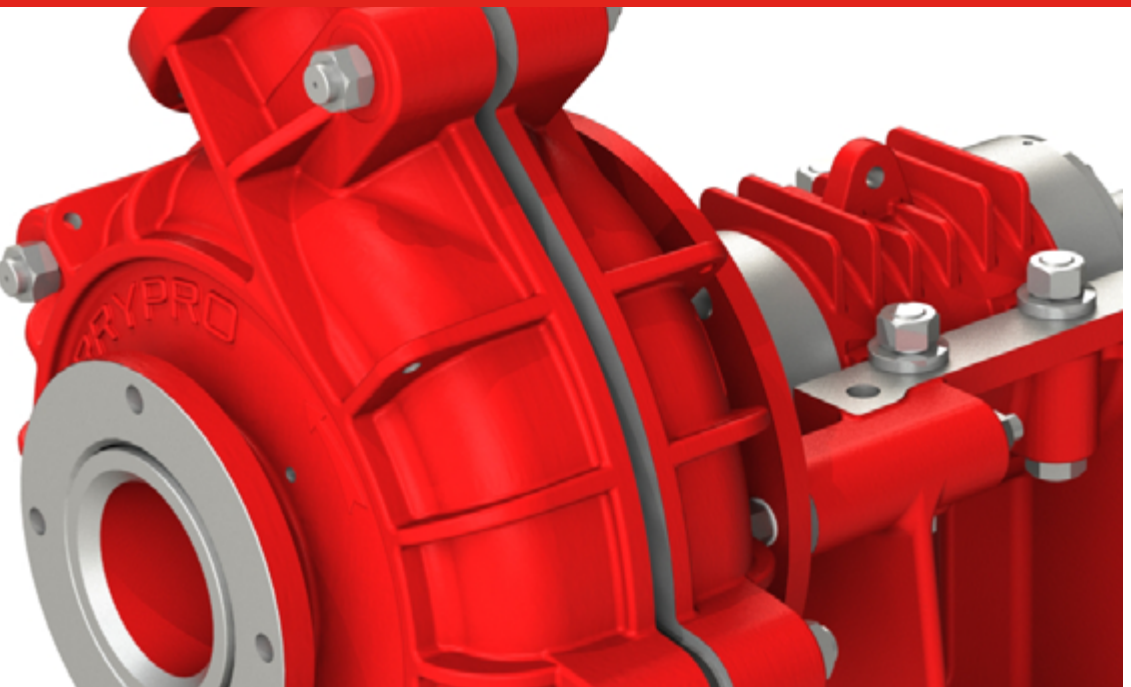

SLURRYPRO



Contents

SYMPTOMS - HOPPER OVERFLOWS
Pump not primed
Excessive amount of air or gas in liquid
Inlet of suction pipe insufficiently submerged
Blocked suction line
Suction valve closed
Inlet pipe diameter too small or length of inlet pipe too long
Speed too slow or wrong direction of rotation
Coupling or drive belts not transmitting power
Total head of system higher than design
Specific gravity of liquid different from design
Entrained air in pump, pump hopper requires baffles
Badly installed pipe line or gaskets partly blocking pipe
Foreign matter in impeller

SYMPTOMS - OVERHEATING OR SEIZURE OF PUMP
Pump not primed
Insufficient margin between suction pressure and vapour pressure
Operation at very low capacity
Drive misalignment
Lack of lubrication
Improper installation of bearings
Rotating part rubbing on stationary part
Impeller out of balance, resulting in vibration
Excessive thrust caused by a mechanical failure inside the pump
Excessive amount of lubricant in bearing housing causing high bearing temp

SYMPTOMS - SHORT BEARING LIFE
Drive misalignment
Shaft bent
Rotating part rubbing on stationary part
Bearings worn
Impeller out of balance, resulting in vibration
Shaft running off-centre because of worn bearings or misalignment
Lack of lubrication
Excessive amount of lubricant in bearing housing causing high bearing temp
Improper installation of bearings
Dirt getting into bearings
Rusting of bearings due to water getting into housing

SYMPTOMS - VIBRATION AND NOISE FROM PUMP
Pump or suction pipe not completely filled with liquid
Suction lift too high
Insufficient margin between suction pressure and vapour pressure
Foot valve too small
Foot valve partially clogged
Inlet of suction pipe insufficiently submerged
Operation at very low capacity
Badly installed pipe line or gaskets partly blocking pipe
Drive misalignment
Rotating part rubbing on stationary part
Shaft running off-centre because of worn bearings or misalignment
Foreign matter in impeller

SYMPTOMS - PACKING HAS SHORT LIFE
Misalignment
Shaft bent
Shaft or shaft sleeves worn or scored at the packing
Packing improperly installed
Shaft running off-centre because of worn bearings or misalignment
Gland sealing water flow inadequate due to worn shaft seal components
Gland sealing water pressure inadequate
Dirt or grit in sealing liquid, leading to scoring shaft sleeve
Expeller worn or blocked
Excessive clearance at bottom of stuffing box, forcing packing into pump

SYMPTOMS - LEAKAGE FROM STUFFING BOX
Misalignment
Shaft bent
Shaft or shaft sleeves worn or scored at the packing
Packing wrong size
Packing improperly installed
Incorrect type of packing for operating conditions
Shaft running off-centre because of worn bearings or misalignment
Gland sealing water pressure too high causing packing extrusion
Dirt or grit in sealing liquid, leading to scoring shaft sleeve
Expeller worn or blocked
Excessive clearance at bottom of stuffing box, forcing packing into pump

SYMPTOMS - EXCESSIVE MOTOR POWER REQUIRED
Speed too high
Wrong direction of rotation
Total head of system higher than design
Total head of system lower than design
Specific gravity of liquid different from design
Viscosity of liquid differs from that for which designed
Misalignment
Shaft bent
Rotating part rubbing on stationary part
Packing improperly installed
Gland too tight, resulting in no flow of liquid to lubricate packing

SYMPTOMS - PUMP LOSES PRIME
Pump or suction pipe not completely filled with liquid
Suction lift too high
Excessive amount of air or gas in liquid
Air pocket in suction line
Air leaks into suction line
Air leaks into pump through stuffing box
Inlet of suction pipe insufficiently submerged
Blocked suction line
Foreign matter in impeller
Inlet pipe diameter too small or length of inlet pipe too long
Entrained air in pump. Pump hopper requires baffles
Badly installed pipe line or gaskets partly blocking pipe

SYMPTOMS - INSUFFICIENT PRESSURE
Excessive amount of air or gas in liquid
Speed too slow
Total head of system higher than design
Viscosity of liquid differs from that for which designed
Entrained air in pump. Pump hopper requires baffles
Badly installed pipe line or gaskets partly blocking pipe
Impeller damaged or worn
Casing gasket defective, permitting internal leakage
Foreign matter in impeller

SYMPTOMS - REDUCED DISCHARGE DELIVERY
Pump or suction pipe not completely filled with liquid
Suction lift too high
Insufficient margin between suction pressure and vapour pressure
Excessive amount of air or gas in liquid
Air pocket in suction line
Air leaks into suction line
Air leaks into pump through stuffing box
Foot valve too small
Foot valve partially clogged
Inlet of suction pipe insufficiently submerged
Blocked suction line

SYMPTOMS -REDUCED DISCHARGE DELIVERY (CONT)
Inlet pipe diameter too small or length of inlet pipe too long
Speed too slow - slippage of vee belts
Speed too slow - incorrect size pulleys
Speed too slow - incorrect "pole" of electric motor
Speed too high
Wrong direction of rotation
Total head of system higher than design
Viscosity of liquid differs from that for which designed
Entrained air in pump. Pump hopper requires baffles
Badly installed pipe line or gaskets partly blocking pipe
Foreign matter in impeller

SYMPTOMS - FAILURE TO DISCHARGE
Pump not primed
Pump or suction pipe not completely filled with liquid
Suction lift too high
Insufficient margin between suction pressure and vapour pressure
Air pocket in suction line
Inlet of suction pipe insufficiently submerged
Blocked suction line
Inlet pipe diameter too small or length of inlet pipe too long
Speed too slow
Total head of system higher than design
Impeller damaged or worn
Foreign matter in impeller

PROBLEM	CAUSE	SOLUTION
▪ Short packing life ▪ Short sleeve life ▪ Slurry exits gland	▪ Slurry wears packing ▪ Slurry wears shaft sleeve ▪ Packing over heating and burning due to low gland sealing water pressure	▪ Increase gland feed water pressure ▪ Increase gland feed water flow-rate ▪ Loosen gland to increase flow ▪ Stop, cool down, repack and then restart with correct gland feed water pressure and flow
▪ Flow from gland too low, in worst case steam exits from gland	▪ Pressure too high causing packing extrusion and flow restriction ▪ Gland too tight ▪ Packing too soft for high pressure	▪ Stop, cool down, repack and then restart with correct, gland feed water pressure and flow ▪ Loosen gland ▪ Review packing type ▪ Use packing retainer ring ▪ Reduce gland feed water pressure
▪ Gland feed water flows around outside of packing rings	▪ Packing rings wrong size or fit-up wrong	▪ Repack gland with correct packing ▪ Review order of assembly
▪ Too much flow from gland	▪ Shaft sleeve worn ▪ Wrong size of packing ▪ Worn packing	▪ Disassemble and refurbish gland with new parts

CAUTION

- On no account should the gland be loosened to such an extent that it disengages from the stuffing box
- Putting more things into a stuffing box when problems occur will only be a short term fix. Extra packing will exacerbate any general wear and eventually lead to excessive leakage.
- Corrosion by saline gland feed water may be minimised by the use of appropriate alloys. The leakage of saline gland feed water from the gland must be trapped and conveyed to waste to avoid corrosion of the pump base and other components.

STEPS FOR THE CORRECT FITTING OF PACKINGS INTO THE STUFFING BOX

1. Packing is normally available in pre-cut and formed rings, or alternatively the user can cut rings from a roll.
2. It is critical that each packing ring is cut to the correct length.
3. The packing cut should be at an angle of 45°, ie, a scarf joint.
4. The packing should fill the annulus. A length of key steel or similar should be used to push the packing into the stuffing box. Care should be taken to start fitting the packing on the joint side and then work around the ring to the opposite side. This should prevent stretching the ring, which could lead to overlap at the cut.
5. The packing should push in easily. If not, check the section dimensions. If incorrect the packing should be replaced. Do not roll formed rings.
6. Each packing should be tamped into position before fitting the next packing. Optimum arrangements for multiple rings of packing are shown below.
7. When all packing rings have now been fitted, assemble the gland and nip the bolts to flatten packing rings evenly. Do not tighten fully.
8. Run the pump. If excessive leakage occurs, tighten the bolts slightly and leave for at least an hour. Repeat if excessive leakage continues. Note that a good steady even drip or constant stream is desirable to cool and lubricate the gland

3 ring arrangement

3 ring arrangement