Puget Sound ROPE

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PLASMA® 12 STRAND

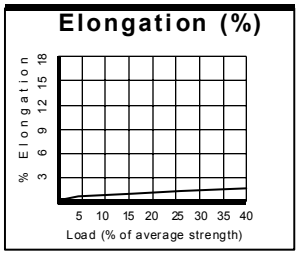
Plasma® 12 strand is the highest strength synthetic rope available. *Plasma*® 12 strand is manufactured from Honeywell Spectra® Fiber that has been enhanced by Puget Sound Rope's patented recrystallization process. This process is especially effective in medium to large diameter ropes where strengths are over 50% higher and creep is significantly less than that of standard Spectra® 12 strand.

Plasma® 12 strand comes standard with a polyurethane finish and is easily spliced using a simple lockstitch type splice, 4-3-2 or 5-4-3 Tuck splice. Its soft, torque free braided construction provides easy handling.

- **Highest strength**
- **Lowest stretch**
- **Low creep**
- **Soft hand**
- **Torque free**
- **Easy splicing**
- **Floats**

	Nominal Diameter		Size Number	Approximate Weight		Minimum Tensile Strength	
	Inch	MM	(circ)	Lbs/100ft	Kg/100m	Pounds	kN
12 STRAND	.04	1	.12	.05	0.1	270	1.2
	.05	1.25	.15	.07	0.1	390	1.7
	.06	1.5	.18	.1	0.1	475	2.1
	.07	1.75	.21	.14	0.2	750	3.3
	.1	2.5	.3	.27	0.4	1,400	6.2
	1/8	3	3/8	.54	0.8	2,800	12.5
	3/16	5	9/16	1.12	1.7	5,500	24.5
	1/4	6	3/4	1.6	2.4	8,000	35.6
	5/16	8	15/16	2.5	3.7	11,700	52.0
	3/8	9	1-1/8	3.7	5.5	17,500	77.8
	7/16	11	1-1/4	4.2	6.3	21,000	93.4
	1/2	12	1-1/2	6.4	9.5	31,300	139.2
	9/16	14	1-3/4	7.9	11.8	37,900	168.6
	5/8	16	2	10.6	15.8	51,400	228.6
	3/4	18	2-1/4	13.3	19.8	68,500	304.7
	13/16	20	2-1/2	15.9	23.7	74,000	329.2
	7/8	22	2-3/4	19.6	29.2	92,600	411.9
	1	24	3	23.4	34.8	110,000	489.3
	1-1/8	28	3-1/2	31.9	47.5	147,000	653.9
	1-1/4	30	3-3/4	36.2	53.9	165,000	734.0
	1-5/16	32	4	41.7	62.1	196,000	871.9
	1-1/2	36	4-1/2	51.7	76.9	221,000	983.1
12 X 12 STRAND	1-9/16	38	4-3/4	57.8	86.0	245,000	1089.9
	1-5/8	40	5	65.7	97.8	291,000	1294.4
	1-3/4	44	5-1/2	78.4	116.7	314,000	1396.7
	2	48	6	91.4	136	355,000	1579.1
	2-1/8	52	6-1/2	109	162.2	428,000	1903.8
	2-1/4	56	7	122	181.6	481,000	2139.6
	2-1/2	60	7-1/2	148	220.2	530,000	2357.7
	2-5/8	64	8	167	248.5	596,000	2651.1
	2-3/4	68	8-1/2	187	278.3	660,000	2935.8
	3	72	9	214	318.5	780,000	3469.6
	3-1/8	76	9-1/2	235	349.7	850,000	3780.8
	3-1/4	80	10	261	388.4	940,000	4181.3
	3-5/8	88	11	324	482.2	1,250,000	5560.3
	4	96	12	394	586.4	1,520,000	6761.3

Tensile Strengths are determined in accordance with Cordage Institute 1500, Test Methods for Fiber Rope. Weights are calculated at linear density under standard preload ($200d^2$) plus 4%. See reverse side for application and safety information.



Specific gravity	0.98
Melting point	284° F (140° C)
Critical temp.	150° F (65° C)
Coefficient of friction	0.09-0.12
Elongation at break	4%-5%
Fiber water absorption	0%
UV resistance	moderate
Wet abrasion	superior
Dry abrasion	superior

Certificate 33149
ABS Quality Evaluations, Inc. Management System Certification
ISO 9001

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Inspection Guidelines for Plasma® Synthetic Ropes

Puget Sound Rope Company

Plasma ropes have been used extensively in numerous diverse applications for many years. Over this time period, particular operating conditions and hazards have been identified which are more harmful to Plasma than to steel. The presence of these conditions can best be determined by periodic inspection of the lines. This guideline presents recommendations for conducting periodic inspection by the end user

Conditions to be avoided in Plasma Lines

There are three areas where close attention needs to be paid to Plasma lines. Below are descriptions of these conditions and likely signs of their presence.

1. Repeated lateral abrasion against sharp edges. While HMPE is one of the most cut-resistant polymers available, metal can prove to be stronger than Plasma in a long-duration abrasion event. Signs of excess abrasion include strand pullouts, heavy fuzzing and cut strands in a single area, and localized bunching. It should be noted that normal light fuzzing of the Plasma rope surface is to be expected in normal use. This light fuzzing does not reduce the rated strength of the line, and actually creates a protective layer on the rope that helps to prevent further damage.

2. Plasma begins to lose strength above about 160 ºF, and has a zero-strength temperature around 250 ºC. Signs of high temperature damage include, melting, fused strands, and significantly reduced diameter. The fused strands should not be confused with high-tension compression of the rope which might appear similar. With standard urethane coatings, the rope can appear melted after high tension has been applied while the rope is bent around a surface. This is normally not melting and can be worked out with little effort. The rope strength is not affected.

3. Plasma lines can lose strength if overstrained. This can be the result of exceeding the recommended design factor for an extended time period, or by instantaneous peak loads during dynamic loading events. A typical design factor is 5:1, but this should be determined in conjunction with the application engineer. Signs of overstraining can be subtle but include localized thinning and elongation, and loss in flexibility (for example the rope becomes rigid).

Inspection Guidelines for Plasma Rope

Below are some suggestions for inspecting Plasma for the above damage conditions. Each end user should develop their own method of routinely inspecting these lines for damage prior to heavy use. The method and frequency of inspection will depend on the end users experience and usage level.

1. Lay rope out under hand tension so the entire length can easily viewed.

2. Visually inspect the entire length of rope for signs of abrasion, heavy fuzzing, stiff regions, fused or melted regions or thinned areas. Make note of any damaged areas.

3. Relate any damage to service over hardware for possible situation remedies.

4. Monitor for overloading. To accomplish this, put a small (less than 10% of break load) but repeatable load on the line. In subsequent inspections a similar load should be applied again, so determine a method that will give approximately the same load each time. Put a bright mark on the line at a point just beyond the tail of the splice (one suggestion is to use a bright colored ribbon through one or two strands of he rope). Put another bright colored mark (or ribbon) approximately 20 feet down rope from first mark.). These marks will be a reference for future measurements and should be located securely. While under reference tension, using a flexible tape measure, measure the length between reference marks. Write down this reference length and compare it to previous or subsequent measurements.

5. Keep a detailed record of the line reference length as well as any damage areas and their approximate locations relative to one or both reference marks. Future inspections should be used to monitor minor damage areas for signs of growth.

Inspection Frequency

The end user should determine the frequency of rope inspections. For heavy use, the rope should be carefully inspected prior to each day's use. The user should also perform a quick visual inspection (without length measurement) prior to any use of the rope.

Rope Replacement:

Ropes that show severe damage should be replaced, repaired (damaged areas cut out and re-spliced), or down-rated to other applications. Examples of severe damage in Plasma rope include (but are not limited to):

a. More than 2 strands severed within a 2-foot segment

b. Fused segment that is no longer flexible (strands not separable)

c. Segment whose diameter is 20% less than other part of the rope

d. Melting on one side that fuses one or more strands together

e. Rope that has lengthened (between reference marks) by more than 10%

Note: It has been found that cleaners/degreasers containing d'Limonene (citrus based cleaners) can rapidly deteriorate HMPE based ropes. Avoid contact with this chemical.

Each end user will determine through experience which signs of damage are more indicative of impending failure. (For example, the critical damage mode of a rope that fails in service might be identified if the location of the break can be traced to damage noted in a prior inspection.)

Plasma represent a significant technological breakthrough in high strength lifting lines; however, as with any synthetic fiber rope product, Plasma lines have a much better chance of meeting expectations when coupled with careful maintenance and periodic inspection.

Chemical Resistance

Strength Retention After Chemical Immersion

	Plasma®		Aramid	
	6 Mos.	2 Yrs	6 Mos.	2 Yrs
SeaWater	100%	100%	100%	98%
Hydraulic Fluid	100%	100%	100%	87%
Kerosene	100%	100%	100%	97%
10% Detergent Solution	100%	100%	91%	*
Gasoline	100%	100%	93%	*
Toluene	100%	96%	72%	*
Glacial Acetic Acid	100%	100%	82%	*
1M Hydrochloric Acid	100%	100%	40%	*
5M Sodium Hydroxide	100%	100%	42%	*
Ammonium Hydroxide (29%)	100%	100%	70%	*
Perchloroethylene	100%	100%	75%	*
Clorox Bleach	91%	73%	0%	0%

** Samples Not Tested Due to Physical Deterioration*

Honeywell Performance Fibers
Targeted Technologies • Intelligent Solutions