

## Questions:

*Why (Silicon Carbide) SiC SiC Faces are better than (Tungsten Carbide) TC TC for Submersible pumpset's Primary (Pump End) Mechanical Seal Faces...?!*

## Answer:

Faces of Mechanical Seals are amongst one of the Most **Stressed**  **parts:**

1) They have to **Slide / Rub**; against each other often upto velocities reaching **20m/s** to 2.0m/s...!

Hence, to have **Long Life**  it is imperative to **reduce**  Erosive Wear - hence, they've to be as **Hard** as possible.

2) They've to extremely **Corrosion Resistant**.  *(much, much more than Impeller or Wearing Rings or any other part used in pumpsets).*

Hence, it should have as **Wide** a Permissible **pH Range** as possible.

3) They've to be of as **Lower Weight**  as possible to **minimize Unbalanced Centrifugal Forces** on Adjacent Seal parts *(Springs, Rubber Elastomers, Carriers, etc).* 

Hence, they have to have **Low Density**.

4) In event of Dry pump running, **Extremely High Temperatures**  may be generated between the Sliding Faces leading to Face Cracking.

Hence, they should have **High Temperature Limits** *(Thermal Endurance Temperatures)*.

5) Even when **Running** in Liquid Submergence, **High Heat** will be generated *(between Sliding Faces)* which needs to be Conducted / Disposed away to Pumped Liquid *(on Outside)* & Oil *(on Inside)* to sustain thermal Equilibrium.

Hence **Higher Thermal Conductivity** is desirable.

**Silicon Carbide** is **Superior** to Tungsten Carbide on all of the above crucial properties - refer Table.

**Mechanical Seals** *(for Primary - i.e. Water / Pump end)* were Historically built with TC TC faces WHEN SiC SiC was **not** yet commercially viable.

Property	Units	Material		Comments
		Tungsten Carbide (TC)	Silicon Carbide (SiC)	
Hardness	kg/mm <sup>2</sup>	1500	2100	the Higher the Better
pH Range	—	05-12	02-12	Wide Range is Better
Density	g/cm <sup>3</sup>	14.95	3.09	the Lower the Better
Max. Working Temp.	°C	1090	1370	the Higher the Better
Thermal Conductivity	W / m <sup>0</sup> K	83	147	the Higher the Better

**Aqua** has **standardized** on **Silicon Carbide** *(even though it is Costlier than Tungsten Carbide)*.