

Your ONE Source for Poles

UNION METAL CORPORATION

**TRANSMISSION
and
DISTRIBUTION**



Union Metal Fluted
Design No. 3
Wireless J

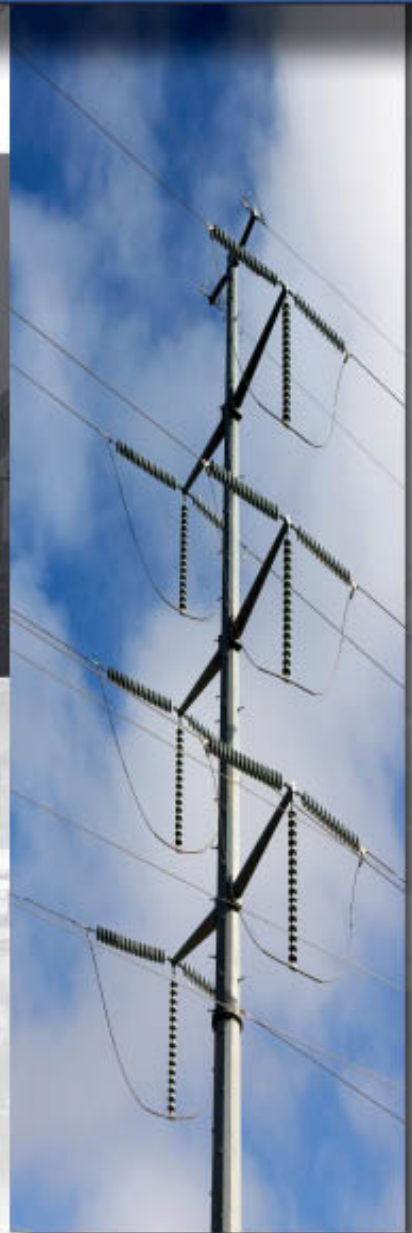


Table of Contents

Introduction To Our Company	2
Company Overview	
Services	
Manufacturing	
Customer Focus	
General Information	3
Steel Pole Advantages	
Standard Features	
Available Options	
Understanding Wood Pole Equivalency	4
General Notes For Standard Steel Pole Designs	5
Catalog Summary For Standard Steel Pole Designs	6
Round Series Catalog Designs	
Multi-Sided Series Catalog Designs	
Standard Steel Pole Designs - Round Series	7-10
Class 5	7
Class 4	7
Class 3	8
Class 2	8
Class 1	9
Class H1	9
Class H2	9
Class H3	10
Class H4	10
Standard Steel Pole Designs - Multi-Sided Series	11-17
Class 1	11
Class H1	12
Class H2	13
Class H3	14
Class H4	15
Class H5	16
Class H6	17
Standard Steel Pole Designs - RUS.....	18-24
Class 1	18
Class H1	19
Class H2	20
Class H3	21
Class H4	22
Class H5	23
Class H6	24
Appendix A	25
Transmission Pole Design Data Sheet	
Appendix B	26
Wood Pole Equivalent Design Tables	
Appendix C	27
Wood Pole Equivalent Examples	
Appendix D	28
Local Buckling Check - Round Pole Example	

Company Overview

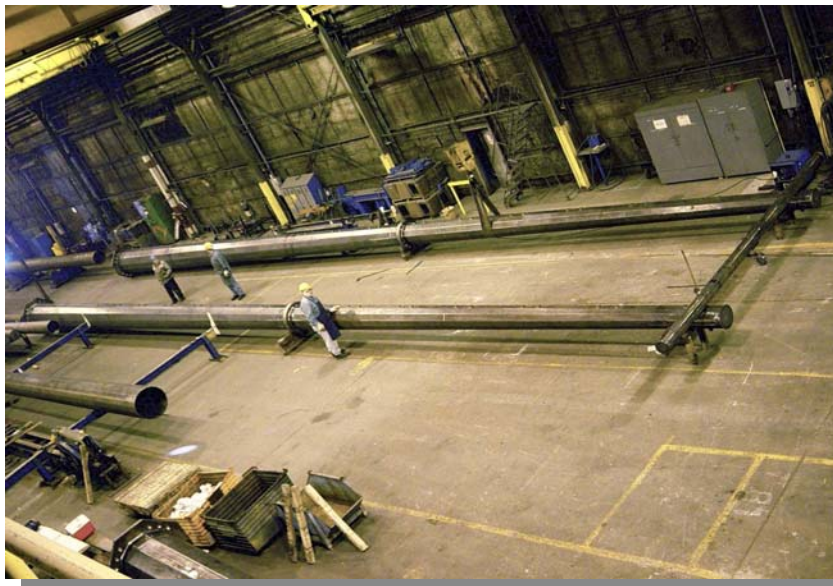
Since 1906, Union Metal has been manufacturing tapered steel poles for lighting, traffic control, communication and utility applications. Union Metal pioneered the development of ornamental lighting standards at the turn-of-the-century and was also at the forefront in the design of lighting standards for highway lighting. Union Metal was instrumental in the development of mast arms (monolevers) in the 1950's and 60's, and pioneered the development of self supporting tubular single pole transmission structures and H-Frames.



Today, with over 100 years of experience and our commitment to excellence, Union Metal remains an industry leader in the manufacture and design of steel tubular structures for all Highway, Municipal, Custom, and Utility applications. Union Metal has a complete staff of professional engineering personnel trained in the PLS Pole program and three different manufacturing processes for producing steel tapered shafts.

Services

Our innovative team offers a wide variety of services to meet our customers' needs. We work hand-in-hand with our customers from the preliminary design phase to completion of the project. With our experienced engineering staff, our company offers leadership, expertise, and professionalism in the electric utility industry.



Manufacturing

Our standard catalog designs feature round and 12-sided pole shapes that range in pole lengths of 30 to 130 feet and are equivalent to ANSI 05.1 wood pole classes 5, 4, 3, 2, 1, H1, H2, H3, H4, H5, H6. In addition to these catalog designs, our manufacturing capabilities allow us to provide alternate pole shapes, grades of material, material thickness, tapers, and lengths.



Custom engineered pole structures are also available to support loading exceeded by a class H6 wood pole equivalent.

Category	Description	Manufacturing Process		
		Brake Formed	Colly Press	Mandrel
Cross Sectional Shape	Round		X	X
	12 Sides	X		
	18 Sides	X		
	16 Flute			X
Maximum Section Length	40'			X
	45'		X	
	53.5'	X		
Diameter Range	4" - 19"		X	
	3" - 23"			X
	7.5" - 76"	X		
Taper Rate	.14 in/ft		X	X
	No Limit	X		
ASTM Material	A572	X	X	
	A595			X
	A871	X	X	
Material Thickness	11, 7, 3, & 0 ga			X
	.119" - .375"		X	
	.188" - .75"	X		

Customer Focus

Union Metal prides itself in meeting customer expectations and pursuing market leadership. Our solid reputation is evident in over one hundred years of design and manufacturing services. We continue to improve our processes to meet the demands of a growing industry. Our quality and standards will meet your requirements on every project.

Steel Pole Advantages

- **Increased Durability** - *less than half the weight of wood poles*
- **Reduced Weight** - *yields lower transportation costs, more poles per truckload*
- **Reduced Costs** - *with handling and installation*
- **Increased Service Life** - *up to 80 years*
- **Eliminates Disposal Problems Associated with Wood Poles**
- **Consistent Dimensional Properties and Material Strength** - *maximized strength and stiffness for loads applied in any direction*
- **Economically Designed**
- **Aesthetically Pleasing**
- **Galvanized** - *corrosion resistance extends life and minimizes maintenance*
- **Increased Labor Savings** - *customer specified pre-drilling patterns*
- **Resistant to Pole Rot, Insects, and Woodpecker Damage**
- **Not Subject to Pole Material Shrinkage** - *avoid hardware retightening maintenance*

Standard Features

- Hot dipped galvanized finish
- Direct Embedded construction
- Grounding Provision(s)
- NESC Grade B Construction or RUS Designs
- Ground line and below grade protective coating
- Grounding plate meeting NESC grounding requirement of two (2) square feet for distribution poles or bearing plate for transmission poles
- Welded steel pole cap
- ID tag

Available Options

- Factory drilled holes for attachments and steps
- Base plate construction
- Ground sleeve
- Dull and oil galvanized finish
- Powder coated or painted finish
- Pole steps
- NESC Grade C construction
- Weathering steel
- Factory installed rivnuts
- Removable pole top
- Bearing plate in lieu of grounding plate for distribution class poles

Wood poles are organized into different classes based on a required ultimate moment capacity at the ground line of the pole. Each class has a required tip load applied to the pole designated by the American National Standards Institute, ANSI 05.1. Steel poles follow the same classification system as wood poles but are equated to wood by applying a tip load that is multiplied by the appropriate equivalency factor for wood to steel.

To further explain wood pole equivalents (wpe), below is a series of questions and answers. Refer to Appendix B and C for design examples.

How is steel equivalent to wood?

The term wood pole equivalent simply refers to a steel pole that is designed to meet the required ultimate moment capacity at ground line for a given ANSI 05.1 class. However, because of variances in sectional properties and material between wood and steel, it is not enough to simply equate ultimate moment capacities at ground line. Further analysis is performed to ensure that steel poles are not susceptible to buckling issues, excessive deflections, or are overstressed from secondary moments.

What is a secondary moment?

A secondary moment often referred to as the p-delta effect is the increase in bending moment due to a structure's displacement under loading.

What is ultimate moment capacity?

Ultimate moment capacity is the moment that occurs when the material starts to yield.

Where is the ground line located?

Unless specified, ground line is located, from the butt of the pole, a distance of ten percent of the pole length plus two feet.

What is a tip load?

A tip load is a horizontal point load applied two feet from the pole top. For NESC designs, the tip load is derived from the ANSI 05.1 wood pole classification system and is then multiplied by an equivalency factor for wood to steel. For RUS designs, the tip load is per section 5.1.4, Table 1.

What is an equivalency factor?

An equivalency factor is the wood to steel ratio of NESC overload factors under a given loading condition. For NESC Grade B construction under wind loading conditions, the wood pole overload factor is 4.0 and the steel pole overload factor is 2.5. Therefore, the equivalency factor for wood to steel becomes $2.5/4.0$ equal to 0.625.

Material

Tubes are manufactured with ASTM A572 material having 65 ksi minimum yield strength. Pole tops, bearing plates, and grounding plates are manufactured with ASTM A36 material or better having 36 ksi minimum yield strength. All material receives a galvanized structural finish in accordance with ASTM A123.

Embedment Depth

Standard embedment depth is calculated as ten percent of the pole length plus two feet. However, soil capacity analysis is the responsibility of the customer and should be performed by a local professional geotechnical engineer.

Steel Design

Structural analysis is performed in accordance with ASCE Manual 48-05 "Design Of Steel Transmission Pole Structures". Ultimate strength methods are used to compute stresses resulting from factored design loads being applied to the structures.

Refer to Appendix D for a local buckling limitation check example calculation for a 65 class H2 round pole.

Joint Construction

The standard method of joint construction for multi-piece wood pole equivalents is a telescoping slip joint. Telescoping slip joints are designed with a nominal lap length that will develop the sufficient strength needed for the connecting sections. Telescoping slip joints are not only cost effective but allow for easier field assembly and installation.

Another method used is a bolted flange plate connection. Bolted flange plate connections are more expensive and reserved for designs where telescoping slip joints are considered not to be good engineering practice as a result of loading conditions or design requirements. Examples of such designs that might warrant bolted flange plate connections are guyed and framed structures.

Weld Penetration

The longitudinal seam weld of the tube receives as a minimum, sixty percent penetration weld. The slip joint area of the female section receives one hundred percent full penetration weld for the nominal joint length plus an additional six inches. The pole cap is joined to the pole top with a 3/16" minimum staggered intermittent fillet weld. The bearing plate is joined to the pole butt with a 1/4" fillet weld. For base plate applications and other circumferential welds, a one hundred percent full penetration weld is used.



Round Series Catalog Designs

- **Pre-Engineered Standard Catalog Designs**
 - 30ft - 85ft pole lengths for Class 5 - Class 1
 - 30ft - 85ft pole lengths for Class H1
 - 30ft - 80ft pole lengths for Class H2
 - 30ft - 80ft pole lengths for Class H3
 - 30ft - 80ft pole lengths for Class H4
- **Cross Section**
 - Round
- **Taper Rate**
 - .14 in/ft
- **Maximum Section Length**
 - 45 feet
- **Wall Thickness**
 - Ranges from .119 in - .25 in
- **Shipping Sections**
 - 1 piece section for pole lengths up to 45 ft
 - 2 piece sections for pole lengths 45ft - 85ft
- **Diameter Range**
 - 3.5 in. minimum
 - 18.56 in. maximum

Multi-Sided Series Catalog Designs

- **Pre-Engineered Standard Catalog Designs**
 - 40ft - 130ft pole lengths for Class H1 - Class H6
- **Cross Section**
 - 12 Sides
- **Taper Rate**
 - Ranges from .12 in/ft - .20 in/ft
- **Maximum Section Length**
 - 53.5 feet
- **Wall Thickness**
 - Ranges from .188 in/ft - .25 in/ft
- **Shipping Sections**
 - 1 piece section for pole lengths up to 50ft
 - 2 piece sections for pole lengths 55ft - 100ft
- **Diameter Range**
 - 7.5 in. minimum across flats
 - 33.14 in. maximum across flats



STEEL POLE DESIGNS GRADE B - ROUND SERIES

Wood Pole Equivalent Class 5

Taper Rate = 0.14 in/ft

Catalog Number	Length (ft)	Embedment Depth (ft)	Top Diameter (in)	Butt Diameter (in)	Wall Thickness (in)	Ultimate Moment Capacity at GL (ft-kips)	Galvanized Weight (lbs)
30CL5-R	30	5.0	4.40	8.60	0.120	30.44	262
35CL5-R	35	5.5	4.40	9.30	0.120	35.61	321
40CL5-R	40	6.0	4.40	10.00	0.120	41.18	386
45CL5-R	45	6.5	4.40	10.70	0.120	47.16	455
50CL5-R	50	7.0	4.50	11.12	0.120 / 0.120	50.66	544
55CL5-R	55	7.5	4.40	11.72	0.120 / 0.120	56.19	630
60CL5-R	60	8.0	4.40	12.42	0.120 / 0.120	62.77	710
65CL5-R	65	8.5	4.40	13.12	0.120 / 0.120	68.98	796
70CL5-R	70	9.0	4.40	13.82	0.120 / 0.120	75.48	886
75CL5-R	75	9.5	4.40	14.52	0.120 / 0.120	82.27	981
80CL5-R	80	10.0	3.60	14.28	0.188 / 0.188	127.06	1520
85CL5-R	85	10.5	3.60	14.98	0.188 / 0.188	140.08	1672

Wood Pole Equivalent Class 4

Taper Rate = 0.14 in/ft

Catalog Number	Length (ft)	Embedment Depth (ft)	Top Diameter (in)	Butt Diameter (in)	Wall Thickness (in)	Ultimate Moment Capacity at GL (ft-kips)	Galvanized Weight (lbs)
30CL4-R	30	5.0	5.50	9.70	0.120	39.73	308
35CL4-R	35	5.5	5.50	10.40	0.120	45.6	375
40CL4-R	40	6.0	5.50	11.10	0.120	51.88	447
45CL4-R	45	6.5	5.50	11.80	0.120	58.57	523
50CL4-R	50	7.0	5.90	12.52	0.120 / 0.120	65.1	640
55CL4-R	55	7.5	5.90	13.22	0.120 / 0.120	71.43	746
60CL4-R	60	8.0	5.90	13.92	0.120 / 0.120	78.03	837
65CL4-R	65	8.5	5.90	14.62	0.120 / 0.120	84.93	933
70CL4-R	70	9.0	3.60	12.88	0.188 / 0.188	102.94	1156
75CL4-R	75	9.5	3.60	13.58	0.188 / 0.188	114.68	1375
80CL4-R	80	10.0	3.60	14.28	0.188 / 0.188	127.06	1520
85CL4-R	85	10.5	3.60	14.98	0.188 / 0.188	140.08	1672



STEEL POLE DESIGNS GRADE B - ROUND SERIES

Wood Pole Equivalent Class 3

Taper Rate = 0.14 in/ft

Catalog Number	Length (ft)	Embedment Depth (ft)	Top Diameter (in)	Butt Diameter (in)	Wall Thickness (in)	Ultimate Moment Capacity at GL (ft-kips)	Galvanized Weight (lbs)
30CL3-R	30	5.0	5.90	10.10	0.120	43.41	324
35CL3-R	35	5.5	6.30	11.20	0.120	53.65	413
40CL3-R	40	6.0	6.30	11.90	0.120	60.44	491
45CL3-R	45	6.5	6.70	13.00	0.120	70.61	598
50CL3-R	50	7.0	7.30	13.92	0.120 / 0.120	79.54	740
55CL3-R	55	7.5	7.30	14.62	0.120 / 0.120	86.5	836
60CL3-R	60	8.0	4.80	12.68	0.188 / 0.188	101.85	1146
65CL3-R	65	8.5	4.80	13.38	0.188 / 0.188	113.54	1282
70CL3-R	70	9.0	4.80	14.08	0.188 / 0.188	125.86	1425
75CL3-R	75	9.5	4.80	14.78	0.188 / 0.188	138.81	1576
80CL3-R	80	10.0	4.80	15.48	0.188 / 0.188	152.41	1734
85CL3-R	85	10.5	4.80	16.18	0.188 / 0.188	166.63	1899

Wood Pole Equivalent Class 2

Taper Rate = 0.14 in/ft

Catalog Number	Length (ft)	Embedment Depth (ft)	Top Diameter (in)	Butt Diameter (in)	Wall Thickness (in)	Ultimate Moment Capacity at GL (ft-kips)	Galvanized Weight (lbs)
30CL2-R	30	5.0	7.10	11.30	0.120	55.44	374
35CL2-R	35	5.5	7.50	12.40	0.120	65.99	471
40CL2-R	40	6.0	8.30	13.90	0.120	80.84	601
45CL2-R	45	6.5	8.30	14.60	0.120	87.85	697
50CL2-R	50	7.0	6.00	12.48	0.188 / 0.188	100.77	994
55CL2-R	55	7.5	6.00	13.18	0.188 / 0.188	112.4	1128
60CL2-R	60	8.0	6.00	13.88	0.188 / 0.188	124.66	1305
65CL2-R	65	8.5	6.00	14.58	0.188 / 0.188	137.55	1453
70CL2-R	70	9.0	6.00	15.28	0.188 / 0.188	151.08	1610
75CL2-R	75	9.5	6.00	15.98	0.188 / 0.188	165.25	1773
80CL2-R	80	10.0	6.00	16.68	0.188 / 0.188	180.05	1944
85CL2-R	85	10.5	6.00	17.38	0.188 / 0.188	195.49	2121



**Union Metal
CORPORATION**

STEEL POLE DESIGNS GRADE B - ROUND SERIES

Wood Pole Equivalent Class 1

Taper Rate = 0.14 in/ft

Catalog Number	Length (ft)	Embedment Depth (ft)	Top Diameter (in)	Butt Diameter (in)	Wall Thickness (in)	Ultimate Moment Capacity at GL (ft-kips)	Galvanized Weight (lbs)
30CL1-R	30	5.0	6.00	10.20	0.188	68.01	506
35CL1-R	35	5.5	6.40	11.30	0.188	84.04	645
40CL1-R	40	6.0	6.40	12.00	0.188	94.69	766
45CL1-R	45	6.5	6.40	12.70	0.188	105.97	895
50CL1-R	50	7.0	7.20	13.68	0.188 / 0.188	123.46	1132
55CL1-R	55	7.5	7.20	14.38	0.188 / 0.188	136.3	1278
60CL1-R	60	8.0	7.20	15.08	0.188 / 0.188	149.77	1471
65CL1-R	65	8.5	7.20	15.78	0.188 / 0.188	163.87	1631
70CL1-R	70	9.0	7.20	16.48	0.188 / 0.188	178.61	1800
75CL1-R	75	9.5	7.20	17.18	0.188 / 0.188	193.99	1975
80CL1-R	80	10.0	7.20	17.88	0.188 / 0.188	210.00	2159
85CL1-R	85	10.5	7.20	18.58	0.188 / 0.188	226.64	2350

Wood Pole Equivalent Class H1

Taper Rate = 0.14 in/ft

Catalog Number	Length (ft)	Embedment Depth (ft)	Top Diameter (in)	Butt Diameter (in)	Wall Thickness (in)	Ultimate Moment Capacity at GL (ft-kips)	Galvanized Weight (lbs)
30CLH1-R	30	5.0	6.80	11.00	0.188	80.32	557
35CLH1-R	35	5.5	7.20	12.10	0.188	97.67	706
40CLH1-R	40	6.0	7.20	12.80	0.188	109.12	835
45CLH1-R	45	6.5	7.60	13.90	0.188	129.21	1011
50CLH1-R	50	7.0	8.25	14.73	0.188 / 0.188	145.21	1248
55CLH1-R	55	7.5	8.25	15.43	0.188 / 0.188	159.1	1488
60CLH1-R	60	8.0	8.40	16.28	0.188 / 0.188	177.18	1637
65CLH1-R	65	8.5	8.40	16.98	0.188 / 0.188	192.5	1811
70CLH1-R	70	9.0	8.40	17.67	0.188 / 0.188	208.45	1993
75CLH1-R	75	9.5	8.40	18.38	0.188 / 0.188	225.03	2181
80CLH1-R	80	10.0	7.60	18.28	0.188 / 0.250	289.98	2622
85CLH1-R	85	10.5	7.60	18.98	0.188 / 0.250	312.53	2879

Wood Pole Equivalent Class H2

Taper Rate = 0.14 in/ft

Catalog Number	Length (ft)	Embedment Depth (ft)	Top Diameter (in)	Butt Diameter (in)	Wall Thickness (in)	Ultimate Moment Capacity at GL (ft-kips)	Galvanized Weight (lbs)
30CLH2-R	30	5.0	7.60	11.80	0.188	93.65	610
35CLH2-R	35	5.5	8.00	12.90	0.188	112.32	766
40CLH2-R	40	6.0	8.40	14.00	0.188	132.69	938
45CLH2-R	45	6.5	8.70	15.00	0.188	152.54	1117
50CLH2-R	50	7.0	9.25	15.73	0.188 / 0.188	167.56	1367
55CLH2-R	55	7.5	9.50	16.68	0.188 / 0.188	188.55	1566
60CLH2-R	60	8.0	8.70	16.58	0.188 / 0.250	242.26	1858
65CLH2-R	65	8.5	8.70	17.28	0.188 / 0.250	262.91	2093
70CLH2-R	70	9.0	8.70	17.98	0.188 / 0.250	284.39	2336
75CLH2-R	75	9.5	8.70	18.68	0.188 / 0.250	306.72	2590
80CLH2-R	80	10.0	7.70	18.26	0.250 / 0.250	289.14	2946



STEEL POLE DESIGNS GRADE B - ROUND SERIES

Wood Pole Equivalent Class H3

Taper Rate = 0.14 in/ft

Catalog Number	Length (ft)	Embedment Depth (ft)	Top Diameter (in)	Butt Diameter (in)	Wall Thickness (in)	Ultimate Moment Capacity at GL (ft-kips)	Galvanized Weight (lbs)
30CLH3-R	30	5.0	8.70	12.90	0.188	113.65	681
35CLH3-R	35	5.5	9.50	14.40	0.188	142.55	879
40CLH3-R	40	6.0	9.90	15.50	0.188	165.39	1068
45CLH3-R	45	6.5	9.90	16.20	0.188	180.19	1233
50CLH3-R	50	7.0	9.00	15.48	0.188 / 0.250	212.43	1579
55CLH3-R	55	7.5	9.00	16.18	0.188 / 0.250	231.79	1798
60CLH3-R	60	8.0	9.00	16.88	0.188 / 0.250	251.99	2042
65CLH3-R	65	8.5	9.00	17.58	0.188 / 0.250	273.03	2256
70CLH3-R	70	9.0	9.00	18.28	0.188 / 0.250	294.92	2472
75CLH3-R	75	9.5	9.00	18.86	0.250 / 0.250	313.11	2993
80CLH3-R	80	10.0	8.00	18.56	0.250 / 0.313	371.16	3440

Wood Pole Equivalent Class H4

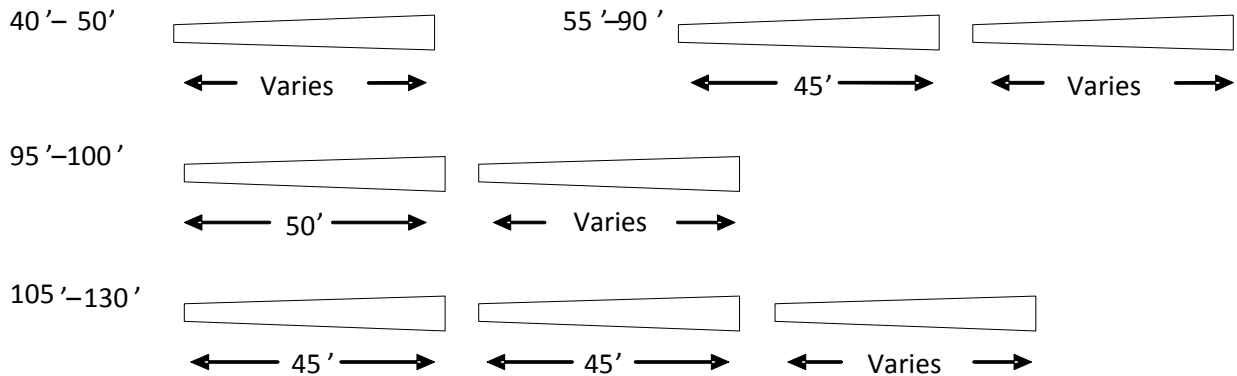
Taper Rate = 0.14 in/ft

Catalog Number	Length (ft)	Embedment Depth (ft)	Top Diameter (in)	Butt Diameter (in)	Wall Thickness (in)	Ultimate Moment Capacity at GL (ft-kips)	Galvanized Weight (lbs)
30CLH4-R	30	5.0	9.90	14.10	0.188	137.68	759
35CLH4-R	35	5.5	9.90	14.80	0.188	151.22	909
40CLH4-R	40	6.0	10.70	16.30	0.188	184.30	1137
45CLH4-R	45	6.5	10.70	17.00	0.188	199.91	1311
50CLH4-R	50	7.0	10.70	17.18	0.188 / 0.250	266.60	1800
55CLH4-R	55	7.5	10.70	17.88	0.188 / 0.250	288.23	2042
60CLH4-R	60	8.0	10.70	18.58	0.188 / 0.250	310.71	2322
65CLH4-R	65	8.5	8.50	16.96	0.250 / 0.313	311.95	2719
70CLH4-R	70	9.0	8.50	17.66	0.250 / 0.313	338.15	3016
75CLH4-R	75	9.5	8.50	18.36	0.250 / 0.313	365.41	3300
80CLH4-R	80	10.0	8.50	18.93	0.313 / 0.313	387.97	3869

Wood Pole Equivalent Class 1

Taper Rate = 0.124 in/ft

Catalog Number	Length (ft)	Embedment Depth (ft)	Top Diameter (in)	Butt Diameter (in)	Wall Thickness (in)	Ultimate Moment Capacity at GL (ft-kips)	Galvanized Weight (lbs)
40CL1-MS	40	6.0	7.50	12.46	0.1875	109.35	808
45CL1-MS	45	6.5	7.50	13.08	0.1875	112.34	937
50CL1-MS	50	7.0	7.50	13.70	0.1875	131.73	1072
55CL1-MS	55	7.5	7.50	13.82	0.1875	132.97	1261
60CL1-MS	60	8.0	7.50	14.44	0.1875	144.99	1404
65CL1-MS	65	8.5	7.50	15.06	0.1875	157.54	1553
70CL1-MS	70	9.0	7.50	15.68	0.1875	170.60	1709
75CL1-MS	75	9.5	7.50	16.30	0.1875	184.19	1871
80CL1-MS	80	10.0	7.50	16.92	0.1875	198.30	2039
85CL1-MS	85	10.5	7.50	17.54	0.1875	212.92	2214
90CL1-MS	90	11.0	7.50	18.16	0.1875	228.07	2395
95CL1-MS	95	11.5	7.50	18.78	0.1875	243.74	2590
100CL1-MS	100	12.0	7.50	19.40	0.1875	259.93	2784
105CL1-MS	105	12.5	7.50	19.52	0.1875	261.67	3055
110CL1-MS	110	13.0	7.50	20.14	0.1875	278.43	3257
115CL1-MS	115	13.5	7.50	20.76	0.1875	295.72	3465
120CL1-MS	120	14.0	7.50	21.38	0.1875	313.52	3679
125CL1-MS	125	14.5	7.50	22.00	0.1875	331.85	3900
130CL1-MS	130	15.0	7.50	22.62	0.1875	350.70	4127



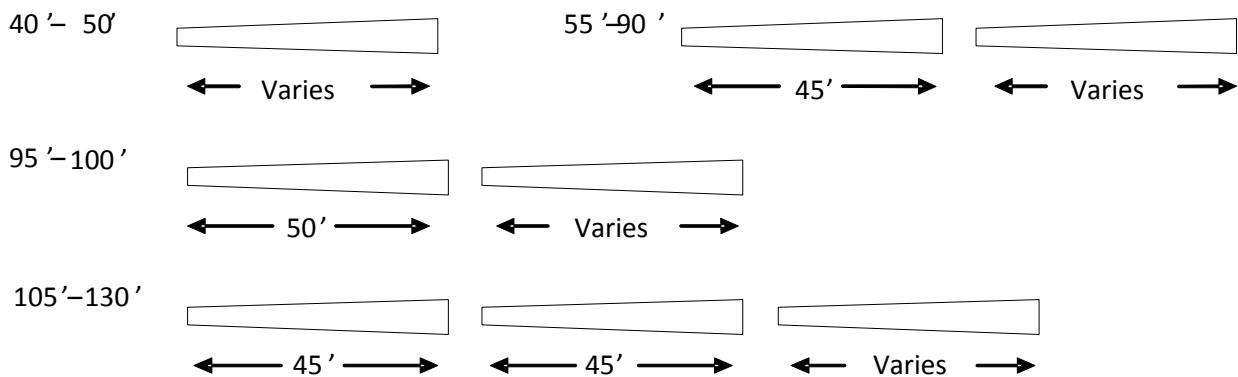
Design Notes

- All Pole shafts manufactured from ASTM A572 Grade 65 steel
- All Poles are designed for Flat-to-Flat Orientation
- Up to 50' All Poles are Single Piece
- 55'-90' All Poles are 2-Piece with standard 45' top section
- 95'-100' All Poles are 2-Piece with standard 50' top section
- 105'-130' All Poles are 3-piece with standard 45' top & mid sections
- No Deflection Limitations
- Loads as per ANSI 05.1

Wood Pole Equivalent Class H1

Taper Rate = 0.1352 in/ft

Catalog Number	Length (ft)	Embedment Depth (ft)	Top Diameter (in)	Butt Diameter (in)	Wall Thickness (in)	Ultimate Moment Capacity at GL (ft-kips)	Galvanized Weight (lbs)
40CLH1-MS	40	6.0	8.130	13.54	0.1875	129.53	878
45CLH1-MS	45	6.5	8.130	14.21	0.1875	142.50	1018
50CLH1-MS	50	7.0	8.130	14.89	0.1875	156.09	1165
55CLH1-MS	55	7.5	8.130	15.06	0.1875	158.34	1371
60CLH1-MS	60	8.0	8.130	15.73	0.1875	172.64	1527
65CLH1-MS	65	8.5	8.130	16.41	0.1875	187.57	1690
70CLH1-MS	70	9.0	8.130	17.08	0.1875	203.11	1860
75CLH1-MS	75	9.5	8.130	17.76	0.1875	219.28	2036
80CLH1-MS	80	10.0	8.130	18.44	0.1875	236.06	2220
85CLH1-MS	85	10.5	8.130	19.11	0.1875	253.46	2411
90CLH1-MS	90	11.0	8.130	19.79	0.1875	271.48	2608
95CLH1-MS	95	11.5	8.130	20.46	0.1875	290.12	2821
100CLH1-MS	100	12.0	8.130	21.14	0.1875	309.37	3039
105CLH1-MS	105	12.5	8.130	21.31	0.1875	312.54	3339
110CLH1-MS	110	13.0	8.130	21.98	0.1875	332.52	3561
115CLH1-MS	115	13.5	8.130	22.66	0.1875	353.11	3788
120CLH1-MS	120	14.0	8.130	23.33	0.1875	374.32	4021
125CLH1-MS	125	14.5	8.130	24.01	0.1875	396.16	4262
130CLH1-MS	130	15.0	8.130	24.69	0.1875	416.61	4510



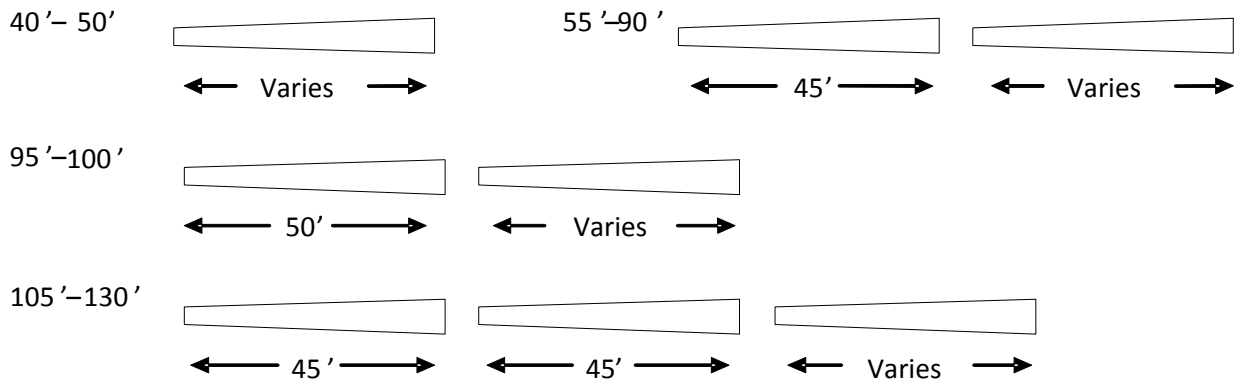
Design Notes

- All Pole shafts manufactured from ASTM A572 Grade 65 steel
- All Poles are designed for Flat-to-Flat Orientation
- Up to 50' All Poles are Single Piece
- 55'-90' All Poles are 2-Piece with standard 45' top section
- 95'-100' All Poles are 2-Piece with standard 50' top section
- 105'-130' All Poles are 3-piece with standard 45' top & mid sections
- No Deflection Limitations
- Loads as per ANSI 05.1

Wood Pole Equivalent Class H2

Taper Rate = 0.151 in/ft

Catalog Number	Length (ft)	Embedment Depth (ft)	Top Diameter (in)	Butt Diameter (in)	Wall Thickness (in)	Ultimate Moment Capacity at GL (ft-kips)	Galvanized Weight (lbs)
40CLH2-MS	40	6.0	8.50	14.54	0.1875	149.10	934
45CLH2-MS	45	6.5	8.50	15.29	0.1875	164.65	1086
50CLH2-MS	50	7.0	8.50	16.05	0.1875	180.98	1245
55CLH2-MS	55	7.5	8.50	16.28	0.1875	184.77	1474
60CLH2-MS	60	8.0	8.50	17.03	0.1875	202.05	1643
65CLH2-MS	65	8.5	8.50	17.79	0.1875	220.09	1820
70CLH2-MS	70	9.0	8.50	18.54	0.1875	238.91	2004
75CLH1-MS	75	9.5	8.50	19.30	0.1875	258.50	2197
80CLH2-MS	80	10.0	8.50	20.05	0.1875	278.86	2397
85CLH2-MS	85	10.5	8.50	20.81	0.1875	299.99	2604
90CLH2-MS	90	11.0	8.50	21.56	0.1875	321.90	2820
95CLH2-MS	95	11.5	8.50	22.32	0.1875	344.58	3052
100CLH2-MS	100	12.0	8.50	23.07	0.1875	368.03	3283
105CLH2-MS	105	12.5	8.50	23.30	0.1875	373.43	3628
110CLH2-MS	110	13.0	8.50	24.06	0.1875	397.83	3869
115CLH2-MS	115	13.5	8.50	24.81	0.1875	422.82	4118
120CLH2-MS	120	14.0	8.50	25.57	0.1875	442.18	4374
125CLH2-MS	125	14.5	8.50	26.32	0.1875	461.52	4639
130CLH2-MS	130	15.0	8.50	27.08	0.1875	480.82	4911



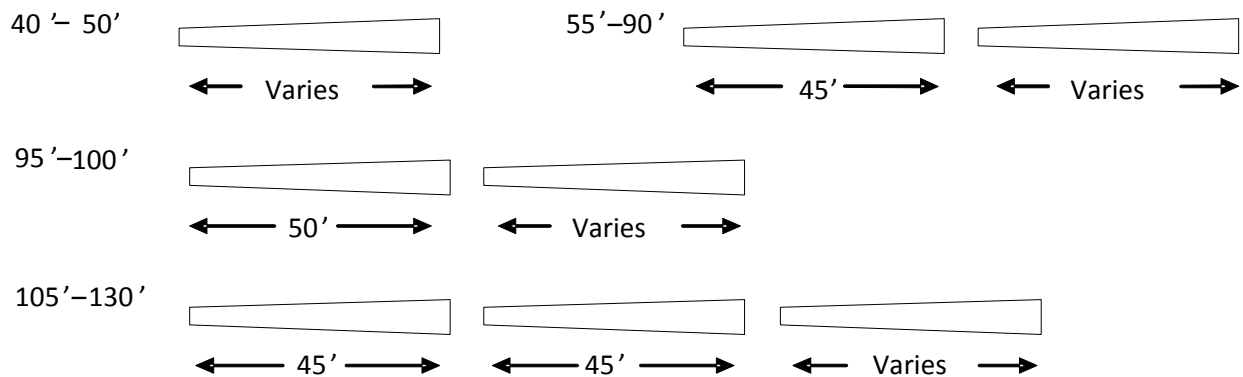
Design Notes

- All Pole shafts manufactured from ASTM A572 Grade 65 steel
- All Poles are designed for Flat-to-Flat Orientation
- Up to 50' All Poles are Single Piece
- 55'-90' All Poles are 2-Piece with standard 45' top section
- 95'-100' All Poles are 2-Piece with standard 50' top section
- 105'-130' All Poles are 3-piece with standard 45' top & mid sections
- No Deflection Limitations
- Loads as per ANSI 05.1

Wood Pole Equivalent Class H3

Taper Rate = 0.168 in/ft

Catalog Number	Length (ft)	Embedment Depth (ft)	Top Diameter (in)	Butt Diameter (in)	Wall Thickness (in)	Ultimate Moment Capacity at GL (ft-kips)	Galvanized Weight (lbs)
40CLH3-MS	40	6.0	8.90	15.62	0.1875	171.73	996
45CLH3-MS	45	6.5	8.90	16.46	0.1875	190.32	1158
50CLH3-MS	50	7.0	8.90	17.30	0.1875	209.87	1329
55CLH3-MS	55	7.5	8.90	17.60	0.1875	215.55	1585
60CLH3-MS	60	8.0	8.90	18.44	0.1875	236.32	1768
65CLH3-MS	65	8.5	8.90	19.28	0.1875	258.04	1960
70CLH3-MS	70	9.0	8.90	20.12	0.1875	280.73	2160
75CLH3-MS	75	9.5	8.90	20.96	0.1875	304.36	2369
80CLH3-MS	80	10.0	8.90	21.80	0.1875	328.96	2586
85CLH3-MS	85	10.5	8.90	22.64	0.1875	354.51	2812
90CLH3-MS	90	11.0	8.90	23.48	0.1875	381.01	3046
95CLH3-MS	95	11.5	8.90	24.32	0.1875	408.47	3300
100CLH3-MS	100	12.0	8.90	25.16	0.1875	433.26	3552
105CLH3-MS	105	12.5	8.90	25.45	0.1875	439.33	3940
110CLH3-MS	110	13.0	8.90	26.29	0.1875	460.85	4203
115CLH3-MS	115	13.5	8.90	27.13	0.1875	482.32	4475
120CLH3-MS	120	14.0	8.90	27.97	0.1875	503.69	4756
125CLH3-MS	125	14.5	8.90	28.81	0.1875	524.92	5045
130CLH3-MS	130	15.0	8.90	29.65	0.1875	545.95	5343



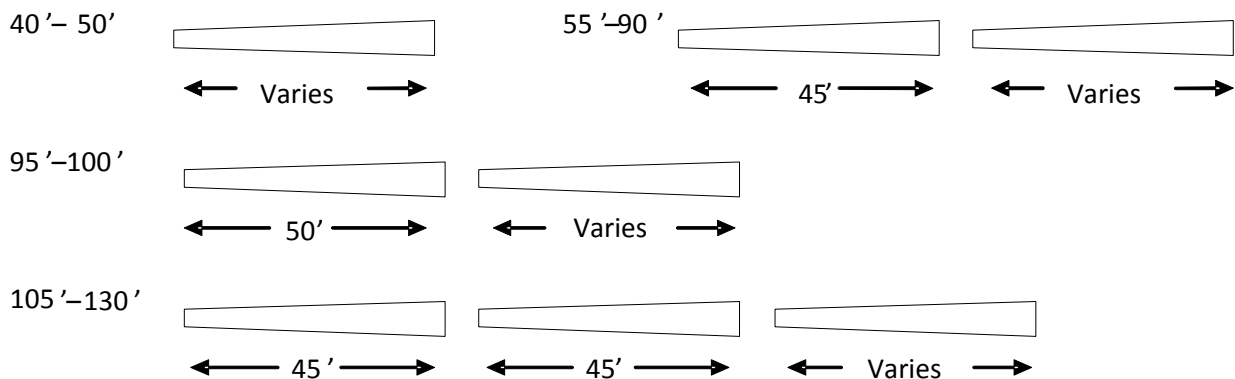
Design Notes

- All Pole shafts manufactured from ASTM A572 Grade 65 steel
- All Poles are designed for Flat-to-Flat Orientation
- Up to 50' All Poles are Single Piece
- 55'-90' All Poles are 2-Piece with standard 45' top section
- 95'-100' All Poles are 2-Piece with standard 50' top section
- 105'-130' All Poles are 3-piece with standard 45' top & mid sections
- No Deflection Limitations
- Loads as per ANSI 05.1

Wood Pole Equivalent Class H4

Taper Rate = 0.196 in/ft

Catalog Number	Length (ft)	Embedment Depth (ft)	Top Diameter (in)	Butt Diameter (in)	Wall Thickness (in)	Ultimate Moment Capacity at GL (ft-kips)	Galvanized Weight (lbs)
40CLH4-MS	40	6.0	8.80	16.64	0.1875	192.75	1033
45CLH4-MS	45	6.5	8.80	17.62	0.1875	215.79	1207
50CLH4-MS	50	7.0	8.80	18.60	0.1875	240.13	1391
55CLH4-MS	55	7.5	8.80	19.01	0.1875	249.02	1667
60CLH4-MS	60	8.0	8.80	19.99	0.1875	275.12	1865
65CLH4-MS	65	8.5	8.80	20.97	0.1875	302.52	2073
70CLH4-MS	70	9.0	8.80	21.95	0.1875	331.22	2291
75CLH4-MS	75	9.5	8.80	22.93	0.1875	361.22	2519
80CLH4-MS	80	10.0	8.80	23.91	0.1875	392.52	2758
85CLH4-MS	85	10.5	8.80	24.89	0.1875	424.43	3006
90CLH4-MS	90	11.0	8.80	25.87	0.1875	449.55	3264
95CLH4-MS	95	11.5	8.80	26.85	0.1875	474.64	3553
100CLH4-MS	100	12.0	8.80	27.83	0.1875	499.60	3832
105CLH4-MS	105	12.5	8.80	28.24	0.1875	508.37	4265
110CLH4-MS	110	13.0	8.80	29.22	0.1875	533.06	4558
115CLH4-MS	115	13.5	8.80	30.22	0.1875	557.47	4861
120CLH4-MS	120	14.0	8.80	31.18	0.1875	581.52	5174
125CLH4-MS	125	14.5	8.80	32.16	0.1875	605.13	5498
130CLH4-MS	130	15.0	8.80	33.14	0.1875	628.22	5831



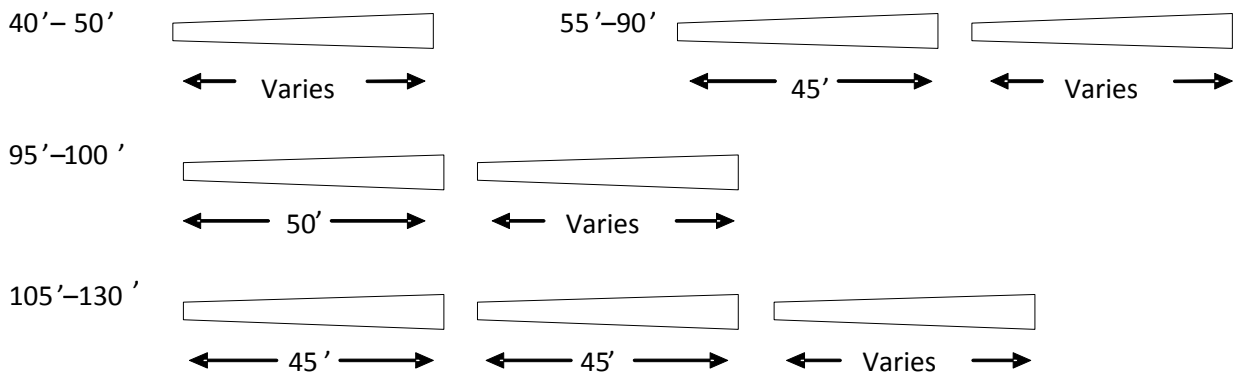
Design Notes

- All Pole shafts manufactured from ASTM A572 Grade 65 steel
- All Poles are designed for Flat-to-Flat Orientation
- Up to 50' All Poles are Single Piece
- 55'-90' All Poles are 2-Piece with standard 45' top section
- 95'-100' All Poles are 2-Piece with standard 50' top section
- 105'-130' All Poles are 3-piece with standard 45' top & mid sections
- No Deflection Limitations
- Loads as per ANSI 05.1

Wood Pole Equivalent Class H5

Taper Rate = 0.163 in/ft

Catalog Number	Length (ft)	Embedment Depth (ft)	Top Diameter (in)	Butt Diameter (in)	Wall Thickness (in)	Ultimate Moment Capacity at GL (ft-kips)	Galvanized Weight (lbs)
40CLH5-MS	40	6.0	9.45	15.97	0.250	238.26	1368
45CLH5-MS	45	6.5	9.45	16.78	0.250	262.76	1589
50CLH5-MS	50	7.0	9.45	17.60	0.250	288.46	1821
55CLH5-MS	55	7.5	9.45	17.75	0.250	290.99	2163
60CLH5-MS	60	8.0	9.45	18.57	0.250	318.01	2408
65CLH5-MS	65	8.5	9.45	19.38	0.250	346.22	2664
70CLH5-MS	70	9.0	9.45	20.20	0.250	375.63	2932
75CLH5-MS	75	9.5	9.45	21.01	0.250	406.24	3211
80CLH5-MS	80	10.0	9.45	21.83	0.250	438.06	3500
85CLH5-MS	85	10.5	9.45	22.64	0.250	471.07	3801
90CLH5-MS	90	11.0	9.45	23.46	0.250	505.28	4113
95CLH5-MS	95	11.5	9.45	24.27	0.250	540.69	4451
100CLH5-MS	100	12.0	9.45	25.09	0.250	577.29	4785
105CLH5-MS	105	12.5	9.45	25.24	0.250	580.88	5292
110CLH5-MS	110	13.0	9.45	26.05	0.250	618.80	5639
115CLH5-MS	115	13.5	9.45	26.87	0.250	657.92	5998
120CLH5-MS	120	14.0	9.45	27.68	0.250	698.25	6367
125CLH5-MS	125	14.5	9.45	28.50	0.250	739.77	6748
130CLH5-MS	130	15.0	9.45	29.31	0.250	782.49	7140



Design Notes

All Pole shafts manufactured from ASTM A572 Grade 65 steel
 All Poles are designed for Flat-to-Flat Orientation

Up to 50

All Poles are Single Piece

55'-90'

All Poles are 2-Piece with standard 45' top section

95'-100'

All Poles are 2-Piece with standard 50' top section

105'-130'

All Poles are 3-piece with standard 45' top & mid sections

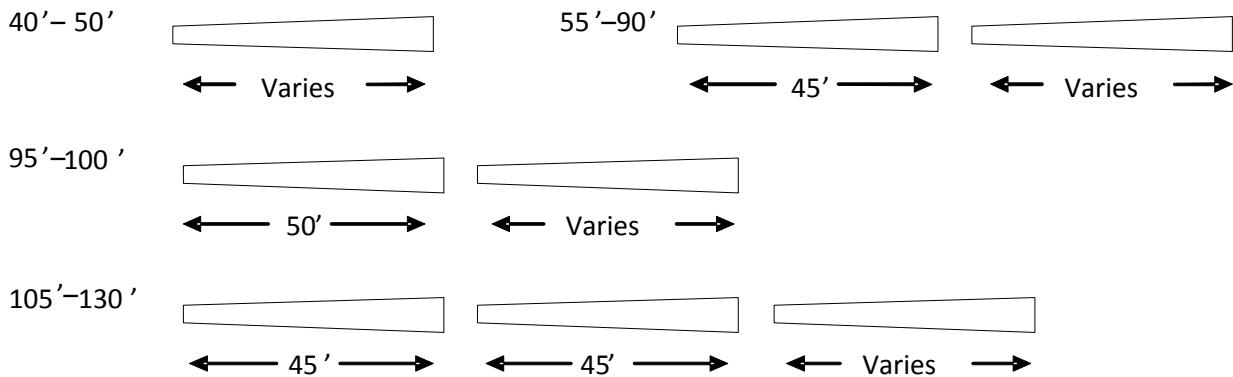
No Deflection Limitations

Loads as per ANSI 05.1

Wood Pole Equivalent Class H6

Taper Rate = 0.171 in/ft

Catalog Number	Length (ft)	Embedment Depth (ft)	Top Diameter (in)	Butt Diameter (in)	Wall Thickness (in)	Ultimate Moment Capacity at GL (ft-kips)	Galvanized Weight (lbs)
40CLH6-MS	40	6.0	10.25	17.09	0.250	274.47	1474
45CLH6-MS	45	6.5	10.25	17.94	0.250	302.04	1710
50CLH6-MS	50	7.0	10.25	18.80	0.250	330.93	1958
55CLH6-MS	55	7.5	10.25	18.98	0.250	334.73	2325
60CLH6-MS	60	8.0	10.25	19.84	0.250	365.11	2587
65CLH6-MS	65	8.5	10.25	20.69	0.250	396.81	2861
70CLH6-MS	70	9.0	10.25	21.55	0.250	429.83	3147
75CLH6-MS	75	9.5	10.25	22.40	0.250	464.17	3444
80CLH6-MS	80	10.0	10.25	23.26	0.250	499.83	3753
85CLH6-MS	85	10.5	10.25	24.11	0.250	536.81	4073
90CLH6-MS	90	11.0	10.25	24.97	0.250	575.12	4405
95CLH6-MS	95	11.5	10.25	25.82	0.250	614.74	4778
100CLH6-MS	100	12.0	10.25	26.68	0.250	655.68	5134
105CLH6-MS	105	12.5	10.25	26.86	0.250	661.01	5663
110CLH6-MS	110	13.0	10.25	27.72	0.250	703.44	6033
115CLH6-MS	115	13.5	10.25	28.57	0.250	747.19	6415
120CLH6-MS	120	14.0	10.25	29.43	0.250	792.26	6808
125CLH6-MS	125	14.5	10.25	30.28	0.250	838.65	7213
130CLH6-MS	130	15.0	10.25	31.14	0.250	886.36	7629



Design Notes

All Pole shafts manufactured from ASTM A572 Grade 65 steel

All Poles are designed for Flat-to-Flat Orientation

Up to 50 All Poles are Single Piece

55'-90' All Poles are 2-Piece with standard 45' top section

95'-100' All Poles are 2-Piece with standard 50' top section

105'-130' All Poles are 3-piece with standard 45' top & mid sections

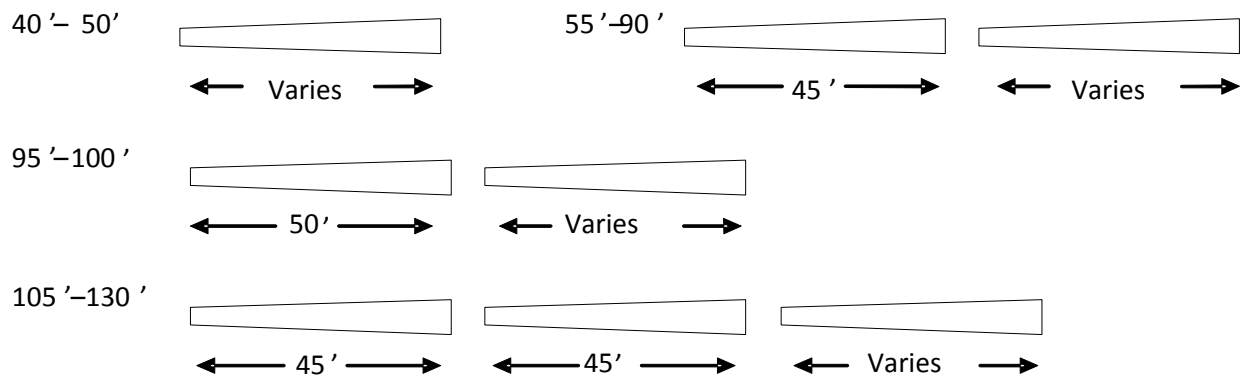
No Deflection Limitations

Loads as per ANSI 05.1

RUS Class 1

Taper Rate = 0.1360 in/ft

Catalog Number	Length (ft)	Embedment Depth (ft)	Top Diameter (in)	Butt Diameter (in)	Wall Thickness (in)	Ultimate Moment Capacity at Point of Fixity	Galvanized Weight (lbs)
40CLRUS1-MS	40	6.0	8.00	13.44	0.1875	135.38	961
45CLRUS1-MS	45	6.5	8.00	14.12	0.1875	149.77	1110
50CLRUS1-MS	50	7.0	8.00	14.80	0.1875	164.90	1265
55CLRUS1-MS	55	7.5	8.00	14.98	0.1875	168.69	1480
60CLRUS1-MS	60	8.0	8.00	15.66	0.1875	184.72	1644
65CLRUS1-MS	65	8.5	8.00	16.34	0.1875	201.47	1816
70CLRUS1-MS	70	9.0	8.00	17.02	0.1875	218.95	1995
75CLRUS1-MS	75	9.5	8.00	17.70	0.1875	237.16	2183
80CLRUS1-MS	80	10.0	8.00	18.38	0.1875	256.10	2377
85CLRUS1-MS	85	10.5	8.00	19.06	0.1875	275.76	2578
90CLRUS1-MS	90	11.0	8.00	19.74	0.1875	296.15	2786
95CLRUS1-MS	95	11.5	8.00	20.42	0.1875	317.27	3018
100CLRUS1-MS	100	12.0	8.00	21.10	0.1875	339.12	3241
105CLRUS1-MS	105	12.5	8.00	21.28	0.1875	344.55	3554
110CLRUS1-MS	110	13.0	8.00	21.96	0.1875	367.30	3786
115CLRUS1-MS	115	13.5	8.00	22.64	0.1875	390.77	4026
120CLRUS1-MS	120	14.0	8.00	23.32	0.1875	414.98	4273
125CLRUS1-MS	125	14.5	8.00	24.00	0.1875	435.51	4527
130CLRUS1-MS	130	15.0	8.00	24.68	0.1875	454.30	4789



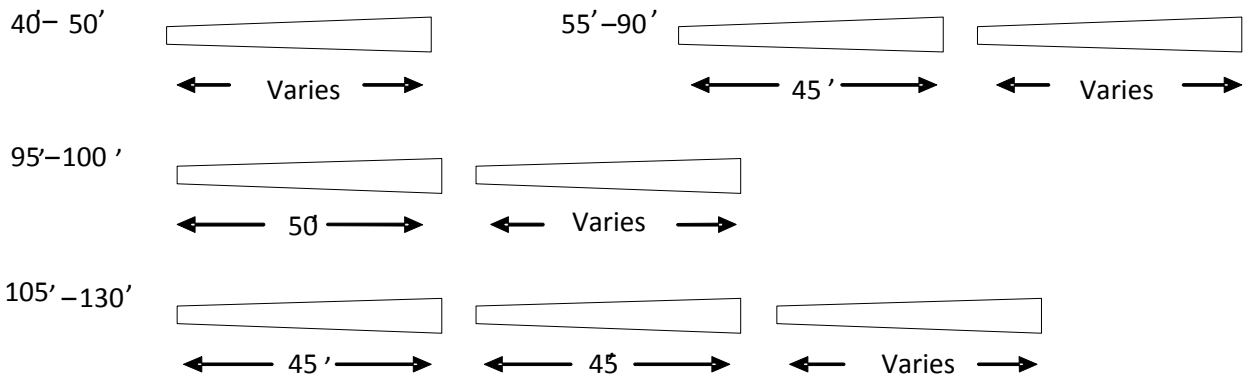
Design Notes

- All Pole shafts manufactured from ASTM A572 Grade 65 steel
- All Poles are designed for Flat-to-Flat Orientation
- Up to 50' All Poles are Single Piece
- 55'-90' All Poles are 2-Piece with standard 45' top section
- 95'-100' All Poles are 2-Piece with standard 50' top section
- 105'-130' All Poles are 3-piece with standard 45' top & mid sections
- Deflection Limited to 15% of the height above Point of Fixity
- Loads per RUS Bulletin 1724E-214

RUS Class H1

Taper Rate = 0.1410 in/ft

Catalog Number	Length (ft)	Embedment Depth (ft)	Top Diameter (in)	Butt Diameter (in)	Wall Thickness (in)	Ultimate Moment Capacity at Point of Fixity	Galvanized Weight (lbs)
40CLRUSH1-MS	40	6.0	8.75	14.39	0.1875	155.98	1039
45CLRUSH1-MS	45	6.5	8.75	15.09	0.1875	171.98	1197
50CLRUSH1-MS	50	7.0	8.75	15.80	0.1875	188.77	1364
55CLRUSH1-MS	55	7.5	8.75	15.99	0.1875	193.16	1600
60CLRUSH1-MS	60	8.0	8.75	16.70	0.1875	210.93	1777
65CLRUSH1-MS	65	8.5	8.75	17.40	0.1875	229.48	1960
70CLRUSH1-MS	70	9.0	8.75	18.11	0.1875	248.81	2151
75CLRUSH1-MS	75	9.5	8.75	18.81	0.1875	268.92	2349
80CLRUSH1-MS	80	10.0	8.75	19.52	0.1875	289.82	2556
85CLRUSH1-MS	85	10.5	8.75	20.22	0.1875	311.50	2769
90CLRUSH1-MS	90	11.0	8.75	20.93	0.1875	333.96	2990
95CLRUSH1-MS	95	11.5	8.75	21.63	0.1875	357.20	3229
100CLRUSH1-MS	100	12.0	8.75	22.34	0.1875	381.22	3465
105CLRUSH1-MS	105	12.5	8.75	22.53	0.1875	387.44	3815
110CLRUSH1-MS	110	13.0	8.75	23.24	0.1875	412.45	4061
115CLRUSH1-MS	115	13.5	8.75	23.94	0.1875	434.26	4314
120CLRUSH1-MS	120	14.0	8.75	24.65	0.1875	453.74	4575
125CLRUSH1-MS	125	14.5	8.75	25.35	0.1875	473.18	4844
130CLRUSH1-MS	130	15.0	8.75	26.06	0.1875	492.56	5121



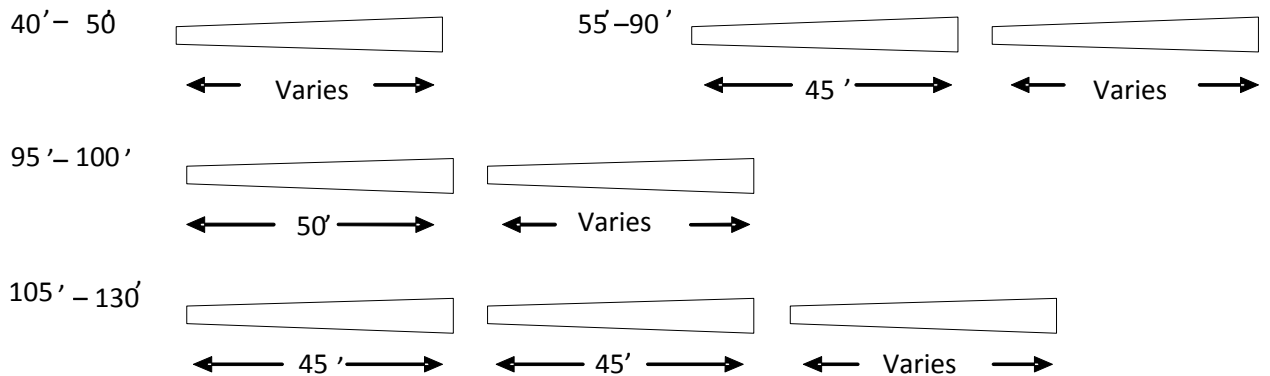
Design Notes

- All Pole shafts manufactured from ASTM A572 Grade 65 steel
- All Poles are designed for Flat-to-Flat Orientation
- Up to 50' All Poles are Single Piece
- 55'-90' All Poles are 2-Piece with standard 45' top section
- 95'-100' All Poles are 2-Piece with standard 50' top section
- 105'-130' All Poles are 3-piece with standard 45' top & mid sections
- Deflection Limited to 15% of the height above Point of Fixity
- Loads per RUS Bulletin 1724E-214

RUS Class H2

Taper Rate = 0.1525 in/ft

Catalog Number	Length (ft)	Embedment Depth (ft)	Top Diameter (in)	Butt Diameter (in)	Wall Thickness (in)	Ultimate Moment Capacity at Point of Fixity	Galvanized Weight (lbs)
40CLRUSH2-MS	40	6.0	9.00	15.10	0.1875	171.73	1082
45CLRUSH2-MS	45	6.5	9.00	15.86	0.1875	189.91	1249
50CLRUSH2-MS	50	7.0	9.00	16.62	0.1875	209.00	1425
55CLRUSH2-MS	55	7.5	9.00	16.86	0.1875	214.68	1674
60CLRUSH2-MS	60	8.0	9.00	17.62	0.1875	234.96	1860
65CLRUSH2-MS	65	8.5	9.00	18.39	0.1875	256.14	2054
70CLRUSH2-MS	70	9.0	9.00	19.15	0.1875	278.24	2255
75CLRUSH2-MS	75	9.5	9.00	19.91	0.1875	301.26	2466
80CLRUSH2-MS	80	10.0	9.00	20.67	0.1875	325.19	2685
85CLRUSH2-MS	85	10.5	9.00	21.44	0.1875	350.03	2911
90CLRUSH2-MS	90	11.0	9.00	22.20	0.1875	375.79	3146
95CLRUSH2-MS	95	11.5	9.00	22.96	0.1875	402.47	3399
100CLRUSH2-MS	100	12.0	9.00	23.72	0.1875	428.15	3650
105CLRUSH2-MS	105	12.5	9.00	23.96	0.1875	434.23	4023
110CLRUSH2-MS	110	13.0	9.00	24.72	0.1875	455.30	4284
115CLRUSH2-MS	115	13.5	9.00	25.49	0.1875	476.32	4554
120CLRUSH2-MS	120	14.0	9.00	26.25	0.1875	497.26	4832
125CLRUSH2-MS	125	14.5	9.00	27.01	0.1875	518.07	5119
130CLRUSH2-MS	130	15.0	9.00	27.77	0.1875	538.72	5414



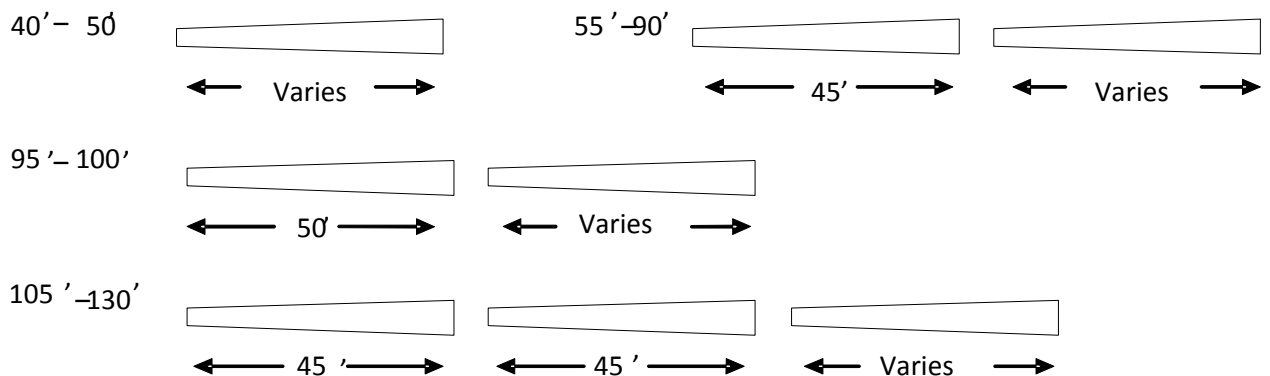
Design Notes

- All Pole shafts manufactured from ASTM A572 Grade 65 steel
- All Poles are designed for Flat-to-Flat Orientation
- Up to 50' All Poles are Single Piece
- 55'-90' All Poles are 2-Piece with standard 45' top section
- 95'-100' All Poles are 2-Piece with standard 50' top section
- 105'-130' All Poles are 3-piece with standard 45' top & mid sections
- Deflection Limited to 15% of the height above Point of Fixity
- Loads per RUS Bulletin 1724E-214

RUS Class H3

Taper Rate = 0.1695 in/ft

Catalog Number	Length (ft)	Embedment Depth (ft)	Top Diameter (in)	Butt Diameter (in)	Wall Thickness (in)	Ultimate Moment Capacity at Point of Fixity	Galvanized Weight (lbs)
40CLRUSH3-MS	40	6.0	9.25	16.03	0.1875	193.35	1137
45CLRUSH3-MS	45	6.5	9.25	16.88	0.1875	214.81	1315
50CLRUSH3-MS	50	7.0	9.25	17.72	0.1875	237.41	1501
55CLRUSH3-MS	55	7.5	9.25	18.03	0.1875	245.33	1777
60CLRUSH3-MS	60	8.0	9.25	18.88	0.1875	269.44	1977
65CLRUSH3-MS	65	8.5	9.25	19.72	0.1875	294.68	2185
70CLRUSH3-MS	70	9.0	9.25	20.57	0.1875	321.05	2402
75CLRUSH3-MS	75	9.5	9.25	21.42	0.1875	348.55	2628
80CLRUSH3-MS	80	10.0	9.25	22.27	0.1875	377.17	2863
85CLRUSH3-MS	85	10.5	9.25	23.11	0.1875	406.93	3108
90CLRUSH3-MS	90	11.0	9.25	23.96	0.1875	433.95	3361
95CLRUSH3-MS	95	11.5	9.25	24.81	0.1875	457.37	3635
100CLRUSH3-MS	100	12.0	9.25	25.66	0.1875	480.72	3906
105CLRUSH3-MS	105	12.5	9.25	25.96	0.1875	488.63	4322
110CLRUSH3-MS	110	13.0	9.25	26.81	0.1875	511.82	4607
115CLRUSH3-MS	115	13.5	9.25	27.66	0.1875	534.81	4899
120CLRUSH3-MS	120	14.0	9.25	28.50	0.1875	557.55	5202
125CLRUSH3-MS	125	14.5	9.25	29.35	0.1875	579.97	5513
130CLRUSH3-MS	130	15.0	9.25	30.20	0.1875	602.02	5834



Design Notes

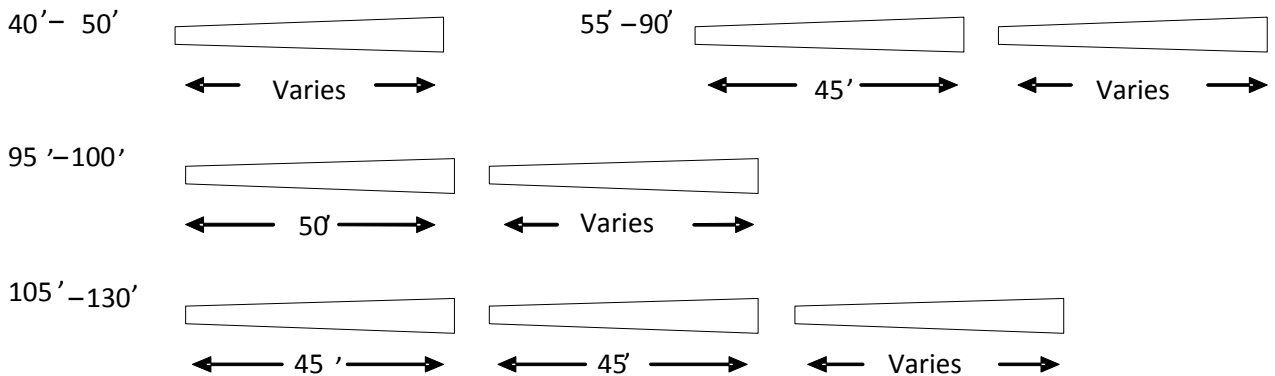
All Pole shafts manufactured from ASTM A572 Grade 65 steel
 All Poles are designed for Flat-to-Flat Orientation
 All Poles are Single Piece
 All Poles are 2-Piece with standard 45' top section
 All Poles are 2-Piece with standard 50' top section
 All Poles are 3-piece with standard 45' top & mid sections
 Deflection Limited to 15% of the height above Point of Fixity
 Loads per RUS Bulletin 1724E-214

Up to 50
 55'-90'
 95'-100'
 105'-130'

RUS Class H4

Taper Rate = 0.2000 in/ft

Catalog Number	Length (ft)	Embedment Depth (ft)	Top Diameter (in)	Butt Diameter (in)	Wall Thickness (in)	Ultimate Moment Capacity at Point of Fixity	Galvanized Weight (lbs)
40CLRUSH4-MS	40	6.0	9.35	17.35	0.1875	225.67	1203
45CLRUSH4-MS	45	6.5	9.35	18.35	0.1875	253.10	1396
50CLRUSH4-MS	50	7.0	9.35	19.35	0.1875	282.11	1600
55CLRUSH4-MS	55	7.5	9.35	19.78	0.1875	277.73	1902
60CLRUSH4-MS	60	8.0	9.35	20.78	0.1875	325.72	2121
65CLRUSH4-MS	65	8.5	9.35	21.78	0.1875	358.51	2351
70CLRUSH4-MS	70	9.0	9.35	22.78	0.1875	392.88	2591
75CLRUSH4-MS	75	9.5	9.35	23.78	0.1875	427.22	2843
80CLRUSH4-MS	80	10.0	9.35	24.78	0.1875	454.85	3105
85CLRUSH4-MS	85	10.5	9.35	25.78	0.1875	482.41	3377
90CLRUSH4-MS	90	11.0	9.35	26.78	0.1875	509.80	3661
95CLRUSH4-MS	95	11.5	9.35	27.78	0.1875	536.93	3977
100CLRUSH4-MS	100	12.0	9.35	28.78	0.1875	563.70	4282
105CLRUSH4-MS	105	12.5	9.35	29.21	0.1875	574.58	4754
110CLRUSH4-MS	110	13.0	9.35	30.21	0.1875	600.67	5074
115CLRUSH4-MS	115	13.5	9.35	31.21	0.1875	626.15	5405
120CLRUSH4-MS	120	14.0	9.35	32.21	0.1875	650.94	5746
125CLRUSH4-MS	125	14.5	9.35	33.21	0.1875	674.93	6099
130CLRUSH4-MS	130	15.0	9.35	34.21	0.1875	698.02	6463



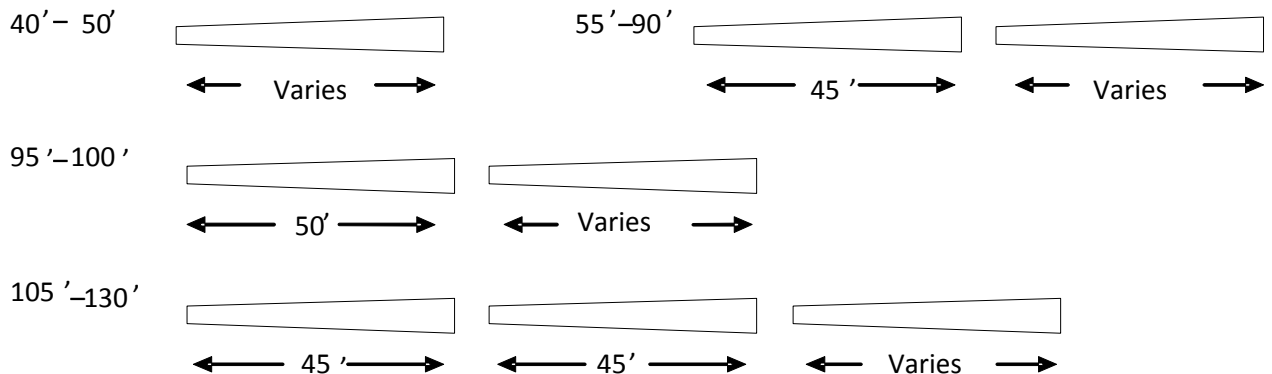
Design Notes

- All Pole shafts manufactured from ASTM A572 Grade 65 steel
- All Poles are designed for Flat-to-Flat Orientation
- Up to 50' All Poles are Single Piece
- 55'-90' All Poles are 2-Piece with standard 45' top section
- 95'-100' All Poles are 2-Piece with standard 50' top section
- 105'-130' All Poles are 3-piece with standard 45' top & mid sections
- Deflection Limited to 15% of the height above Point of Fixity
- Loads per RUS Bulletin 1724E-214

RUS Class H5

Taper Rate = 0.1670 in/ft

Catalog Number	Length (ft)	Embedment Depth (ft)	Top Diameter (in)	Butt Diameter (in)	Wall Thickness (in)	Ultimate Moment Capacity at Point of Fixity	Galvanized Weight (lbs)
40CLRUSH5-MS	40	6.0	9.50	16.18	0.250	260.03	1510
45CLRUSH5-MS	45	6.5	9.50	17.01	0.250	288.33	1746
50CLRUSH5-MS	50	7.0	9.50	17.85	0.250	318.10	1995
55CLRUSH5-MS	55	7.5	9.50	18.02	0.250	323.66	2359
60CLRUSH5-MS	60	8.0	9.50	18.86	0.250	355.15	2622
65CLRUSH5-MS	65	8.5	9.50	19.69	0.250	388.10	2898
70CLRUSH5-MS	70	9.0	9.50	20.53	0.250	422.52	3184
75CLRUSH5-MS	75	9.5	9.50	21.36	0.250	458.40	3483
80CLRUSH5-MS	80	10.0	9.50	22.20	0.250	495.74	3794
85CLRUSH5-MS	85	10.5	9.50	23.03	0.250	534.55	4117
90CLRUSH5-MS	90	11.0	9.50	23.87	0.250	574.82	4452
95CLRUSH5-MS	95	11.5	9.50	24.70	0.250	616.55	4814
100CLRUSH5-MS	100	12.0	9.50	25.54	0.250	659.74	5173
105CLRUSH5-MS	105	12.5	9.50	25.71	0.250	667.73	5714
110CLRUSH5-MS	110	13.0	9.50	26.54	0.250	712.65	6087
115CLRUSH5-MS	115	13.5	9.50	27.38	0.250	759.03	6474
120CLRUSH5-MS	120	14.0	9.50	28.21	0.250	806.88	6872
125CLRUSH5-MS	125	14.5	9.50	29.05	0.250	856.18	7277
130CLRUSH5-MS	130	15.0	9.50	29.88	0.250	906.95	7697



Design Notes

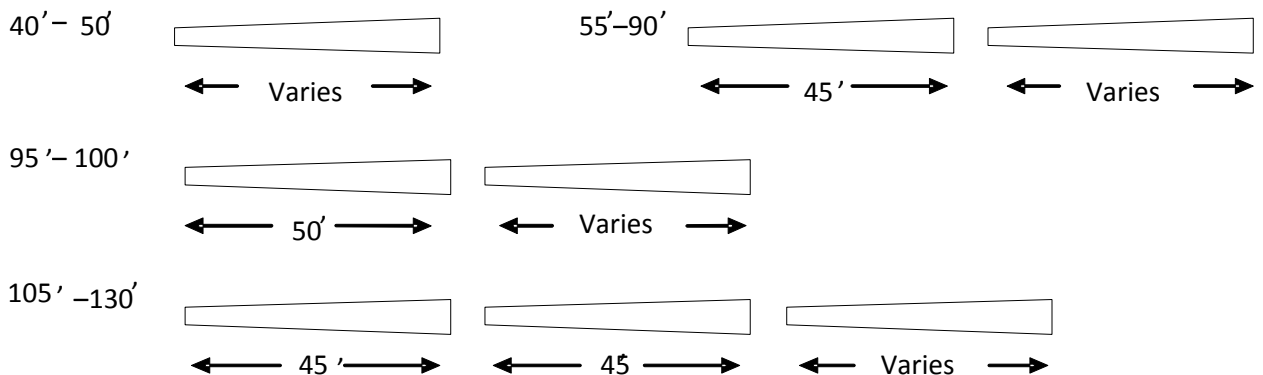
Up to 50
55'-90'
95'-100'
105'-130'

All Pole shafts manufactured from ASTM A572 Grade 65 steel
 All Poles are designed for Flat-to-Flat Orientation
 All Poles are Single Piece
 All Poles are 2-Piece with standard 45' top section
 All Poles are 2-Piece with standard 50' top section
 All Poles are 3-piece with standard 45' top & mid sections
 Deflection Limited to 15% of the height above Point of Fixity
 Loads per RUS Bulletin 1724E-214

RUS Class H6

Taper Rate = 0.1760 in/ft

Catalog Number	Length (ft)	Embedment Depth (ft)	Top Diameter (in)	Butt Diameter (in)	Wall Thickness (in)	Ultimate Moment Capacity at Point of Fixity	Galvanized Weight (lbs)
40CLRUSH6-MS	40	6.0	10.25	17.29	0.250	298.14	1621
45CLRUSH6-MS	45	6.5	10.25	18.17	0.250	330.07	1874
50CLRUSH6-MS	50	7.0	10.25	19.05	0.250	363.62	2140
55CLRUSH6-MS	55	7.5	10.25	19.26	0.250	371.01	2530
60CLRUSH6-MS	60	8.0	10.25	20.14	0.250	406.53	2811
65CLRUSH6-MS	65	8.5	10.25	21.02	0.250	443.68	3105
70CLRUSH6-MS	70	9.0	10.25	21.90	0.250	482.45	3412
75CLRUSH6-MS	75	9.5	10.25	22.78	0.250	522.84	3731
80CLRUSH6-MS	80	10.0	10.25	23.66	0.250	564.86	4062
85CLRUSH6-MS	85	10.5	10.25	24.54	0.250	608.51	4406
90CLRUSH6-MS	90	11.0	10.25	25.42	0.250	653.78	4764
95CLRUSH6-MS	95	11.5	10.25	26.30	0.250	700.67	5162
100CLRUSH6-MS	100	12.0	10.25	27.18	0.250	749.19	5544
105CLRUSH6-MS	105	12.5	10.25	27.39	0.250	759.78	6126
110CLRUSH6-MS	110	13.0	10.25	28.27	0.250	810.26	6524
115CLRUSH6-MS	115	13.5	10.25	29.15	0.250	862.38	6934
120CLRUSH6-MS	120	14.0	10.25	30.03	0.250	916.11	7356
125CLRUSH6-MS	125	14.5	10.25	30.91	0.250	971.48	7792
130CLRUSH6-MS	130	15.0	10.25	31.79	0.250	1021.67	8240



Design Notes

- All Pole shafts manufactured from ASTM A572 Grade 65 steel
- All Poles are designed for Flat-to-Flat Orientation
- Up to 50' All Poles are Single Piece
- 55'-90' All Poles are 2-Piece with standard 45' top section
- 95'-100' All Poles are 2-Piece with standard 50' top section
- 105'-130' All Poles are 3-piece with standard 45' top & mid sections
- Deflection Limited to 15% of the height above Point of Fixity
- Loads per RUS Bulletin 1724E-214

TRANSMISSION POLE DESIGN DATA SHEET

Project Information

Customer: _____ Project Location: _____

Date: _____ Structure Type: Dead End / Tangent / Angle

Pole Length: _____ ft Pole Height Above Ground: _____ ft

Anchor Base Embedded Specified Embedment Depth _____ ft

Note: Embedment depth is calculated as 10% x pole height + 2ft unless otherwise specified

Conductor Data				
	Overhead Shield Wire	Conductor 1	Conductor 2	Conductor 3
Name/Type (Ex "Penguin" ACSR)				
Elevation Above Ground (FT)				
Wind Span (FT)				
Weight Span (FT)				
Line Angle (DEG)				

Guy Data				
	Guy 1	Guy 2	Guy 3	Guy 4
Attachment Elevation (FT)				
Azmuth (DEG)				
Guy Lead (FT)				

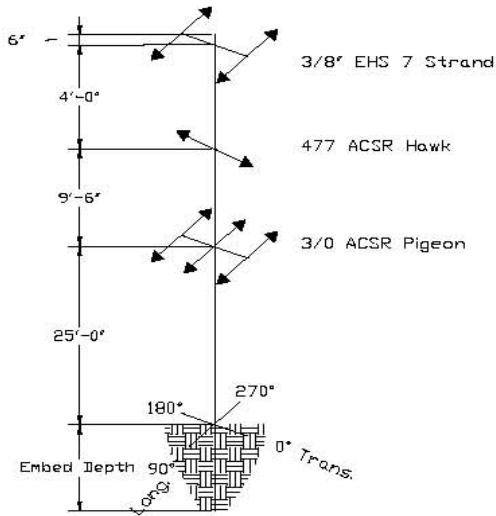
Load Case Data				
Load Case 1				
Load Case Description:				
Ahead Span Tension (LBS)			Overload Factors	
Back Span Tension (LBS)			Wind	
Wind Pressure (PSF)			Tension	
Radial Ice Thickness (IN)			Vertical	
Deflection Requirement:				

Load Case 2				
Load Case Description:				
Ahead Span Tension (LBS)			Overload Factors	
Back Span Tension (LBS)			Wind	
Wind Pressure (PSF)			Tension	
Radial Ice Thickness (IN)			Vertical	
Deflection Requirement				

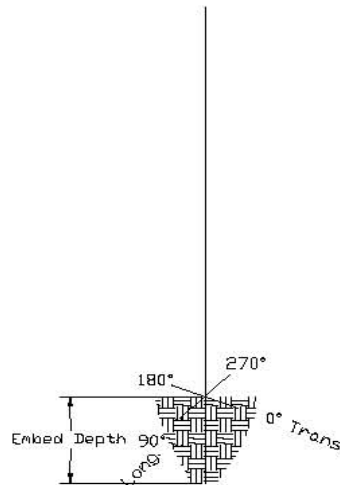
Load Case 3				
Load Case Description:				
Ahead Span Tension (LBS)			Overload Factors	
Back Span Tension (LBS)			Wind	
Wind Pressure (PSF)			Tension	
Radial Ice Thickness (IN)			Vertical	
Deflection Requirement				

TRANSMISSION POLE DESIGN DATA SHEET

Example Sketch



Sketch of Structure



Additional Information: _____

B.1 Wood Pole Equivalent Load

Pole Class	ANSI 05.1 Load (#)	Wood Pole Equivalent Load (#)
5	1900	1188
4	2400	1500
3	3000	1875
2	3700	2313
1	4500	2813
H1	5400	3375
H2	6400	4000
H3	7500	4688
H4	8700	5438
H5	10000	6250
H6	11400	7125

Wood pole equivalent loads charted are applicable for NESC Grade B construction, embedment depths equal to 10% of the pole length plus 2'-0" and an equivalency factor of $2.5/4.0 = .625$

H2 Wood Pole Equivalent Load Example

$$6400 \# \times (2.5/4.0) = 4000\#$$

B.2 Minimum Ground Line Moments

Pole Class	Pole Length (ft)																
	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120
5	38	43	49	54	59	65	70	75	81	86	91	97	102	107	113	118	124
4	48	55	62	68	75	82	89	95	102	109	116	122	129	136	143	149	156
3	60	68	77	85	94	102	111	119	128	136	144	153	161	170	178	187	195
2	74	84	95	105	116	126	136	147	157	168	178	188	199	209	220	230	241
1	90	103	115	128	141	153	166	179	191	204	217	229	242	255	267	280	293
H1	108	123	138	154	169	184	199	214	230	245	260	275	290	305	321	336	351
H2	128	146	164	182	200	218	236	254	272	290	308	326	344	362	380	398	416
H3	150	171	192	213	234	255	277	298	319	340	361	382	403	424	445	466	488
H4	174	198	223	247	272	296	321	345	370	394	419	443	468	492	517	541	566
H5	200	228	256	284	313	341	369	397	425	453	481	509	538	566	594	622	650
H6	228	260	292	324	356	388	420	452	485	517	549	581	613	645	677	709	741

Minimum ground line moments are in kip-ft and are calculated from the wood pole equivalent loads charted above.

C.1 Wood Pole Equivalent Example 1

Given

NESC Grade B Construction
60 foot pole length needed
160 ft-kips required ground line moment

Find

The wood pole equivalent class required to meet given criteria

Solution

Per Appendix B Table B.2, the minimum pole class required to meet the 160 ft-kip ground line moment would be a 60 foot class H1

Pole Class	Pole Length (ft)				
	40	45	50	55	60
5	38	43	49	54	59
4	48	55	62	68	75
3	60	68	77	85	94
2	74	84	95	105	116
1	90	103	115	128	141
H1	106	123	138	154	169
H2	128	146	164	182	200
H3	150	171	192	213	234

C.2 Wood Pole Equivalent Example 2

Given

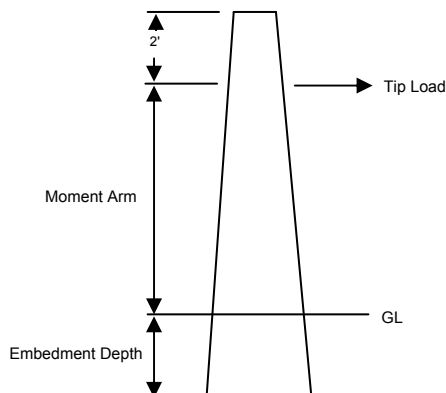
80' Class H2 Pole

Find

The minimum ground line moment

Solution

The minimum ground line moment is 272 ft-kips



Embedment Depth

$$(80 \text{ ft} \times 10\%) + 2 \text{ ft} = 10 \text{ ft}$$

Moment Arm

$$80 \text{ ft} - 10 \text{ ft} - 2 \text{ ft} = 68 \text{ ft}$$

Minimum Ground Line Moment

$$4000\# \times 68 \text{ ft} \div (1\text{kip}/1000\#) = 272 \text{ ft} \cdot \text{kips}$$

LOCAL BUCKLING CHECK FOR ROUND POLES

ASCE Design of Steel Transmission Pole Structures specifies that round poles in pure bending are checked for local buckling with the following equations supported by test results of axially compressed manufactured round tubes.

$$(eq\ 1) \quad F_b = F_y \quad \text{when} \quad \frac{D_o}{t} \leq \frac{6000}{F_y}$$

$$(eq\ 2) \quad F_b = 0.7 F_y + \frac{1800}{\frac{D_o}{t}} \quad \text{when} \quad \frac{6000}{F_y} < \frac{D_o}{t} \leq \frac{12000}{F_y}$$

- F_b = allowable bending stress (ksi)
- F_y = minimum yield stress (ksi)
- D_o = outside diameter (in)
- t = thickness (in)
- S = section modulus (in³)
- d_1 = inside diameter (in)
- fb = computed bending stress (ksi)

UNION METAL LOCAL BUCKLING LIMITATION CHECK

65ft Class H2

D_o at ground line = 16.89 in

t = .188 in

Moment at ground line 4kip · 54.5 ft = 218 kip · ft

$$(1) \quad \frac{D_o}{t} = \frac{16.89}{0.1888} = 89.84$$

$$(2) \quad s = \pi \frac{d_o^4 - d_1^4}{32 \cdot 16.89} = \pi \frac{(16.89^4 - 16.51^4)}{32 \cdot 16.89} = 41.15 \text{ in}^3$$

$$(3) \quad fb = \frac{M}{S} = \frac{218 \text{ (kip} \cdot \text{ft)} \cdot 12 \text{ in/ft}}{41.15 \text{ in}^3} = 63.57 \text{ ksi}$$

$$(4) \quad \frac{6000}{F_y} = \frac{6000}{65} = 92.3 \quad \text{and} \quad \frac{12000}{F_y} = \frac{12000}{65} = 184.62$$

89.84 ≤ 92.3 ∴ F_b is limited by (eq 1)

$$(5) \quad F_b = F_y = 65 \text{ ksi}$$

$$(6) \quad \text{check } fb \leq F_b \quad 63.57 \text{ ksi} \leq 65 \text{ ksi} \quad \bullet \bullet \quad \text{ok}$$

1. PRICES - All prices are subject to change without notice and shall not be binding on Seller until reduced to writing and signed by Seller. All orders are subject to written acceptance and approval by an authorized representative of Seller. All prices are F.O.B. Seller's plant, and do not include transportation costs or charges relating to transportation, which costs and charges shall be solely the responsibility of Buyer. Prices quoted include standard packing according to Seller's specifications. All costs and taxes for special packing requested by Buyer, including packing for exports, shall be paid by Buyer as an additional charge.

2. TERMS OF PAYMENT - a) Unless different payment terms are expressly set forth elsewhere in the quotation or agreed to in writing by Seller in any confirmation of sale, products will be invoiced upon shipment. Payment in full is due within thirty (30) days from the invoice date.
b) In the event payment is not made when due, Purchaser agrees to pay Seller a finance charge of one and one half percent (1.5 %) per month (18 % per annum) on the unpaid balance of the invoice from and after the invoice due date. Purchaser is responsible for all costs and expenses associated with the collection of any past due invoices and with any checks returned due to insufficient funds.
c) Irrespective of any credit terms set forth in Seller's quotation, all credit sales are subject to the prior approval of Seller's credit department.

3. BUYER'S FINANCIAL CONDITION - If, during the performance of a contract with Buyer, the financial responsibility or condition of Buyer is such that Seller in good faith deems itself insecure, or if Buyer becomes insolvent, or if a material change in the ownership of the Buyer occurs, or if Buyer fails to make any payments in accordance with the terms of its contract with Seller, then, in any such event, Seller is not obligated to continue performance under the contract and may stop products in transit and defer or decline to make delivery of products, except upon receipt of satisfactory security or cash payments in advance, or Seller may terminate the order without further obligation to Purchaser whatsoever. If the Buyer fails to make payments or fails to furnish security satisfactory to Seller then Seller shall also have the right to enforce payment to the full contract price of the work completed and in process. Upon default by Buyer in payment when due, Buyer shall immediately pay to Seller the entire unpaid amounts for any and all shipments made to Buyer irrespective of the terms of said shipment and whether said shipments are made pursuant to this quotation or any other contract of sale between Seller and Buyer, and Seller may withhold all subsequent shipments until the full amount is settled. Acceptance by the Seller of less than full payment shall not be a waiver of any of its rights hereunder.

4. TAXES - The price for the products does not include any applicable sales, use, excise, GST, VAT, or similar tax. Buyer shall have the responsibility for the payment of such taxes if applicable. Any taxes which the Seller may be required to pay and does pay under any existing or future law upon or with respect to the sale, purchase, delivery, storage, processing, use, consumption or transportation of any of the products covered by this quotation shall be deemed to have been so paid for the account of the Buyer, who shall promptly pay the amount thereof to the Seller upon demand. This provision shall not apply if Buyer furnishes Seller, with its order, a valid tax exemption certificate in a form acceptable to the appropriate taxing authority.

5. SHIPMENT/DELAYS - a) Time of shipment promised is approximate and is not guaranteed. The time quoted hereunder begins from receipt by Seller of required manufacturing information, complete material requirements, including any required approved drawings or written releases to proceed with manufacturing and Seller has reviewed and approved the same. Seller will make a reasonable effort to fill orders promptly, and on stated delivery dates, but Seller shall not be responsible for damages of any kind, direct or indirect, growing out of, or in consequence of delay in delivery. Seller shall have the right to deliver the goods at one time or in installments from time-to-time within the quoted time of delivery. This contract shall be deemed separable as to the products sold. When delivery in installments is chosen by Seller, the delivery of nonconforming goods, or a default of any nature in relation to one or more installments, will not substantially impair the value of this contract as a whole and will not constitute a breach of the contract as a whole. When delivery in installments is chosen by Seller, Seller shall prepare an invoice showing the price of the goods shipped at the time of each shipment, and from date of shipment Buyer shall pay the amount of the invoice as provided in 30 days unless other payment terms have been agreed to.
b) If there is any design change, project or work suspension, or unreasonable delay not caused by Seller which prevents completion of the Seller's work, or if Buyer defaults in payment under any contract, Seller shall have the right to charge Buyer for the value of all work performed, including engineering or administrative costs, and the cost of all material ordered and of all material fabricated, in whole or part, under any contract entered into on the basis of Seller's quotation, and the Buyer shall pay said amounts in full upon Seller's invoice.

c) Seller shall be excused for any delay or failure in performance due to acts of God, war, riot, embargoes, act of civil or military authorities, failures of suppliers, vendors, or sub-contractors, fires, floods, accidents, quarantine restrictions, mill conditions, labor unrest, delays in transportation, shortage of fuel, labor, materials, breakdown, compliance with or actions taken to carry out the intent or purposes of any applicable law or regulation, destruction of plant or equipment or other manufacturer's difficulty, or any other cause beyond the reasonable control of Seller. In the event that any one or more deliveries hereunder is suspended or delayed by reason of any one or more of the occurrences or contingencies stated above, any and all deliveries so suspended or delayed shall be made after such occurrences or contingencies have ceased to exist, and nothing herein contained shall be construed in any way as lessening the full amount of products herein being purchased and sold, but only as deferring delivery and payment in the event(s) and to the extent herein provided for. Neither shall any delay in shipment be considered as a default under this contract nor give rise to any liability on the part of Seller for any incidental, special or consequential damage.

6. DESIGN - a) Seller's designs, details, erection plans and bills of material are prepared in accordance with generally accepted engineering practices.

b) The parties acknowledge and agree that, if Buyer has identified specific applications for the use of products, Seller shall not be responsible for any deviations from the specific applications or the nondisclosure by Buyer of any additional information, whether known or unknown which may effect or relate to the selection or recommendation by Seller of any specific products, designs, erection plans, or bills of material.

c) BUYER'S SPECIFICATIONS: If the design and specifications are specified by Buyer, the parties agree that Buyer is exclusively responsible for the design and specifications. Seller shall not be responsible for the correctness or adequacy of any design details, or erection plans, or bills of material not furnished by Seller. Unless otherwise expressly provided, the parties agree that Seller shall not be responsible for or obligated to inspect, correct, or modify in any regard the designs, specifications, or bills of material supplied by Buyer.

d) COMBINED SPECIFICATIONS: In the event that both the Seller and Buyer each shall partially design the products or select the bills of materials, the Seller shall not be responsible for the integration of its design or selection with those of the Buyer and Buyer shall be exclusively responsible for said integration.

e) MODIFICATIONS: The parties further agree that the Seller shall not be responsible for any products which have been modified or integrated with other products not designed or selected by the Seller.

7. CHANGE ORDERS - a) After acceptance of the quotation, any changes in the type of products, the arrangement of the products, or application of the products requested by Buyer will be made at Buyer's expense. Seller shall not be obligated to furnish or perform extra material or labor required by changes in the scope of the work, type of products and/or additions to the project until all of the terms and conditions hereof have been agreed upon and the Seller has received written approval for such from the Buyer. If Seller furnishes extra labor or materials at Buyer's request, but without Buyer's prior written approval of all terms and conditions, Buyer agrees that such labor or materials shall be furnished at Seller's price and terms for similar work.

b) Seller shall apply best efforts to make any changes in the work that Buyer or his agents order in writing, and Buyer shall promptly furnish all necessary information. Design and detail drawings reflecting changes in the work which Buyer and his agent may make subsequent to the date of this quotation shall constitute extra orders in writing to Seller to make such changes. Unless otherwise agreed upon between Buyer and Seller, Buyer shall pay Seller for any additional work Seller performs as a result of any such changes.

8. INSPECTION - The products to be furnished by Seller shall be subject to Seller's standard inspection at the place of manufacture. If Buyer or his agent is to inspect, such inspection shall be so conducted as not to interfere unreasonably with the manufacturer's operations. Approval or rejection shall be made before shipment of the products. Notwithstanding the foregoing, if upon receipt of such products by Buyer, the same shall appear not to conform to the contract between Buyer and Seller, Buyer shall notify Seller, in writing, of such condition within ten (10) days of unloading and afford Seller a reasonable opportunity to inspect the products. No withholding of funds, backcharges, returns, credits, or repairs against amounts otherwise due Seller will be permitted unless agreed to in writing by Seller beforehand. Buyer's failure to inspect the products or failure to notify the Seller in writing that the products are nonconforming within ten (10) days of their receipt, shall constitute a waiver of Buyer's right to inspect and/or reject the products for nonconformity and shall be equivalent to an irrevocable acceptance of the products by Buyer.

9. TITLE, RISK OF LOSS, SHIPPING - Risk of loss will pass to Buyer at Seller's point of shipment. If Buyer is unable to accept products in accordance with the shipment schedules, Seller will store the furnished products at a place of Seller's choosing. Costs related to storage (including insurance) shall be borne by the Buyer. Invoices for the products will be issued the date the products are placed in storage, less applicable freight charges. It is the responsibility of Buyer to notify Seller within 48 hours of f.o.b. destination shipment of any shipping damage. Failure to comply with this requirement will absolve Seller from any damage claims.

10. PATENTS - The Buyer shall indemnify and save the Seller harmless from infringement of U.S. and Foreign patents resulting from Seller's compliance with design or specifications furnished by Buyer. Seller shall indemnify and save the Buyer harmless from infringement of patents by materials furnished or work performed hereunder in conformity with designs or specifications furnished by Seller.

11. LIMITED WARRANTY; DISCLAIMER AND LIMITATION OF LIABILITIES AND REMEDIES – Seller warrants to the original Buyer for a period of one year from date shipped that the products are free from defects in materials and workmanship. THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS OR IMPLIED WARRANTIES, GUARANTEES, AGREEMENTS, CONDITIONS OR REPRESENTATIONS MADE BY ANY PERSON WITH RESPECT TO THE PRODUCTS COVERED BY THIS OFFER, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WHICH ARE HEREBY SPECIFICALLY DISCLAIMED. IN NO CASE WILL SELLER BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM A BREACH OF WARRANTY OR ANY OTHER CAUSE INCLUDING, BUT NOT LIMITED TO, LOSS OF USE OF THE PRODUCT, LOSS OF TIME, INCONVENIENCE, INJURY, LOSS OR DAMAGE TO PERSON OR PROPERTY, COMMERCIAL LOSS, LOSS OF PROFITS, PENALTIES OR LIQUIDATED DAMAGES, LIABILITIES OF PURCHASER TO ITS CUSTOMERS OR THIRD PERSONS OR OTHER MATTERS NOT SPECIFICALLY STATED, WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY. Purchaser must give written notice to Seller of any alleged defects in material or workmanship of warranted products within ten (10) days of the date when any defects are first manifest. Upon such notice and if the products are found by Seller to be defective, THE SOLE RESPONSIBILITY OF SELLER UNDER THIS LIMITED WARRANTY SHALL BE TO REPAIR OR REPLACE, AT ITS OPTION, DEFECTS IN THE MATERIAL OR WORKMANSHIP DURING THE WARRANTY PERIOD F.O.B. SELLER'S FABRICATION FACILITY. IN NO EVENT SHALL SELLER BE LIABLE FOR CONSEQUENTIAL OR SPECIAL DAMAGES, OR FOR TRANSPORTATION, INSTALLATION, ADJUSTMENT OR OTHER EXPENSES WHICH MAY ARISE IN CONNECTION WITH SUCH DEFECTIVE PRODUCTS. Any action resulting from any breach on the part of Seller as to the products delivered hereunder must be commenced within one (1) year after the cause of action has occurred.

12. LIMITED AUTHORITY OF SALES AGENTS - The sales agents and representatives of Seller have no authority to enter into agreements, contracts or understandings, or to bind or incur any liability or obligation on behalf of Seller. Orders and contract proposals taken by the sales agents and representatives of Seller are subject to written approval by an authorized representative of Seller at its home office.

13. SELLER'S TERMS TO CONTROL - Seller's offer, as shown by this quotation, is made for prompt written acceptance by Buyer and is subject to withdrawal without notice unless otherwise stated on the face hereof. This offer is made expressly contingent upon Buyer's acceptance of the terms and conditions included in this quotation. Acceptance by Purchaser is limited to Seller's terms and conditions and Buyer, upon placing an order for any products quoted by Seller, agrees to be bound by the terms and conditions set forth herein. Any inconsistent, additional or different terms and conditions contained in Buyer's purchase order or Buyer's response to Seller's quotation shall be construed as a counteroffer and shall not be effective or binding unless specifically consented to in writing by an authorized representative of Seller. Neither Seller's commencement of performance nor delivery shall be deemed or construed as acceptance of Purchaser's additional or different terms and conditions. If for any reason Buyer should fail to accept in writing, any conduct by Buyer which recognizes the existence of a contract pertaining to the subject matter hereof, shall constitute acceptance by Buyer of this quotation and all of its terms and conditions. If this quotation has been issued by Seller in response to an offer or purchase order, and if any terms herein are additional to, or different from any terms of such offer or purchase order, then the issuance of this quotation by Seller shall constitute an acceptance of such offer or purchase order subject to the express condition that the Buyer assent to such additional and different terms herein, and acknowledge that this quotation constitutes the entire agreement between Buyer and Seller with respect to the subject matter hereof and the subject matter of such offer or purchase order, and Buyer shall be deemed to have so assented and acknowledged unless Buyer notifies Seller to the contrary in writing within ten (10) days of receipt of this quotation.

14. ENTIRE AGREEMENT - The terms and conditions contained herein and in any confirmation of sale by Seller shall constitute the entire and complete agreement between Seller and Buyer and shall supersede all prior oral or written statements or understandings of any kind whatsoever made by the parties or their representatives. No modifications or additions to these terms and conditions shall be binding on Seller unless specifically agreed to in writing and signed by an authorized representative of Seller. Further, no oral or written statement made subsequent to the acceptance of Buyer's order by Seller which purports to modify in any way these terms and conditions shall be binding upon Seller unless such statement is clearly adopted and agreed to in writing by a duly authorized representative of Seller.

15. DEFAULT - Upon the happening of one or more of the following events, Seller shall forthwith have the unrestricted right to cancel the contract, in whole or in part, without cost or liability to Seller and/or pursue any further remedies available at law, or in equity:

- a) Buyer's insolvency or inability to meet obligations as they come due.
- b) The appointment of a trustee or receiver of Buyer, or any substantial part of Buyer's assets by any court.
- c) The filing of a voluntary or involuntary petition of bankruptcy under any provision of the federal Bankruptcy Code or any state insolvency law.
- d) Buyer fails, or appears to be unable, to perform any of its obligations in accordance with the terms and conditions of this agreement.

No waiver by Seller of a breach by Buyer of any provision of this agreement shall constitute a waiver of any other breach of such provision. All of Seller's rights and remedies hereunder shall be cumulative and not exclusive.

16. INTERPRETATION AND ENFORCEMENT OF CONTRACT - This quotation and any related confirmation or contract of sale shall be governed by and construed in accordance with the laws of Ohio. Buyer consents to the jurisdiction of any state or federal court located within the state of Ohio for purposes of resolving any dispute which may arise between Seller and Buyer hereunder.



SINCE 1906



Union Metal Corporation - 1432 Maple Avenue NE - Canton, Ohio 44705

Phone: 330-456-7653

www.unionmetal.com

e-mail: sales@unionmetal.com