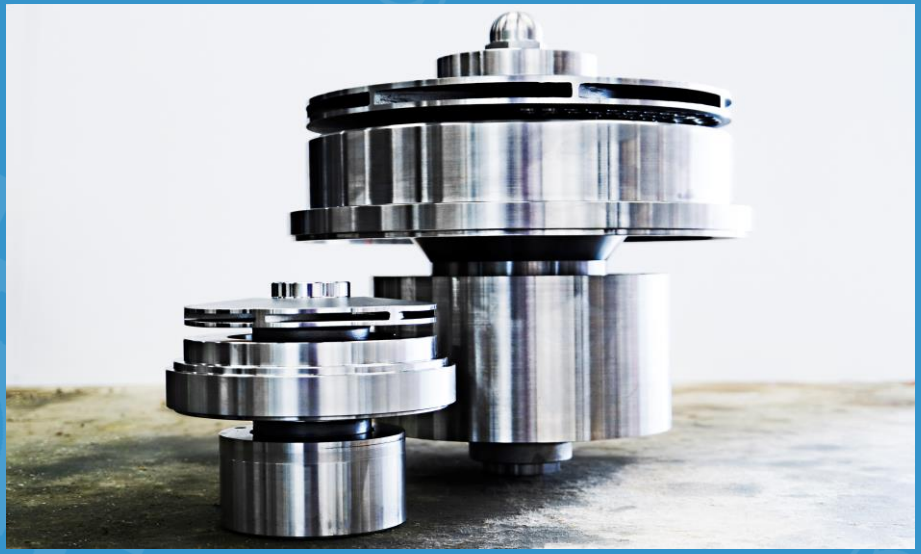
The Chemical Pump Specialists

Runsafe SIC - aDLC Coating
The innovative solution against dry running conditions



Damages

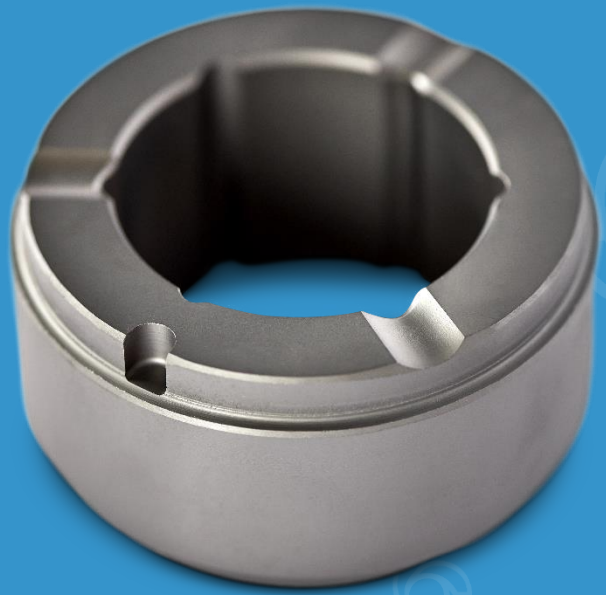
One of the most common cause of pump failure in magnetically driven pumps can be caused by DRY running. Standard mag drive bearings create a high frictional heat that can quickly cause a catastrophic failure.

How does this happen?

The friction coefficient SiC is extremely high (0.5 to 0.7); With rigid bearings used in mag drive pumps, the contact occurs between two moving surfaces without lubrication friction is converted into heat over a small surface area. High temperatures can lead to silicon particles flaking off the bearing surfaces and ultimately destroying the unit completely.

Solution

Amorphous layer made of diamond-like carbon (aDLC) is just a few microns thick can be applied to the silicon carbide bearing by a special process called “plasma assisted chemical vapour deposition”.



aDLC Coatings PROPERTIES

- Amorphous, isotropic, readily adhesive layer • Great hardness (HV 0.05 4000-6000)
- Good elasticity in spite of great hardness
- High wear resistance
- Optimum surface qualities
- Good thermal conductivity
- Temperature-resistant up 300°C
- Universally resistant to chemicals

The coefficient of friction is 0.02-0.04 without lubrication

aDLC Coatings Engineering Benefits

- Higher-efficiency of the pump
- Lower power consuming equipment
- Reduced friction and assisted lubrication
- Coating thickness will not affect the final dimensions
- Ultraclean surface

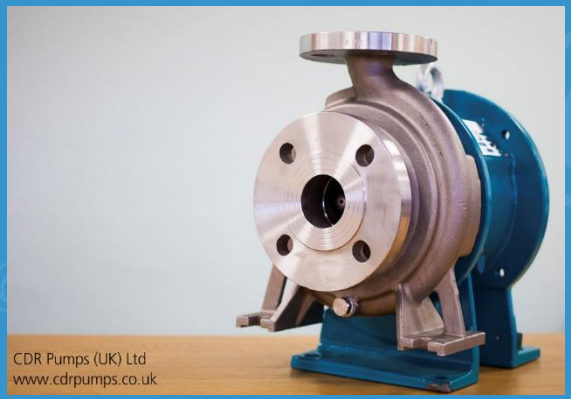
- Prevent failures by accidental start-up with empty pump
- Pumps can be used for low-boiling products close to the vapor pressure limit
- Safety devices have a longer reaction time to stop the pump

aDLC Coatings CDR Tests

Dry Running Test

- Pump Model: UTS-B 80-50-200
- Materials: Stainless Steel Bushes: Runsafe Sic
- Isolation Shell: Hastelloy-C

- Step 1: Pump start-up for tank unloading
- Step 2: Empty tank – operate the pump until failure
- Step 3: Pump failure occurred after 46’30’’ of dry running



aDLC Coatings CDR TESTS

Dry Running Test

- Pump Model: UTS-B 80-50-200
- Materials : Stainless Steel Bushes: Runsafe SIC
- Isolation Shell: Zirconium oxide Step

- 1 Pump start-up for tank unloading
- Step 2 Empty tank – operate until failure
- Step 3 Pump failure occurred after 53’40” of dry running.

With a zirconium oxyde isolation shell, the temperature inside the pump is significantly lower (no eddy current present), therefore the remaining fluid inside the pump will not completely vaporize, allow lubrication to the bushes creating a long running time under critical conditions. Furthermore, with a zirconium oxide isolation shell there may be a consistent benefit in energy savings, as the eddy current losses are completely removed.

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