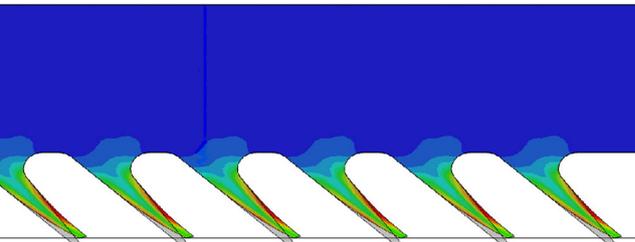


Labyrinth seal – made from Arlon® 4020, approximately 25 in. (63.5 cm) in diameter



FEA of Arlon® 4020 tooth flex-and-return capability

Custom Engineering Delivers Maximum Performance and Efficiency

Flexible Thermoplastic Tooth Design Minimises Clearances

Non-contacting labyrinth seals deliver leakage reduction in centrifugal applications, restricting flow through a sequence of chambers formed between the rotating element and the teeth to control the passage of media. Traditional metallic labyrinth seals require large clearances to avoid potential heat generation, deformation, and galling that reduce efficiency and component life. Metallic labyrinth seals also suffer from corrosion and erosion damage in high acid or mercury and high velocity environments.

Greene Tweed's Arlon® 4020 labyrinth seals deliver superior performance by combining custom-engineered tooth designs and high-performance thermoplastic materials. Our solution incorporates a tooth profile with outstanding dimensional stability, allowing for a cyclic flex-and-return motion to withstand contact during critical speeds. This allows for tighter clearances, dramatically increasing efficiency and reliability for longer run times. The engineered tooth profile also creates a more controlled flow pattern, further increasing efficiency by encouraging vortex generation and reducing carry-over media that can bypass chambers – especially in high-velocity applications.

Arlon® 4020's excellent tribological properties reduce friction and wear during contact, eliminating galling to extend seal life and reduce maintenance costs. The material's enhanced corrosion and erosion resistance make it ideally suited to severe sealing applications, including high-acid or mercury contents and high-velocity media. The superior thermal expansion of Arlon® 4020 allows for tight clearances at operating temperatures while maintaining the generous clearances of conventional metallic seals during ambient installation. This allows for retrofit and like-for-like replacement, using the same assembly techniques.

Typical Properties

| Physical Properties (ASTM Standard) | Typical |
|--|---|
| Color | Black |
| Specific Gravity (D792) | 1.45 |
| Mechanical (ASTM Standard) | |
| Elongation, % (D638) | 1.5 |
| Flexural Modulus, 0.5% Secant, psi (MPa) (D790) | 880,000 (6,070) |
| Flexural Strength, psi (MPa) (D790) | 15,800 (109) |
| Modulus, 0.5% Secant, psi (MPa) (D638) | 810,000 (5,585) |
| Tensile Strength @ Break, psi (MPa) (D638) | 8,800 (61) |
| Wear Factor, 10 ⁻¹⁰ in. ³ /min./ft.-lb.-hr. (D3702) | 55 |
| Thermal (ASTM Standard) | |
| Coefficient of Radial Thermal Expansion, in./in./°F (mm/mm/°C) 85°F to 265°F (30°C to 130°C) | 20.8 x 10 ⁻⁶ (37.5 x 10 ⁻⁶) |
| 340°F to 520°F (170°C to 270°C) (E831-05) | 71.4 x 10 ⁻⁶ (128.9 x 10 ⁻⁶) |
| Heat Deflection Temperature @ 264 psi (1.8 MPa), °F (°C) (D648) | >600°F (315°C) |

Features and Benefits

- » Flexible tooth profile delivers tight running clearances for increased efficiency
- » Reduced tooth contact loading eliminates permanent deformation for extended seal life and reduced maintenance costs
- » Engineered tooth design reduces mass flow rate to enhance sealing performance and increase efficiency
- » Enhanced corrosion and erosion resistance delivers exceptional performance in severe applications, including high-mercury or high-velocity media
- » Optimized thermal expansion allows for retrofit and like-for-like replacement of conventional metallic designs
- » Increased efficiency delivers energy savings and a reduced spatial footprint for dramatic cost savings and environmental benefits

Applications

Labyrinth seals for centrifugal compressors and dry gas seals in:

- » Oil and gas production
- » Air separation plants
- » Chemical industry

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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