n the 1980s, corrosion of pipework under insulation was recognized as a large problem. Extensive research into the problem was carried out by various large petrochemical companies and by NACE. It was concluded that pipework insulation material can become saturated due to ingress of water and that corrosion of steel pipe can occur even when a pipe is coated and when pipe temperatures are in excess of 212 F (100 C). To alleviate this, it was proposed that the pipework be better protected against corrosion, e.g., by protecting the insulation with higher performance coatings (those suitable for immersion service).

JPCL/PCE revisited the issue by posing the following question to two experts: What role does protecting insulation from water ingress play in preventing corrosion of galvanized steel under insulation in 250 F (120 C) service?

According to Jack Delahunt, retired from Exxon Mobil and now a consultant with Carmagen Engineering in the U.S., weather protection of insulation plays a major role in preventing corrosion under thermal insulation and is just as important as the selection and design of the thermal insulation. He adds that protecting insulation is also as important as selecting a corrosion-resistant coating for application to carbon steel operating between 25 and 300 F (-4 and 150 C), the temperature range within which corrosion occurs. However, according to Mr. Continued
Delahunt, the major role of the weather barrier is to maintain thermal efficiency by minimizing water pickup within the insulation system. Substantial and valuable information concerning this subject is contained in the NACE Standard RP 0198, The Control of Corrosion Under Thermal Insulation and Fireproofing Materials. Mr. Delahunt also pointed out that inorganic zinc and galvanized coatings are not recommended for use under thermal insulation to prevent corrosion because such coatings have not provided satisfactory service at elevated temperatures and have been known to fail rapidly.

Neil Smallwood, managing director of FTi Ltd, Somerset, UK, answered the question by saying that without water being present in reasonable quantities in the insulation, corrosion of the substrate will be prevented. Typically, metal cladding systems are used to protect the insulation material, although the cladding can be easily damaged by people walking on it, tools being dropped, etc., and it is also difficult to make the seams and terminations watertight. A system is required which can form an impermeable barrier around the thermal insulation material and thus prevent water ingress.

According to Mr. Smallwood, one such system is a proprietary tape pre-impregnated with polyester or vinyl ester resin and glass reinforcement. The product is designed for application to pipelines (including complex bends), tanks, and vessels in plants, ships, and offshore structures. The tape is supplied as a “tacky,” mouldable solid which is wrapped around the insulation and is cured by natural daylight, augmented if necessary by a UV lamp to form an impermeable barrier. The product has watertight seams and terminations and is strong enough to withstand foot traffic, which can damage metal cladding systems. This material has received Lloyd’s certification, Mr. Smallwood says.