



Arlon® 3000 XT Eliminates Breakage in Backup Rings



Challenge

A major oilfield services company struggled with frequent breakage of its small backup rings during installation. The backup rings were required to withstand maximum pressures of 25 – 35 ksi and temperatures of 356°F – 401°F (180°C – 205°C).

Due to these operating parameters, a glass- or carbon-filled PEEK material was being used. These materials provided the desired creep and extrusion resistance but were very brittle, leading to frequent fracture during installation. The result was a scrap rate of 60-70% and significant time lost performing multiple installation attempts. In addition, the risk of breakage necessitated high stock levels in order to avoid production delays and removal and had to be replaced. Vibrations caused by premature bushing failures contributed to mechanical seal failures, leading to dangerous product leakage. These multiple component issues led to additional pump downtime and increased maintenance and inventory costs.

Technical Description

- Media: Common drilling and production media including high H₂S
- Temperature: 356°F – 401°F (180°C – 205°C)
- Pressure: 25,000 – 35,000 psi

Highlights

CHALLENGE

- A major oilfield services company struggled with frequent breakage of its small backup rings during installation
- The backup rings were required to withstand pressures up to 25 – 35 ksi and temperatures of 356°F – 401°F (180°C – 205°C)
- For this reason, glass- and carbon-filled PEEK had been used, which are known for their brittle nature
- The result was a scrap rate of 60-70% and significant time lost performing multiple installation attempts

SOLUTION

- Greene Tweed suggested switching to Arlon® 3000 XT, a new high-temperature polymer that provided superior creep and extrusion resistance with an elongation three times higher than filled PEEK

RESULTS

- After making the switch, the scrap rate during installation was reduced to nearly zero
- As a result, the customer has since converted all of their backup rings to Arlon® 3000 XT
- The result has been reduced stock levels, decreased the time spent on installation, and consolidated ordering in the future



Solution

Greene Tweed recommended a new virgin material, Arlon® 3000 XT, for the backup rings. Arlon® 3000 XT has an elongation at least three times higher than filled PEEK, as well as providing superior creep and extrusion resistance. It could easily accommodate the required temperature and pressure range while remaining flexible to enable easier installation.

Results

After switching the small backup rings to Arlon® 3000 XT, the scrap rate during installation was reduced to nearly zero. This allowed the customer to dramatically reduce their stock levels and time spent performing installations. As a result of this success, the customer has since converted all of their backup rings to Arlon® 3000 XT. By consolidating orders to a single source, they have been able to streamline purchasing significantly versus working with multiple suppliers and materials.

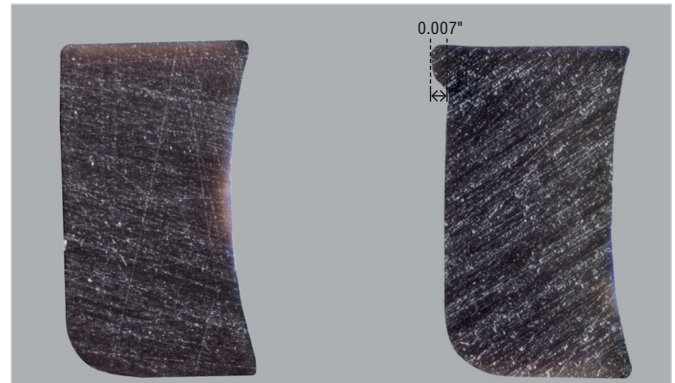
Testing

Extrusion Test: Backup ring cross sections tested at 450°F (232°C), 40 ksi for 48 hours

Arlon® 3000 XT has an elongation at least three times higher than filled PEEK, as well as providing superior creep and extrusion resistance.

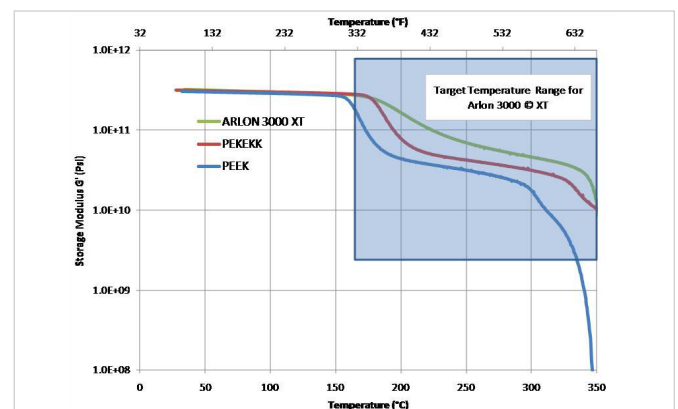


PEEK before test (left), and after test (right)



Arlon® 3000 XT before test (left), and after test (right)

DYNAMIC MECHANICAL ANALYSIS (DMA):



Arlon® 3000 XT shows improved mechanical performance over PEEK and PEKEK above 350°F (160°C)

Greene Tweed

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Arlon 3000 XT is patent pending. Arlon® 3000 XT by Greene, Tweed based on VESTAKEEP®, an Evonik product.

Statements and recommendations in this publication are based on our experience and knowledge of typical applications of this product and shall not constitute a guarantee of performance nor modify or alter our standard warranty applicable to such products.

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