Frost | Productions

Rope and Rigging Info Packet

Here is some information about the characteristics, ratings and possible factors that can degrade a NYLON rope.

Frost Rope Kits:
Remember to take care of these kits at the warehouse and out in the field on site for installs and strikes (someone's life could depend on it!). Rope Kits should always be packed & put back in the pelican case after using and rigging gear/ropes should NEVER be left on the ground (rigging gear/ropes can get damaged and become faulty). Repacking packing rope kits on site after being not only protect the gear it will help deture freelance staff, vendors or anyone from taking the gear or just getting lost. So if you spec' gear it is your responsibility to protect and keep track of the gear, along with anyone who uses or packs the gear too.

Working Loads:
No blanket safe working load (SWL) recommendations can be made for any line because SWL's must be calculated based on application, conditions of use, and potential danger to personnel among other considerations. It is recommended that the end user establish working loads and safety factors based on best practices established by the end user's industry; by professional judgment and personal experience; and after thorough assessment of all risks. The SWL is a guideline for the use of a rope in good condition for non-critical applications and should be reduced where life, limb, or valuable property is involved, or in cases of exceptional service such as shock loading, sustained loading, severe vibration, etc. The Cordage Institute specifies that the SWL of a rope shall be determined by dividing the Minimum Tensile Strength of the rope by a safety factor. The safety factor ranges from 5 to 12 for non-critical uses and is typically set at 15 for life lines.

Sheaves:
Recommended sheave diameter to rope diameter is 8:1.

Sunlight/UV:
Very little degradation from sunlight. Can be used outside over long term if inspected regularly.

Chemicals:
Nylon will degrade with strong oxidizing agents, mineral acids, and 90% formic acid. May discolor when exposed to high levels of carbon dioxide. Polyester has good resistance to most chemicals, except 95% sulfuric acid and strong alkalines at boil.

Heat:
Nylon melts at 460F with progressive strength loss above 300F. Polyester melts at 480F with progressive strength loss above 300F.

Dielectrics:
Good resistance to the passage of electrical current. However, dirt, surface contaminants, water entrapment, and the like can significantly affect dielectric properties. Extreme caution should be exercised any time a rope is in the proximity of live circuits.

Frost | Productions

Rope and Rigging Info Packet

Rope Rating Chart:

Rope Size		Breaking Strength		Weight		Rec'd safe working loads 3.5:1		5:1	
in.	mm	lbs	kg	lbs/ft	kg/m	lbs	kg	lbs	kg
1/4	6	6800	3091	0.12	.17	1943	883	1360	618
5/16	8	10540	4791	0.18	.27	3011	1369	2108	958
3/8	9	15100	6864	0.26	.39	4314	1961	3020	1373
7/16	12	20400	9273	0.35	.52	5829	2649	4080	1855
1/2	13	26600	12091	0.46	.69	7600	3455	5320	2418
5/8	15	41200	18727	0.72	1.07	11771	5351	8240	3745
3/4	19	58800	26727	1.04	1.55	16800	7636	11760	5345
7/8	22	79600	36182	1.42	2.12	22743	10338	15920	7236
1	25	103400	47000	1.85	2.76	29543	13429	20680	9400
1 1/8	28	130000	59091	2.34	3.49	37143	16883	26000	11818
1 1/4	28	159800	72636	2.89	4.31	45657	20753	31960	14527
1 3/8	28	192000	87273	3.50	5.22	54857	24935	38400	17455

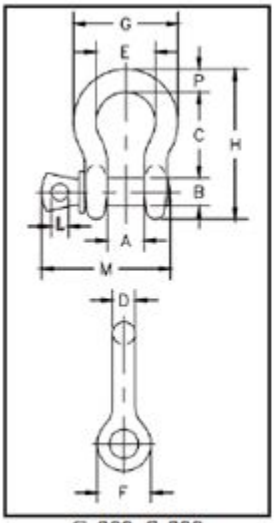
For further information on ropes, rope handling, and the mechanical advantages of using ropes and associated hardware please see:
https://www.ropeinc.com/rope-glossary-terms.html
http://www.ropebook.com/information/pulley-systems

The following page includes charts for shackle and spanset ratings.

Frost | Productions

Rope and Rigging Info Packet

Shackle Rating Chart:



G-209 S-209

Nominal Size (in.)	Working Load Limit (t)*	Stock No.		Weight Each (lbs.)	Dimensions (in.)											Tolerance +/-	
		G-209	S-209		A	B	C	D	E	F	G	H	L	M	P	C	A
3/16	1/3	1018357	-	.06	.38	.25	.88	.19	.60	.56	.98	1.47	.16	1.14	.19	.06	.06
1/4	1/2	1018375	1018384	.10	.47	.31	1.13	.25	.78	.61	1.28	1.84	.19	1.43	.25	.06	.06
5/16	3/4	1018393	1018400	.19	.53	.38	1.22	.31	.84	.75	1.47	2.09	.22	1.71	.31	.06	.06
3/8	1	1018419	1018428	.31	.66	.44	1.44	.38	1.03	.91	1.78	2.49	.25	2.02	.38	.13	.06
7/16	1-1/2	1018437	1018446	.38	.75	.50	1.69	.44	1.16	1.06	2.03	2.91	.31	2.37	.44	.13	.06
1/2	2	1018455	1018464	.72	.81	.63	1.88	.50	1.31	1.19	2.31	3.28	.38	2.69	.50	.13	.06
5/8	3-1/4	1018473	1018482	1.37	1.06	.75	2.38	.63	1.69	1.50	2.94	4.19	.44	3.34	.69	.13	.06
3/4	4-3/4	1018491	1018507	2.35	1.25	.88	2.81	.75	2.00	1.81	3.50	4.97	.50	3.97	.81	.25	.06
7/8	6-1/2	1018516	1018525	3.62	1.44	1.00	3.31	.88	2.28	2.09	4.03	5.83	.50	4.50	.97	.25	.06
1	8-1/2	1018534	1018543	5.03	1.69	1.13	3.75	1.00	2.69	2.38	4.69	6.56	.56	5.13	1.06	.25	.06
1-1/8	9-1/2	1018552	1018561	7.41	1.81	1.25	4.25	1.16	2.91	2.69	5.16	7.47	.63	5.71	1.25	.25	.06
1-1/4	12	1018570	1018589	9.50	2.03	1.38	4.69	1.29	3.25	3.00	5.75	8.25	.69	6.25	1.38	.25	.06
1-3/8	13-1/2	1018598	1018605	13.53	2.25	1.50	5.25	1.42	3.63	3.31	6.38	9.16	.75	6.83	1.50	.25	.13
1-1/2	17	1018614	1018623	17.20	2.38	1.63	5.75	1.54	3.88	3.63	6.88	10.00	.81	7.33	1.62	.25	.13
1-3/4	25	1018632	1018641	27.78	2.88	2.00	7.00	1.84	5.00	4.19	8.86	12.34	1.00	9.06	2.25	.25	.13
2	35	1018650	1018669	45.00	3.25	2.25	7.75	2.08	5.75	4.81	9.97	13.68	1.22	10.35	2.40	.25	.13
2-1/2	55	1018678	1018687	85.75	4.13	2.75	10.50	2.71	7.25	5.69	12.87	17.84	1.38	13.00	3.13	.25	.25

* NOTE: Maximum Proof Load is 2.0 times the Working Load Limit. Minimum Ultimate Strength is 6 times the Working Load Limit.

Spanset Rating Chart:

Colourcoded according to DIN-EN 1492-1	Working Load Limits with 1 webbing sling							Working Load Limits with 1 webbing sling			
	Straight lift	Choked lift	0-7	Bis 7°	7°-45°	45°-60°	45°-60°	Straight lift 45°	Choked Lift up to 45°	Straight lift 45°-60°	Choked lift 45°-60°
											
	1,0	0,8	2,0	1,4	1,0	0,7	0,5	1,4	1,12	1,0	0,8
WLL 1t	1000	800	2000	1400	1000	700	500	1400	1120	1000	800
WLL 2t	2000	1600	4000	2800	2000	1400	1000	2800	2240	2000	1600
WLL 3t	3000	2400	6000	4200	3000	2100	1500	4200	3360	3000	2400
WLL 4t	4000	3200	8000	5600	4000	2800	2000	5600	4480	4000	3200
WLL 5t	5000	4000	10000	7000	5000	3500	2500	7000	5600	5000	4000
WLL 6t	6000	4800	12000	8400	6000	4200	3000	8400	6720	6000	4800
WLL 8t	8000	6400	16000	11200	8000	5600	4000	11200	8960	8000	6400
WLL 10t	10000	8000	20000	14000	10000	7000	5000	14000	11200	10000	8000
WLL 12t	12000	9600	24000	16800	12000	8400	6000	16800	13440	12000	9600