THE INSTITUTE OF PETROLEUM

GUIDELINES FOR THE DESIGN AND PROTECTION OF PRESSURE SYSTEMS TO WITHSTAND SEVERE FIRES

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FOREWORD

Mitigation of the impact of severe fires on hydrocarbon, petrochemical and chemical processing plant is critical to minimise the risk to personnel, reduce damage and limit capital loss. These guidelines are intended for design and process engineers concerned with large, essentially fully enveloping pool fires and jet fire impingement on pressure vessels, their associated pipework, valves, flanges and other equipment, referred to collectively in this document as pressure systems. The scope of this document covers a wide range of steel pressure vessels used both onshore and offshore. These include process vessels, fixed storage vessels and transportable vessels such as road and rail tankers whilst at the loading/unloading facility. These guidelines do not apply to small portable pressure vessels such as gas cylinders as these already have specific requirements related to their portability. These guidelines are intended for use primarily for designing new facilities and specifically deal with fires that are more severe than the open pool fires currently covered in other documents. These guidelines are therefore intended to be used in conjunction with the existing codes and recommended practices, which cover the design and fire protection required for all other fire scenarios.

It is recognised that current experimental data and modelling capabilities are mainly confined to the response of vessels containing Liquefied Petroleum Gases. Whilst models for predicting the behaviour of vessels containing multi-component fluids (with or without emergency depressurization) under severe fire loads do exist, relatively little validation has been performed and there are no validated criteria for the failure of vessels subjected to such fire loads. One of the purposes in compiling these guidelines was to identify areas of uncertainty that might warrant carrying out further experimental work. The guidance provided recognises these uncertainties, which are identified in the text. The intention is to revise this **interim guideline** to incorporate the results of any further work and the feedback received on the recommendations included in this document. Users are therefore encouraged to submit written comments to:

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