



## Mechanical Seal Analysis (MSA)

<b>Date</b>	10/6/20	<b>Pump Position</b>	P-2152
<b>MSA #</b>	2020-049	<b>Seal Manufacturer</b>	FSI
<b>Inquiry #</b>	I-20-0101	<b>Seal Model</b>	MS1010MS0040-2418
<b>Customer</b>	Anchor Seals	<b>Shaft Size</b>	2.50"
<b>Customer Ref #</b>	2194509	<b>Drawing #</b>	FSI-2418
<b>End User</b>	USS Clairton Works	<b>Seal Serial #</b>	02084
<b>Pump House</b>	TEC	<b>Inboard Rotary Material</b>	Tungsten Carbide
<b>Contact</b>	Jason DiBiase	<b>Inboard Stationary Material</b>	Tungsten Carbide
<b>Phone</b>	412-299-6900	<b>Outboard Rotary Material</b>	-
<b>Salesperson</b>	House	<b>Outboard Stationary Material</b>	-
		<b>Elastomers</b>	Aflas / Viton

### General Seal Condition

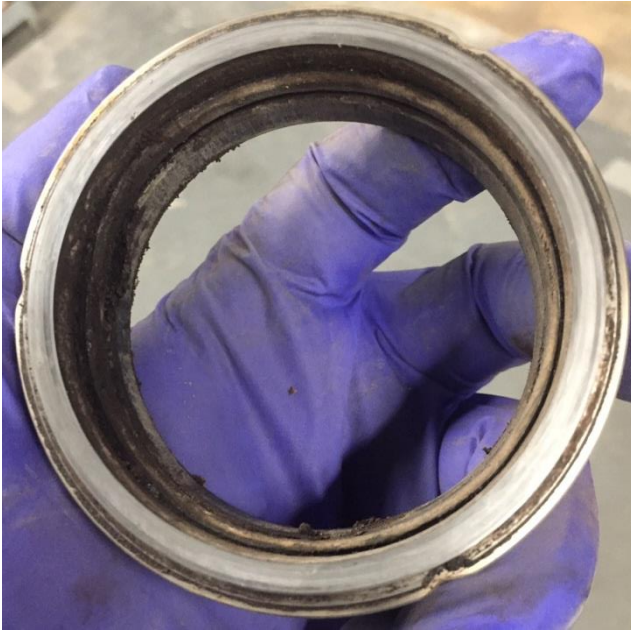
Seal was returned covered in product.



**Figure 1 & 2: Seal Assembly**

## Seal Face Conditions

The Tungsten Carbide rotary face was found to have an even wear pattern.



**Figure 3: Rotary Face**

The Tungsten Carbide stationary face was found cracked in two locations 180 degrees apart. The contact the stationary face made with the seal sleeve more than likely caused the face to break.



**Figure 4: Stationary Face**

## Metal Components, Springs, Pins

Most metal parts were in good condition. The OD of the seal sleeve shows signs of rubbing the ID of the stationary face.



**Figure 6: Seal Components**

The seal sleeve OD is worn from making contact with the ID of the tungsten carbide stationary face. The marks are the entire way around the sleeve OD. Shown in figure 8 is the seal sleeve reinserted into the gland without the rotary portion of the seal. This better shows where the stationary face (shown) and the seal sleeve (shown) made contact. You can even see the raised edge on the sleeve from the contact.



**Figure 7 & 8: Seal Sleeve**



### Failure Explanation/Recommendation

**Failure Explanation:** It appears that the seal gland dropped allowing the ID of the stationary to make contact with the sleeve OD. That rubbing eventually caused the stationary face to crack and break resulting in the seal failure. It should be noted that there were reports of gravel in the pump casing during pump disassembly. This debris and subsequent vibration may have aided the movement of the gland.

**Recommendation:** Follow all proper installation instructions and required torque specs when installing the seal on the pump. Also filter/ screen or otherwise find a way to eliminate large debris from entering the pump.

**Additional Note:** It was reported that the pump had a 7 month runtime.