

Project:	15010
Date:	10/26/2014
Rev #:	B

ENGINEERING REQUIREMENTS

Rqmt. #	Importance	Source	Functional Decomposition Function	Detailed Function	Engr. Requirement	Unit of Measure	Marginal Value	Ideal Value
S1	9	CR1	Provide Safe Experience	Wheelchair remains in place on platform.	Wheelchair does not move on platform forwards, backwards or side ways once secured.	inches	0-0.5	0.25
S2	9	CR2	Provide Safe Experience/ Start Movement/Stop Movement	Platform can complete motion without hitting the ground.	Platform can complete motion within range of 2" to 12" off ground at rest.	inches	2.0-12.0	4
S3	9	CR2/ CR3/ CR12/ CR16	Provide Safe Experience/ Start Movement/Stop Movement	System accommodates for elongation or vertical movement of platform caused by increased weight	Platform can complete intended motion at increased weights.	lbs	400-800	750
S4	9	CR4	Stop Movement	Mechanism can come to a safe and comfortable stop that does not jolt user.	Wheel chair can reach 0 position with 0 velocity from max speed in under 1 minute.	seconds	60	45
S5	9	CR4/ CR11	Enter Swing/Provide Safe Experience/Start Movement/Stop Movement/Exit Swing:	Wheelchair swing may be operated safely by one volunteer/aide	Staff can operate swing an arm's length away from the path of motion.	inches	12	24+
S6	9	CR4	Start Movement/Stop Movement	Force to push swing will be equal to or less than the frictional force between the aid and ground.	Estimated force to push participant is at minimum 46.46 lbft and at maximum 425 lbft based on calculations so frictional force must be greater than or equal to that.	lbf	25-100	50
S7	3	CR6	Assemble Swing	Disassembled mechanism can fit through Arc's facility doors	When disassembled, pieces fit through approximately 5' x 7.5' space.	feet	5.5'x7'-6'X6	4'X4
S8	1	CR10/ CR9	Assemble Swing	Two Arc facilities management employees can move/assemble apparatus	When disassembled, pieces are less than 102 lbs each.	lbs	52-102	75
S9	9	CR7/ CR11/ CR4	Provide Safe Experience/ Start Movement/Stop Movement	Degree of motion enables vestibular stimulation but also does not endanger participant safety or aid safety	Has a swing motion of 30 degrees	degrees	15 - 45	30*
S10	9	CR8	Enter Swing/Provide Safe Experience/Exit Swing:	Platform accommodates both standard and powered wheelchairs	Platform is 40" wide by 50" long	inches	>30 X >50	40 X 50
S11	3	CR11	Stop Movement	Braking system can be safely operated by aid.	Braking system is within 24" (arm length) of the aid at all times throughout operation	inches	12"-36"	24
S12	9	CR14	Provide Safe Experience/ Start Movement/Stop Movement	Swing will not exceed a safe swinging velocity	Swing will not exceed a speed of 12 feet per second	feet/second	12sec-3sec	5
S13	9	CR14	Provide Safe Experience	One volunteer/aide can load participant onto swing	Loading participant onto swing will not require a force above 50 lbf	lbf	<50	40
S14	9	CR2/ CR4/ CR9/ CR11/ CR13	Provide Safe Experience	Swing will not threaten the occupant or aid's safety	Complies with OSHA and ADA and Architectural and Transportation Barriers Compliance Board (ADAAG) requirements. 1:16 maximum slope	Ratio	None	1:12
S15	9	CR16	All functions rely on budget constraints	Budgetary Measure	Costs less than \$2,500	dollars	<2500	2000

* Action Item: Requirement is based on educated engineering assumptions but can be further verified