



Nonmetallic Sealing of Cathode and Anode Powders on Shear mixers and other mixing equipment.

Cinchseal
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Outline

- Introduction & Background
- Advantages
- How the seal works
- Questions

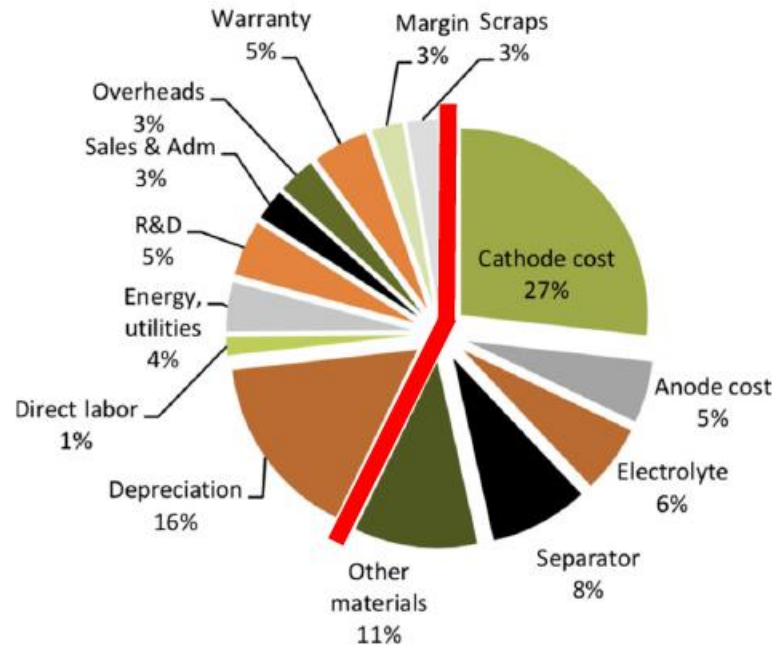
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Manufacturing yield is critical in Li-ion

- Raw Materials are $>1/2$ the cost of a Li-ion cell
- These yield losses cannot be recovered:
 - Most bad cells cannot be reworked
 - There are no commercially viable recycling technologies
 - Manufacturers often have to pay to dispose of reject cells

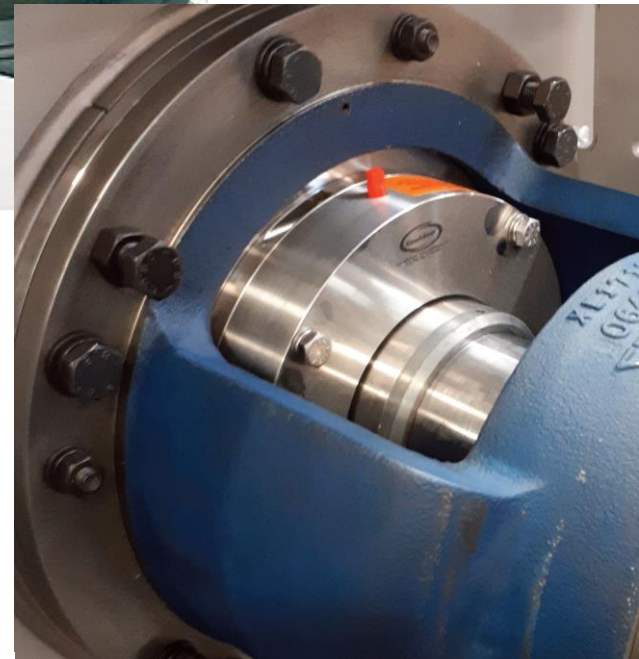
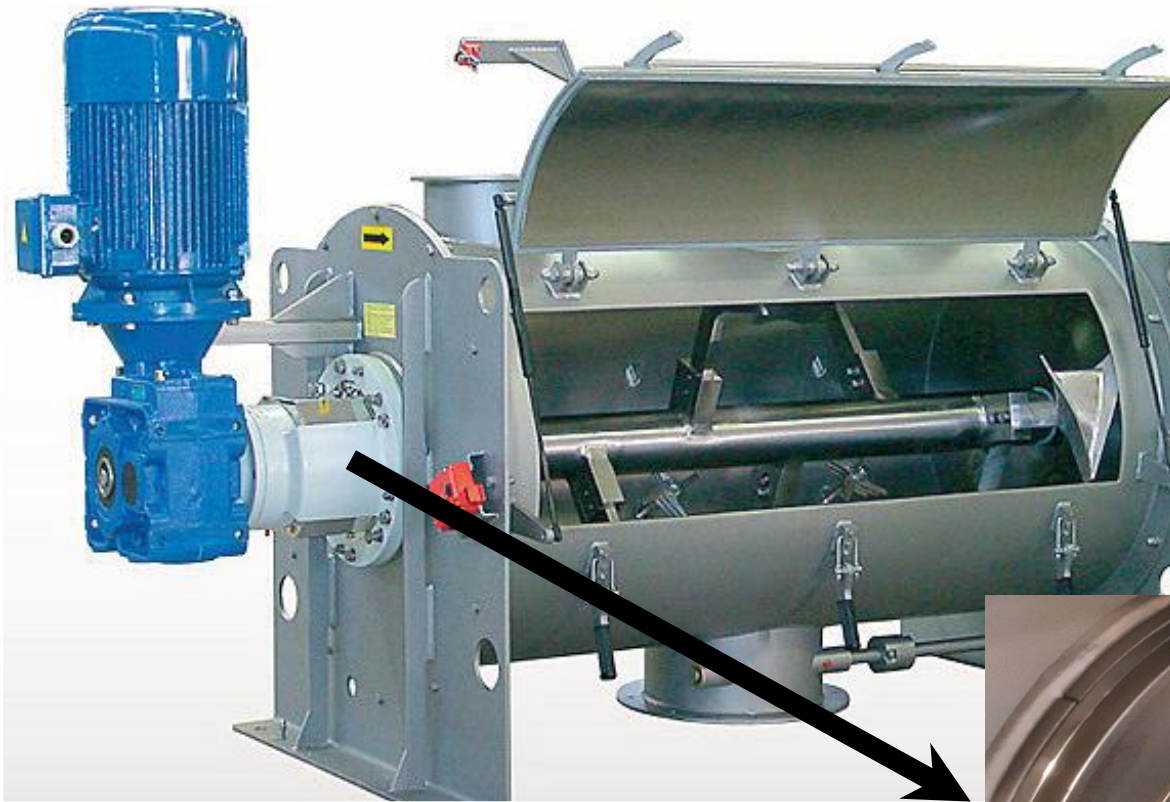


Sources: Avicenne, 2018

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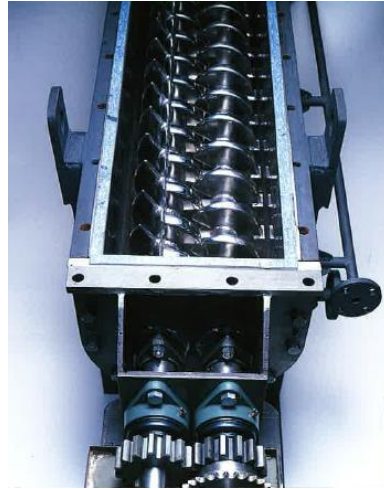
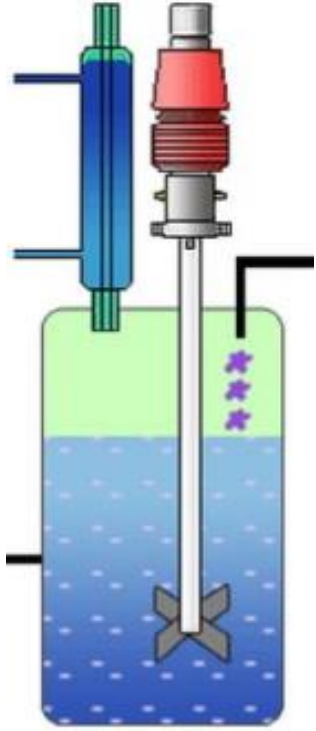


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Battery Industry PROCESS



Drying Process
Paddle dryer
Or Rotary dryer



Mixing Process
Mixer are used where
Conductive material and Binder
is added.

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Battery Industry PROCESS



Pre Mixer for Binder mixing



P/D Mixer for Making slurry

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- **Our Vision:**
- Be the premier Sealing solutions provider.
- **Mission Statement:**
 - To provide superior quality sealing solutions that: CUSTOMERS recommend to their peers, OEM's prefer for their customers and DISTRIBUTORS see a value in selling and provide their customers with a quick return on investment.
- **Current Customer base:**
 - More than 4000 different customers.
 - Provided seals to more than 50 different countries.
- **Offices and Employees in USA, Hong Kong and Japan.**
 - 10,000+ ft² (929 m²) facility in NJ, USA.
- **Debt Free company.**
- **Battery Mixing:**
 - We have more than 2000 seal assemblies working successfully sealing cathode and other battery powders and slurries with more than 2 1/2 years of continuous operation.

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Brief History

- Established in 1995
- Manufactures rotary shaft seals
- Serves food, chemical, and material handling industries.
- Located in Mt. Laurel, NJ

Cinchseals are unique and problem solving sealing devices that are designed to seal powder, slurries, or bulk materials on process equipment.

It is an effective powder or slurry rotary shaft seal used to reduce product loss, eliminate housekeeping issues, and prevent bearing and equipment downtime in todays demanding industrial processing plants.

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Rotating Equipment we seal:

- Mixer & Blenders
- Screw Conveyor
- Extruders
- Rotary Air Valves
- Ribbon Blenders & Paddle Mixers
- Bucket Elevators



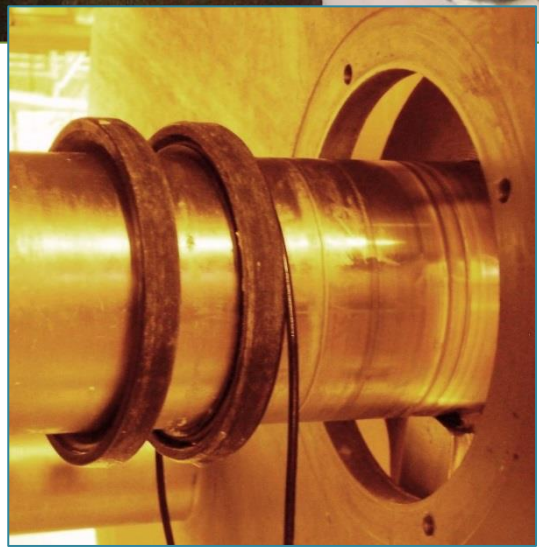
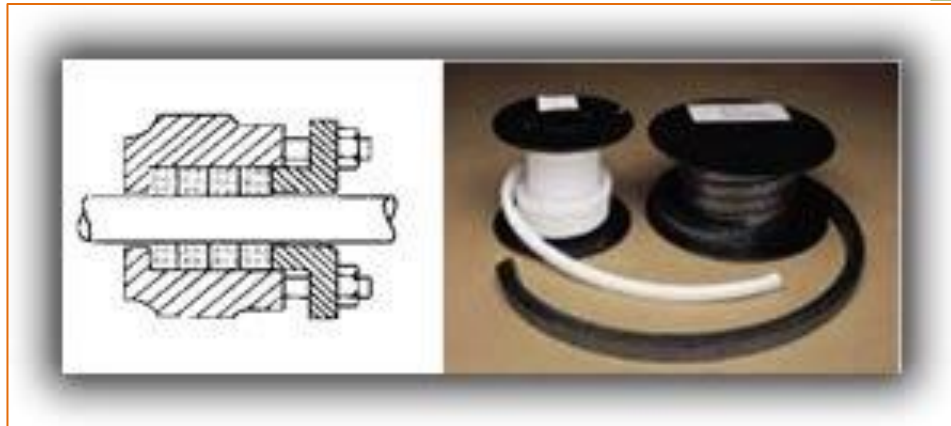
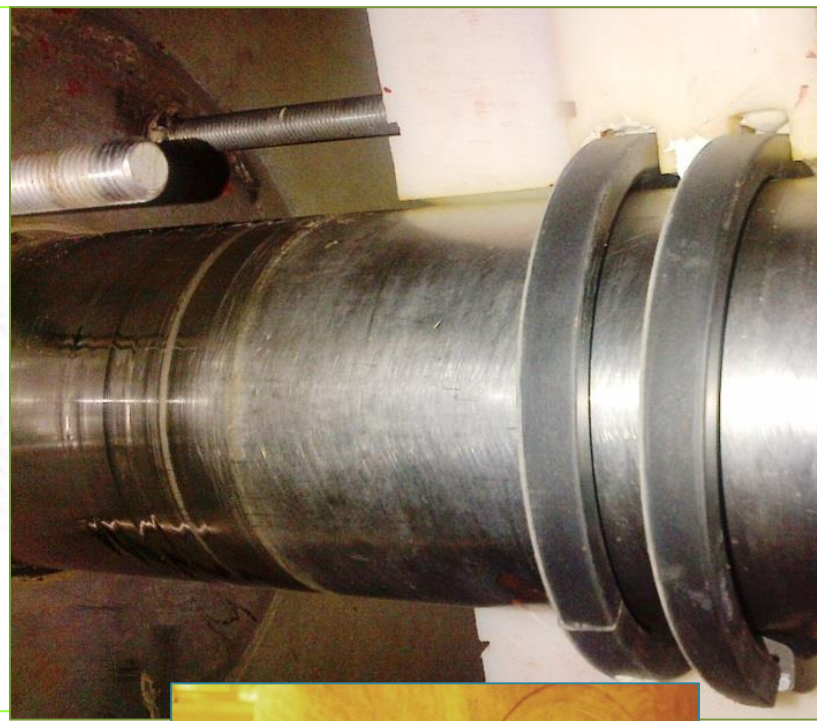
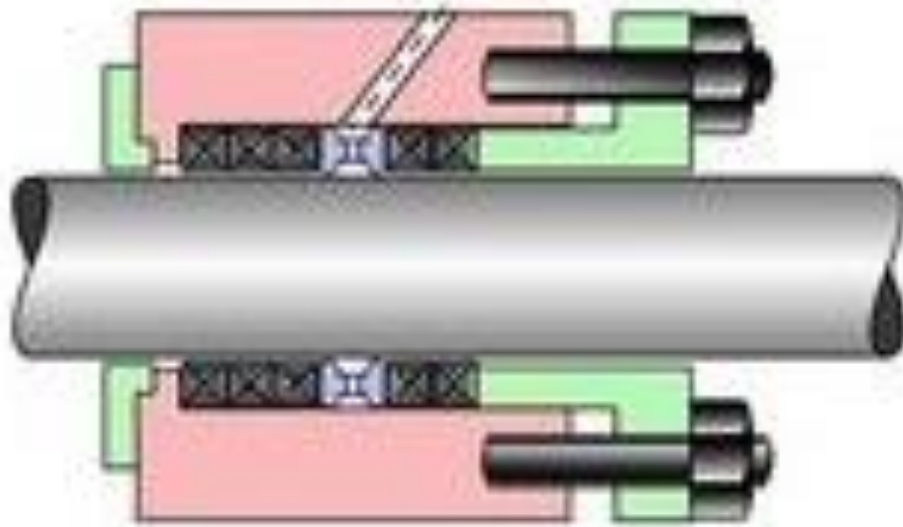
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Typical inferior seals: Mechanical packing/lip seals

Compression packing

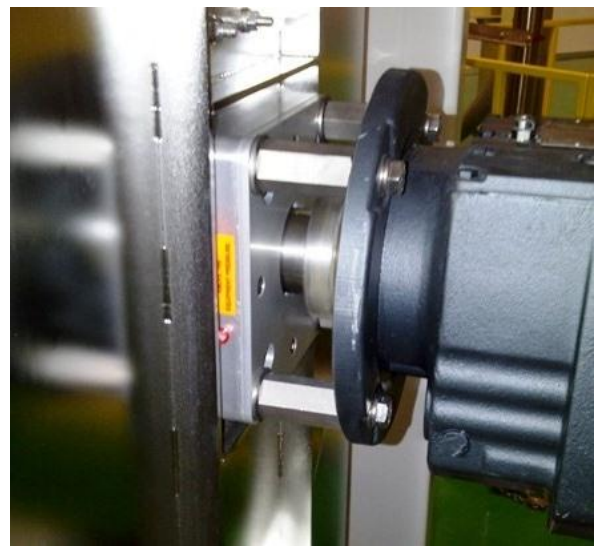
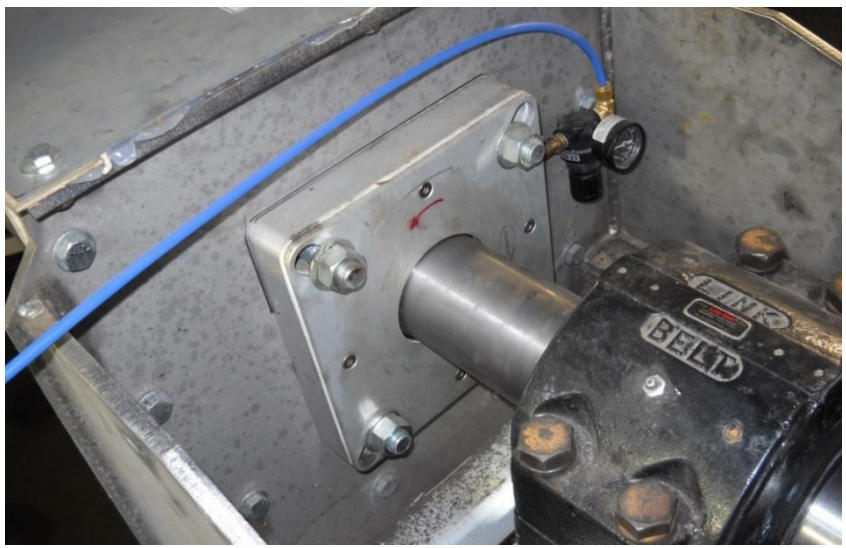


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Results with CinchSeal:

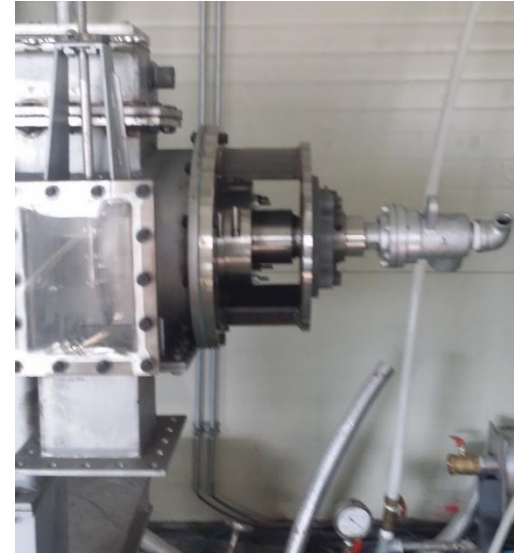


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Battery Industry Seals



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- [CinchSeal Animation.mp4](#)

- [Animation of Cinchseal.pptx](#)

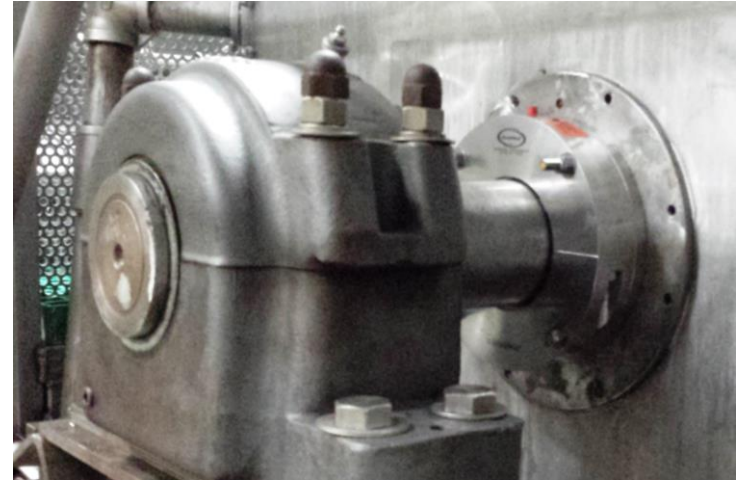
Battery Mixing:

Powders and coating slurries for making **anodes and cathodes** of lithium batteries contain a large percentage of solid particles & binders of different chemicals, sizes and shapes.

The sealing of these powders & slurries with binders poses a major challenge in the battery manufacturing process including no metal contamination of the mix.

Slurry or powder leakage along with possible metal contamination at the mixing stage costs the battery industry millions of dollars every year. In addition to wasted money, unattended leaks can result in downtime, affect product quality, pollute the environment, and cause respiratory injury. Successful sealing involves containment of the battery mix within the mixing system while excluding contaminants.

We have more than **2,000 seal assemblies** working successfully sealing cathode & anode battery powders and slurries with more than 2 ½ years of continuous operation.



Our engineered seals have proven to be the solution to your battery mixing needs for both anode and cathode material and do an excellent job in preventing battery slurry mix or powder from leaking or metal contamination.



Challenges in sealing of battery mixers & dryers

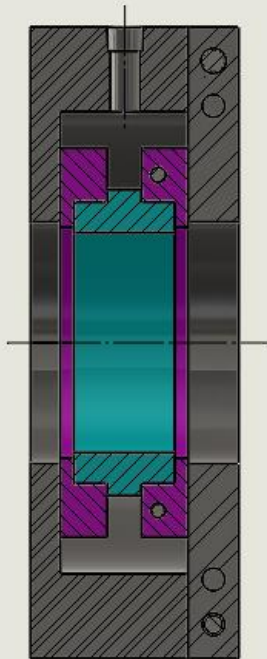
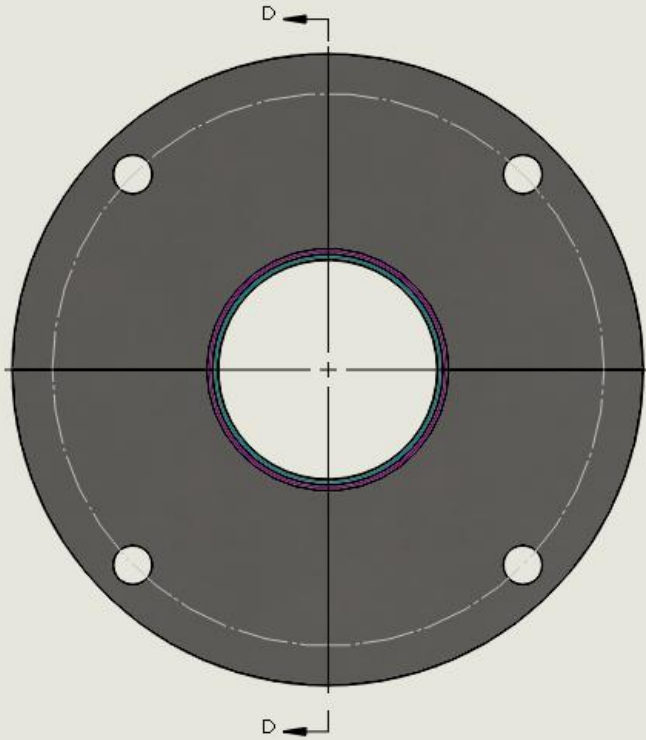
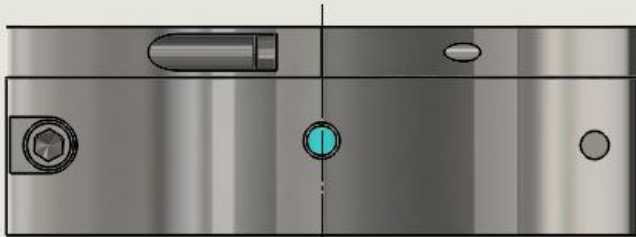
- **Cost savings**: Customers can show cost savings due to the money saved by the elimination of product loss, unscheduled maintenance costs and down time, and premature bearing failure.
- **No metal contamination due to seals** : High quality battery mix ensuring final quality approved batch and reduced battery waste.
- **Damage to shafts due to the abrasive battery mix.** : Due to CinchSeal's unique design, rotating shafts can not be scored or damaged due to the abrasive battery mix.
- **Large Runouts and especially as machines run the runouts can increase due to worn bearings etc**: Can handle up to ¼" [6.35mm] shaft runout without losing the seal
- **Healthier**: Our seals improve the safety of employees by eliminating the leakage of dust that can contaminate working areas.
- **Repairable**: Designed to accommodate Repair/Rebuild Kits.
- **Operation in Vacuum[-1 bar]**

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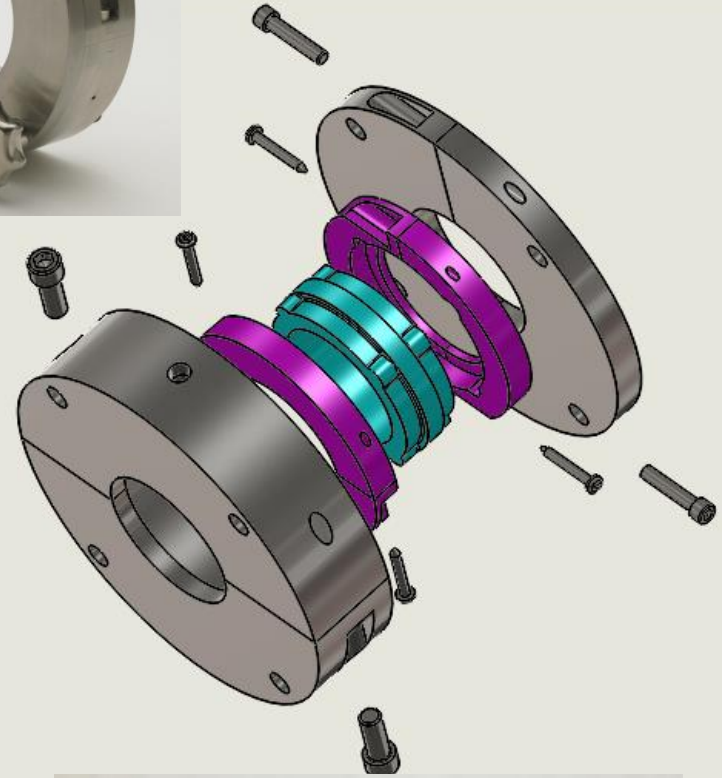


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SEAL ASSEMBLY



SECTION D-D
SCALE 1 : 1

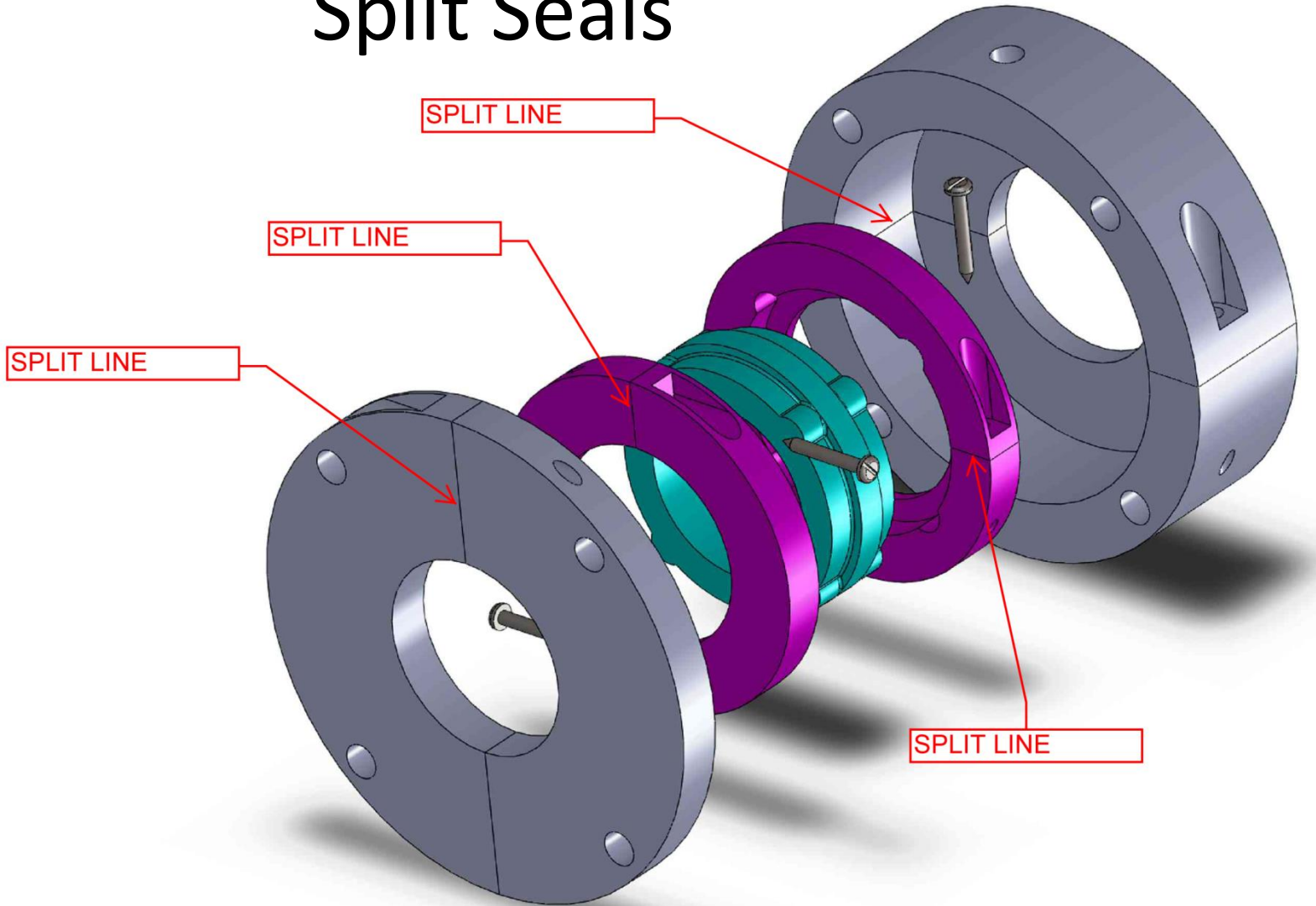


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Split Seals

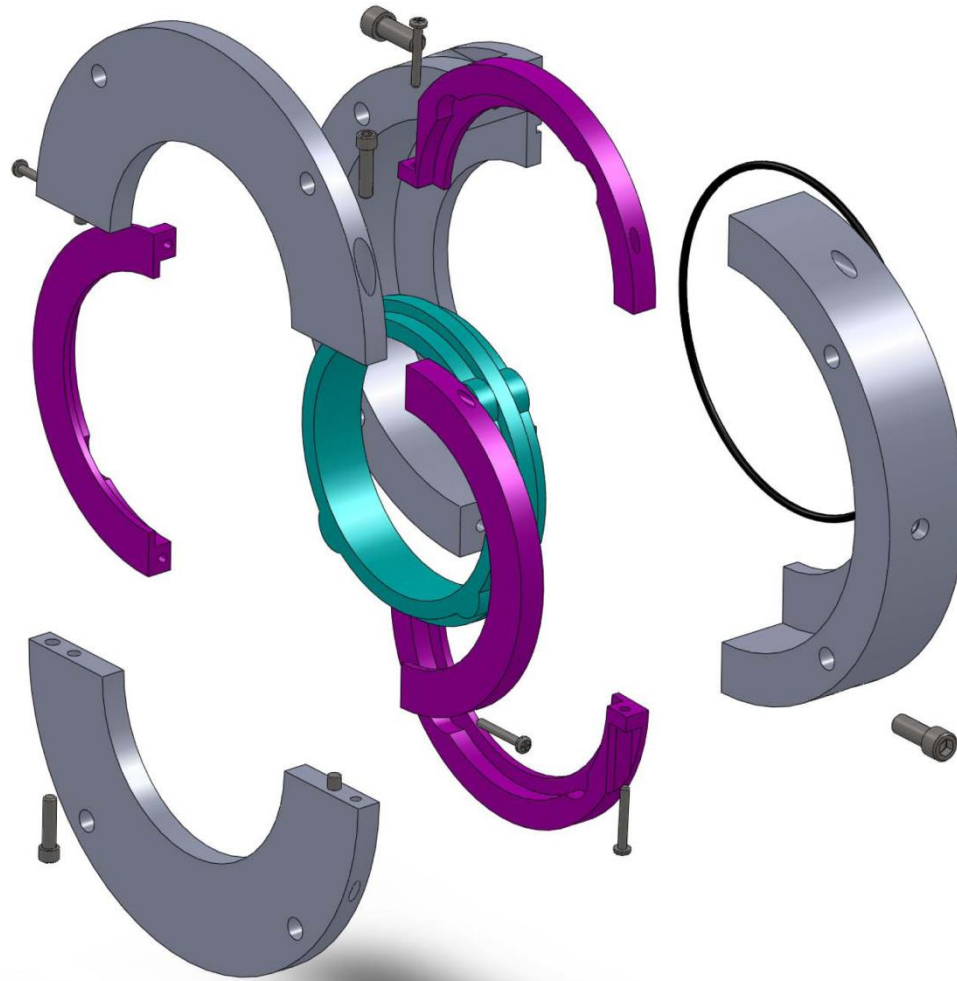


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Split Seals

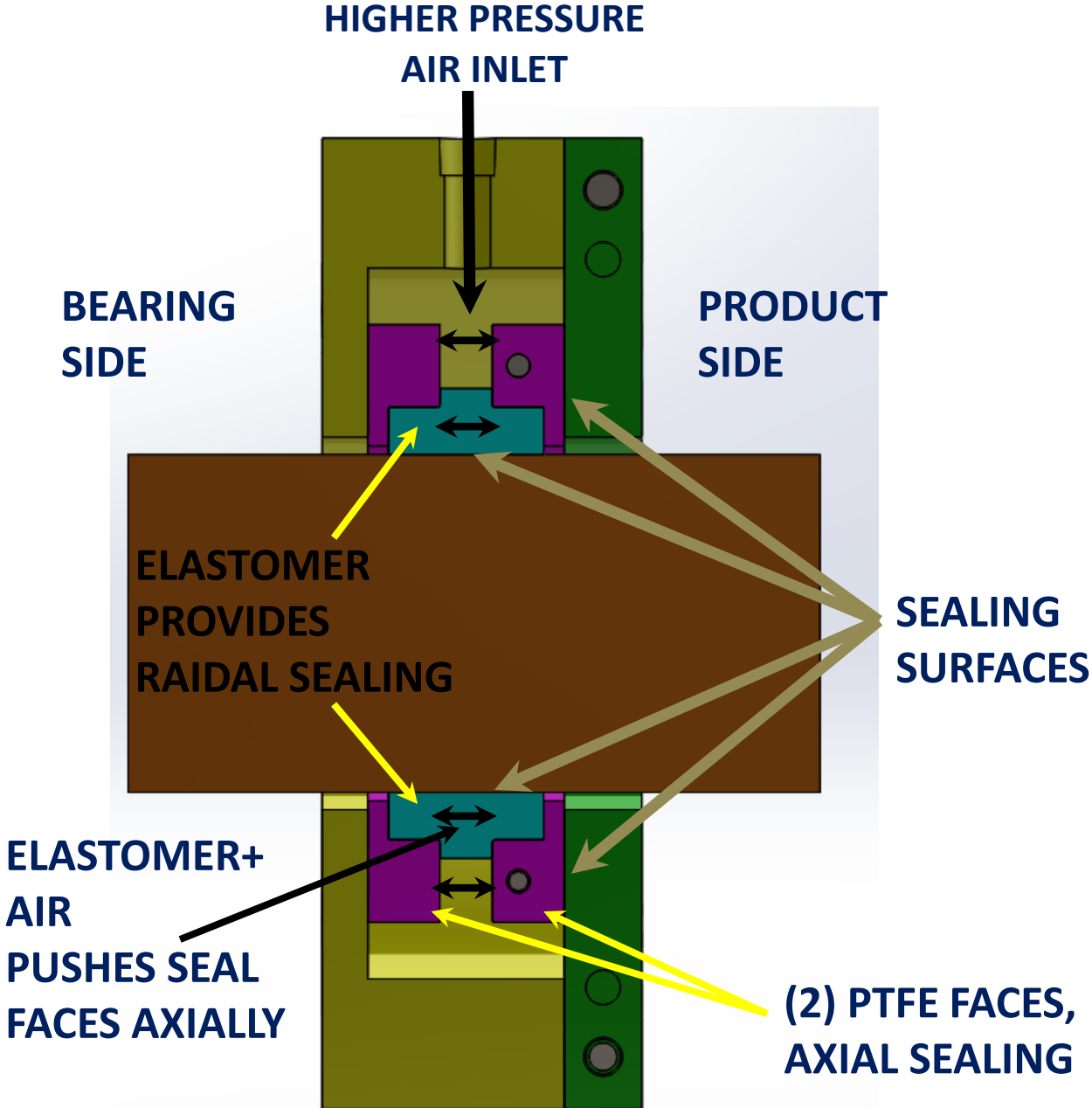


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CROSSECTION OF SEAL



ELASTOMER HAS INTERFERENCE FIT WITH SHAFT & ROTATES THE TWO PTFE FACES WITH IT

How can this seal benefit you

- **Cost savings**: Customers can show cost savings due to the money saved by the elimination of product loss, unscheduled maintenance costs and down time, and premature bearing failure.
- **No damage to shafts**: Due to CinchSeal's unique design, rotating shafts can not be scored or damaged.
- **No metal contamination due to seals** : High quality battery mix ensuring final quality approved batch and reduced battery waste.
- **Runout**: Can handle up to ¼" [6.35mm] shaft runout without losing the seal
- **Healthier**: Our seals improve the safety of employees by eliminating the leakage of dust that can cause explosions and contaminate working areas.
- **Repairable**: Designed to accommodate Repair/Rebuild Kits.
- **Operation in Vacuum[-1 bar]**

Typical Cinchseal assembly

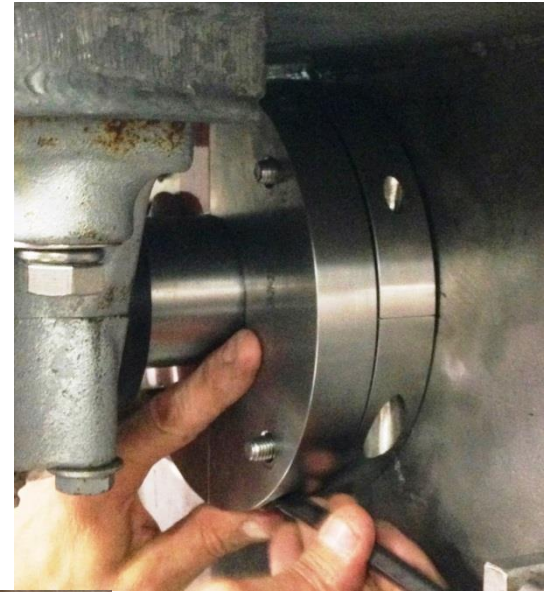


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Typical Cinchseal assembly



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CinchSeal Handles Powders, Pastes & Slurries



- Corrosive Materials
- Chemicals – including Lithium mixes
- Ash
- Limestone
- Sugar
- Cement

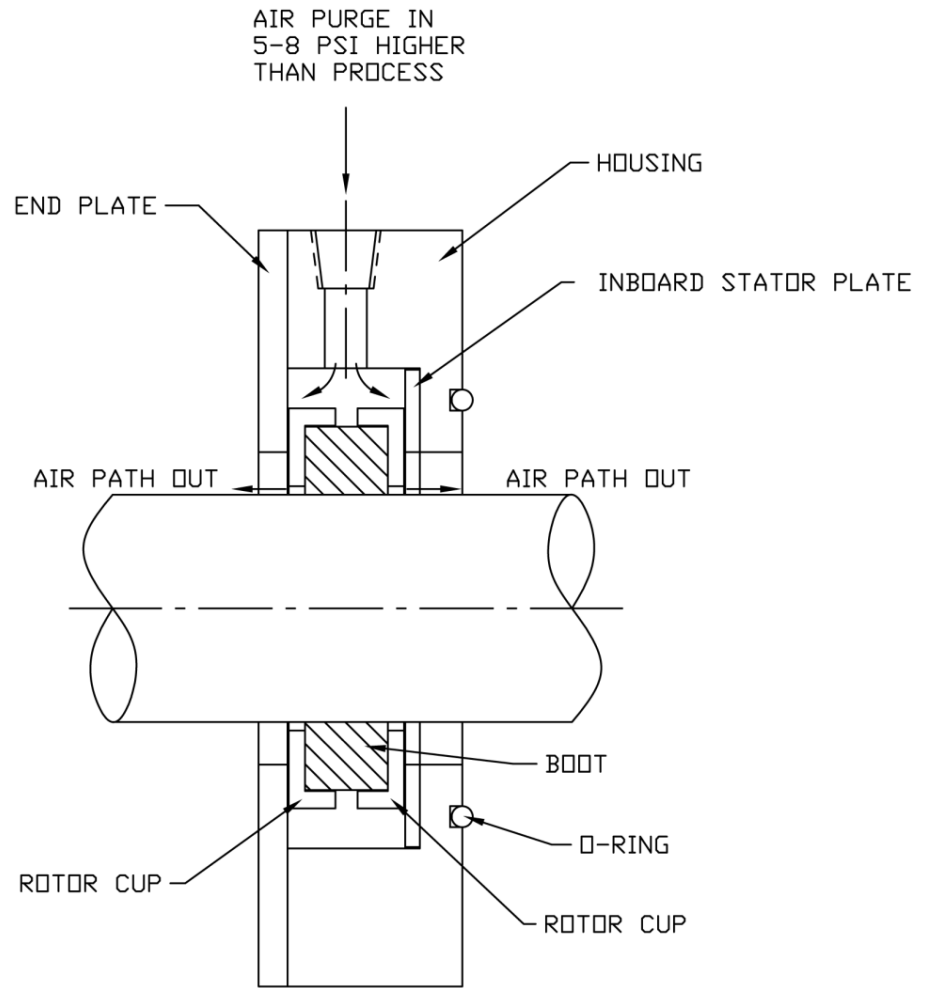
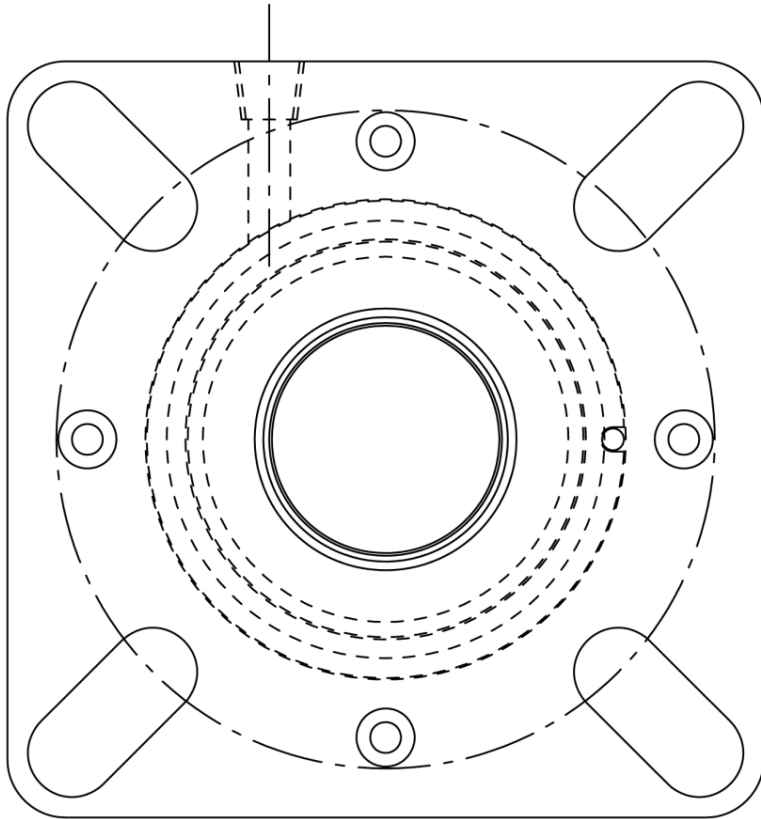


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Air purge



Why do we air purge our seals?

- Creates a higher pressure in the seal chamber to create a natural air barrier that keeps product out of the seal.
- Air purge cools the rotating seal faces by reducing temperature caused by friction.
- The pressure inside the seal housing creates a force that pushes the rotating faces outward against the stationary faces creating a tighter seal.