

***Characteristics and Comparisons of
Roller Coaster Launching Systems:
Hydraulic, Magnetic, and Friction Wheel***

Compiled Coaster Physics Data

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Senior Science Project 2016

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Top Thrill Dragster

Cedar Point, Ohio



Launch system	Hydraulic
Number of hydraulic pumps	32 pumps
Top velocity	120 mph
Max hill height	420 feet
Acceleration of launch	13.5 meters/sec
Force of launch	94,170 Newtons
Power of launch	2,533,733 Watts
G-force of launch	1.80 G's

Kingda Ka

Six Flags Great Adventure, New Jersey



Launch system	Hydraulic
Number of hydraulic pumps	40 pumps
Top velocity	128 mph
Max hill height	456 feet
Acceleration of launch	16.3 meters/sec
Force of launch	108,395 Newtons
Power of launch	3,110,888 Watts
G-force of launch	1.66 G's

Formula Rossa

Ferrari World, United Arab Emirates



Launch system	Hydraulic
Number of hydraulic pumps	48 pumps
Top velocity	149 mph
Max hill height	170 feet
Acceleration of launch	16.3 meters/sec
Force of launch	114,542 Newtons
Power of launch	3,826,626 Watts
G-force of launch	1.80 G's

Xcelerator

Knott's Berry Farm, California



Launch system	Hydraulic
Number of hydraulic pumps	25 pumps
Top velocity	82 mph
Max hill height	205 feet
Acceleration of launch	16.0 meters/sec
Force of launch	111,913 Newtons
Power of launch	2,057,587 Watts
G-force of launch	1.62 G's

Zaturn

Space World, Japan



Launch system	Hydraulic
Number of hydraulic pumps	25 pumps
Top velocity	80 mph
Max hill height	205 feet
Acceleration of launch	15.6 meters/sec
Force of launch	112,303 Newtons
Power of launch	2,014,396 Watts
G-force of launch	1.58 G's

Stealth

Thorpe Park, England



Launch system	Hydraulic
Number of hydraulic pumps	30 pumps
Top velocity	80 mph
Max hill height	205 feet
Acceleration of launch	18.9 meters/sec
Force of launch	135,945 Newtons
Power of launch	2,438,480 Watts
G-force of launch	1.91 G's

Storm Runner

Hersheypark, Pennsylvania



Launch system	Hydraulic
Number of hydraulic pumps	23 pumps
Top velocity	72 mph
Max hill height	150 feet
Acceleration of launch	16.1 meters/sec
Force of launch	113,004 Newtons
Power of launch	1,824,288 Watts
G-force of launch	1.51 G's

Superman Escape from Krypton

Six Flags Magic Mountain, California



Launch system	LSM
Magnetic area	458 Ft ²
Top velocity	100 mph
Max hill height	370 feet
Acceleration of launch	9.0 meters/sec
Force of launch	27,354 Newtons
Power of launch	613,324 Watts
G-force of launch	1.01 G's

Full Throttle

Six Flags Magic Mountain, California



Launch system	LSM
Magnetic area	460 Ft ²
Top velocity	70 mph
Max hill height	160 feet
Acceleration of launch	9.0 meters/sec
Force of launch	34,4049 Newton
Power of launch	675,662 Watts
G-force of launch	1.10 G's

Helix

Liseberg, Sweden



Launch system	LSM
Magnetic area	461 Ft ²
Top velocity	62 mp
Max hill height	135 feet
Acceleration of launch	7.0 meters/sec
Force of launch	48,655 Newtons
Power of launch	676,366 Watts
G-force of launch	0.70 G's

iSpeed

Mirbilandia, Italy



Launch system	LSM
Magnetic area	503 Ft ²
Top velocity	62 mph
Max hill height	180 feet
Acceleration of launch	12.6 meters/sec
Force of launch	53,078 Newtons
Power of launch	737,854 Watts
G-force of launch	1.28 G's

Blue Fire

Europa Park, Germany



Launch system	LSM
Magnetic area	737 Ft ²
Top velocity	62 mph
Max hill height	125 feet
Acceleration of launch	11.1 meters/sec
Force of launch	77,848 Newtons
Power of launch	1,082 185 Watts
G-force of launch	1.30 G's

Cheetah Hunt

Busch Gardens Tampa, Florida



Launch system	LSM
Magnetic area	460 Ft ²
Top velocity	60 mph
Max hill height	130 feet
Acceleration of launch	9.0 meters/sec
Force of launch	50,224 Newton
Power of launch	675,662 Watts
G-force of launch	0.91 G's

Thunderbird

Holiday World, Indiana



Launch system	LSM
Magnetic area	579 Ft ²
Top velocity	60 mph
Max hill height	140 feet
Acceleration of launch	7.7 meters/sec
Force of launch	57,655 Newtons
Power of launch	775,632 Watts
G-force of launch	0.78 G's

Rock N Rollercoaster

Disney's Hollywood Studios, Florida



Launch system	LSM
Magnetic area	529 Ft ²
Top velocity	57 mph
Max hill height	80 feet
Acceleration of launch	9.1 meters/sec
Force of launch	76,682 Newtons
Power of launch	980,012 Watts
G-force of launch	0.93 G's

Verbolten

Busch Gardens Williamsburg, Virginia



Launch system	LSM
Magnetic area	359 Ft ²
Top velocity	53 mph
Max hill height	88 feet
Acceleration of launch	7.9 meters/sec
Force of launch	44,365 Newtons
Power of launch	527,204 Watts
G-force of launch	0.80 G's

Mr. Freeze Reverse Blast

Six Flags St. Louis, Missouri and Six Flags Over Texas, Texas



Launch system	LIM
Magnetic area	618 Ft ²
Top velocity	70 mph
Max hill height	160 feet
Acceleration of launch	8.3 meters/sec
Force of launch	57,824 Newtons
Power of launch	907,551 Watts
G-force of launch	0.84 G's

Volcano

Kings Dominion, Virginia



Launch system	LIM
Magnetic area	537 Ft ²
Top velocity	70 mph
Max hill height	155 feet
Acceleration of launch	9.0 meters/sec
Force of launch	50,224 Newtons
Power of launch	788,272 Watts
G-force of launch	0.83 G's

Batman and Robin: The Chiller

Six Flags Great Adventure, New Jersey



Launch system	LIM
Magnetic area	507 Ft ²
Top velocity	65 mph
Max hill height	140 feet
Acceleration of launch	7.3 meters/sec
Force of launch	51,009 Newtons
Power of launch	743,404 Watts
G-force of launch	0.74 G's

California Screamin

Disney's California Adventure, California



Launch system	LIM
Magnetic area	553 Ft ²
Top velocity	62 mph
Max hill height	70 feet
Acceleration of launch	7.0 meters/sec
Force of launch	58,386 Newton
Power of launch	811,639 Watts
G-force of launch	0.70 G's

Flight of Fear

Kings Island, Ohio and Kings Dominion, Virginia



Launch system	LIM
Magnetic area	340 Ft ²
Top velocity	54 mph
Max hill height	74 feet
Acceleration of launch	6.1 meters/sec
Force of launch	41,166 Newtons
Power of launch	498,421 Watts
G-force of launch	0.61 G's

Jet Rescue

Sea World Gold Coast, Australia



Launch system	Friction Wheel
Launch distance	30 meters
Top velocity	44 mph
Max hill height	130 feet
Acceleration of launch	6.6 meters/sec
Force of launch	65,770 Newtons
Power of launch	648,850 Watts
G-force of launch	0.50 G's

Incredible Hulk

Universal's Islands of Adventure, Florida



Launch system	Friction Wheel
Launch distance	18 meters
Top velocity	40 mph
Max hill height	70 feet
Acceleration of launch	4.5 meters/sec
Force of launch	100,448 Newtons
Power of launch	900,883 Watts
G-force of launch	0.91 G's

FireChaser Express

Dollywood, Tennessee



Launch system	Friction Wheel
Launch distance	9 meters
Top velocity	20 mph
Max hill height	70 feet
Acceleration of launch	4.5 meters/sec
Force of launch	36,099 Newtons
Power of launch	161,877 Watts
G-force of launch	0.45 G's