

Liftcrane Boom

Extended Upper Point Capacities

MLC650 SERIES 1

Boom No. B40:680-681-682

with 24.9 ft Extended Upper Boom Point
440,900 lb VPC (Variable Position Counterweight)
360 Degree Rating



LIFTING CAPACITIES: Lifting capacities for various boom lengths and operating radii are for freely suspended loads and may be based on percent of static tipping or strength of structural components. Capacities shown are for boom point or extended upper boom point and their respective operating radii.

Weight of all load blocks, hooks, weight ball, slings, hoist lines, etc., beneath sheaves is considered part of load. Boom is not to be lowered beyond radii where combined weights are greater than rated capacity. Where no capacity is shown, operation is not intended or approved.

BOOM BACKWARD STABILITY: Capacities indicated by (b) require 8,000 lb minimum weight and (c) require 13,000 lb minimum weight. **Caution: Do not operate in areas indicated by (b) or (c) without required minimum weights.** Boom will not lower and boom hoist wire rope may go slack causing wire rope damage or failure.

OPERATING CONDITIONS: Machine to operate on a firm, level, and uniformly supporting surface. Refer to Boom Rigging No. 81022863, Wire Rope Specification chart No. 9368-A, Counterweight Arrangement chart No. 9349-A, and Wind Conditions chart No. 9370-A. Crane operator judgment must be used to allow for dynamic load effects of swinging, hoisting or lowering, travel, wind conditions, as well as adverse operating conditions and physical machine depreciation. Refer to Operator's Manual for operating guidelines.

MACHINE TRAVEL: Machine to travel on a firm, level, and uniformly supporting surface. Boom must be within boom angle range shown in capacity chart. Refer to Maximum Allowable Travel Specification chart No. 9367-A.



EXTENDED UPPER BOOM POINT OPERATING RADIUS: Extended upper boom point operating radius is horizontal distance from axis of rotation to center of vertical hoist line or load block.



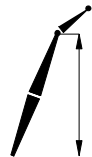
BOOM POINT OPERATING RADIUS: Boom point operating radius is horizontal distance from axis of rotation to center of vertical hoist line or load block on boom point.



BOOM ANGLE: Boom angle in degrees (°) is angle between horizontal and centerline of boom butt and inserts, and is an indication of operating radius. In all cases, operating radius shall govern capacity.



EXTENDED UPPER BOOM POINT ELEVATION: Extended upper boom point elevation is vertical distance from ground level to centerline of extended upper boom point shaft.



BOOM POINT ELEVATION: Boom point elevation is vertical distance from ground level to centerline of boom point shaft.

MACHINE EQUIPMENT: Machine equipped with 36 ft 6 in. crawlers, 60 in. or 80 in. treads, 36 ft 1 in. live mast, 30 part boom hoist reeving, boom support straps, and 440,900 lb VPC.

Luffing Jib Backstay Deduct	
Boom Length	Deduct
144.4 ft	3,400 lb
164.0 ft	3,400 lb
183.7 ft	5,900 lb
203.4 ft	5,900 lb
223.1 ft	8,400 lb
242.8 ft	8,400 lb
252.6 ft	8,400 lb
262.5 ft	8,400 lb
272.3 ft	8,400 lb
282.2 ft	8,400 lb
Deduct the appropriate value from capacities when luffing jib backstays are stored on boom.	

Upper Boom Point (upper sheave) Capacity for Liftcrane Service - Whip Line	
Drum 1 or 3	
1 Part	2 Parts
30,000 lb	60,000 lb
In all cases upper boom point (upper sheave) capacities cannot exceed those listed for extended upper boom point.	

Boom Point Capacity for Liftcrane Service - Whip Line	
Drum 1	Drum 3
1 Part	
48,800 lb	30,000 lb
2 Parts	
97,600 lb	60,000 lb
3 Parts	
146,400 lb	90,000 lb
4 Parts	
195,200 lb	120,000 lb

Refer to **Tables 1 and 2** (with luffing jib backstays stored) and **Tables 3 and 4** (without luffing jib backstays stored) for raising ability with the maximum weight of all load blocks, hooks, weight balls, slings, and hoist lines beneath boom point and/or extended upper boom point (lower or upper sheaves). For block weights shown with #, load blocks, hooks, weight balls, and slings must remain on ground until combined weights are within rated capacity of chart. Raising is not permitted in shaded areas of table.

Caution: Combined weight beneath boom point and/or extended upper boom point (lower or upper sheaves) must not exceed block weight shown.

Raising With Block and With Luffing Jib Backstays

Table 1

Over End or Side of Crawlers	
Boom Length	Block Weight
144.4 ft	22,800 lb
164.0 ft	22,800 lb
183.7 ft	22,800 lb
203.4 ft	22,800 lb
223.1 ft	22,800 lb
242.8 ft	9,400 lb
252.6 ft	#
262.5 ft	#
272.3 ft	Raising Not Permitted
282.2 ft	
292.0 ft	

Table 2

Over End of Blocked Crawlers	
Boom Length	Block Weight
144.4 ft	22,800 lb
164.0 ft	22,800 lb
183.7 ft	22,800 lb
203.4 ft	22,800 lb
223.1 ft	22,800 lb
242.8 ft	22,800 lb
252.6 ft	9,400 lb
262.5 ft	9,400 lb
272.3 ft	#
282.2 ft	#
292.0 ft	Raising Not Permitted

Raising With Block and Without Luffing Jib Backstays

Table 3

Over End or Side of Crawlers	
Boom Length	Block Weight
144.4 ft	22,800 lb
164.0 ft	22,800 lb
183.7 ft	22,800 lb
203.4 ft	22,800 lb
223.1 ft	22,800 lb
242.8 ft	17,700 lb
252.6 ft	9,400 lb
262.5 ft	#
272.3 ft	#
282.2 ft	Raising Not Permitted
292.0 ft	

Table 4

Over End of Blocked Crawlers	
Boom Length	Block Weight
144.4 ft	22,800 lb
164.0 ft	22,800 lb
183.7 ft	22,800 lb
203.4 ft	22,800 lb
223.1 ft	22,800 lb
242.8 ft	22,800 lb
252.6 ft	22,800 lb
262.5 ft	17,700 lb
272.3 ft	9,400 lb
282.2 ft	#
292.0 ft	#

Explanation of Symbols

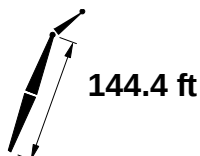
	Boom No. B40:680-681-682
	VPC (Variable Position Counterweight)
	360 Degree Rating
	Boom Length
	Extended Upper Boom Point Offset Angle
	Extended Upper Boom Point Operating Radius (see page 1)
	Boom Point Operating Radius (see page 1)
	Boom Angle (see page 1)
	Extended Upper Boom Point Elevation (see page 1)
	Boom Point Elevation (see page 1)
	Lifting Capacities (see page 1)



440,900 lb

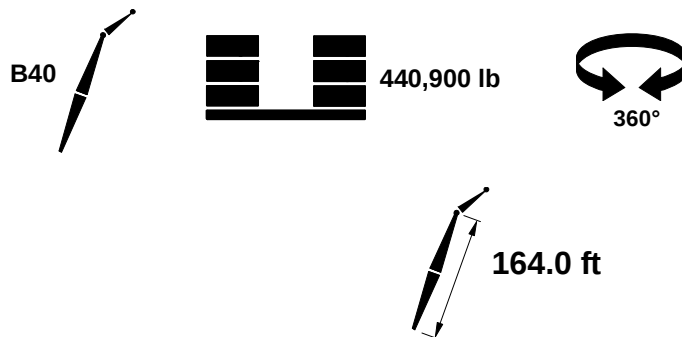


360°



144.4 ft

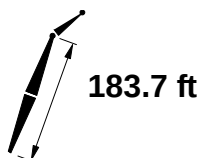
28°						35°					
ft	ft	ft	ft	°	lb	ft	ft	ft	ft	°	lb
32	176.4	22.6	151.9	84.8	292,800 c						
33	176.2	23.5	151.8	84.5	292,800 c						
34	176.1	24.3	151.7	84.1	292,800 c	34	175.2	22.3	152.0	85.0	292,800 c
35	175.9	25.2	151.6	83.8	292,800 c	35	175.0	23.1	151.8	84.6	292,800 c
36	175.7	26.0	151.4	83.5	292,800 c	36	174.8	24.0	151.7	84.3	292,800 c
37	175.5	26.9	151.3	83.1	292,800 b	37	174.6	24.9	151.6	83.9	292,800 b
38	175.3	27.7	151.2	82.8	292,800 b	38	174.4	25.7	151.5	83.6	292,800 b
40	174.9	29.5	150.9	82.1	292,800 b	40	174.0	27.4	151.2	82.9	292,800 b
45	173.8	33.7	150.1	80.3	292,800 b	45	172.8	31.7	150.5	81.1	292,800 b
50	172.5	38.0	149.1	78.6	292,800	50	171.5	36.1	149.6	79.4	292,800
55	171.0	42.3	148.0	76.8	292,800	55	170.0	40.4	148.5	77.6	292,800
60	169.4	46.6	146.8	75.0	292,800	60	168.4	44.7	147.4	75.8	292,800
65	167.5	50.9	145.4	73.2	292,800	65	166.6	49.1	146.0	74.0	292,800
70	165.5	55.2	143.9	71.4	284,500	70	164.6	53.4	144.5	72.1	284,800
75	163.3	59.5	142.2	69.5	260,800	75	162.4	57.8	142.9	70.2	261,000
80	161.0	63.8	140.3	67.6	240,600	80	160.0	62.1	141.1	68.3	240,800
85	158.4	68.1	138.3	65.7	223,300	85	157.3	66.5	139.1	66.4	223,500
90	155.6	72.5	136.1	63.7	208,200	90	154.5	70.9	136.9	64.5	208,400
95	152.5	76.8	133.6	61.8	195,000	95	151.4	75.3	134.5	62.4	195,100
100	149.2	81.1	131.0	59.7	183,300	100	148.1	79.7	131.9	60.4	183,400
105	145.7	85.5	128.2	57.6	172,800	105	144.6	84.1	129.1	58.3	173,000
110	141.8	89.8	125.0	55.5	163,500	110	140.7	88.6	126.0	56.1	163,600
115	137.7	94.2	121.7	53.3	155,100	115	136.5	93.0	122.7	53.9	155,200
120	133.2	98.6	118.0	51.0	145,400	120	132.0	97.5	119.0	51.6	146,000
125	128.3	103.0	114.1	48.6	136,500	125	127.0	101.9	115.0	49.2	137,100
130	123.0	107.4	109.7	46.1	128,400	130	121.7	106.4	110.7	46.7	128,900
135	117.2	111.8	105.0	43.5	121,000	135	115.8	111.0	105.9	44.0	121,400
140	110.8	116.2	99.7	40.8	114,000	140	109.3	115.5	100.6	41.2	114,400
145	103.8	120.7	93.9	37.8	107,600	145	102.1	120.1	94.7	38.2	107,900
150	95.8	125.2	87.3	34.6	101,600						
155	86.7	129.7	79.7	31.1	96,000						



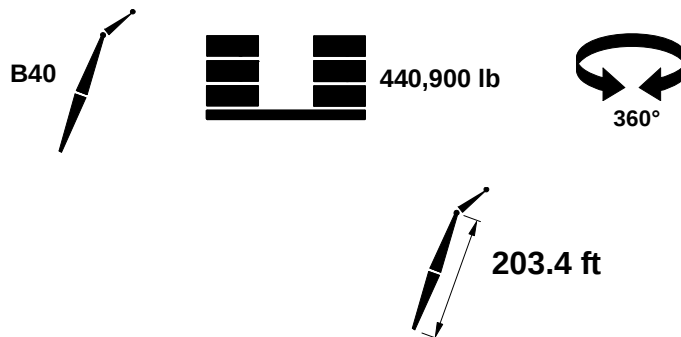
28°						35°					
	ft		ft		ft		ft		ft		lb
34	196.0	24.6	171.4	84.8	292,800 b						
35	195.8	25.4	171.3	84.5	292,800 b						
36	195.7	26.3	171.2	84.2	292,800 b	36	194.7	24.2	171.5	84.9	292,800 b
37	195.5	27.2	171.1	83.8	292,800 b	37	194.5	25.1	171.3	84.6	292,800 b
38	195.3	28.1	170.9	83.5	292,800 b	38	194.4	26.0	171.2	84.3	292,800 b
39	195.1	28.9	170.8	83.2	292,800 b	39	194.2	26.8	171.1	84.0	292,800 b
40	194.9	29.8	170.7	82.9	292,800 b	40	194.0	27.7	171.0	83.7	292,800 b
45	193.9	34.2	170.0	81.4	292,800	45	193.0	32.1	170.3	82.1	292,800
50	192.8	38.5	169.1	79.8	292,800	50	191.8	36.5	169.5	80.5	292,800
55	191.5	42.9	168.1	78.2	292,800	55	190.5	40.9	168.6	78.9	292,800
60	190.0	47.2	167.0	76.6	292,800	60	189.0	45.3	167.5	77.3	292,800
65	188.4	51.6	165.8	75.0	292,800	65	187.4	49.7	166.3	75.7	292,800
70	186.6	55.9	164.4	73.4	287,100	70	185.7	54.1	165.0	74.1	287,400
75	184.7	60.3	162.9	71.8	263,200	75	183.7	58.5	163.5	72.5	263,500
80	182.6	64.7	161.2	70.1	242,900	80	181.6	62.9	161.9	70.8	243,100
85	180.4	69.1	159.4	68.5	225,400	85	179.3	67.4	160.1	69.1	225,600
90	177.9	73.5	157.4	66.8	210,200	90	176.9	71.8	158.2	67.4	210,400
95	175.3	77.9	155.3	65.0	196,900	95	174.2	76.3	156.1	65.7	197,000
100	172.5	82.3	153.0	63.3	185,100	100	171.4	80.7	153.9	63.9	185,200
105	169.4	86.7	150.5	61.5	174,600	105	168.3	85.2	151.4	62.1	174,700
110	166.2	91.1	147.9	59.7	164,900	110	165.1	89.6	148.8	60.3	165,300
115	162.7	95.5	145.0	57.8	154,300	115	161.6	94.1	146.0	58.4	155,100
120	159.0	99.9	141.9	55.9	144,600	120	157.8	98.6	142.9	56.5	145,400
125	155.0	104.4	138.6	54.0	135,800	125	153.8	103.1	139.6	54.5	136,500
130	150.7	108.8	135.1	52.0	127,700	130	149.4	107.6	136.0	52.5	128,300
135	146.0	113.3	131.2	49.9	120,300	135	144.8	112.2	132.2	50.4	120,800
140	141.1	117.7	127.1	47.7	113,400	140	139.7	116.7	128.1	48.2	113,900
145	135.7	122.2	122.6	45.5	107,000	145	134.3	121.3	123.6	46.0	107,500
150	129.9	126.7	117.7	43.2	101,100	150	128.4	125.8	118.7	43.6	101,500
155	123.6	131.2	112.4	40.7	95,600	155	122.0	130.4	113.3	41.1	95,900
160	116.6	135.7	106.6	38.1	90,400	160	115.0	135.1	107.4	38.5	90,700
165	109.0	140.2	100.1	35.3	85,500	165	107.2	139.7	100.9	35.7	85,800
170	100.3	144.8	92.8	32.3	80,900						
175	90.5	149.4	84.4	28.9	76,600						



440,900 lb



28°						35°					
ft	ft	ft	ft	°	lb	ft	ft	ft	ft	°	lb
35	215.7	25.7	191.1	85.0	292,800						
36	215.6	26.6	191.0	84.7	292,800						
37	215.4	27.4	190.9	84.4	292,800						
38	215.2	28.3	190.8	84.2	292,800	38	214.3	26.2	191.0	84.8	292,800
39	215.1	29.2	190.7	83.9	292,800	39	214.1	27.1	190.9	84.5	292,800
40	214.9	30.1	190.5	83.6	292,800	40	214.0	28.0	190.8	84.3	292,800
41	214.7	31.0	190.4	83.3	292,800	41	213.8	28.9	190.7	84.0	292,800
42	214.6	31.8	190.3	83.0	292,800	42	213.6	29.7	190.6	83.7	292,800
45	214.0	34.5	189.9	82.2	292,800	45	213.0	32.4	190.2	82.9	292,800
50	212.9	38.9	189.1	80.8	292,800	50	212.0	36.9	189.5	81.4	292,800
55	211.8	43.3	188.2	79.4	292,800	55	210.8	41.3	188.6	80.0	292,800
60	210.5	47.8	187.2	77.9	292,800	60	209.5	45.7	187.7	78.6	292,800
65	209.0	52.2	186.1	76.5	292,800	65	208.0	50.2	186.6	77.1	292,800
70	207.4	56.6	184.8	75.1	290,700	70	206.5	54.7	185.4	75.7	291,000
75	205.7	61.0	183.4	73.6	266,400	75	204.7	59.2	184.0	74.2	266,700
80	203.9	65.5	181.9	72.1	245,800	80	202.9	63.6	182.6	72.7	246,100
85	201.8	69.9	180.3	70.6	228,100	85	200.8	68.1	181.0	71.2	228,300
90	199.7	74.3	178.6	69.1	212,700	90	198.7	72.6	179.3	69.7	212,900
95	197.4	78.8	176.7	67.6	199,200	95	196.3	77.1	177.4	68.2	199,400
100	194.9	83.2	174.6	66.1	187,300	100	193.8	81.6	175.4	66.7	187,400
105	192.2	87.7	172.4	64.5	174,200	105	191.1	86.1	173.2	65.1	175,300
110	189.4	92.1	170.1	62.9	162,300	110	188.3	90.6	170.9	63.5	163,300
115	186.4	96.6	167.6	61.3	151,600	115	185.2	95.1	168.4	61.9	152,600
120	183.1	101.1	164.8	59.7	141,900	120	182.0	99.6	165.8	60.2	142,800
125	179.7	105.6	162.0	58.0	133,100	125	178.5	104.2	162.9	58.5	133,900
130	176.0	110.0	158.9	56.3	125,000	130	174.9	108.7	159.9	56.8	125,700
135	172.2	114.5	155.6	54.5	117,600	135	170.9	113.2	156.6	55.0	118,200
140	168.0	119.0	152.1	52.7	110,700	140	166.8	117.8	153.1	53.2	111,300
145	163.6	123.5	148.4	50.9	104,300	145	162.3	122.4	149.4	51.4	104,900
150	158.9	128.0	144.4	49.0	98,400	150	157.6	127.0	145.4	49.5	98,900
155	153.8	132.6	140.1	47.0	92,900	155	152.5	131.5	141.1	47.5	93,400
160	148.4	137.1	135.5	45.0	87,800	160	147.0	136.2	136.5	45.4	88,200
165	142.6	141.6	130.5	42.9	82,900	165	141.1	140.8	131.5	43.3	83,300
170	136.3	146.2	125.2	40.7	78,400	170	134.8	145.4	126.1	41.1	78,700
175	129.5	150.8	119.3	38.3	74,100	175	127.8	150.1	120.2	38.7	74,400
180	122.0	155.3	112.9	35.9	70,000	180	120.3	154.8	113.7	36.2	70,300
185	113.8	159.9	105.8	33.2	66,200						
190	104.5	164.6	97.9	30.3	62,500						



28°						35°					
ft	ft	ft	ft	°	lb	ft	ft	ft	ft	°	lb
37	235.3	27.7	210.7	84.9	292,800						
38	235.1	28.5	210.6	84.7	292,800						
39	235.0	29.5	210.5	84.4	292,800	39	234.0	27.3	210.7	85.0	292,800
40	234.8	30.3	210.4	84.2	292,800	40	233.9	28.2	210.6	84.8	292,800
41	234.7	31.2	210.3	83.9	292,800	41	233.7	29.1	210.5	84.5	292,800
42	234.5	32.1	210.2	83.6	292,800	42	233.5	30.0	210.4	84.3	292,800
43	234.3	33.0	210.0	83.4	292,800	43	233.4	30.9	210.3	84.0	292,800
45	234.0	34.8	209.8	82.9	292,800	45	233.0	32.7	210.1	83.5	292,800
50	233.0	39.2	209.1	81.6	292,800	50	232.1	37.2	209.4	82.2	292,800
55	232.0	43.7	208.2	80.3	292,800	55	231.0	41.6	208.6	80.9	292,800
60	230.8	48.2	207.3	79.0	292,800	60	229.8	46.1	207.7	79.6	292,800
65	229.5	52.7	206.3	77.7	292,800	65	228.5	50.6	206.7	78.3	292,800
70	228.0	57.1	205.1	76.4	292,800	70	227.0	55.2	205.6	77.0	292,800
75	226.5	61.6	203.9	75.1	268,800	75	225.5	59.7	204.4	75.6	269,000
80	224.8	66.1	202.5	73.7	248,000	80	223.8	64.2	203.1	74.3	248,200
85	223.0	70.6	201.0	72.4	230,100	85	222.0	68.7	201.7	73.0	230,400
90	221.0	75.1	199.4	71.1	214,600	90	220.0	73.2	200.1	71.6	214,800
95	219.0	79.6	197.7	69.7	201,000	95	217.9	77.8	198.4	70.2	201,200
100	216.7	84.0	195.8	68.3	186,300	100	215.7	82.3	196.6	68.8	187,500
105	214.4	88.5	193.9	66.9	173,000	105	213.3	86.8	194.6	67.4	174,200
110	211.8	93.0	191.8	65.5	161,200	110	210.8	91.4	192.5	66.0	162,300
115	209.1	97.5	189.5	64.1	150,500	115	208.1	95.9	190.3	64.6	151,500
120	206.3	102.1	187.1	62.6	140,800	120	205.2	100.5	187.9	63.1	141,700
125	203.3	106.6	184.5	61.1	131,900	125	202.2	105.0	185.4	61.6	132,800
130	200.1	111.1	181.8	59.7	123,800	130	198.9	109.6	182.7	60.1	124,600
135	196.7	115.6	178.9	58.1	116,400	135	195.5	114.2	179.9	58.6	117,100
140	193.1	120.1	175.9	56.6	109,500	140	191.9	118.8	176.8	57.1	110,200
145	189.3	124.7	172.6	55.0	103,100	145	188.1	123.4	173.6	55.5	103,800
150	185.3	129.2	169.2	53.4	97,200	150	184.0	128.0	170.2	53.8	97,800
155	181.0	133.7	165.6	51.7	91,700	155	179.7	132.6	166.5	52.2	92,300
160	176.5	138.3	161.7	50.0	86,600	160	175.2	137.2	162.6	50.4	87,100
165	171.7	142.9	157.5	48.3	81,800	165	170.3	141.8	158.5	48.7	82,200
170	166.6	147.4	153.1	46.5	77,300	170	165.2	146.4	154.1	46.9	77,700
175	161.1	152.0	148.4	44.6	73,000	175	159.7	151.1	149.4	45.0	73,400
180	155.3	156.6	143.4	42.7	69,000	180	153.8	155.8	144.3	43.0	69,300
185	149.0	161.2	137.9	40.7	65,200	185	147.5	160.4	138.8	41.0	65,500
190	142.3	165.8	132.1	38.5	61,600	190	140.7	165.1	132.9	38.8	61,900
195	135.0	170.4	125.7	36.3	58,200	195	133.3	169.9	126.5	36.6	58,400
200	127.0	175.1	118.8	33.9	55,000						
205	118.3	179.7	111.1	31.4	51,800						
210	108.4	184.4	102.5	28.6	48,900						

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ASME B30.5

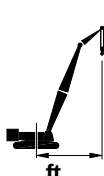
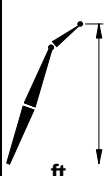
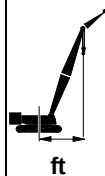
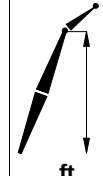
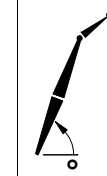
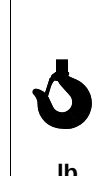
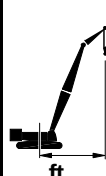
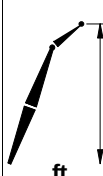
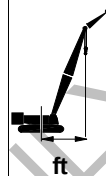
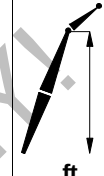
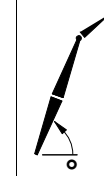
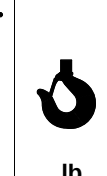


440,900 lb



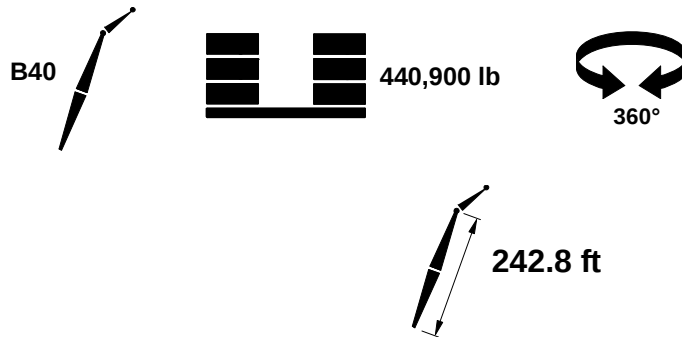
360°

223.1 ft

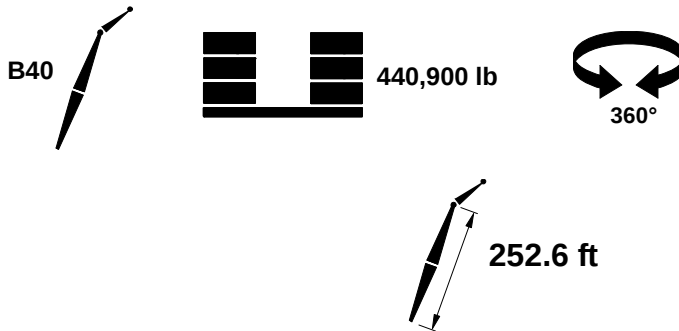
 28°						 35°					
											
ft	ft	ft	ft	o	lb	ft	ft	ft	ft	o	lb
39	254.8	29.7	230.3	84.9	292,800						
40	254.7	30.5	230.2	84.6	292,800						
41	254.6	31.4	230.1	84.4	292,800	41	253.6	29.3	230.3	85.0	292,800
42	254.4	32.3	230.0	84.2	292,800	42	253.4	30.2	230.2	84.7	292,800
43	254.3	33.2	229.9	83.9	292,800	43	253.3	31.1	230.1	84.5	292,800
44	254.1	34.1	229.7	83.7	292,800	44	253.1	32.0	230.0	84.2	292,800
45	253.9	35.0	229.6	83.5	292,800	45	253.0	32.9	229.9	84.0	292,800
50	253.1	39.5	229.0	82.3	292,800	50	252.1	37.4	229.3	82.8	292,800
55	252.1	44.0	228.2	81.1	292,800	55	251.1	41.9	228.6	81.6	292,800
60	251.0	48.6	227.3	79.9	292,800	60	250.0	46.5	227.8	80.5	292,800
65	249.8	53.1	226.4	78.7	292,800	65	248.8	51.0	226.8	79.3	292,800
70	248.5	57.6	225.3	77.5	292,800	70	247.5	55.6	225.8	78.0	292,800
75	247.1	62.1	224.2	76.3	273,100	75	246.1	60.1	224.7	76.8	273,400
80	245.5	66.6	222.9	75.1	252,000	80	244.5	64.7	223.5	75.6	252,300
85	243.9	71.1	221.6	73.9	233,600	85	242.9	69.2	222.2	74.4	234,100
90	242.1	75.6	220.1	72.6	214,300	90	241.1	73.8	220.7	73.2	216,000
95	240.2	80.2	218.5	71.4	197,500	95	239.2	78.3	219.2	71.9	199,000
100	238.2	84.7	216.8	70.1	182,600	100	237.1	82.9	217.5	70.7	184,000
105	236.0	89.3	215.0	68.9	169,300	105	235.0	87.5	215.7	69.4	170,600
110	233.8	93.8	213.1	67.6	157,300	110	232.7	92.0	213.8	68.1	158,600
115	231.3	98.3	211.0	66.3	146,600	115	230.3	96.6	211.8	66.8	147,700
120	228.8	102.9	208.9	65.0	136,800	120	227.7	101.2	209.7	65.5	137,900
125	226.1	107.4	206.6	63.7	127,900	125	225.0	105.8	207.4	64.2	128,900
130	223.2	112.0	204.1	62.4	119,800	130	222.1	110.4	205.0	62.8	120,700
135	220.2	116.5	201.5	61.0	112,300	135	219.1	115.0	202.4	61.5	113,200
140	217.0	121.1	198.8	59.6	105,400	140	215.9	119.6	199.7	60.1	106,200
145	213.7	125.6	195.9	58.2	99,000	145	212.5	124.2	196.8	58.7	99,800
150	210.1	130.2	192.9	56.8	93,100	150	209.0	128.8	193.8	57.3	93,800
155	206.4	134.8	189.6	55.4	87,600	155	205.2	133.5	190.6	55.8	88,200
160	202.5	139.4	186.2	53.9	82,400	160	201.3	138.1	187.2	54.3	83,000
165	198.4	143.9	182.7	52.4	77,600	165	197.1	142.7	183.6	52.8	78,200
170	194.0	148.5	178.9	50.9	73,100	170	192.7	147.4	179.8	51.2	73,600
175	189.4	153.1	174.8	49.3	68,800	175	188.0	152.0	175.8	49.7	69,300
180	184.5	157.7	170.6	47.7	64,800	180	183.1	156.7	171.6	48.0	65,300
185	179.3	162.3	166.1	46.0	61,100	185	177.9	161.3	167.0	46.3	61,500
190	173.8	166.9	161.3	44.3	57,500	190	172.4	166.0	162.2	44.6	57,900
195	168.0	171.6	156.1	42.5	54,100	195	166.5	170.7	157.1	42.8	54,400
200	161.8	176.2	150.7	40.6	50,900	200	160.2	175.4	151.6	40.9	51,200
205	155.1	180.8	144.8	38.7	47,800	205	153.5	180.2	145.7	39.0	48,100
210	148.0	185.5	138.5	36.7	44,900	210	146.2	184.9	139.4	36.9	45,100
215	140.2	190.2	131.7	34.5	42,100						
220	131.8	194.8	124.2	32.3	39,400						
225	122.5	199.5	116.0	29.8	36,800						

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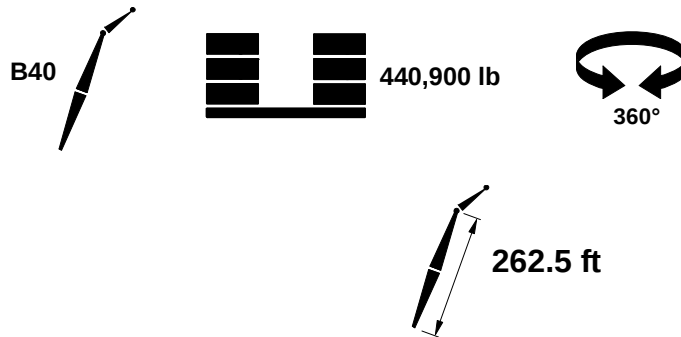
ASME B30.5



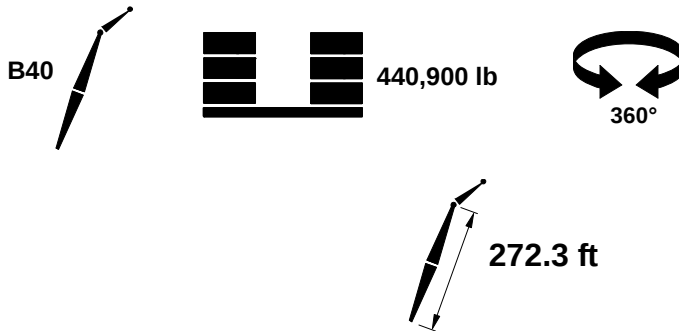
28°						35°					
ft	ft	ft	ft	°	lb	ft	ft	ft	ft	°	lb
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41	274.4	31.6	249.9	84.8	292,800						
42	274.3	32.5	249.8	84.6	292,800						
43	274.1	33.4	249.7	84.4	292,800	43	273.1	31.3	249.9	84.9	292,800
44	274.0	34.3	249.6	84.2	292,800	44	273.0	32.2	249.8	84.7	292,800
45	273.8	35.3	249.5	83.9	292,800	45	272.9	33.1	249.7	84.5	292,800
46	273.7	36.1	249.4	83.7	292,800	46	272.7	34.0	249.6	84.2	292,800
47	273.5	37.1	249.2	83.5	292,800	47	272.5	34.9	249.5	84.0	292,800
50	273.0	39.8	248.9	82.9	292,800	50	272.0	37.6	249.2	83.4	292,800
55	272.1	44.3	248.1	81.8	292,800	55	271.1	42.2	248.5	82.3	292,800
60	271.1	48.9	247.3	80.7	292,800	60	270.1	46.8	247.7	81.2	292,800
65	270.0	53.4	246.5	79.6	292,800	65	269.0	51.3	246.9	80.1	292,800
70	268.8	58.0	245.5	78.5	292,800	70	267.8	55.9	245.9	79.0	292,800
75	267.5	62.5	244.4	77.3	275,400	75	266.5	60.5	244.9	77.8	275,600
80	266.1	67.1	243.2	76.2	254,100	80	265.1	65.1	243.8	76.7	254,300
85	264.6	71.6	242.0	75.1	232,400	85	263.5	69.7	242.5	75.6	234,300
90	262.9	76.2	240.6	74.0	213,200	90	261.9	74.2	241.2	74.5	214,900
95	261.2	80.7	239.2	72.8	196,300	95	260.2	78.8	239.8	73.3	197,900
100	259.4	85.3	237.6	71.7	181,300	100	258.3	83.4	238.2	72.2	182,800
105	257.4	89.9	235.9	70.5	168,000	105	256.3	88.0	236.6	71.0	169,400
110	255.3	94.5	234.2	69.4	156,000	110	254.3	92.6	234.9	69.8	157,300
115	253.1	99.0	232.3	68.2	145,200	115	252.0	97.2	233.0	68.7	146,400
120	250.8	103.6	230.3	67.0	135,400	120	249.7	101.9	231.1	67.5	136,600
125	248.3	108.1	228.2	65.8	126,500	125	247.2	106.5	229.0	66.3	127,600
130	245.7	112.7	226.0	64.6	118,300	130	244.6	111.1	226.8	65.1	119,300
135	243.0	117.3	223.6	63.4	110,800	135	241.9	115.7	224.5	63.8	111,800
140	240.2	121.9	221.1	62.1	103,900	140	239.0	120.3	222.0	62.6	104,800
145	237.1	126.5	218.5	60.9	97,500	145	236.0	125.0	219.4	61.3	98,400
150	234.0	131.1	215.8	59.6	91,600	150	232.8	129.6	216.7	60.0	92,400
155	230.7	135.7	212.9	58.3	86,100	155	229.5	134.2	213.8	58.7	86,800
160	227.2	140.3	209.8	57.0	81,000	160	226.0	138.9	210.8	57.4	81,600
165	223.5	144.9	206.6	55.7	76,100	165	222.3	143.5	207.6	56.1	76,800
170	219.7	149.5	203.3	54.3	71,600	170	218.4	148.2	204.2	54.7	72,200
175	215.6	154.1	199.7	53.0	67,400	175	214.4	152.9	200.7	53.3	67,900
180	211.4	158.7	196.0	51.5	63,400	180	210.1	157.5	197.0	51.9	63,900
185	206.9	163.4	192.1	50.1	59,600	185	205.6	162.2	193.1	50.5	60,100
190	202.2	168.0	188.0	48.6	56,000	190	200.9	166.9	188.9	49.0	56,500
195	197.3	172.6	183.6	47.1	52,700	195	195.9	171.6	184.6	47.5	53,100
200	192.1	177.3	179.0	45.6	49,500	200	190.6	176.3	180.0	45.9	49,800
205	186.6	181.9	174.1	44.0	46,400	205	185.1	181.0	175.1	44.3	46,800
210	180.7	186.6	168.9	42.3	43,500	210	179.2	185.7	169.9	42.6	43,800
215	174.5	191.2	163.4	40.6	40,700	215	172.9	190.4	164.4	40.9	41,000
220	167.9	195.9	157.6	38.8	38,100	220	166.3	195.2	158.5	39.1	38,300
225	160.9	200.6	151.3	37.0	35,600	225	159.1	199.9	152.2	37.2	35,800
230	153.3	205.3	144.6	35.0	33,100	230	151.5	204.7	145.4	35.2	33,300
235	145.1	210.0	137.3	33.0	30,800						
240	136.2	214.7	129.3	30.8	28,500						
245	126.4	219.4	120.6	28.4	26,400						



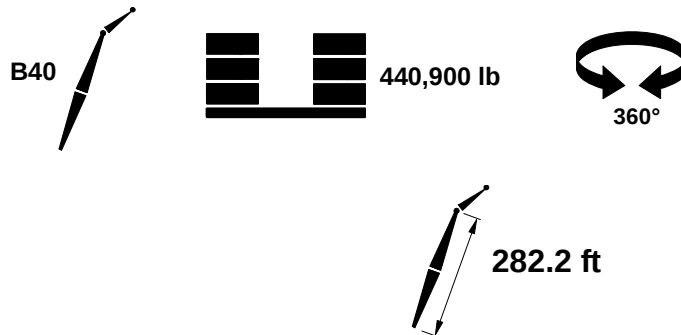
28°						35°					
ft	ft	ft	ft	°	lb	ft	ft	ft	ft	°	lb
41	284.3	31.7	259.7	85.0	292,800						
42	284.2	32.6	259.6	84.8	292,800						
43	284.1	33.5	259.5	84.6	292,800						
44	283.9	34.4	259.4	84.4	292,800	44	282.9	32.2	259.7	84.9	292,800
45	283.8	35.3	259.3	84.2	292,800	45	282.8	33.1	259.6	84.7	292,800
46	283.6	36.3	259.2	83.9	292,800	46	282.6	34.1	259.5	84.4	292,800
47	283.5	37.2	259.1	83.7	292,800	47	282.5	35.0	259.4	84.2	292,800
48	283.3	38.1	259.0	83.5	292,800	48	282.3	35.9	259.3	84.0	292,800
50	283.0	39.9	258.7	83.1	292,800	50	282.0	37.7	259.0	83.6	292,800
55	282.1	44.5	258.0	82.1	292,800	55	281.1	42.3	258.4	82.6	292,800
60	281.2	49.0	257.3	81.0	292,800	60	280.2	46.9	257.6	81.5	292,800
65	280.1	53.6	256.4	79.9	292,800	65	279.1	51.5	256.8	80.4	292,800
70	278.9	58.1	255.5	78.9	292,800	70	277.9	56.0	255.9	79.4	292,800
75	277.7	62.7	254.4	77.8	275,800	75	276.7	60.7	254.9	78.3	276,100
80	276.3	67.3	253.3	76.7	253,700	80	275.3	65.2	253.8	77.2	254,700
85	274.9	71.8	252.1	75.7	231,400	85	273.8	69.9	252.6	76.1	233,400
90	273.3	76.4	250.8	74.6	212,100	90	272.3	74.5	251.4	75.0	213,900
95	271.6	81.0	249.4	73.5	195,200	95	270.6	79.0	250.0	73.9	196,800
100	269.9	85.6	247.9	72.4	180,200	100	268.8	83.7	248.5	72.8	181,700
105	268.0	90.1	246.3	71.3	166,800	105	266.9	88.3	246.9	71.7	168,300
110	266.0	94.7	244.6	70.2	154,800	110	264.9	92.9	245.3	70.6	156,200
115	263.9	99.3	242.8	69.0	144,000	115	262.8	97.5	243.5	69.5	145,300
120	261.6	103.9	240.9	67.9	134,200	120	260.6	102.1	241.6	68.3	135,400
125	259.3	108.5	238.8	66.8	125,200	125	258.2	106.7	239.6	67.2	126,400
130	256.8	113.1	236.7	65.6	117,100	130	255.7	111.4	237.5	66.0	118,100
135	254.2	117.7	234.4	64.4	109,600	135	253.1	116.0	235.3	64.9	110,500
140	251.5	122.3	232.1	63.2	102,600	140	250.4	120.6	232.9	63.7	103,600
145	248.6	126.9	229.6	62.1	96,200	145	247.5	125.3	230.5	62.5	97,100
150	245.6	131.5	227.0	60.8	90,300	150	244.5	129.9	227.9	61.3	91,100
155	242.5	136.1	224.2	59.6	84,800	155	241.3	134.6	225.1	60.0	85,500
160	239.2	140.7	221.3	58.4	79,600	160	238.0	139.2	222.3	58.8	80,300
165	235.7	145.3	218.3	57.1	74,800	165	234.5	143.9	219.2	57.5	75,500
170	232.1	149.9	215.1	55.8	70,300	170	230.8	148.5	216.0	56.2	70,900
175	228.2	154.5	211.7	54.5	66,000	175	227.0	153.2	212.7	54.9	66,600
180	224.3	159.2	208.2	53.2	62,000	180	223.0	157.9	209.2	53.6	62,600
185	220.1	163.8	204.5	51.9	58,200	185	218.8	162.6	205.5	52.2	58,800
190	215.7	168.4	200.7	50.5	54,700	190	214.4	167.3	201.6	50.8	55,200
195	211.1	173.1	196.6	49.1	51,300	195	209.7	171.9	197.6	49.4	51,800
200	206.2	177.7	192.3	47.6	48,100	200	204.8	176.6	193.3	48.0	48,500
205	201.1	182.4	187.7	46.1	45,000	205	199.7	181.4	188.7	46.5	45,400
210	195.7	187.0	183.0	44.6	42,100	210	194.3	186.1	183.9	44.9	42,500
215	190.0	191.7	177.9	43.0	39,400	215	188.5	190.8	178.9	43.3	39,700
220	184.0	196.3	172.6	41.4	36,700	220	182.5	195.5	173.5	41.7	37,000
225	177.7	201.0	166.9	39.8	34,200	225	176.0	200.3	167.8	40.0	34,500
230	170.9	205.7	160.9	38.0	31,800	230	169.2	205.0	161.7	38.3	32,000
235	163.6	210.4	154.4	36.2	29,500	235	161.9	209.8	155.2	36.4	29,700
240	155.9	215.1	147.4	34.3	27,200						
245	147.5	219.8	139.9	32.2	25,100						
250	138.3	224.5	131.8	30.1	23,000						



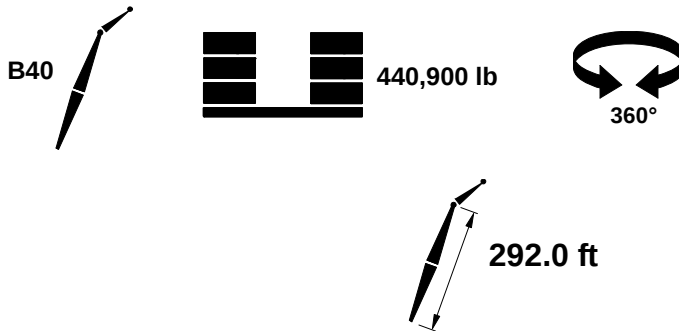
28°						35°					
ft	ft	ft	ft	°	lb	ft	ft	ft	ft	°	lb
42	294.1	32.7	269.6	85.0	292,800						
43	294.0	33.6	269.5	84.8	292,800						
44	293.9	34.5	269.4	84.6	292,800						
45	293.7	35.5	269.3	84.4	292,800	45	292.7	33.2	269.5	84.8	292,800
46	293.6	36.4	269.2	84.2	292,800	46	292.6	34.1	269.4	84.6	292,800
47	293.4	37.3	269.1	84.0	292,800	47	292.4	35.0	269.3	84.4	292,800
48	293.3	38.2	269.0	83.8	292,800	48	292.3	36.0	269.2	84.2	292,800
49	293.1	39.1	268.8	83.6	292,800	49	292.1	36.9	269.1	84.0	292,800
50	293.0	40.0	268.7	83.3	292,800	50	292.0	37.8	269.0	83.8	292,800
55	292.1	44.6	268.0	82.3	292,800	55	291.1	42.4	268.4	82.8	292,800
60	291.2	49.1	267.3	81.3	292,800	60	290.2	47.0	267.7	81.8	292,800
65	290.2	53.7	266.5	80.3	292,800	65	289.2	51.6	266.9	80.8	292,800
70	289.0	58.3	265.6	79.3	292,800	70	288.0	56.2	266.0	79.7	292,800
75	287.8	62.9	264.6	78.2	277,100	75	286.8	60.8	265.0	78.7	277,400
80	286.5	67.5	263.5	77.2	252,700	80	285.5	65.4	264.0	77.7	254,900
85	285.1	72.1	262.3	76.2	230,400	85	284.1	70.0	262.8	76.6	232,500
90	283.6	76.7	261.0	75.1	211,100	90	282.6	74.6	261.6	75.6	213,000
95	282.0	81.2	259.7	74.1	194,100	95	281.0	79.3	260.3	74.5	195,800
100	280.3	85.8	258.2	73.0	179,100	100	279.3	83.9	258.8	73.5	180,700
105	278.5	90.4	256.7	71.9	165,700	105	277.4	88.5	257.3	72.4	167,200
110	276.6	95.0	255.0	70.9	153,700	110	275.5	93.1	255.7	71.3	155,100
115	274.5	99.6	253.3	69.8	142,800	115	273.5	97.8	254.0	70.2	144,100
120	272.4	104.2	251.5	68.7	133,000	120	271.3	102.4	252.2	69.1	134,200
125	270.2	108.8	249.5	67.6	124,000	125	269.1	107.0	250.3	68.0	125,200
130	267.8	113.4	247.5	66.5	115,900	130	266.7	111.7	248.3	66.9	116,900
135	265.3	118.0	245.3	65.4	108,300	135	264.2	116.3	246.1	65.8	109,400
140	262.7	122.6	243.0	64.3	101,400	140	261.6	121.0	243.9	64.7	102,400
145	260.0	127.3	240.6	63.1	95,000	145	258.8	125.6	241.5	63.5	95,900
150	257.1	131.9	238.1	62.0	89,000	150	255.9	130.3	239.0	62.4	89,900
155	254.1	136.5	235.5	60.8	83,500	155	252.9	134.9	236.4	61.2	84,300
160	250.9	141.1	232.7	59.6	78,300	160	249.8	139.6	233.6	60.0	79,100
165	247.6	145.7	229.8	58.4	73,500	165	246.5	144.3	230.8	58.8	74,200
170	244.2	150.4	226.8	57.2	69,000	170	243.0	148.9	227.8	57.6	69,700
175	240.6	155.0	223.6	56.0	64,700	175	239.4	153.6	224.6	56.3	65,400
180	236.8	159.6	220.3	54.7	60,700	180	235.6	158.3	221.3	55.1	61,300
185	232.9	164.3	216.8	53.4	57,000	185	231.6	163.0	217.8	53.8	57,500
190	228.7	168.9	213.1	52.1	53,400	190	227.4	167.7	214.1	52.5	53,900
195	224.4	173.5	209.3	50.8	50,000	195	223.1	172.4	210.3	51.2	50,500
200	219.9	178.2	205.3	49.5	46,800	200	218.5	177.1	206.3	49.8	47,300
205	215.1	182.9	201.0	48.1	43,800	205	213.7	181.8	202.0	48.4	44,200
210	210.1	187.5	196.6	46.7	40,900	210	208.7	186.5	197.6	47.0	41,300
215	204.8	192.2	191.9	45.2	38,100	215	203.4	191.2	192.9	45.5	38,500
220	199.3	196.9	186.9	43.7	35,500	220	197.8	196.0	187.9	44.0	35,800
225	193.4	201.5	181.7	42.2	33,000	225	191.9	200.7	182.7	42.5	33,300
230	187.3	206.2	176.2	40.6	30,500	230	185.7	205.4	177.1	40.9	30,800
235	180.7	210.9	170.4	38.9	28,200	235	179.1	210.2	171.2	39.2	28,500
240	173.8	215.6	164.1	37.2	26,000	240	172.0	215.0	164.9	37.5	26,200
245	166.3	220.3	157.4	35.4	23,900	245	164.5	219.8	158.2	35.6	24,100
250	158.4	225.0	150.3	33.6	21,800						
260	140.4	234.5	134.1	29.4	17,900						



28°						35°					
ft	ft	ft	ft	°	lb	ft	ft	ft	ft	°	lb
43	303.9	33.7	279.3	84.9	292,800						
44	303.8	34.6	279.2	84.7	292,800						
45	303.6	35.5	279.1	84.5	292,800	45	302.6	33.3	279.4	85.0	292,800
46	303.5	36.4	279.0	84.4	292,800	46	302.5	34.2	279.3	84.8	292,800
47	303.4	37.4	278.9	84.2	292,800	47	302.4	35.1	279.2	84.6	292,800
48	303.2	38.2	278.8	84.0	292,800	48	302.2	36.0	279.1	84.4	292,800
49	303.1	39.2	278.7	83.8	292,800	49	302.1	37.0	279.0	84.2	292,800
50	302.9	40.1	278.6	83.6	292,800	50	301.9	37.9	278.9	84.0	292,800
55	302.1	44.7	277.9	82.6	292,800	55	301.1	42.5	278.3	83.1	292,800
60	301.2	49.3	277.2	81.6	292,800	60	300.2	47.1	277.6	82.1	292,800
65	300.2	53.8	276.4	80.6	292,800	65	299.2	51.7	276.8	81.1	292,800
70	299.1	58.4	275.5	79.6	292,800	70	298.1	56.3	275.9	80.1	292,800
75	298.0	63.1	274.6	78.6	278,800	75	296.9	61.0	275.0	79.1	279,600
80	296.7	67.6	273.5	77.6	252,900	80	295.7	65.6	274.0	78.1	255,100
85	295.3	72.2	272.4	76.6	230,600	85	294.3	70.2	272.9	77.1	232,600
90	293.9	76.8	271.2	75.6	211,200	90	292.9	74.8	271.7	76.1	213,100
95	292.4	81.4	269.8	74.6	194,100	95	291.3	79.5	270.4	75.1	195,900
100	290.7	86.0	268.4	73.6	179,100	100	289.7	84.1	269.1	74.0	180,700
105	289.0	90.6	267.0	72.6	165,700	105	287.9	88.7	267.6	73.0	167,200
110	287.1	95.2	265.4	71.5	153,600	110	286.1	93.4	266.0	72.0	155,100
115	285.2	99.9	263.7	70.5	142,800	115	284.1	98.0	264.4	70.9	144,100
120	283.1	104.4	261.9	69.5	132,900	120	282.0	102.6	262.6	69.9	134,200
125	281.0	109.1	260.0	68.4	124,000	125	279.9	107.3	260.8	68.8	125,200
130	278.7	113.7	258.1	67.3	115,800	130	277.6	111.9	258.8	67.8	116,900
135	276.3	118.3	256.0	66.3	108,200	135	275.2	116.6	256.8	66.7	109,300
140	273.8	122.9	253.8	65.2	101,300	140	272.7	121.3	254.6	65.6	102,300
145	271.2	127.6	251.5	64.1	94,900	145	270.1	125.9	252.4	64.5	95,800
150	268.4	132.2	249.1	63.0	88,900	150	267.3	130.6	250.0	63.4	89,800
155	265.6	136.8	246.6	61.9	83,400	155	264.4	135.2	247.5	62.3	84,200
160	262.6	141.4	244.0	60.8	78,200	160	261.4	139.9	244.8	61.1	79,000
165	259.4	146.1	241.2	59.6	73,400	165	258.2	144.6	242.1	60.0	74,100
170	256.1	150.7	238.3	58.5	68,900	170	254.9	149.3	239.2	58.8	69,600
175	252.7	155.4	235.2	57.3	64,600	175	251.5	153.9	236.2	57.6	65,300
180	249.1	160.0	232.1	56.1	60,600	180	247.9	158.6	233.0	56.4	61,200
185	245.4	164.7	228.7	54.9	56,800	185	244.1	163.3	229.7	55.2	57,400
190	241.5	169.3	225.3	53.7	53,300	190	240.2	168.0	226.3	54.0	53,800
195	237.4	173.9	221.7	52.4	49,900	195	236.1	172.7	222.6	52.7	50,400
200	233.1	178.6	217.8	51.1	46,700	200	231.8	177.4	218.8	51.5	47,200
205	228.6	183.3	213.8	49.8	43,600	205	227.3	182.1	214.9	50.2	44,100
210	223.9	187.9	209.7	48.5	40,800	210	222.6	186.8	210.7	48.8	41,200
215	219.0	192.6	205.3	47.1	38,000	215	217.6	191.5	206.3	47.5	38,400
220	213.9	197.3	200.7	45.8	35,400	220	212.4	196.3	201.7	46.1	35,700
225	208.5	201.9	195.8	44.3	32,900	225	207.0	201.0	196.8	44.6	33,200
230	202.8	206.6	190.7	42.9	30,500	230	201.2	205.8	191.7	43.1	30,800
235	196.8	211.3	185.3	41.4	28,200	235	195.2	210.5	186.3	41.6	28,400
240	190.4	216.0	179.7	39.8	25,900	240	188.8	215.3	180.5	40.0	26,200
245	183.7	220.7	173.6	38.2	23,800	245	182.0	220.1	174.5	38.4	24,000
250	176.6	225.5	167.2	36.5	21,800	250	174.8	224.9	168.0	36.7	22,000
260	160.8	234.9	153.0	32.9	17,900						



28°						35°					
ft	ft	ft	ft	°	lb	ft	ft	ft	ft	°	lb
44	313.7	34.7	289.2	84.9	292,800						
45	313.6	35.6	289.1	84.7	292,800						
46	313.4	36.5	289.0	84.5	292,800	46	312.4	34.3	289.2	85.0	292,800
47	313.3	37.4	288.9	84.3	292,800	47	312.3	35.2	289.1	84.8	292,800
48	313.2	38.4	288.8	84.2	292,800	48	312.2	36.1	289.0	84.6	292,800
49	313.0	39.3	288.7	84.0	292,800	49	312.0	37.0	288.9	84.4	292,800
50	312.9	40.2	288.5	83.8	292,800	50	311.9	38.0	288.8	84.2	292,800
55	312.1	44.8	287.9	82.8	292,800	55	311.1	42.6	288.2	83.3	292,800
60	311.2	49.4	287.2	81.9	292,800	60	310.2	47.2	287.6	82.3	292,800
65	310.3	54.0	286.4	80.9	292,800	65	309.2	51.8	286.8	81.4	292,800
70	309.2	58.6	285.6	80.0	292,800	70	308.2	56.5	286.0	80.4	292,800
75	308.1	63.2	284.7	79.0	277,700	75	307.1	61.1	285.1	79.4	280,200
80	306.9	67.8	283.6	78.0	251,800	80	305.8	65.7	284.1	78.5	254,000
85	305.5	72.4	282.5	77.1	229,400	85	304.5	70.4	283.0	77.5	231,500
90	304.1	77.0	281.3	76.1	210,000	90	303.1	75.0	281.9	76.5	211,900
95	302.7	81.6	280.1	75.1	192,900	95	301.6	79.6	280.6	75.6	194,800
100	301.1	86.3	278.7	74.1	177,900	100	300.0	84.3	279.3	74.6	179,500
105	299.4	90.9	277.3	73.2	164,400	105	298.3	88.9	277.9	73.6	166,000
110	297.6	95.5	275.8	72.2	152,400	110	296.6	93.6	276.4	72.6	153,800
115	295.7	100.1	274.1	71.2	141,500	115	294.7	98.2	274.8	71.6	142,900
120	293.8	104.7	272.4	70.2	131,600	120	292.7	102.9	273.1	70.6	132,900
125	291.7	109.4	270.6	69.1	122,700	125	290.6	107.6	271.3	69.5	123,900
130	289.5	114.0	268.7	68.1	114,400	130	288.4	112.2	269.5	68.5	115,600
135	287.2	118.6	266.7	67.1	106,900	135	286.1	116.9	267.5	67.5	108,000
140	284.8	123.3	264.6	66.1	100,000	140	283.7	121.5	265.4	66.4	101,000
145	282.3	127.9	262.4	65.0	93,500	145	281.2	126.2	263.2	65.4	94,500
150	279.7	132.6	260.1	63.9	87,600	150	278.5	130.9	260.9	64.3	88,500
155	276.9	137.2	257.7	62.9	82,000	155	275.8	135.6	258.5	63.3	82,900
160	274.0	141.8	255.1	61.8	76,800	160	272.9	140.2	256.0	62.2	77,700
165	271.0	146.5	252.5	60.7	72,000	165	269.9	144.9	253.4	61.1	72,800
170	267.9	151.1	249.7	59.6	67,500	170	266.7	149.6	250.6	60.0	68,200
175	264.6	155.8	246.8	58.5	63,200	175	263.4	154.3	247.7	58.8	63,900
180	261.2	160.4	243.8	57.4	59,200	180	260.0	159.0	244.7	57.7	59,900
185	257.6	165.0	240.6	56.2	55,400	185	256.4	163.7	241.6	56.5	56,100
190	253.9	169.7	237.3	55.0	51,900	190	252.7	168.4	238.3	55.4	52,400
195	250.1	174.4	233.9	53.9	48,500	195	248.8	173.1	234.8	54.2	49,000
200	246.0	179.0	230.2	52.6	45,300	200	244.7	177.8	231.2	53.0	45,800
205	241.8	183.7	226.4	51.4	42,200	205	240.5	182.5	227.4	51.7	42,700
210	237.4	188.4	222.5	50.2	39,400	210	236.0	187.2	223.5	50.5	39,800
215	232.8	193.1	218.4	48.9	36,600	215	231.4	191.9	219.4	49.2	37,000
220	227.9	197.7	214.1	47.6	34,000	220	226.5	196.7	215.1	47.9	34,400
225	222.9	202.4	209.5	46.3	31,500	225	221.4	201.4	210.5	46.6	31,800
230	217.6	207.1	204.7	44.9	29,100	230	216.1	206.2	205.7	45.2	29,400
235	212.0	211.8	199.7	43.5	26,800	235	210.5	210.9	200.7	43.8	27,100
240	206.2	216.5	194.5	42.1	24,600	240	204.6	215.7	195.4	42.3	24,900
245	200.0	221.2	189.0	40.6	22,500	245	198.4	220.5	189.9	40.8	22,700
250	193.5	225.9	183.1	39.0	20,400	250	191.8	225.2	184.0	39.3	20,700
260	179.3	235.4	170.3	35.8	16,600	260	177.5	234.8	171.1	36.0	16,800



28°						35°					
ft	ft	ft	ft	°	lb	ft	ft	ft	ft	°	lb
45	323.5	35.6	298.9	84.9	292,800						
46	323.4	36.6	298.8	84.7	292,800						
47	323.2	37.5	298.7	84.5	292,800	47	322.2	35.3	299.0	85.0	292,800
48	323.1	38.4	298.6	84.3	292,800	48	322.1	36.2	298.9	84.8	292,800
49	322.9	39.4	298.5	84.2	292,800	49	321.9	37.1	298.8	84.6	292,800
50	322.8	40.3	298.4	84.0	292,800	50	321.8	38.1	298.7	84.4	292,800
51	322.7	41.2	298.3	83.8	292,800	51	321.7	39.0	298.6	84.2	292,800
55	322.0	44.9	297.8	83.1	292,800	55	321.0	42.7	298.1	83.5	292,800
60	321.2	49.5	297.1	82.1	292,800	60	320.2	47.3	297.5	82.6	292,800
65	320.3	54.1	296.4	81.2	292,800	65	319.3	52.0	296.7	81.6	292,800
70	319.3	58.7	295.5	80.3	292,800	70	318.2	56.6	295.9	80.7	292,800
75	318.2	63.3	294.6	79.4	276,400	75	317.2	61.2	295.1	79.8	279,000
80	317.0	68.0	293.6	78.4	250,300	80	316.0	65.9	294.1	78.9	252,700
85	315.7	72.6	292.6	77.5	227,900	85	314.7	70.5	293.1	77.9	230,100
90	314.4	77.2	291.4	76.6	208,400	90	313.3	75.2	291.9	77.0	210,400
95	312.9	81.8	290.2	75.6	191,300	95	311.9	79.8	290.8	76.0	193,200
100	311.4	86.4	288.9	74.7	176,100	100	310.4	84.5	289.5	75.1	177,900
105	309.8	91.1	287.5	73.7	162,700	105	308.7	89.1	288.1	74.1	164,300
110	308.1	95.7	286.0	72.7	150,600	110	307.0	93.8	286.6	73.1	152,100
115	306.3	100.3	284.5	71.8	139,600	115	305.2	98.4	285.1	72.2	141,100
120	304.3	105.0	282.8	70.8	129,800	120	303.3	103.1	283.5	71.2	131,100
125	302.3	109.6	281.1	69.8	120,700	125	301.3	107.8	281.8	70.2	122,000
130	300.2	114.2	279.2	68.9	112,500	130	299.2	112.4	279.9	69.2	113,700
135	298.0	118.9	277.3	67.9	104,900	135	296.9	117.1	278.0	68.2	106,100
140	295.7	123.6	275.2	66.9	98,000	140	294.6	121.8	276.0	67.2	99,000
145	293.3	128.2	273.1	65.9	91,500	145	292.2	126.5	273.9	66.2	92,500
150	290.8	132.8	270.9	64.8	85,500	150	289.7	131.1	271.7	65.2	86,500
155	288.1	137.5	268.6	63.8	80,000	155	287.0	135.8	269.4	64.2	80,900
160	285.4	142.1	266.1	62.8	74,800	160	284.2	140.5	267.0	63.1	75,600
165	282.5	146.8	263.6	61.7	69,900	165	281.3	145.2	264.5	62.1	70,700
170	279.5	151.4	260.9	60.7	65,400	170	278.3	149.9	261.8	61.0	66,200
175	276.4	156.1	258.1	59.6	61,100	175	275.2	154.6	259.1	59.9	61,900
180	273.1	160.7	255.2	58.5	57,100	180	271.9	159.2	256.2	58.9	57,800
185	269.7	165.4	252.2	57.4	53,300	185	268.5	164.0	253.2	57.8	54,000
190	266.2	170.1	249.0	56.3	49,700	190	264.9	168.7	250.0	56.6	50,400
195	262.5	174.7	245.8	55.2	46,300	195	261.2	173.4	246.7	55.5	46,900
200	258.6	179.4	242.3	54.0	43,100	200	257.4	178.1	243.3	54.4	43,700
205	254.6	184.1	238.7	52.9	40,100	205	253.3	182.8	239.7	53.2	40,600
210	250.4	188.7	235.0	51.7	37,200	210	249.1	187.5	236.0	52.0	37,700
215	246.1	193.5	231.1	50.5	34,400	215	244.8	192.3	232.1	50.8	34,900
220	241.5	198.1	227.0	49.3	31,800	220	240.2	197.0	228.0	49.6	32,200
225	236.8	202.8	222.7	48.0	29,300	225	235.4	201.8	223.7	48.3	29,700
230	231.8	207.5	218.3	46.7	26,900	230	230.4	206.5	219.3	47.0	27,300
235	226.6	212.2	213.6	45.4	24,600	235	225.2	211.2	214.6	45.7	24,900
240	221.2	216.9	208.7	44.1	22,400	240	219.7	216.0	209.6	44.3	22,700
245	215.5	221.6	203.5	42.7	20,300	245	214.0	220.7	204.5	43.0	20,600
250	209.5	226.3	198.1	41.3	18,200	250	207.9	225.5	199.1	41.5	18,500