



STERLING SIHI PUMPS FOR HOT THERMAL FLUIDS



NEW

ZTND PN 16

Standard Casing Pump

Capacities to 4400 GPM
Pressures to 312 Feet
Temperature to 662 Degrees F
DIN PN 16 Flanges Drilled to 150 or 300 # ANSI
Casing Pressure Limit PN 16-232 psi (to size 150250)
Casing Pressure Limit PN 25-363 psi (Sizes 150315 to 200500)
Sealing Radial Seal Rings (uncooled) to 110 psi at pump discharge
Mechanical seals (uncooled)

ZTNY PN 40

Hi Pressure Casing Pump

Capacities to 4400 GPM
Pressures to 312 Feet
Temperature to 662 Degrees F
DIN PN 40 Flanges Drilled to 300 # ANSI
Casing Pressure Limit PN 40-580 psi
Sealing Radial Seal Rings (uncooled) to 110 psi at pump discharge
Mechanical seals (uncooled)

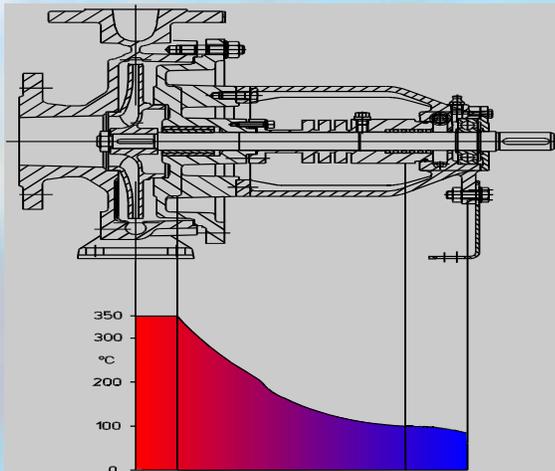
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Thermal Expansion in Hot Thermal Fluid Pumps

Thermal Expansion takes place in all pumps that operate at high temperatures. The SIHI ZTN series pump operates at temperature to 662 degrees F without external cooling, and with standard TEFC motors without the need for auxiliary fan assist.

Thermal expansion generally occurs in the form of growth of the pump against fixed points. For example, since the pump is firmly fixed to a base plate, it may grow in a vertical direction. In other words, using the shaft as a point of reference, the distance from the base plate to the centerline of the shaft may increase with thermal expansion. Note however that the temperature at the pump casing support feet is considerably more than the temperature at the support bracket closer to the drive, as illustrated below. The SIHI support bracket however has a “slotted hole” where it is fastened to the pump to allow uniform growth and thus ensure alignment of the seal and bearings.

Note that the SIHI unique “Heat Transfer Tube” design effectively dissipates heat from the pump casing to the support bracket thus not exposing the seal and bearings to high pumpage temperatures. It also illustrates the difference thermal expansion means between the pump and motor shafts, necessitating examination and possible “hot re alignment”.



Centerline Support Pumps are they worth the extra?

While a centerline support somewhat isolates the casing temperature from the centerline bracket, thermal growth still occurs.

Let’s explore the actual growth using both a ductile iron foot mounted pump as well as a centerline support pump using a pumpage temperature of 550 degrees F and an ambient air condition of 70 degrees F. The pumps in this example are a size 50200 SIHI and the equivalent centerline support pump 3x4x8.5.

Foot Mounted – Increase in shaft height = .0197”*

Centerline Support - Increase in shaft height = .015”**

* Using thermal expansion formula CTE (Ductile Iron) x Temperature change x length

** Using a centerline vertical bracket 10” long and the average temperature of the bracket of 300 Degrees F

What does this increase mean? Can it be ignored? What are the effects on coupling alignment?

Typical Coupling Misalignment tolerance = .002”

CONCLUSION / RECOMMENDATION – Using either type of pump, that is, either a foot mounted or centerline supported pump, there is sufficient vertical thermal expansion to warrant re alignment in the field at operating temperatures.

