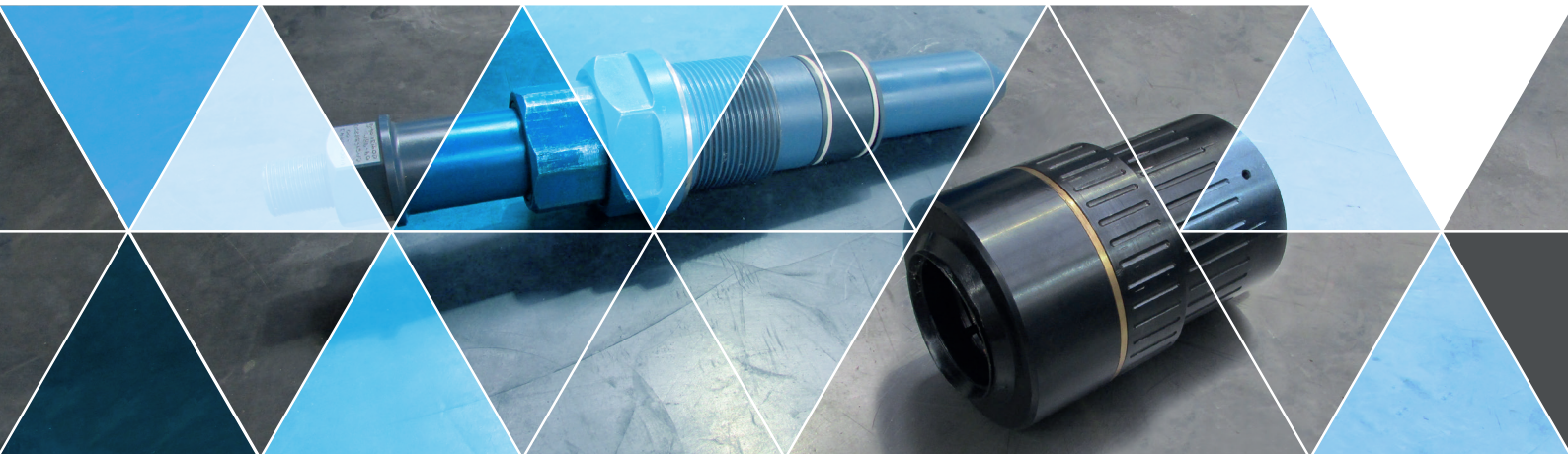


Case Study

Dual Solution to Seal Tie-Down Bolts and Prevent Gas Leakage



PRODUCT: SEALING CAP AND MODIFIED TIE DOWN BOLTS

Project:

Minor gas leakage was detected on a well in the North Sea originating from tie-down bolts on a casing hanger. The gas in the annulus stemmed from gas lift valves downhole. The original tie-down bolts had already been changed out with a like-for-like replacement only to find they started leaking again after a short period of time.

Unity was approached to provide a more robust solution to prevent further gas leakage.

Solution 1:

- Unity developed a dual solution to address this issue. The first was a Sealing Cap to mount on top of the tie-down bolts to prevent any gas escaping.
- The retrofitable, quick and easy to install design sealed over the top of the existing bolts, negating the need to replace them.
- The design consisted of a pressure retaining body with an internal gripping/slip mechanism with moulded face seals. The body slid over the existing tie-down bolt, with a gripping/slip mechanism energised onto the body of the bolt. The face seal system then energised onto the outer diameter of the wellhead via a screwed thread collar. An added feature enabled the entire cavity inside the body to be monitored for pressure or completely filled with sealant as a back-up contingency seal.

- The design was built to meet all API-6A verification and certification criteria and was approved by an Independent Verification Body.
- The solution prevented the replacement of the original leaking tie-down bolts, potentially saving over £600,000 in well plugging costs, deferred production and replacement bolts.

Solution 2:

- The second solution was a modified tie-down bolt based on the original bolt design but with enhanced sealing capabilities.
- The design consisted of an internal packing element that gave a greater sealing footprint, as well as a backup outer seal ring, which acted as an independent contingency seal. The design also enabled pumping of sealant through the bolt as an additional sealing mechanism.
- The design met all necessary API-6A verification and certification criteria and was approved by an Independent Verification Body.
- The solution prevented the replacement of future bolt change-outs, potentially saving over £600,000 in well plugging costs, deferred production and replacement tie-down bolts.

Aberdeen

Wellheads Crescent, Dyce, Aberdeen, AB21 7GA, UK
T: +44 1224 937600

Esbjerg

Øresundsvej 11, 6715 Esbjerg North, Denmark
T: +45 7370 9550

Great Yarmouth

1 Bessemer Way, Great Yarmouth, Norfolk, NR31 0LX, UK
T: +44 (0) 1493 653555