Power Cube: Failure Modes and Trouble Shooting

	hydraulic failure						mechanical failure			
Cause	pump does not deliver liquid	pump does not deliver sufficient capacity	pump does not deliver sufficient pressure	pump delivers flow intermittently	bearings run hot and/ or fail on a regular basis	high rate of mechanical seal failure	packing has short life	pump vibrates at higher-than-normal levels	pump is drawing too much power	wear of internal wetted parts is accelerated
pump not primed or prime lost	X	X	X	X						
suction and/or discharge valves closed or clogged	X	X	X					X		
suction piping incorrect	X	X	X							
insufficient NPSH available*	X	X	X			X		X		X
excessive air entrapped in liquid	X	X	X	X						
RPM too low*	X	X	X							
incorrect rotation		X							X	
broken impeller or bent vanes		X	X		X			X		
incorrect impeller or impeller diameter		X	X							
system head too high		X								
instrumetns give erroneous readings		X	X							
air leaks in suction line				X						
excessive shaft misalignment					X	X		X		
inadequate lubrication					X					
lubricant contamination					X					
inadequate lubricant cooling					X					
axial thrust or radial loads higher than bearing rating					X					
improper coupling lubrication					X			X		
suction pressure too high					X	X				
bearing incorrectly installed					X	X		X		
impeller out of balance					X	X		X		
overheating of seal faces						X				
excessive shaft deflection					X	X		X		
lack of seal flush at seal faces						X				
incorrect seal installation						X				
pump is run dry						X				
pump is run off design point					X	X	X	X	X	
shaft/shaft sleeve worn						X	X			
packing gland not properly adjusted							X		X	
packing not properly installed							X			
impeller clogged	X							X		
coupling out of balance					X	X		X		
baseplate not installed properly					X	X		X		
pump operating speed too close to system's natural frequency								X		
bearing failure					X	X		X		
piping not properly anchored					X	X		X		
pump and/or driver not secured to baseplate					X	X		X		
specific gravity higher than specified					X	X			X	
viscosity higher than specified					X	X			X	
internal clearances too tight								X	X	
chemicals in liquid other than specified										X
pump assembled incorrectly			X		X	X	X	X		X
higher solids concentration than specified										X

NPSH = Net Positive Suction Head; difference between liquid pressure and vapor pressure at a certain temperature. Too little of it means your liquid is boiling.

RPM = Revolutions Per Minute; speed at which something turns. Too little of it means not spinning fast enough.