

Hemodynamic Simulator II (P09026)

Project/Product Risk Review (Rev. 3)

	Likelihood (1-5)	Severity (1-5)	RPN Total
Summary			
Number of 5's			92
Number of 4's	1	4	

#	Category / Tag	Risk	Description/Comment	Likelihood (1-5)	Severity (1-5)	Risk Priority Number	Mitigation Activity
1	Cost	Actuator Cost		2	3	6	6K budget,
2		Large volume of air in pneumatic actuation may add lag to system	Compression of air volume may create lag in the reaction between the fluid and air interface and demand too long of a stroke for the frequency require dof the cylinder	3	4	8	Design system with the air volume in mind and limit the air volume to eliminate risk of lag and overstroke
3		Actuator creates a negative pressure	Negative pressure created during retraction/filling	2	2	4	Control system or adding relief valve to system
4	Design	Water Column Inertia	During reversing water column will have inertia causing non-idealization	3	4	12	Build factor of safety and flexibility into system
5		Tank/Tubing Leak	Water leaks from the heart, tank, or tubing	2	3	6	Tight fittings, check to make sure all connections are sealed
6		Tank Pressure	Tank pressure does not meet the specs	1	3	8	Adjust the tank or water level to adjust the pressure
7	Materials	Actuator/Pump Inaccuracies	Actuator does not pump water at the desired rate	2	2	4	Adjust the programming until the desired waveform is reached
8	Measurement	Inaccurate measurements	inaccuracy of measurements improperly placed flow meters	1	2	2	Place the sensors where they will record the desired measurements
9		Assembly error	Connections not tight, tubes not connected to the correct ports	1	3	3	Check all connections before turning on power and testing the simulator
10		Labview errors	Trouble communicating between computer and sensors, not reading desired values	2	3	6	Debug software to ensure desired results
11	Methods	Overload Actuator	Put to much pressure on the actuator	1	4	4	Review actuator data sheet to make sure we do not use inputs that are too large
12	People	Water Spill	Caused by user error, loose connections, incorrect filling or draining	1	2	2	User must be careful when filling the tank and assembling the tubing
13	Scheduling	Lead time for actuator	Actuator takes long time to receive	3	3	9	Specify and order by week 6
14		Losses in System cause inaccuracies	Viscous fluid losses non-idealization	4	4	16	Build factor of safety and flexibility into system
15	Simulations	Air column resonance	Air may resonate during pulsation	1	2	2	Analyze system for resonance (Helmholtz resonance theory)