

# Appendix E

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## Example Operational Checklists

This appendix contains the following checklists:

- [Prestart and Startup Checklist](#)
- [Pre-Operational Checklist - Equipment Test Report Form](#)

*These checklists are provided as informational only.*

**Note: This example checklist has not been reviewed or approved for wide use. It is provided as informational only. The engineer may use this information, but it should be thoroughly checked.**

### Prestart and Startup Checklist

**Contractor:** \_\_\_\_\_ **Pump Serial Number:** \_\_\_\_\_  
**Project Name:** \_\_\_\_\_ **Pump Model Number:** \_\_\_\_\_

Procedure	Yes	No	N/A	Comments
<b>1. SHIPMENT</b>				
Was there any damage in transit? (List)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all items received? (List)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>2. STORAGE</b>				
Has equipment been protected from the elements?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was equipment subject to flooding?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Have storage instructions been followed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>3. Installation</b>				
Were retaining fasteners, used in shipping, removed prior to installation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is grouting under base properly compacted?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is grouting of the non-shrink type?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Have proper anchor bolts been used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Have the bolts been properly tightened?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Have both the suction and discharge been checked for pipe strain?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are lube lines and seal water lines properly installed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are accessory items, RTD's, bearing temp detectors, vibration sensors, etc. mounted and properly installed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are lube lines purged of air and lubricant added? (pump and driver)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are all safety guards in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Have impellers been checked for proper clearance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>4. ALIGNMENT</b>				
Has the alignment of driver to pump been checked?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Have indicator readings been taken? (List)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>5. ROTATION</b>				
Has the rotation of drives been checked for correctness?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Has the coupling been turned to assure free				



MECHANICAL (cont.)

	Contractor		Vendor		Project Rep	
	Verified	Date	Verified	Date	Verified	Date
Seal Water System –						
Water available?						
Solenoid tested?						
Equipment rotates freely?						
Safety guards in place?						
Isolation valves operational?						
Check Valves Direction OK?						
Weights installed?						
Pressure Regulating Valve Set Point: Checked?						
Pressure Relief Valve Set Point: Checked?						
Surge Control Valve Operating Valves Orientation Correct?						
Open Set Point –						
Close Set Point –						
Emergency Close Set Point –						
Vibration monitors installed?						
Bearing temperature monitor installed?						
Manufacturer's Installation Certificate complete?						
O&M Manual information complete?						
Have all spare parts been turned over?						

**MECHANICAL (cont.)**

	<b>Contractor</b>		<b>Vendor</b>		<b>Project Rep</b>	
	Verified	Date	Verified	Date	Verified	Date
Pump curves available for test?						
Test fluid and discharge point established?						

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**ELECTRICAL (Circuit Ring-Out and High-Pot Tests)**

	<b>Contractor</b>		<b>Vendor</b>		<b>Project Rep</b>	
	Verified	Date	Verified	Date	Verified	Date
Circuits:						
Power: MCC to motor						
Control: Motor to HOA						
Indicators at MCC:						
Red (Running)						
Green (Power)						
Amber (Auto)						
Indicators at Local Control Panel						
Red (Running)						
Green (Power)						
Amber (Auto)						
Wiring labels complete?						
Nameplates:						
MCC						
Local Control Panel						
Pumps						
Remote Control Panel						
Equipment bumped for rotation?						

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**ELECTRICAL (Circuit Ring-Out and High-Pot Tests) (cont.)**

	<b>Contractor</b>		<b>Vendor</b>		<b>Project Rep</b>	
	Verified	Date	Verified	Date	Verified	Date

**PIPING SYSTEMS**

	<b>Contractor</b>		<b>Vendor</b>		<b>Project Rep</b>	
	Verified	Date	Verified	Date	Verified	Date
Cleaned and Flushed:						
Suction						
Discharge						
Construction screens and test plates removed?						
Pressure Tests						
Test PSI?						
Piping Supports: Has the support system been designed by an engineer?						
Calc's in the file?						
Support system complete?						
Pipe material and method of joining welded, treaded or flanged correct?						
Approved type of gasket material used?						
Temporary Piping Systems In Place –						

**INSTRUMENTATION AND CONTROLS**

	<b>Contractor</b>		<b>Vendor</b>		<b>Project Rep</b>	
	Verified	Date	Verified	Date	Verified	Date
Are loop-to-loop checkout requirements completed?						
Flow meter Calibration:						
Calibration Report No.						
Flow Recorder Calibrated:						
Against Transmitter						
VFD Speed Indicator Calibrated						
Against:						
Independent Reference:						
Discharge Over-Pressure:						
Switch Calibration						
PSI Setting						
Simulate Discharge Over-pressure:						
PSI Shutdown						
Simulate Emergency Stop Shutdown Signal -						

**RECOMMENDED**

\_\_\_\_\_  
Contractor Representative

\_\_\_\_\_  
Date

**ACCEPTED**

\_\_\_\_\_  
Project Representative

\_\_\_\_\_  
Date

## INITIAL OPERATION CHECKLIST - EQUIPMENT TEST REPORT FORM

Note: This example equipment test report is provided for the benefit of the Contractor and is not specific to any piece of equipment to be installed. The example is furnished, as a means of illustrating the level of detail required for the preparation of equipment test report forms. Check specific equipment specification and contract requirements to determine if an independent analysis for vibration or noise is required.

Equipment Name: \_\_\_\_\_

Equipment Number: \_\_\_\_\_

Specification Reference: \_\_\_\_\_

Location: \_\_\_\_\_

Design Data:

<b>HP:</b>	<b>GPM:</b>	<b>TDH:</b>	<b>RPM:</b>
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### INITIAL OPERATION CHECKLIST

#### MECHANICAL

	Contractor		Vendor		Project Rep	
	Verified	Date	Verified	Date	Verified	Date
Motor Operation						
Temperature						
Allowable -						
Actual -						
Pump Operating						
Temperature						
Allowable -						
Actual -						
Vibration Motor						
Allowable -						
Actual -						
Vibration Pump						
Allowable -						
Actual -						
Vibration Suction Pipe (2'						
out)						
Allowable -						



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Actual –

Vibration Discharge (2'  
out)

Allowable –

Actual –

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MECHANICAL (cont.)

	Contractor		Vendor		Project Rep	
	Verified	Date	Verified	Date	Verified	Date
Pump Operation:						
Measurement at design point						
Flow						
Pressure						
Test Gauge Number						
Test multiple point using attached pump test form						
Seal Water System Operational -						
Pressure Regulating Valve Downstream PSI -						
Pressure Relief Valve Open at -						
Surge Control Valve Operating Valves Orientation Correct –						
Open PSI –						
Open Time -						
Close PSI –						
Close Time -						
Emergency Close Time –						
Bearing Temperature Upper Bearing Temp –						
Lower Bearing Temp -						
Test Water Supply Check Volume –						
Test Water Discharge Check Location –						

Remarks:

**ELECTRICAL**

	Contractor		Vendor		Project Rep	
	Verified	Date	Verified	Date	Verified	Date
Local Switch Function:						
Runs in HAND						
No Control Power in OFF						
Remote Control in AUTO						
Overpressure Protection Switch:						
PSI Shutdown –						
Functional in both HAND and AUTO –						
Emergency Stop Operational –						

**OPERATIONAL TEST**

48-hour continuous test. Pump cycles as specified, indicators functional, controls functional, pump maintains capacity, over pressure protection remains functional, hour meter functional.

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	Contractor		Project Rep	
	Verified	Date	Verified	Date
If required, was independent vibration analysis performed?				
If performed, was it acceptable?				

**RECOMMENDED**

\_\_\_\_\_  
Contractor Representative

\_\_\_\_\_  
Date

**ACCEPTED**

\_\_\_\_\_  
Project Representative

\_\_\_\_\_  
Date

## POST-OPERATIONAL CHECKLIST - EQUIPMENT TEST REPORT FORM

Note: Continued use of equipment following initial testing may not occur and scheduled maintenance by the owner will likely not start until the facility passes performance testing. For this reason it is helpful to perform a Post Test Check to ensure pumping system integrity following initial operation. This example equipment test report is provided for the benefit of the Contractor and is not specific to any piece of equipment to be installed. The example is furnished, as a means of illustrating the level of detail recommended for the preparation of equipment post operational check forms.

Equipment Name: \_\_\_\_\_

Equipment Number: \_\_\_\_\_

Specification Reference: \_\_\_\_\_

Location: \_\_\_\_\_

Design Data:

<b>HP:</b>	<b>GPM:</b>	<b>TDH:</b>	<b>RPM:</b>
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### POST OPERATIONAL CHECKLIST

#### MECHANICAL

	Contractor		Vendor		Project Rep	
	Verified	Date	Verified	Date	Verified	Date
Lubrication						
Level -						
Pump Pedestal						
No Cracks –						
Motor/Pump Anchor Bolts						
Tight –						
No Cracks around Bolts-						
Seal Water System						
Operational -						
Equipment Rotates						
Freely -						
Motor Operation						
Temperature						
Actual –						
Pump Operating						
Temperature						
Actual –						
Vibration Motor						
Actual –						

MECHANICAL (cont.)

	Contractor		Vendor		Project Rep	
	Verified	Date	Verified	Date	Verified	Date
Vibration Pump Actual –						
Vibration Suction Pipe (2' out) Actual –						
Vibration Discharge (2' out) Actual –						
Pump Operation:						
Measurement at design point						
Flow						
Pressure						
Test Gauge Number						
Test multiple point using attached pump test form						
Surge Control Valve Operating Valves Orientation Correct –						
Open PSI – Open Time -						
Close PSI – Close Time -						
Emergency Close Time –						
Bearing Temperature Upper Bearing Temp –						
Lower Bearing Temp -						
Test Water Discharge Check Location –						
Has pump test information been transmitted to CMMS records?						

RECOMMENDED

\_\_\_\_\_  
Contractor Representative

\_\_\_\_\_  
Date

ACCEPTED

\_\_\_\_\_  
Project Representative

\_\_\_\_\_  
Date

rotation of pump and motor?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>6. SYSTEM</b>				
Has the system been checked to insure that it is free of foreign matter and purged of air which could damage the pump?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is liquid available to the pump?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Has assurance been obtained from responsible parties that all piping is secure and that the routing of flow has been established and is correct?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>7. START-UP</b>				
Has flow been established? Flow rate: _____GPM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Have gauge readings been taken? Suction Press: _____PSI Discharge Press: _____PSI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Has packing been adjusted to insure proper lubrication of packing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If pumps are equipped with mechanical seals, is the lubricating seal water pressure a constant 10 to 15 p.s.i., above the discharge of the pump?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is excessive vibration present?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is bearing operating temperature excessive?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>8. SAFETY</b>				
Have all safety warning labels been read and understood?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

\_\_\_\_\_  
INSTALLER

\_\_\_\_\_  
SUPERVISOR

\_\_\_\_\_  
DATE