

## Maintenance Guidelines, Machinery Reliability Programs

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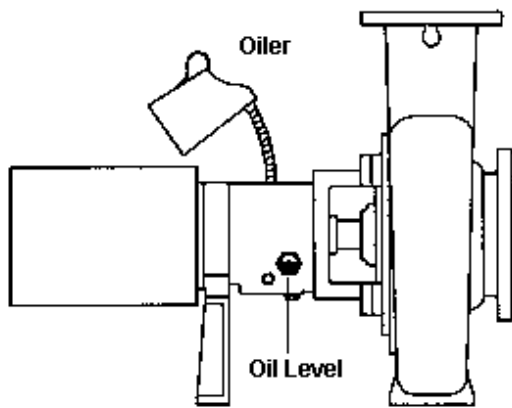
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### 8.2 Recommended preventive maintenance checks for centrifugal pumps and drives

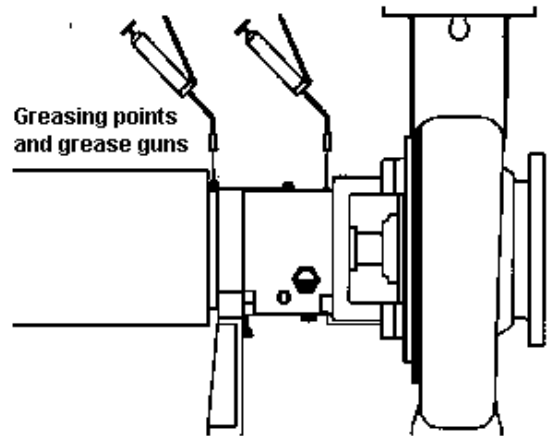
Interval	Routines	Date/Initial
Daily	Check pump for noisy bearings and cavitation.	
Daily	Check bearing oil for water and discoloration.	
Daily	Feel all bearings for temperature.	
Daily	Inspect bearings and oil rings through filling ports. Wipe bearing covers clean.	
Daily	Check oil leaks at the gaskets.	
Daily	Self flush pumps - Hand check the flush line temperature to determine flow through the line. External flush pumps - Determine if flow indicator and needle valve adjustment are functioning properly.	
Daily	Determine if the mechanical seal conditions are normal.	
Daily	Check any water cooling for effective operation. Hand test differential across coolers, jackets and exchangers. Disassemble and clean as required.	
Daily	Check the operability of the heat tracing.	
Daily	Determine if steam leakage at packing and glands is normal.	
Daily	Check for leaks at pressure casing and gaskets. Determine if steam traps are operating properly - no continuous blow & water in casing or drain.	
Monthly	Add oil to the bearing reservoirs, if required.	
Monthly	Clean oiler bulbs and level windows as required.	
Monthly	Make sure that the oil level is the correct distance from the shaft centerline. Adjust if necessary.	
Monthly	Clean out debris from bearing brackets. Drain hole must be open.	
Monthly	Change oil in hydraulic governors.	
Monthly	Determine if hydraulic governor heater is working.	
Monthly	Check for proper oil level & leaks at hydraulic governor. Check for oil leaks at lines, fittings & power piston.	
Monthly	Replace guards (repair if required).	
Monthly	Determine if pump unit requires general cleaning by others.	
6 Months	Machines not running - Standby service: Overfill bearing housing to bottom of the shaft and rotate several turns by hand to coat the shaft and the bearing with oil.	
6 Months	Apply a light coat of rust preventive product to expose machined surfaces to prevent rust and corrosion.	
6 Months	Clean & oil governor linkage & valve stems.	
6 Months	Exercise overspeed trip & valve steam linkage on turbines not running.	
Yearly	Thoroughly inspect disc coupling for signs of wear & cracks in laminations. Tighten bolts.	
Yearly	Using a dial indicator, check the coupling alignment with the equipment coupled. Use special coupling indicator clamps where possible. Ensure that thermal growth allowance is correct.	
Yearly	Using an indicator clamped on the coupling, depress and lift on each coupling and note the dial indicator change. Determine if the deflection is normal for this machine. Refer to OEM manual.	
Yearly	Using an indicator, check axial float of the pump & the driver shaft in similar manner.	
Yearly	Remove turbine sentinel valve. Shop test & adjust to proper setting.	
Yearly	Inspect trip and throttle valve stems and their linkages for wear. Check over-speed mechanism for wear. (Turbine must be down).	
Yearly	Remove mechanical the governor cover & inspect flyball seat, spring, bearing & plunger for wear.	

<b>Yearly</b>	Uncouple from pump & overspeed turbine. Ensure that trip valve will stop turbine with steam supply valve (throttle valve) fully open. Compare tripping speed with previous records. Adjust trip mechanism & repeat procedure. Follow manufacturer s instructions when making adjustments.	
<b>Yearly</b>	Where the process will allow it, test run the turbine coupled to the pump. When not possible, run the turbine uncoupled. With a tachometer – verify proper governor operation & control. Determine if hand (booster) valves are completely closed when required to carry load. This influences steam economy.	
<b>Seasonal</b>		
<b>Fall &amp; Summer</b>	Do a seasonal oil change out, if required by OEM lubrication guide.	
<b>Fall</b>	Where cooling water is decommissioned, ensure that no water remains in the jackets, coolers and piping.	
<b>Fall</b>	Inspect for damaged or missing insulation	
<b>Fall</b>	Reestablish steam flow or electrical tracing continuity.	

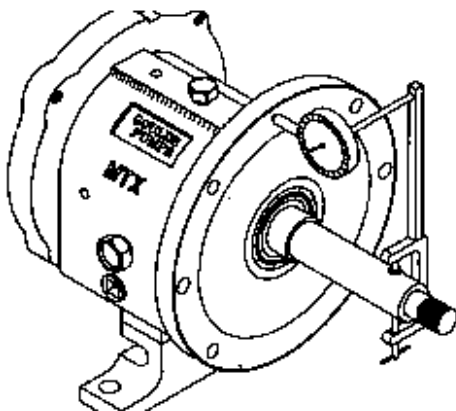
### Illustrations of maintenance checks<sup>1</sup>



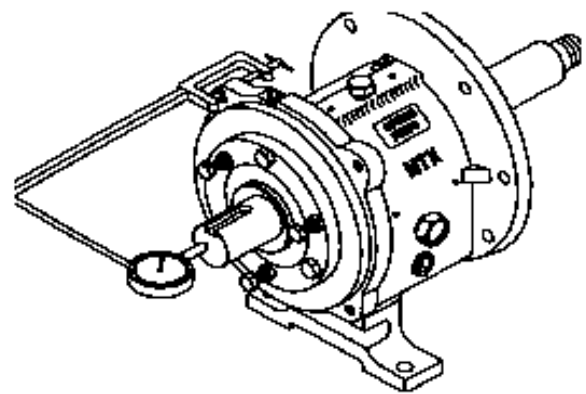
1. Oil level check



2. Re-greasing of bearings



3. Shaft to bearing housing face runout



4. Shaft end play measurement

<sup>1</sup> Pictures courtesy of Goulds Pumps  
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