



A.1 – PUMP COMMISSIONING CHECK LIST

NOTE This list is intended as a guide only and other may require inspection depending on specific installation requirements and equipment configuration.

DATE:
MODEL:
SITE:
START TIME:
FINISH TIME:
SERIAL #:
WET END/SEAL ARRANGMENT:
OTHER:

NO.	PRE-COMMISSIONING	ACCEPTABLE	NOT ACPT.	COMMENT	SIGNATURE	DATE/TIME
1	Visual inspection, check for damage and correct equipment supply.					
2	Inspect baseplate and guarding, adequate concrete/grouting, etc.					
3	Check required lifting tools, special tools, critical spares and BOMS					
4	Visually verify that all connections have been made					
5	Approximate elevation difference between pump outlet & pumps pressure transmitter					
6	Approximate elevation difference between pump outlet & pump's local pressure indicator					
7 *	Pump, Motor & Gearbox Anchor Bolts are tight & lock washers or nuts have been used.					
8	Visually verify level of the bed plates with an Engineering level					
9 *	Impeller has been adjusted by the factory verify free rotation					
10 *	Verify impeller adjusting bolts have been tightened					
11 *	If equipped, verify that the Mechanical Seal has been set & that any shipping locks have been removed according to ICS instructions					
12 *	If equipped, verify that the Gland Sealing Requirements are per the instructions as shown.					



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13 *	Check that pump bolts have been tightened for shipping					
14 *	Bearing Assembly has been factory greased. As per the TAG					
15	Check that all belts are the correct quantities and matched lengths					
16	Check pulley alignment					
17	Bump motor to check rotation					
18	Check vee-belt tensioning in accordance with pump manual					
19	Before flooding of the suction tank, a full operating sequence test on local and then full remote must be conducted for all valves to make sure that all control systems and pneumatics are correctly installed before testing pump					
20 *	Complete lubrication of pump, coupling, motor and gearbox					
21 *	Check all bolts/ nuts on pumps and drive for correct torque					
22	Check hold down bolts and baseplate flatness / level					
23	Check that inlet and outlet flanges/pipework is secured, without excessive strain					
24 *	Check and adjust impeller/Throatbush clearance					
25	Check pump suction is clear (strainer), pipes free of debris					
26 *	Check that pump and motor turn by hand					
27	Check surface treatment for possible damage					
28	Complete I/O checks with drive uncoupled and motor disconnected					
29	Complete earth leakage/megger test					
30	Check thermal, current, speed etc overload setting to confirm operating parameters					
31	Check available condition monitoring to verify flow, pressure, amps, etc					
32	Connect motor and check for correct rotation direction					
33	Run motor and monitor bearing temp / noise					
34	Repeat applicable motor checks for gearbox					
35	Place commission tag					



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SITE:
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FINISH TIME:
SERIAL #:
WET END/SEAL ARRANGMENT:
OTHER:

NO.	PUMP	ACCEPTABLE	NOT ACPT.	COMMENT	SIGNATURE	DATE/TIME
1	Verify torques and record					
2	Head to frame bolts					
3	Impeller adjustment					
4	Motor support bolts					
5	Bearing assembly bolts					
6	Bearing assembly adjusting nuts					
7	Labyrinth greasing (drive end)					
8	Labyrinth greasing (wet end)					

NO.	ELECTRIC MOTOR	ACCEPTABLE	NOT ACPT.	COMMENT	SIGNATURE	DATE/TIME
1	Verify torques and record					
2	Motor rotation					
3	Disengage run 2 hours					
4	Maximum bearing temp					
5	Max vibration RMS					
6	Lubrication					

NO.	MECHANICAL SEAL if applicable	ACCEPTABLE	NOT ACPT.	COMMENT	SIGNATURE	DATE/TIME
1	Flushing Water					
2	Grub screws					
3	Spacer and screws					

NO.	OTHER SEALS	ACCEPTABLE	NOT ACPT.	COMMENT	SIGNATURE	DATE/TIME
1						
2						
3						



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NO.	GEAR BOX	ACCEPTABLE	NOT ACPT.	COMMENT	SIGNATURE	DATE/TIME
1	Cleaned Inspected					
2	Oil Flushed					
3	Oil Filled					
4	Cooling water piping					
5	Gearbox motor run					
6	Vibration test					

NO.	PUMP TO GEARBOX Alignment	ACCEPTABLE	NOT ACPT.	COMMENT	SIGNATURE	DATE/TIME
1	Coupling angular					
2	Coupling offset					
3	Coupling gap					
4	Lubrication					
5	Gaskets list					

NO.	VEE-BELT DRIVE	ACCEPTABLE	NOT ACPT.	COMMENT	SIGNATURE	DATE/TIME
1	Belt number quality / match					
2	Belt tensioning 16mm/m					
3	Pulley alignment					
4	Check taper locks after first 3 hours of operation					

NO.	VALVE START SYSTEM Test	ACCEPTABLE	NOT ACPT.	COMMENT	SIGNATURE	DATE/TIME
1	Suction valve local					
2	Discharge valve local					
3	Drain valve local					
4	Motor start local					
5	Suction valve: remote					
6	Motor start: remote					
7	Discharge valve: remote					
8	Drain valve: remote					
9	Full sequence start: Auto					
10	Full sequence stop: Auto					



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NO.	WATER TEST Auto	ACCEPTABLE	NOT ACPT.	COMMENT	SIGNATURE	DATE/TIME
1	Ambient air temperature					
2	Pump full filled – seal flooded					
3	Inlet valve fully open					
4	Motor start					
5	Open discharge valve slowly					
6	Pump operating speed					
7	Record motor current (amps)					
8	Discharge pressure (kPa)					
9	Intake pressure (kPa)					
10	Mechanical seal leakage					
11	Gearbox bearing stable temps					
12	Gearbox vibration					
13	Pump bearing stable temp					
14	Pump vibration					
15	Stop test drain					

NO.	WET COMMISSIONING (Data collection prior to water test run)	ACCEPTABLE	NOT ACPT.	COMMENT	SIGNATURE	DATE/TIME
1	Review O&M for correct operational sequence					
2 *	Review pump curve. Calculate & record discharge pressure for minimum flow					
3 *	Review pump curve. Calculate & record discharge pressure for normal flow					
4 *	Review pump curve. Calculate & record discharge pressure for maximum flow					
5 *	Review pump curve & record design RPM					
6	Review pump drawings and record effective motor sheave OD					
7	Review pump drawings & record effective pump sheave OD					
8	Final check all connections, guards and valve positions					
9	Verify that the supply tank is filled past the minimum level specified in the O&M. Record Level					
10	Measure ambient air temperature & record					
11	Isolate motor and connect drive pulleys/couplings					
12	Check belt tension (if applicable)					
13	Check drive alignment					



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14	Replace drive guards						
15	Check discharge valves are operational						
16	Check discharge point is clear and personnel advised						
17	Supply water to sealing arrangement (correct flow and pressure)						
18	Start pump and check rotation direction (quick)						
19	Supply water to pump suction and ensure pump is primed						
20	Start water test on full auto control						
21	Start pump and check performance, select time intervals and number of readings						
22	Verify that no part of the driveline is rubbing on guard						
23	Check that the intake and discharge valves are open fully once the pump is up to operating pressure						
24	Record pump operating speed						
25	Slowly open discharge valve from closed position						
	AMPS	At 10 Min	At 60 Min				
27	Record intake pressure						
28	Monitor bearing temperature and vibration (select time intervals)						
	Pump: Drive-End	°C & mm/s	°C & mm/s				
	Wet-End	°C & mm/s	°C & mm/s				
	Motor: Drive-End	°C & mm/s	°C & mm/s				
	Wet-End	°C & mm/s	°C & mm/s				
29	Record Pump Vibration						
30	Monitor for vibrations and unusual noises						
31	Record gearbox vibration						
32	Record pump vibration						
33	Check pump for leakage, gland must have slow drip of water						
34	Check mechanical seal for leakage						
35	Record cooling water piping temperatures, in & out						
36	If fitted with a lube oil pump record lubrication oil pressure and temperature						
37	Close the discharge valve and turn off the pump						

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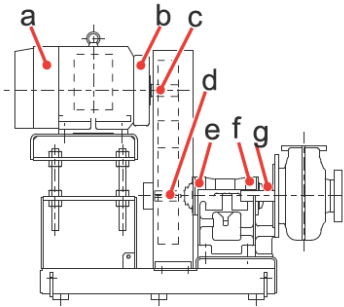
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38	Turn off gland water after pump has come to a stop				
39	Remove commissioning tags				

NOTES:

A.2 VEE-BELT SLURRY PUMP COMMISSIONING CHECK LIST

DETAILED PUMP DESCRIPTION:



- A. MOTOR NON-DRIVE END
- B. MOTOR DRIVE END
- C. CHECK MOTOR SHAFT GUARD FOR RUBBING DURING START
- D. CHECK PUMP SHAFT FOR RUBBING DURING START
- E. PUMP DRIVE END BEARING
- F. PUMP NON-DRIVE END BEARING
- G. MECHANICAL SEAL

NOTE: AT INITIAL START-UP THE BEARING ASSEMBLY MAY OVERHEAT, DO NOT ADD GREASE LET THE TEMPERATURE REACH 93.3°C (200°F), THEN SHUT DOWN THE PUMP. ALLOW THE PUMP BEARINGS TO RETURN TO NEAR AMBIENT TEMPERATURE. THEN RESTART THE PUMP AND RECORD. THIS PROCESS MAY NEED TO BE COMPLETED A FEW TIMES.

DATE:
START TIME:

TEMPERATURES AND RUBBING CHECKS							
HOURS PAST START TIME	A	B	C	D	E	F	G
00:00			YES / NO	YES / NO			
00:01							
00:05							
00:10							
00:15							
00:30							
00:45							
01:00							
01:15							
01:30							
01:45							
02:00							
02:15							
02:30							
02:45							
03:00							



A.3 MULTI-ELEMENT PUMP COMMISSIONING

CUSTOMER NAME:
UTILITY NAME:
PLANT NAME:
PUMP SIZE:
BEARING ASSEMBLY TYPE:
GEAR REDUCER NUMBER:
GEAR REDUCER MANUFACTURER:
GEAR REDUCER MODEL:
MOTOR SERIAL NUMBER:
MOTOR MANUFACTURER:
MOTOR HP AND RPM:

The purpose of this document is to verify the actions required by the installation contractor / on site staff to properly install and commission multi-element pumps. Read the manual for complete storage, installation, operation and safety information.

NOTE:

- All piping is expected to be supported and constrained to minimize and piping forces acting on the pump
- Adequate backing rings are required to compress the pump suction and discharge flange seals when connecting to fiberglass piping. The suction and discharge flanges connected to the pump must be capable of compressing the pump suction and discharge gaskets completely all the way to their inside diameter. This may require installation of a load distribution ring between the connecting flange and the pump and may require high flange bolt torques
- Foundations must be adequately designed and constructed to accept the forces outlined on the supplied general arrangement drawing
- All bolts and bolt torques must be rechecked by the site installation team before the operation of any equipment
- All manufacturer storage and maintenance requirement must be met and recorded in order to validate equipment warranties
- The impeller clearance has been set at the factory. Resetting of the impeller clearance prior to pump commissioning/start-up phase at the site must only be completed under the supervision of a trained service person
- Motors equipped with cylindrical roller bearings must not be operated unloaded. Unloaded operation motors equipped with cylindrical roller bearings void manufacture's warranty
- The system must include an adequate flushing system to completely flush the pump of solids at shut down
- Special care must be given to equipment supplied with mechanical seals. Dry running and/or off-duty point operation will result in seal failure not covered under manufacture's warranty



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PRE-OPERATIONAL INSPECTION		INSTALLATION TEAM
		Record Valve Or ✓
		Initial & Date
Verify that all connections have been made (piping, wiring, etc)		
No.	Description	Circle One
1	Mechanical Seal Flush Port	YES / NO / NA
2	Mechanical Seal Quench Port.	YES / NO / NA
3	Water Cooling Pipes	YES / NO / NA
4	Oil cooling pipes	YES / NO / NA
5	Instrumentation	YES / NO / NA
Bolt Torque Review		
1	Verify pump hold down bolt torque and record (ft-lbs)	
2	Verify pump bearing assembly hold down bolt torque and record (ft-lbs)	
3	Verify pump mechanical seal drive collar bolt torque and record value (ft-lbs)	
4	Verify pump bearing assembly adjustment bolt nuts are tight	
5	Verify gear reducer hold down bolt torque and record value (ft-lbs)	
6	Verify motor hold down bolt torque and record valve (ft-lbs)	
7	Verify low speed coupling bolt torque and record value (ft-lbs)	
8	Hand check that all bolts are tight. Check once completed	
9	Verify suction piping flange bolt torque and record value (ft-lbs)	
10	Verify discharge piping flange bolt torque and record value (ft-lbs)	
11	Record shim quantity underneath gear reducer feet	
12	Record shim overall height underneath gear reducer feet (Avg)	
13	Record shim quantity underneath motor feet	
14	Record shim overall height underneath motor feet (Avg)	
15	Verify base plates are level with a machinist level 98 and record level	
16	Verify pump shaft is level with a machinist level 98 and record level	
17	Impeller has been adjusted by the factory, verify free rotation and record findings	
18	Verify that the mechanical seal has been set per the manufacturer's manual	
19	Verify that the clips have been removed according to the seal manual	



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PRE-OPERATIONAL INSPECTION		INSTALLATION TEAM	
		Record Valve Or ✓	Initial & Date
No.	Properly first fill out oil lubricated equipment immediately before initial operation.		
1	Pump		
2	Gear Reducer		
3	Motor		
Take lubrication samples from each piece of equipment before operation. Replace if condition does not meet requirements			
1	Pump		
2	Gear Reducer		
3	Motor		
Check lubricant levels in all pieces of equipment. Adjust constant level oilers if equipped.			
1	Pumps		
2	Gear Reducer		
3	Motor		
4	Set low speed coupling gap per certified general arrangement drawing and record		
5	Check for gear reducer soft foot. DO NOT loosen pump hold down bolts or remove factory installed shims		
6	Allowances for thermal growth need to be taken into consideration		
7	Record cold alignment values on attached sheets		
Uncoupled Motor Run			
1	Confirm motor is properly lubricated		
2	Ensure motor is uncoupled from other drive components		
3	Verify shaft rotation by bumping motor		
4	For motors equipped with sleeve bearings, run motor uncoupled for two hours, check rotation, scribe magnetic center, check vibration, prox probes output, stator and bearing temperature		
Unloaded Motor/Gear Reducer Run			
1	Set high speed coupling gap per certified general assembly drawing and record. Set high speed coupling alignment		
2	Check for motor and gear reducer soft foot		
3	Allowances for thermal growth need to be taken into consideration		
4	Record cold alignment values on attached sheets		
5	Assemble and lubricate high speed coupling per instruction manual		
6	Verify high speed coupling bolt torque and record value (ft-lbs)		
7	Confirm low speed coupling is not connected to the pump		



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PRE-OPERATIONAL INSPECTION		INSTALLATION TEAM	
		Record Valve Or ✓	Initial & Date
Gear Reducer			
1	Secure gear reducer low speed coupling hub for unloaded run		
2	Open inspection cover and ass oil to normal operating level is not already completed		
3	Prime oil troughs and bearing dams		
4	Replace inspection cover		
5	Ensure breather is installed and in like new condition. Replace if necessary		
6	Lubricate shaft seals as required		
7	Insure cooling system is operational and functioning correctly		
Gear Reducer Air-oil Cooler (If Applicable)			
1	Prime oil circulation pump and hoses		
2	Operate oil circulation pump to make sure it is functioning correctly		
3	Recheck gear reducer oil level after initial priming and operation of cooler system		
4	Install all guarding		
5	Perform unloaded motor / gear reducer test run		
6	Operate until gear reducer oil sump temperature stabilizes and record maximum value		
7	Monitor bearing temperatures and record		
Clear Water Drive Train Run			
1	Installed pump bearing assembly breather (if applicable)		
2	Assemble and lubricate low speed coupling per instruction manual. Record alignment		
3	Verify low speed coupling bolt torque and record valve (ft-lbs)		
4	Install all guarding		
5	Final check all connections, guarding and valve positions		
6	Open suction valve to flood pump		
7	Check for any leaks in piping, connections or pump		
8	After ensuring the pump is flooded, start pump. Assembly must be run for a minimum of 4 hours before shutting off		
9	Monitor bearing temperatures. Record on sheet		
10	Monitor gear reducer oil sump temperature. Record on sheet		
Complete Hot Alignments			
1	Take readings to confirm the hot alignment meets manufactures requirements		
2	Record final hot alignments values in the attached sheet		



A.4 SPARE PARTS

When ordering spare parts, provide the pump model, serial number, part description and complete part numbers.

Spare parts for pumps consist of liners, impellers, bearings, shaft sleeves, seals and shaft seal parts. We recommend that sufficient spares are kept in stock based on expected wear life of each part to maximize operational availability of installed pumps. In larger plants we recommend that for every ten pumps of the same size to stock two completely new bearing assemblies. This enables a quick change out of the bearing assemblies leading to less down time.

NOTE: GENUINE PARTS

- Genuine parts and accessories are designed, tested and incorporated into the products to help ensure they maintain continued product quality and performance.
- As we do not test parts and accessories sourced from other vendors, the installation of such part and accessories may negatively affect the performance.
- The failure to properly select, install or use authorized parts and accessories is considered misuse. Damage by misuse is not covered warranty.
- Any modification of products or removal of original components may impair the safety of these products in their use.