

Centrifugal Pump Troubleshooting Guide

Table 4-6

Troubleshooting Guide -- Centrifugal Process Pumps

Symptoms												Symptoms											
D Insufficient Disch. Pressure						Short Bearing Life						E											
C Intermittent Operation						Short Mech. Seal Life						F											
B Insufficient Capacity						Vibration & Noise						G											
A No Liquid Delivery						Power Demand Excessive						H											
Possible Causes												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									
	Insufficient Immersion Of Suction Pipe Or Bell (VertTurbinePump)	2	1	1	1							1	2	* Lower Suction Pipe Or Raise Sump Level * Increase System Resistance									
	Pump Not Primed	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									
	Supply Tank Empty	5	3										5	* Refill Supply Tank									
	Obstructions In Lines Or Pump Housing	6		9		7						7	6	* Inspect And Clear									
Possible Causes												Possible Remedies											

Table 4-6 (cont.)

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Possible Causes												Possible Remedies											
HYDRAULIC SYSTEM	Strainer Partially Clogged	7		3									7	* Inspect And Clean									
	Pump Impeller Clogged	8	8	8								5	8	* Check For Damage And Clean									
	Suction And/Or Discharge Valve(s) Closed	9	9										9	* Shut Down And Open Valves									
	Viscosity Too High	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									
	Specific Gravity Too High	11										2	11	* Check Design Specific Gravity									
MECHANICAL 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.										
	Total System Head Higher Than Design Head Of Pump	13	6	5	4			10	2			13	* Decrease System Resistance To Obtain Design Flow * Check Design Parameters Such As Impeller Size, Etc.										
	Unsuitable Pumps In Parallel Operation	14	7	6		6							14	* Check Design Parameters									
Improper Mechanical Seal	15							1				15	* Check Mechanical Seal Selection Strategy										
Possible Causes												Possible Remedies											

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Table 4-6 (cont.)

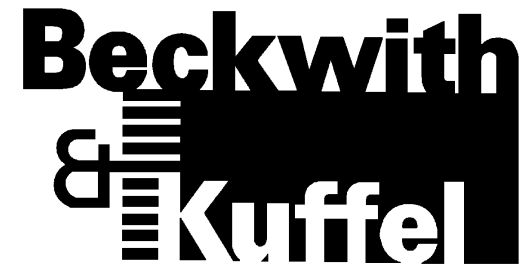
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Possible Causes	#	A	B	C	D	E	F	G	H	#	Possible Remedies	Possible Causes	#	A	B	C	D	E	F	G	H	#	Possible Remedies								
Speed Too High	16									1	16	* Check Motor Voltage - Slow Down Driver																			
Speed Too Low	17	4	4		2						17	* Consult 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						24	* Check Impeller Clearances																			
Possible Causes	#	A	B	C	D	E	F	G	H	#	Possible Remedies	Possible Causes	#	A	B	C	D	E	F	G	H	#	Possible Remedies								

MECHANICAL SYSTEM

Table 4-6 (cont.)

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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	Possible Causes	#	A	B	C	D	E	F	G	H	#	Possible Remedies								

MECHANICAL SYSTEM



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