

Vesconite Hilube

Ideal lineshaft bearings for Vertical Turbine Pumps



Vesconite Hilube

- No water swell
- Can run dry
- Has low wear
- Is low friction



Some case studies

Vesconite Hilube overcomes a 30 second dry startup on a large vertical circulating water pump application.

A USA company were manufacturing a sea water pump to be used for an off shore oil rig in Asia, designed with sea water lubricated lineshaft bearings. This pump required a 30 second dry start up once per week.

Pump capacity 150 000 l/min ; Pump speed 500 RPM
Bearing sizes 155x127–250 & 127 mm long (6" x 5" – 9.8" and 7.7" long)
12 longitudinal grooves included in the bearing.

Metal backed rubber bearings were originally specified. Rubber is an acceptable bearing material as long as there is a suitable water lubrication cooling film available on the bearing, but does not survive when water flow through the bearing is not present. For this reason Vesconite Hilube was considered.

The Vesconite Hilube bearings were Stainless Steel 316L backed.
Priming the pump on startup was not possible so the pump was required to run for 30 seconds without any bearing lubrication.
Due to the structural strength of Vesconite Hilube the metal backings required for rubber bearings can be eliminated, giving a more cost effective bearing.

Dry running tests conducted with Vesconite Hilube.

Pressure $P = 0.4 \text{ kg/cm}^2$ (5.7 psi)
Surface velocity $v = 360 \text{ m/min}$ (1152 fpm)
 $PV = 136 \text{ kg.m/min.cm}^2$ (6566 psi.fpm)

Vesconite Hilube survived these conditions for well over 1 minute without damaging the bearing!
This is far better than alternative water lubricated pump bearing materials, many of which melt down or burn within seconds. 90% of dry start up specifications require only a 1 minute running time.

www.vesconite.com

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Vesconite Hilube

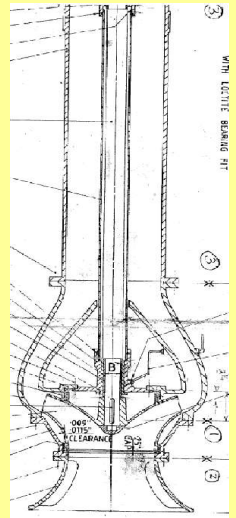
Vesconite bearings in power station cooling water feed pumps solve dry running problem.

Vesconite bearings in cooling water feed pumps at New Zealand gas fired thermal power station have overcome problems caused by the interruption of process water causing serious bearing failure.

*Drysdale Pump – 5" discharge pipe, 5 Bar, 60 HP, 1450 RPM
Shaft size : 2" (50 mm), Housing size : 2 5/8" (66 mm), Bearing length : 8" (200 mm)*

Water supply to the pumps can be blocked by sea weed. The original rubber bearings would often overheat and be severely damaged within 30 seconds, often before the alarm was sounded. Rubber bearings are an acceptable pump bearing material provided a stable supply of cooling water is available. The bearings may be dry at startup or may run dry if the water flow is blocked. Elastomeric materials widely used for pump bearings wore the expensive 316L stainless steel shafts.

The bearings were then replaced with Vesconite. The pumps fitted with Vesconite bearings have shown no bearing or shaft wear and can survive a temporary suspension of water flow.



Vesconite bearings for power station main cooling water pumps.



Specifications : Ebara, Japan, 5 m³/sec, Head 14 m, Power 900 KW, Speed 680 RPM. Pumped medium Partly filtered fresh river water with suspended pumice sand.

Bearings : 5 per pump. 230 x 180 – 280 mm long with 12 grooves.

During pump refurbishment Vesconite bearings were installed rather than the originally designed rubber in a bronze sleeve.

In many cases large diameter rubber bearings have to be specially manufactured to order. In contrast, ready to machine Vesconite bushing stocks are kept in many worldwide centers.

Vesconite is easy to install and easy to remove.

A further advantage is that the running clearance was much closer for the Vesconite bearings than was possible with the original rubber bearings increasing efficiency and decreasing vibration.

The reliability of Vesconite makes it suited to critical pump bearing applications.

Vesconite for inline shaft bearings for Mono axial flow pump.

Vesconite bearings fitted to Mono axial flow pumps abstracting river water have successfully solved wear problems caused by dirty and silt laden water during seasonal floods. Previously the pump bearings needed regular overhauls.

Pump size : 12" and 16", 1460 RPM, 110 KW
Bearing size : 57 x 38 - 127 mm long with 6 longitudinal grooves

Originally the intake (suction bell) bearings were fitted with bronze bearings that were grease lubricated twice daily. During seasonal rains, large quantities of sand are suspended in the pumped water. Bearings needed to be replaced each time high sand concentrations were present in the water being pumped. Worn bearings also resulted in eccentric shafts causing expensive casing wear and loss in pump efficiency.

Vesconite was proposed as an alternative. A clean water bearing flush was added to the bearing. The bearing was sealed on the upstream side and open on the downstream side.



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Advantages over traditional bearings materials

Rubber lined bearings

Rubber bearings have a high friction and must be constantly lubricated with water. Rubber swells in water.

Vesconite carries a higher load than rubber and has a lower friction.

Rubber bearings cannot easily be machined to size. Vesconite can be machined to accommodate for variable housing and shaft sizes from easily available stock material.



Laminated materials

Laminated materials tend to absorb water and delaminate. Laminated materials can result in high shaft wear and a noisy operation.

Vesconite is a homogenous material with no water swell and no chance of delamination. Vesconite bearings are quiet and give an exceptionally low wear to bearing and shaft.



Bronze

Bronze must be lubricated to operate. Even with grease or oil, bronze has a higher friction than Vesconite.

Internally lubricated Vesconite Hilube has a low friction and survives a temporary suspension of the water flow. Vesconite Hilube can be lubricated with water, oil or grease or many other available fluids.



Elastomers

Elastomers lack dimensional stability – they absorb water and have a high thermal expansion. Larger clearances must be used resulting in a more unstable shaft and a loss of allowable ear life.

Elastomers do not have the same strength as Vesconite.

Vesconite Hilube does not absorb water and so closer clearances can be maintained without the fear of seizure. Vesconite Hilube is easy to machined and does not change size during machining.

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