



Properties of Plastic Screws

• The Abbreviations, Names, and Heat Resistance

Temperature of Plastics

Abbreviation	Name	Heat Resistance Temperature
VESPEL*	SP-1	288°C
	SCP-5000	350°C
PEEK	Polyetheretherketone	260°C
PTFE	Tetrafluoroethylene	260°C
PPS	Polyphenylene Sulfide	200°C
H-PVC	Hard Polyvinyl Chloride	35°C
RENY*	RENY	105°C
PC	Polycarbonate	115°C
PP	Polypropylene	65°C
PVDF	Polyvinylidene Fluoride	150°C
POM	Polyacetal	95°C
PFA	Perfluoroalkoxy Alkane	260°C

•The heat resistance temperatures in the chart are for the plastic material. The max. operating temperature of the product changes with performance conditions such as tightening torque.

*VESPEL is a registered trademark of DuPont.

RENY is a registered trademark of Mitsubishi Engineering-Plastics Corporation.

• Selection Criteria for Plastic Screws

Strength	RENY>PPS>VESPEL (SCP-5000)>PEEK>VESPEL (SP-1)>PC>POM>PVDF>PP>H-PVC>PFA>PTFE	From tensile strength data
Heat Resistance	VESPEL (SCP-5000)>VESPEL (SP-1)>PEEK · PTFE · PFA>PPS>PVDF>PC>RENY>POM>PP>H-PVC	From heat resistance temperature
Chemical Resistance	PTFE>PFA>PVDF>H-PVC · PP>PEEK>PPS>PC>VESPEL (SCP-5000)>VESPEL (SP-1)>RENY>POM	From chemical resistance data

• Physical Properties

Properties	Test Method	Unit	VESPEL SP-1	VESPEL SCP-5000	PEEK	PTFE	PPS	RENY	PC	PP	PVDF	POM	PFA
Tensile Strength	D638	N/mm ²	86	160	97	24	185	285	62	36	57	60	28
Tensile Elongation	D638	%	7.5	7	65	200 - 400	1.9	2.1	110	500	70 - 80	60	88
Flexural Strength	D790	N/mm ²	110	247	156	—	255	380	88.2	—	75	90	—
Flexural Modulus	D790	GPa	3.1	5.7	4.1	0.56	13.2	17.4	2.3	1.5	1.99	2.58	0.48
Izot Impact (with Notch)	D256	J/m	42.7	—	94	160	100	110	880	30	160 - 375	63	No fracture
Rockwell Hardness	D785	R and M Scales	M90	M100	M99	—	M100	M111	R120	R100	R93 - 116	M80	—
Deflection Temp. under Load (1.82 MPa)	D648	°C	360	350	152	—	260	234	135	120	80	110	—
Flame Class	UL94	—	V-0	V-0	V-0	V-0	V-0	HB	V-2	HB	V-0	HB	V-0
Dielectric Constant (10 ⁶ Hz)	D150	—	3.6	3.3	3.3	<2.1	4.6	4.0	2.9	—	10	3.7	<2.1
Dielectric Loss Tangent (10 ⁶ Hz)	D150	—	0.0034	0.001	0.003	<0.0002	0.002	0.009	0.009	—	0.015	0.007	0.0003
Volume Resistivity (× 10 ¹⁴)	D257	Ω·m	1 - 10	1	4.9	>100	1.0	1.3	4.0	1.0	0.1 - 1	1	>100
Dielectric Breakdown Strength	D149	MV/m	22	—	17	19	12	32	16	31	300	19	20
Arc Resistance	D495	sec	—	—	23	>300	120	129	120	—	—	240	>300
Specific Gravity	D792	—	1.43	1.43	1.30	2.14 - 2.2	1.66	1.65	1.20	0.91	1.79	1.41	2.15
Water Absorption (in 23 °C Water for 24 h)	D570	%	0.240	0.080	0.500	0.010	0.015	0.140	0.150	0.010	0.030	0.22	0.01
Glass Fiber Content	—	%	—	—	—	—	40	50	—	—	—	—	—

•Values in chart are for reference only. They are not guaranteed values.

• Physical Properties (H-PVC)

Properties	Test Method (JIS)	Unit	H-PVC
Tensile Strength	JISK7162	Test Speed : 10mm/min	N/mm ² 38.8
Tensile Elongation	JISK7162	Test Speed : 10mm/min	% 188
Hardness	JISK7215	10 seconds later (2 mm thickness 3 sheets overlaid)	Hs 97
Specific Gravity	JISK7112	Method A	— 1.32

•Values in chart are for reference only. They are not guaranteed values.



Precautions for Plastic Screws

- While these plastics screws comply with JIS and ISO standards, there are some areas irrelevant to these screws as their manufacturing methods differ from that of metal screws.
- The values in the mechanical properties chart are reference values.
- Use a torque driver or torque wrench when tightening.
- Always carry out tests under performance conditions similar to actual conditions in advance.
- The color of machine screws, bolts, nuts, and washers may differ by lot.

• Chemical Resistance

Chemical Name	VESPEL SP-1	VESPEL SCP-5000	PEEK	PTFE	PPS	H-PVC	RENY	PC	PP	PVDF	POM	PFA
10% Hydrochloric Acid	○	○	○	○	○	○	×	○	○	○	×	○
10% Sulfuric Acid	○	○	○	○	○	○	×	○	○	○	×	○
50% Sulfuric Acid	×	△	×	○	×	○	×	△	—	○	×	○
10% Nitric Acid	△	△	○	○	○	○	×	○	○	○	×	○
50% Nitric Acid	×	×	×	○	×	△	×	△	—	○	×	○
10% Hydrofluoric Acid	△	△	—	○	△	△	×	○	○	○	×	○
50% Hydrofluoric Acid	×	×	×	○	×	△	×	△	△	△	×	○
Phosphoric Acid	—	—	○	○	△	○	×	○	○	○	×	○
Formic Acid	△	△	△	○	○	△	×	○	○	○	×	○
Phosphoric Acid	○	○	○	○	○	○	×	○	○	○	△	○
Citric Acid	○	○	○	○	○	○	△	○	○	○	△	○
Chromic Acid	—	—	○	○	△	○	×	○	○	○	×	○
Boric Acid	○	○	○	○	○	○	△	○	○	○	—	△
Methyl Alcohol	△	△	○	○	○	○	—	△	—	○	○	○
Glycol	○	○	○	○	○	—	—	○	—	—	○	○
Ammonia	×	△	○	○	○	○	○	×	○	○	×	○
10% Sodium Hydroxide	×	△	○	○	○	○	○	—	○	○	△	○
10% Potassium Hydroxide	×	△	○	○	△	○	○	×	○	○	△	○
Calcium Hydroxide	—	—	○	○	△	○	×	○	○	○	○	○
Water	○	○	○	○	○	○	△	○	○	○	○	○
Hydrogen Sulfide (Gas)	—	—	○	○	○	—	○	○	○	○	△	○
Sulfur Dioxide	—	—	○	○	△	—	○	○	○	—	○	○
Ammonium Nitrate	—	—	○	○	○	—	○	○	○	○	△	○
Sodium Nitrate	—	—	○	○	○	—	○	×	○	○	△	○
Calcium Carbonate	—	—	○	○	○	—	○	×	○	○	○	○
Calcium Chloride	—	—	○	○	○	○	○	○	○	○	○	○
Magnesium Chloride	—	—	○	○	○	○	○	○	○	○	○	○
Magnesium Sulfate	—	—	○	○	○	—	○	○	○	○	○	○
Zinc Sulfate	—	—	○	○	○	—	○	○	○	○	△	○
Hydrogen peroxide	△	△	○	○	△	○	△	○	○	○	×	○

○Usable

△Usable under certain conditions

×Non-usable

•A test piece was used to acquire the test data at room temperature (23°C). Chemical resistance changes with performance conditions. Always carry out tests under performance conditions similar to actual conditions in advance.

• Torsional Rupture Torque of Plastic Screws (N · m)

	VESPEL SP-1	VESPEL SCP-5000	PEEK	PPS	RENY	PC	PP	PVDF	PFA
M1.7	—	—	0.038	—	0.041	0.022	—	—	—
M2	—	—	0.071	0.084	0.101	0.055	—	—	—
M2.6	—	—	0.15	—	0.22	0.12	—	—	—
M3	0.12	0.21	0.21	0.29	0.36	0.18	—	0.11	—
M4	0.27	0.47	0.47	0.69	0.85	0.39	0.22	0.26	0.06
M5	0.54	0.98	0.96	1.23	1.65	0.8	0.39	0.44	0.1
M6	0.95	1.65	1.64	2.05	2.74	1.2	0.69	0.81	0.2
M8	2.26	4.04	3.68	5.48	6.22	3.2	1.58	1.56	0.44
M10	—	—	7.9	8.87	11.39	—	3.32	3.16	—
M12	—	—	13.64	13.7	15.93	—	5.36	5.73	—
M16	—	—	—	—	38.9	—	—	—	—

•Values in chart are for reference only. They are not guaranteed values. The recommended torque is 50% of the value in the chart. The value differs depending on the head shape of the screw. See the product page for details.