in the Acknowledgements, cannot accept any responsibility for any actions taken, or not taken, on the basis of this information. The EI shall not be liable to any person for any loss or damage that may arise from the use of the information contained in any of its publications.

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Kieran Glynn	BP International
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John Henderson (Chairperson)	Chicago Bridge and Iron (representing British Chemical Engineering Contractors Association (BCECA))
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Jens Holen	Statoil

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Jens Holen	Statoil

1 INTRODUCTION, SCOPE AND APPLICATION

1.1 INTRODUCTION

This technical publication brings together the knowledge and good practice of many specialists and practitioners within the process and passive fire protection industries, including asset owners, design engineers and consultants, fire protection specialists, competent authorities (CAs) and passive fire protection (PFP) material manufacturers.

This technical publication provides guidance on the use of PFP materials and their application across the life cycle of process and storage assets. It has been set out to cover the initial determination of PFP material requirements, specification of PFP material performance, generic PFP details in selection, installation/application, through to ongoing inspection, maintenance and the effects of changes on PFP duty.

There exist other technical publications (e.g. codes, standards and guidelines) that deal with certain aspects of PFP use and application; however, these only tend to focus on specific applications, e.g. structural or vessels, or have been too general and broad in application, e.g. the use of default performance durations to protect against generic fire types, whereas this technical publication aims to provide an overview to enable PFP to be fully integrated in the range of major accident hazard (MAH) control and mitigation measures.

1.2 SCOPE

The guidance provided in this technical publication applies to the use of PFP materials for the fire exposure protection of process and storage plant and equipment in a fixed location, both onshore and offshore. It is therefore applicable to the use of PFP materials on items such as the main process unit structural steelwork, process vessels, storage vessels, process pipework, emergency shutdown valves (ESDVs), control valves, bolted flanges, and other permanent items whose failure could lead to incident escalation. It also includes the protection of support structures for equipment items (e.g. vessel saddles and skirts, steel pedestals, and lugs).

The following are not in scope:

- Use of PFP covered by other technical publications, such as:
  - within civil 'building' elements;
  - enclosures containing emergency response systems (such as fire pumps, uninterruptable power supplies (UPSs) and communication systems;
  - on the main structure on an offshore platform such as the jacket, and
  - fire walls/barriers.
- Specialised PFP materials such as fire-resistant rubber for riser protection and for sealing.
- Pipe and cable penetration sealing systems.
- Mobile items such as road, rail and seagoing tankers/vessels. However, equipment such as fixed storage and transfer systems used to fill these mobile items is in scope.
- The occupational health implications of handling existing or new PFP materials. Users should read the pertinent safety data sheet (SDS).

1.3 APPLICATION

The installation operator has a duty to comply with all legal requirements relating to major accidents. All hazards should be identified and documented and all risks fully understood, suitably controlled and mitigated. One option in the control and mitigation of risk presented by fires in the process industry is by the use of PFP. This technical publication aims to assist the installation operator in the selection and use of PFP materials as part of process safety management (PSM).

This technical publication does not provide a prescriptive set of 'rules' that must be followed nor a detailed 'how to' assessment procedure. Instead, it provides background information and guidance to those who select, specify and have ownership of PFP materials as part of fire protection measures, such as asset owners and operators, consultancies, engineering, procurement and construction (EPC) contractors, CAs and inspection service companies. It should help them to understand the issues, specify requirements, make decisions, and manage PFP material on an ongoing basis. Although not specifically intended for PFP manufacturers, it should help to inform them on issues associated with use of PFP materials.

This technical publication applies equally to both existing assets and new projects.

This technical publication as far as possible references internationally recognised technical publications (e.g. codes, standards and guidelines) including those originating from Norway, United Kingdom (UK) and United States of America (USA). Although written with a UK focus, the intent is that it should be applicable to assets and projects worldwide. Local or national legislation should be observed.

This technical publication may be used by referring to appropriate sections as applicable to the life cycle stage in use of PFP materials, without the necessity to read it all. To support this, there is some intentional duplication of topics.