

SIGMA STRUT™

SIGMA STRUT™ is Park Electrochemical Corp.'s patented composite strut. The SIGMA STRUT design provides significant weight savings compared to metal struts and other composite struts. The SIGMA STRUT utilizes a unique metal end fitting which is co-cured into each end of the strut without the use of adhesives. This technique allows the fittings to carry the full load of the strut body without having to rely on bond areas to carry shear loads as with typical designs. The end fittings can be threaded internally to receive a metal rod end attachment, or can be designed to fit other specific applications. Since these end fittings use no adhesive, they are not as susceptible to failure at high or low temperatures outside the capability range of some bonding materials.

SIGMA STRUTS can be used in either tension or compression and have been used to support loads up to 240,000 lbs. SIGMA STRUTS have been tested to temperatures ranging from -150°F to 400°F.

These light-weight struts can be custom designed for specified load, length and fitting size requirements. A typical two foot long, 10,000 pound tension strut weighs only 130 grams (0.28 pounds). Current SIGMA STRUT designs range from 6 inches to over 12 feet in length.



SIGMA STRUTS on NASA's Max Launch Abort System ("MLAS") test vehicle. The struts indicated by the arrows are 11 feet in length.



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WEIGHT SAVINGS OF SIGMA STRUTS VERSUS METAL STRUTS

Part Number	Ultimate Load (lbs)		Dimensions (inches)			Weight (lbs)		
	Max Axial (Tension)	Min Axial (Compression)	Tube Length	Strut Diameter (ref)	Rod End Thread Diameter	Typical Metal Strut Weight	SIGMA STRUT™ Weight	Weight Savings
1	12,000	-12,000	61	3.00	3/8	8.3	2.0	6.3
2	500	-2,000	51	2.00	3/8	3.0	0.6	2.4
3	2,700	-20,000	63	3.00	1/2	8.5	2.7	5.9
4	4,000	-15,000	68	3.00	1/2	8.9	2.8	6.1
5	6,000	-25,000	62	3.00	5/8	8.5	2.8	5.7
6	20,000	-15,000	95	3.00	5/8	11.0	4.4	6.6
7	20,000	-35,000	55	3.00	5/8	8.0	3.1	4.9
8	6,000	-30,000	66	3.00	5/8	8.7	3.8	4.9
9	80,000	-15,000	75	5.00	1	15.7	5.5	10.1
10	70,000	-70,000	71	5.00	1	14.9	7.9	7.0
11	150,000	-145,000	48	5.00	1.5	11.0	7.4	3.6

ABOUT PARK

Park Electrochemical Corp. is a global advanced materials company which develops and manufactures high-technology digital and RF/microwave printed circuit materials principally for the telecommunications and internet infrastructure and high-end computing markets and advanced composite materials, parts and assemblies principally for the aerospace markets. Park's core capabilities are in the areas of polymer chemistry formulation and coating technology. The Company's manufacturing facilities are located in Singapore, China, France, Connecticut, Kansas, Arizona and California. The Company also maintains R&D facilities in Arizona, Kansas and Singapore.

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