

A unique array of pressure activated sealants

By Jed Doubenmier, Seal-Tite International

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Seal-Tite International has developed a unique array of pressure activated sealants able to withstand the high pressure and extreme temperature conditions associated with subsea drilling and production operations. The sealant is polymerized by the differential pressure created through the leak sight. The polymerization process only occurs in the sealant that passes through the leak sight; all other sealant remains liquid and can be circulated out of the well with no damage to any of the well components.



Seal-Tite International and a major service company conducted a series of tests to determine if pressure activated sealants were a viable alternative repair option to the conventional methods presently used. Testing on an actual riser stack assembly showed that the sealant would indeed repair the leaks and be able to hold the MAWP of 15,000 psi.

Subsequently, Seal-Tite was contacted to diagnose and repair a leaking drilling riser choke line in 5,795 feet water depth in the Gulf of Mexico. Using dye and ROV inspection, the leak was identified as a connection at 4,275'. The leak rate was 8.5 gallons per minute at 2,000 psi injection pressure. The high leak rate was further aggravated by loop currents exceeding 2.6 knots.

A 2.5 bbl sealant pill was displaced to the leaking connection with seawater by circulating down the choke line and taking returns on the kill line. Once in position the BOP crossover valve was closed and sealant was squeezed into the leaking seals. Over the next 12 hours the sealant injection pressure was steadily increased until an 8,000 psi seal was achieved. This pressure was held for 8 hours to allow the sealant to cure, during which no pressure bleedoff was observed. The sealant was then flushed from the system and the choke line tested to 7,500 psi, allowing normal drilling operations to resume.

The leak was repaired and the client was able to complete drilling operations over the next 30 days with no further riser-related downtime. The choke line riser was successfully tested to 7,500 psi every three days for the duration of the drilling operation with no leaks observed.

Once the well had been suspended, the riser was pulled to the leaking connection and the damaged seals removed for inspection. Above is a photo of the polypack seals. It can be seen that one of the seals was completely separated while the second seal had significant damage to the sealing areas. ■

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