Characterizing Slurries

The Three Types of Slurries

A slurry is defined as a mixture of solids in a liquid carrier, generally but not always water. The properties of a slurry will vary depending on the properties of the solids. Solids can make a slurry abrasive, corrosive and cause variation in the viscosity of the fluid. The hardness of the solids particles, their size and sharpness help to define the properties of the slurry. Slurries can be grouped into three different types which guide our selection of sealing options.

Settling slurries contain particles which are .003 inches/75 µm or larger and allow the fluid to flow freely. These particles can be very hard (see figure 1) and sharp which can cause abrasion, but the solids will "settle out of the slurry. Minerals in solution are typical of settling slurries.

Non-settling slurries allow particles to remain in suspension. If 50% or more of the particles in the slurry are smaller than .003 inches/75 µm, then the slurry will suffer changing viscosity (called non-Newtonian) as it flows. Non-settling slurries tend to be less abrasive, but have less free fluid to lubricate seal faces. Corn starch in solution is an example of a non-settling slurry.

Dewatering slurry contains particles which are less dense than the fluid. These particles are often fibrous and may be abrasive. They adhere to surfaces around the seal and can absorb fluid starving the seal faces of lubrication. If no lubrication is provided to the seal faces they will heat check (See figure 4) allowing leakage. Examples of dewatering slurries are fine paper/pulp stock.

Characterizing the properties of the slurry is the first step to successful sealing.

Mineral	Brinell	Moh	Common
Talc	3	1	Graphite
Gypsum	12	2	Fingernail, Pure gold, Sliver, Aluminum
Calcite	53	3	Copper penny
Fluorspar	64	4	
Apatite	137	5	Window glass/ Knife blade
Feldspar	147	6	Hardened steel/file
Quartz	178	7	
Topaz	304	8	Tungsten Carbide
Corundum	667	9	Silicon Carbide
Diamond	1500	10	

Figure 1 – Hardness of Minerals in a Slurry

Figure 2 – Abrasion Caused by a Settling Slurry

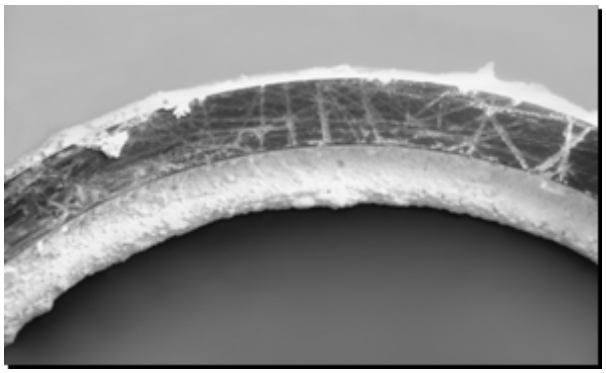

Figure 3 – Damage Caused by Non-Settling Slurry

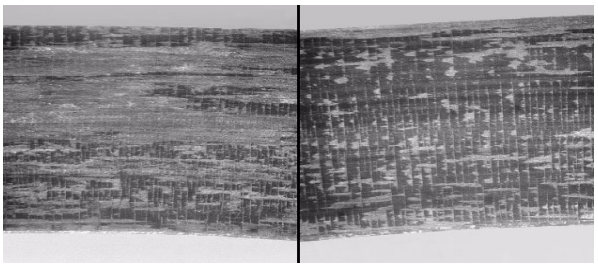

Figure 4 – Heat Checking Caused by Dewatering Slurry

Slurry Sealing Options

Settling Slurries

1. Split Seal with RSC/RSC, SpiralTrac S and Flush up to 20% solids
2. Slurry Seal with TC/TC seal faces up to 40% solids No Flush
3. Slurry Seal with TC/TC seal faces above 40% solids with SpiralTrac I and flush
4. Dual Seal with hard faces and piping plan 53/54 and a SpiralTrac I for up to 30% solids

Non-Settling Slurries

1. Split Seal w/RSC/RSC, restriction bushing/flush to 20% solids
2. Single Seal w/hard faces, restriction bushing or SpiralTrac version N Type I with flush up to 40%
3. Dual Seal w/hard faces using plan 54 – no flush required.
4. Superset with 1830SSP and flush

Dewatering Slurries

1. Split Seal with RSC/RSC, SpiralTrac S Type F and flush up to 8% solids
2. Single Seal with hard seal faces, SpiralTrac Version D Type I up to 4% solids no flush
3. Dual Seal with hard seal faces above 4% solids with SpiralTrac Type F and plan 54
4. Superset with 1730 and flush

A.W. Chesterton Company
29 East Street,
Winchester, MA 01890

Telephone: **1-781-481-3947**
Fax: **1-781-481-3968**
GlobalTraining@chesterton.com
www.chesterton.com