

Failure Analysis System Procedure

8" Z8-ZN8 SUBMERSIBLE PUMPS



1) Pump applications

- Water distribution;
- industrial washing;
- pressurization;
- irrigation;
- industrial system;
- fire fighting;
- reverse osmosis.

2) Critical items of application

2.1) Liquid

- Max liquid temperature: from 25 °C to 30 °C depending from installation conditions and motor power:
 - if liquid temperature is greater than limits, motor overheats.
- Max amount of sand in water: 100 g/m³:
 - excessive presence of sand generates wear of impellers and wear rings, so a decrease of performances.
- Liquid must not be brackishwater, seawater or corrosive.
 - for aggressive water it would be better use of pump made with AISI 316 stainless steel or Duplex stainless steel;
 - corrossions are caused by incorrect applications (inadequate ground system, leakage current, stray current, unsuitable pumped liquid...) and they cannot be inputed to product or constructive materials.

2.2) Installation

- Max depth of immersion 250 m (L6C motors), 350 m (MC8-MC10 motors with mechanical seal):
 - an excessive depth of immersion causes over heating of motor.
- Min depth of immersion: 1 m measured between the surface of the water and the pump lower casing (for suction speed of 4.2 m/s);
 - a lower depth generates a dry operating with pumping problems and damaging of pump.
- Installation of non return valve at 10 m from delivery and another nonreturn valve for anyone of 30 ÷ 50 m of pipeline:
 - lack or insufficient presence of non return valve, generates a great water hammer, so damaging of pump;
 - lack of non return valve, when the pump has been switched off, generates a great backflow and the consequent damaging of pump.
- It must be guarantee a minimum distance of 1 m between pump and bottom of well:
 - if pump is too near the bottom, it can suck deposited solid parts, witch obstruct the filter and damages the pump.

2.3) Motor coupling

- Pump can be coupled with 6" encapsulated motors with power from 3 kW to 37 kW or 8" 10" PVC insulated motors with power from 30 kW to 150 kW.

3) Inspection of defected product

3.1) Preliminary information

To receive of defected product, require of Customer:

- purchase date (if possible, confirmed by bill or sale slip);
- installation date;
- conditions of installation.

3.2) External visual inspection

- External aspect of product

Corrosion on metal surface or on welds (with little holing) are an indication of incorrect or unsuitable use (see 2.1, 2.2, 2.3, 2.4) and exclude an acknowledgment of technical warrant.

Product analyse stop and repair (if required) is made for a fee.

If there are not elements of objection, go on with inspections in 4.3.

3.3) Preliminary inspections

- Data in plate:
 - type of product and code;
 - series number;
 - manufacturing date;
- Welds and dents in the jacket.

4) Disassembly and analysis

- Remove the filter from lower suction casing
 - check presence of sand or earth deposits.



- Remove valve body (if present) or delivery casing.
- Examine the bush bearing:
 - presence of wear, damaging.
- Extract the spring and non return valve:
 - check presence of possible damaging due to the water hammer.
- Check the condition of gasket on valve seat.



- Disassemble stages casing and for each, check the condition of:
 - O-Ring;
 - bush bearing;
 - impeller;
 - wear ring.



- Extract thrust washer:
 - check presence of slidings, damagings.

- Examine condition of shaft and coupling





5) Check list

Type of problem

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Does not delivery water
 Low performance
 Noisy
 Further:

Pump data

Type:
Code:
Series number:
Installation date:
Manufacturing date:
Liquid pumped:
Temperature:
Remarks:

8" submersible pump failure causes required for claim opening

Where	What	Why
300 Total hydraulic	300 Low performance	106 Uncorrect assembly/testing of components
		112 Not complying components tooling
		300 Wrong rating plate/packing
		100 Further (supply detailed description of failure)
		103 Not complying/unsuitable applications
		119 Normal wear
		120 Excessive wear
300 Total hydraulic	104 Noisy / locked / vibrate	101 Further:
		106 Uncorrect assembly/testing of components
		112 Not complying components tooling
		114 Hydraulic rotating part locked
		100 Further (supply detailed description of failure)
		103 Not complying/unsuitable applications
		119 Normal wear
403 Pump sleeve	400 Leak	120 Excessive wear
		101 Further:
		106 Uncorrect assembly/testing of components
		112 Not complying components tooling
		100 Further (supply detailed description of failure)
		103 Not complying/unsuitable applications
		119 Normal wear
404 OR/Mechanical seal	400 Leak	120 Excessive wear
		101 Further:
		106 Uncorrect assembly/testing of components
		112 Not complying components tooling
		100 Further (supply detailed description of failure)
		103 Not complying/unsuitable applications
		119 Normal wear
408 Pump shaft/joint	401 Broken/cracked	120 Excessive wear
		101 Further:
		106 Uncorrect assembly/testing of components
		112 Not complying components tooling
		100 Further (supply detailed description of failure)
		103 Not complying/unsuitable applications
		119 Normal wear
600 Product	600 Wrong rating plate packing	106 Uncorrect assembly/testing of components
	601 Wrong product document	200 Lack of technical / commercial information
	602 Not acknowledgment of warranty	600 Out of legal warranty period
		601 Product tampering



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7) Faq

Problem founded	Possible causes of the problem
Pump does not start	Power supply problems: <ul style="list-style-type: none"> • no power; • unconnected cable or damaged; • supply voltage too low; • starting drop voltage too high; Fuses burnt. Circuit breaker not calibrated. 2 phases powered. Mechanical seal stuck. Stator slot interrupted. Pump shaft broken. Activation of level probes. Excessive operating depth. Hydraulic locked. Faulty stator
Pump does not delivery water	Water level has dropped Depth of installation too low Delivery outlet clogged Pump shaft broken Clogged filter
Low performance	Water level has dropped Delivery outlet clogged Clogged non return valve Pump shaft broken Wrong connections in the motor System leaks Dirty filter Wear of hydraulic part Wear of wear ring Pump run in the opposite way Wrong pump, undersized
Does not stops	Level probe defected Leaks in system
Noisy	Motor bearings damaged Thrust washer damaged Unbalanced hydraulic Impellers slides on diffusers
Starts and stops too frequently	Pump oversized Pressure switch not calibrated Liquid temperature too high Excessive power input Leaks in system
Runs slowly	Wrong windings connections inside the motor

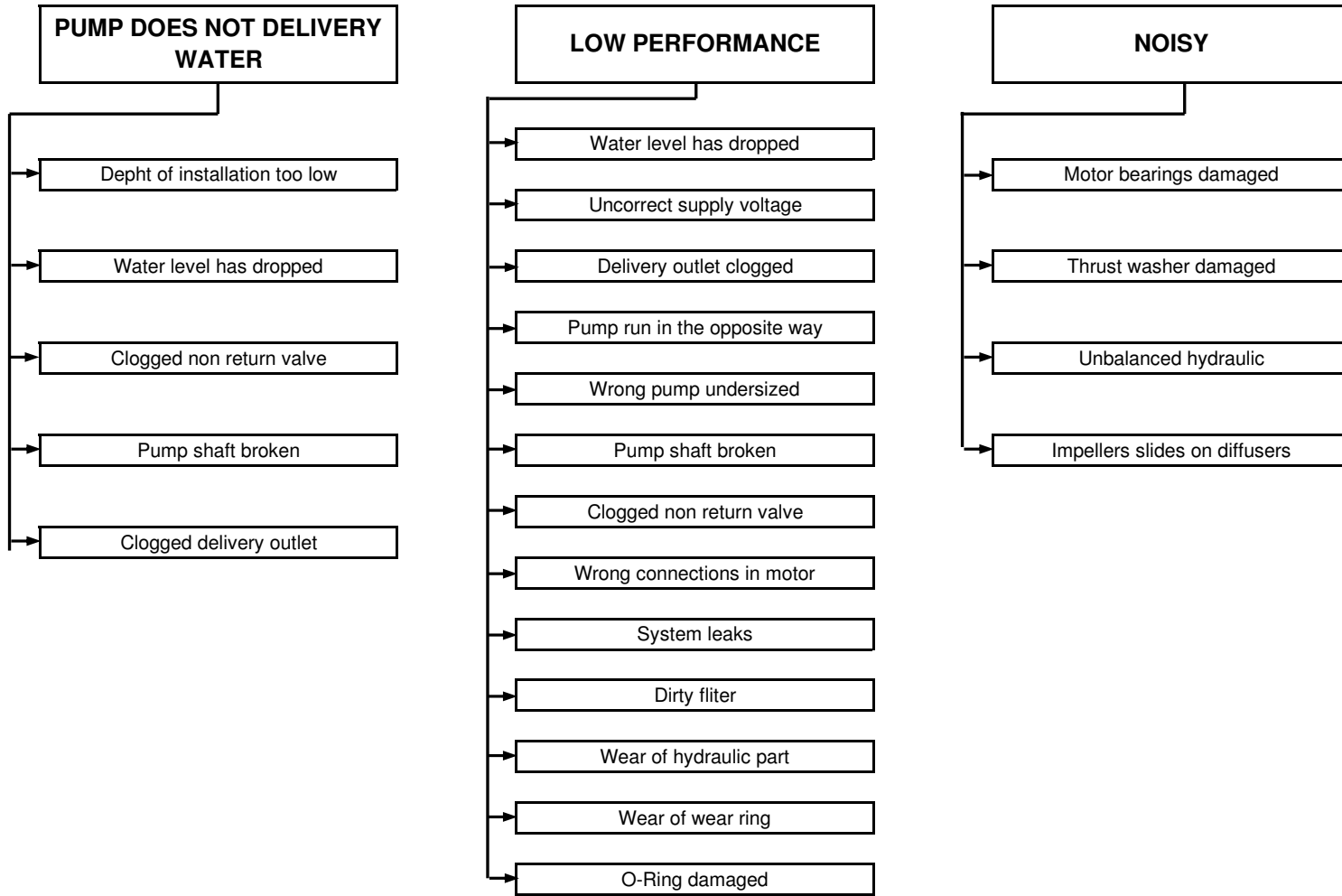


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Excessive power input	Uncorrect voltage Windings defected Motor supplied with 2 phases instead of 3 Presence of sand or other foreign matters inside of pump Wrong pump Pump defected Motor bearings and/or thrust washer defected
Hydraulic locked	Liquid unsuitable Presence of foreign matters in pump

6) Failure tree (8" submersible pump)



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