



# Bubbletherm: A new approach to insulation

Bubbletherm was launched as a Joint Industry Project after ITF secured funding from four of its member companies, allowing SME Company, TJCD to further develop its subsea pipeline insulating system.

**The Requirement:** Although pipe-in-pipe is a commonly used and reliable method of insulating subsea pipelines, it has a number of disadvantages – namely, cost, the technical difficulties of the field joint and the time it takes to complete this joint on the lay barge.

## The Solution:

Cumbria and Newcastle upon Tyne based SME company TJCD, has developed an innovative new system for insulating subsea pipelines, with the potential to offer significant cost and logistical benefits over existing pipe-in-pipe systems. The system, named 'Bubbletherm', is based on the company's proprietary, light weight, low thermal conductivity material. The result is an insulating performance currently only achievable with pipe-in-pipe systems. A key feature of Bubbletherm is the ability to apply it at a site of convenience, typically adjacent to a pipe mill, make-up site or spool base. Bubbletherm not only offers significant potential cost savings when competing against pipe-in-pipe, it is also a technical enabler that could allow development of fields previously not deemed feasible. With no steel outer carrier, Bubbletherm is constructed from prefabricated components.

## The Method:

After realising the potential of Bubbletherm, ITF secured funding from four major operating companies in a bid to turn Bubbletherm into a joint industry project (JIP). BG, BP, Shell and Total sponsored phase one of the project.

Phase 1 of the development programme aimed to test the integrity and performance of the system, to determine whether it could fulfil technical expectations. In all regards the system has performed as expected, or exceeded the criteria set. Trials

confirmed that aggregate U-values of 0.5 to 3W/m<sup>2</sup>K were readily achievable. During simulated shut-in, the product was shown to take in excess of 6 days to cool from 60 to 20 °C in 4 °C external conditions. The structural capacity of the Bubbletherm system has also been investigated. No damage was incurred during impact tests conducted at energy levels equivalent to a 3500 kg trawl board striking at a velocity of 2.8 m/sec.

The thermal performance benefits demonstrated by Bubbletherm in phase one of the project mean the technology has, to some extent already fulfilled the objectives originally set out in JIP proposal.

## Implementation:

Following the success of phase one, phase two of the Bubbletherm project aimed to bring this pioneering system to a commercial, market capacity. Phase two included satisfying qualification requirements and full scale production/field jointing trials.

As Bubbletherm offers the possibility of a reeled system with the performance of pipe-in-pipe, reeling trials are ongoing. Production trials, full scale structural testing and laboratory material testing (including service simulation) also make up phase two of the project. The Bubbletherm pipe joints resulting from the production trials are to be used for the structural testing.

TJCD has recently made arrangements to commercially deploy Bubbletherm to the North Sea and West Africa.

Promotion of the Bubbletherm system is also underway with preparation of supporting technical documentation.

As a means by which to promote the system within the field, a Bubbletherm pipe spool is shortly to be installed in the Gulf of Mexico, in 2000 metres water depth. Phase two is programmed to be complete at the end of October 2007.

## The Outcomes:

**Although it is likely that in the future the system will be developed for deeper water, in the first instance it will be developed for depths up to 2500 meters. Development of Bubbletherm for application to spool pieces and bends is also ongoing.**



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