



Mechanical Seal Analysis (MSA)

Date	1/21/2022	Pump Position	2019
MSA #	2022-005	Seal Manufacturer	FSI
Inquiry #	I-22-0007	Seal Model	MS1040HD0034-2395
Customer	Anchor Seals	Shaft Size	2.125"
Customer Ref #	12316843	Drawing #	FSI-2395
End User	USS Clairton Works	Seal Serial #	01708-R03
Pump House	TEC	Inboard Rotary Material	Silicon Carbide
Contact	Brandon Spithaler	Inboard Stationary Material	Silicon Carbide
Phone	412-865-2101	Outboard Rotary Material	-
Salesperson	Brandon Spithaler	Outboard Stationary Material	-
		Elastomers	Kalrez 1050LF

General Seal Condition

The seal arrived assembled and covered in traces of product.



Figure 1: Seal Assembly

The flush port orifice was found mostly clear



Figure 2: Flush Ports



Figure 2: Quench Ports



Figure 2: Drain Ports

Seal Face Conditions

The Silicon Carbide stationary face was cracked where it would engage with the thrust disk.



Figure 3 & 4: Stationary Face

The Silicon Carbide rotary face was cracked prior to being removed from the inboard carrier. Once removed it was broken in multiple locations.



Figure 5 & 6: Rotary Face

Elastomers

All O-rings are in fair condition for sealing purposes.



Figure 7 & 8: O-Rings

Metal Components, Springs, Pins

Most all metal parts were in good working condition.



Figure 9: Metal Components

Some springs were difficult to remove from the seal gland.



Figure 10: Springs

Failure Explanation/Recommendation

Failure Explanation: It appears that this seal failed due to a loss of steam quench and subsequent product build up on an around the seal faces. This then resulted in the cracking of the seal faces due to the added torque of the buildup. The cracked seal faces are shown throughout the report. As well as product residue in the steam quench port suggesting that the steam supply was lost at some point during the operation.

Recommendation: Ensure that the steam quench is always provided to the seal at 3-5psi.

Additional Note: