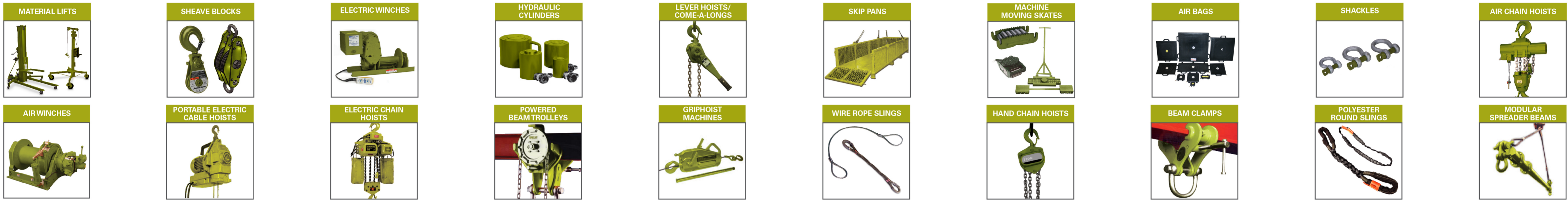


# AMPLIFY YOUR INVENTORY WITH OUR EXTENSIVE LINE OF GEAR INCLUDING



## Rigging Hardware

### Sling Tension & Load Angles

**HORIZONTAL SLING ANGLES OF LESS THAN 30 DEGREES ARE NOT RECOMMENDED. REFER TO ANSI B30.9 FOR FULL INFORMATION.**

**LOAD ANGLE FACTORS**

HORIZONTAL SLING ANGLE (A) DEGREE	LOAD ANGLE FACTOR = L/H
90	1.000
60	1.155
50	1.305
45	1.414
30	2.000

LOAD ON EACH LEG OF SLING = VERTICAL SHARE OF LOAD X LOAD ANGLE FACTOR

**SLING TENSION**

LOAD ON SLING (S1 + S2)  
TENSION 1 = LOAD X D2 X S1 / (HD1 + D2)  
TENSION 2 = LOAD X D1 X S2 / (HD1 + D2)

LOAD ON SLING (S1 + S2)  
TENSION 1 = LOAD X D2 X S1 / (HD1 + D2)  
TENSION 2 = LOAD X D1 X S2 / (HD1 + D2)

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## Rigging Hardware

### Slings - Load Factors

**Effect of Angle Chart**

Tension Factor (TF)	Angle From Horizontal	Reduction Factor (RF)
1.000	90°	1.000
1.155	60°	0.866
1.414	45°	0.707
2.000	30°	0.500

Slings capacity decreases as the angle from horizontal decreases. Sling angles of less than 30° are not recommended.

**BASKET HITCH**

ANGLE (A)	CAPACITY % OF SINGLE LEG
90	200%
60	170%
45	140%
30	100%

A BASKET HITCH HAS TWICE THE CAPACITY OF A SINGLE LEG ONLY IF D1 & D2 RATIO IS 25/1 AND THE LEGS ARE VERTICAL.

**CHOKER HITCH**

A CHOKER HITCH HAS 75% OF THE CAPACITY OF A SINGLE LEG WHEN THE CORNERS ARE PROTECTED AND THE ANGLE OF THE CHOKE IS GREATER THAN 120°.

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## Rigging Hardware

### Center of Gravity / Weight of Material

**CENTER OF GRAVITY AND SLING LOADING**

WHEN LIFTING VERTICALLY, THE LOAD WILL BE SHARED EQUALLY IF THE CENTER OF GRAVITY IS PLACED EQUALLY BETWEEN THE PICK POINTS.

IF THE WEIGHT OF THE LOAD IS 10,000 LBS, THEN EACH SLING WILL HAVE A LOAD OF 5,000 LBS. AND EACH SHACKLE AND EYEBOLT WILL ALSO HAVE A LOAD OF 5,000 LBS.

**WEIGHT = VOLUME X UNIT WEIGHT OF MATERIAL**

UNIT WEIGHT STEEL = 490 LBS/FT<sup>3</sup>  
UNIT WEIGHT ALUMINUM = 165 LBS/FT<sup>3</sup>  
UNIT WEIGHT REINFORCED CONCRETE = 150 LBS/FT<sup>3</sup>  
UNIT WEIGHT WOOD (FIR-WET) = 50 LBS/FT<sup>3</sup>  
UNIT WEIGHT WATER = 62 LBS/FT<sup>3</sup>  
UNIT WEIGHT WET SAND AND GRAVEL = 120 LBS/FT<sup>3</sup>

**VOLUME OF CUBE = HEIGHT X WIDTH X LENGTH**

**CENTER OF GRAVITY AND SLING LOADING**

WHEN THE CENTER OF GRAVITY IS NOT EQUALLY SPACED BETWEEN THE PICK POINTS, THE SLING AND FITTINGS WILL NOT CARRY AN EQUAL SHARE OF THE LOAD. THE SLING CLOSEST TO THE CENTER OF GRAVITY WILL CARRY THE GREATEST SHARE OF THE LOAD.

SLING 1 = W x D2 / (D1 + D2)  
SLING 2 = W x D1 / (D1 + D2)

**WEIGHT = VOLUME X UNIT WEIGHT OF MATERIAL**

**VOLUME OF SPHERE**  
V = (4/3) x 3.14 x r<sup>3</sup>

**VOLUME OF CYLINDER**  
V = 3.14 x r<sup>2</sup> x H

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## Rigging Hardware

### Level & Incline Planes

**LEGEND**

W – Weight of load  
CF – Coefficient of friction  
F – Force required to move load  
H – Height in feet  
R – Run, horizontal distance in feet  
L – Length of ramp in feet

**Level:** CF x W = F

**Uphill:** [(CF x W x (R/L)) + ((H/L) x W)] = F

**Downhill:** [(CF x W x (R/L)) - ((H/L) x W)] = F

**COEFFICIENTS OF FRICTION**

Material	Coefficient	Material	Coefficient
Load on air	≤0.01	Cast Iron on Steel	0.25
Load on wheels	0.05	Wood on Metal	0.30
Steel on Steel	0.10	Leather on Metal	0.40
Continuous Lubricated	0.15	Manila Rope on	0.40
		Wood on Concrete	0.45
		Wood on Wood	0.50
		Metal on Concrete	0.60
		Concrete on	0.65

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## Rigging Hardware

### Links / Turnbuckles

**LINKS AND RINGS**

W/ GRADE 80 ALLOY STEEL CHAIN MATERIAL

P-6830 WITH FLAT PART FOR CONNECTING GRADE 80 CHAIN SLINGS P-6820

WLL (tons)	P-6830 Diameter	P-6820 Diameter
1.5	511"	—
2.5	—	629"
3.2	629"	—
3.5	—	708"
4.5	708"	—
6.2	787"	—
6.5	—	866"
8.2	866"	—
8.5	—	984"
10	—	1102"
10.6	984"	—
12.8	1102"	—
13	—	1181"
15.5	1181"	—
17	—	1417"
20	1417"	—
25	1496"	—
27	—	1772"
30	1772"	—
37	1772"	—
40	—	1989"
50	1989"	—
60	—	2283"
63	2165"	—
80	2756"	—
100	—	3151"
125	3151"	—

**TURNBUCKLES**

USE LOCKNUTS OR MOUSING TO PREVENT THE TURNBUCKLES FROM ROTATING. THIS METHOD IS MOST EFFECTIVE.

SIZE	WLL EYE AND EYE (tons) 5/1 DESIGN FACTOR	WLL HOOK AND HOOK (tons) 5/1 DESIGN FACTOR
3/8	.54	.54
1/2	1	.68
5/8	1.59	1.02
3/4	2.36	1.36
7/8	3.27	1.81
1	4.54	2.27
1-1/4	6.9	2.95
1-1/2	9.71	3.4
1-3/4	12.7	—
2-1/2	22.2	—
2-3/4	34	—

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## Rigging Hardware

### Shackles / Hooks

SHACKLES	SCREW COLLAR PIN / SAFETY BOLT		HOOKS		LARGE EYE			
DIAMETER OF BOW (INCHES)	WORKING LOAD LIMIT (TONS)	INSIDE WIDTH AT PIN (INCHES)	DIAMETER OF PIN (INCHES)	WLL (tons) Carbon Steel, GR A54 4	WLL (tons) Alloy Steel, Grade 8	Headroom Length (in) a	Opening Width (in) d	Weight (lbs)
1/2	2	7/8	5/8	0.8	1.25	3.22	0.787	0.59
5/8	3.25	1-1/16	3/4	1	1.6	3.66	0.866	0.88
3/4	4.75	1-7/32	7/8	1.6	2.5	4.05	0.905	1.21
7/8	6.5	1-13/32	1	2	3.2	4.72	1.06	1.82
1	8.5	1-11/16	1-1/8	3.2	5.4	5.78	1.37	4.18
1-1/8	9.5	1-27/32	1-1/4	5	8.2	7.36	1.69	7.71
1-1/4	12	2	1-3/8	7.5	12.8	9.05	2.08	15.21
1-3/8	13.5	2-1/4	1-1/2	10	16	10.07	2.28	23.14
1-1/2	17	2-3/8	1-5/8	15	22	12.51	3.07	38.58
1-3/4	25	2-29/32	2					
2	35	3-9/32	2-1/4					
2-1/4	42.5	3-3/4	2-9/16					
2-1/2	55	4-1/8	2-3/4					
3*	85	5	3-1/4					

\*Available in Safety Bolt Shackles

**SCREW COLLAR SAFETY**

**CARBON STEEL GRADE 4**

**ALLOY STEEL GRADE 8**

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