

Centrifugal Pump Troubleshooting Guide

Table 4-6

Troubleshooting Guide -- Centrifugal Process Pumps

Symptoms												
Insufficient Disch. Pressure						Short Bearing Life						
Intermittent Operation			Short Mech. Seal Life			Vibration & Noise			Power Demand Excessive			
Insufficient Capacity			Vibration & Noise			Power Demand Excessive			Power Demand Excessive			
No Liquid Delivery			Vibration & Noise			Power Demand Excessive			Power Demand Excessive			
Possible Causes	#	A	B	C	D	E	F	G	H	#	Possible Remedies	
SUCTION PROBLEMS Pump Is Cavitating (Symptom For Liquid Vaporizing In Suction System) -Horizontal Pumps	1	2	1	1			9	1		1	* Check NPSHa/ NPSHr Margin * If Pump Is Above Liquid Level, Raise Liquid Level Closer To Pump * If Liquid Is Above Pump, Increase Liquid Level Elevation	
	2	1	1	1				1		2	* Lower Suction Pipe Or Raise Sump Level * Increase System Resistance	
	3	1		2						3	* Fill Pump And Suction Piping Complete With Liquid * Eliminate High Points In Suction * Remove All Non-Condensibles (Air From Pump, Piping and Valves) * Eliminate High Points In Suction Piping * Check For Faulty Foot Valve Or Check Valve	
HYDRAULIC SYSTEM Non-Condensibles In Liquid	4		2	3	1					4	* Check For Gas/Air Ingress Through Suction System/Piping * Install Gas Separation Chamber	
	5	3								5	* Refill Supply Tank	
	6		9		7			7		6	* Inspect And Clear	
Possible Causes	#	A	B	C	D	E	F	G	H	#	Possible Remedies	

Table 4-6 (cont.)

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Insufficient Disch. Pressure						Short Bearing Life						
Intermittent Operation			Short Mech. Seal Life			Vibration & Noise			Power Demand Excessive			
Insufficient Capacity			Vibration & Noise			Power Demand Excessive			Power Demand Excessive			
No Liquid Delivery			Vibration & Noise			Power Demand Excessive			Power Demand Excessive			
Possible Causes	#	A	B	C	D	E	F	G	H	#	Possible Remedies	
HYDRAULIC SYSTEM Strainer Partially Clogged	7		3							7	* Inspect And Clean	
	8	8	8						5	8	* Check For Damage And Clean	
	9	9								9	* Shut Down And Open Valves	
	10		7		5				4	10	* Heat Up Liquid To Reduce Viscosity * Increase Size Of Discharge Piping To Reduce Pressure Loss * Use Larger Driver Or Change Type Of Pump * Slow Pump Down	
	11									2	11	* Check Design Specific Gravity
HYDRAULIC SYSTEM Total System Head Lower Than Design Head Of Pump	12				4		11		3	12	* Increase System Resistance To Obtain Design Flow * Check Design Parameters Such As Impeller Size, Etc.	
	13	6	5	4			10	2		13	* Decrease System Resistance To Obtain Design Flow * Check Design Parameters Such As Impeller Size, Etc.	
MECHANICAL SYSTEM Unsuitable Pumps In Parallel Operation	14	7	6		6					14	* Check Design Parameters	
	15						1			15	* Check Mechanical Seal Selection Strategy	
Possible Causes	#	A	B	C	D	E	F	G	H	#	Possible Remedies	

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Table 4-6 (cont.)

Symptoms												
D Insufficient Disch. Pressure						E Short Bearing Life						
C Intermittent Operation						F Short Mech. Seal Life						
B Insufficient Capacity						G Vibration & Noise						
A No Liquid Delivery						H Power Demand Excessive						
Possible Causes	#	A	B	C	D	E	F	G	H	#	Possible Remedies	
Speed Too High	16								1	16	* Check Motor Voltage - Slow Down Driver	
Speed Too Low	17	4	4		2					17	* Consult Driver Troubleshooting Guide	
Wrong Direction Of Rotation	18	5			3				6	18	* Check Rotation With Arrow On Casing - Reverse Polarity On Motor	
Impeller Installed Backward (Double Suction Imp.)	19		10						12	19	* Inspect	
Misalignment	20					1	2	4	7	20	* Check Angular And Parallel Alignment Between Pump And Driver	
Casing Distorted From Excessive Pipe Strain	21					2	3	5		21	* Check For Misalignment * Check Pump For Wear Between Casing And Rotating Elements * Analyze Piping Loads	
Inadequate Grouting Of Base	22								6	22	* Check Grouting And Regrout If Required	
Bent Shaft	23					3	4	7	8	23	* Check Deflection (Should Not Exceed 0.002"). Replace Shaft And Bearings If Necessary	
Internal Wear	24				8				9	24	* Check Impeller Clearances	
Possible Causes	#	A	B	C	D	E	F	G	H	#	Possible Remedies	

MECHANICAL SYSTEM

Table 4-6 (cont.)

Symptoms												
D Insufficient Disch. Pressure						E Short Bearing Life						
C Intermittent Operation						F Short Mech. Seal Life						
B Insufficient Capacity						G Vibration & Noise						
A No Liquid Delivery						H Power Demand Excessive						
Possible Causes	#	A	B	C	D	E	F	G	H	#	Possible Remedies	
Mechanical Defects Worn, Rusted, Defective Bearings	25						5	8	10	25	* Inspect Parts For Defects - Repair Or Replace. Use Bearing Failure Analysis Guide * Check Lubrication Procedures	
Unbalance - Driver	26					5	7	9		26	* Run Driver Disconnected From Pump Unit - Perform Vibration Analysis	
Unbalance - Pump	27					4	6	3		27	* Investigate Natural Frequency	
Motor Troubles	28					6	8	10	11	28	* Consult Motor Troubleshooting Guide	
Possible Causes	#	A	B	C	D	E	F	G	H	#	Possible Remedies	

MECHANICAL SYSTEM



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