OIL LIFTER <1>

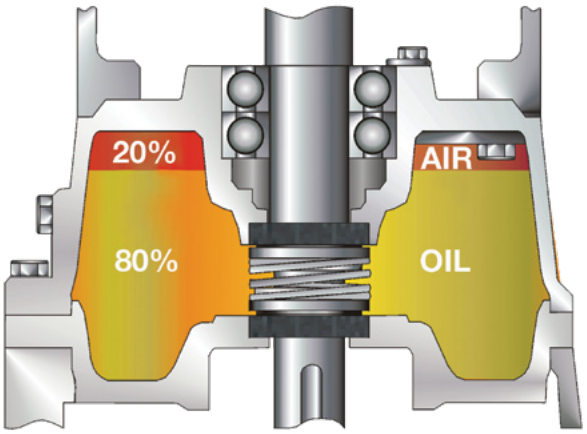

Figure 1

In an ongoing effort to improve the longevity and durability of their submersible pumps, Tsurumi has addressed the problem of maintaining proper lubrication of the upper mechanical seal faces for an extended period of time, with the invention of the Oil Lifter (see **Fig 4)**. Mechanical seal faces are lubricated by a thin layer of lubricating liquid seeping across the seal faces. This thin layer is know as a hydrodynamic film. Normally an oil lubricated mechanical seal will be located in a chamber that consists of approximately 80% oil and 20% air space. The air space is required in order to allow for expansion of the oil due to the heat generated by the motor and the heating of the seal faces due to friction **(Fig. 1)**.

A common problem that exists in all submersible pumps that incorporate a mechanical seal in an oil chamber is that as the mechanical seal is rotating inside the seal chamber, it will impart energy to the oil. The oil will start to rotate, thereby causing a vortex to form in the oil chamber. The rotating vortex will cause the oil to drop in the center of the rotation and pull away from the top seal faces, starving them from lubrication **(Fig. 2)**. Various manufacturers employ different methods to break up this centrifugal vortex. Some manufacturers rely on anti-vortexing vanes cast into the oil chamber itself, **(Fig 3 Item 1)**. This particular method is only effective while the oil level is maintained at a high level.

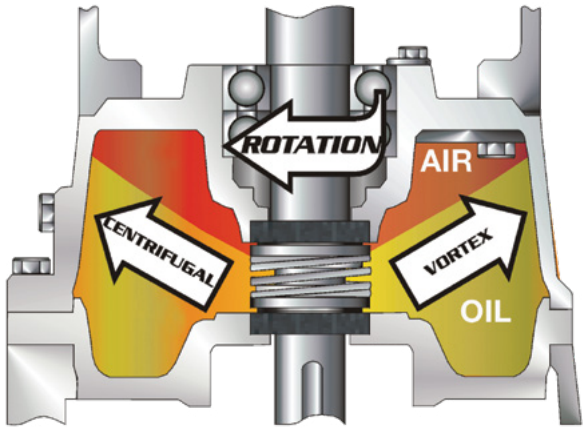

Figure 2

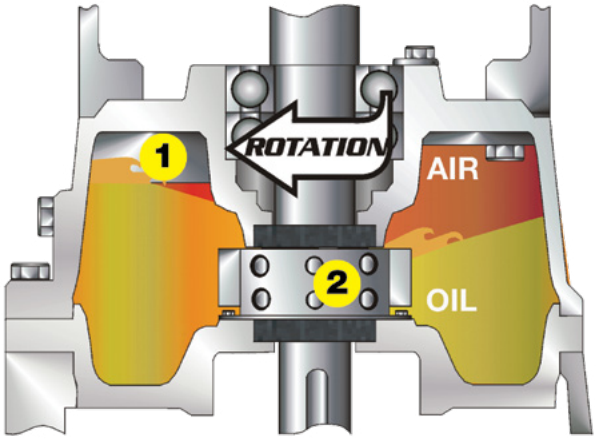

Figure 3

Prior to the introduction of the Oil Lifter, Tsurumi incorporated a fabricated seal cage with external anti-vortexing vanes **(Fig. 3 Item 2)**. As can be discerned from **Fig 3**, this method of stopping the vortex from forming is superior to the cast in anti-vortexing vane, in that it will continue to function to a much lower oil level than the cast in anti-vortexing vane.