

EB 101 Poles—Dimensional Data

Scope

This standard provides the minimum diameters of Douglas fir, western red cedar, lodgepole pine, and southern pine poles for the purpose of determining bolt and associated hardware dimensions, at different distances from the top of the pole.

Dimensional Data

Tables 1 through 3 list the minimum diameters of Douglas fir, western red cedar, lodgepole pine, and southern pine poles based on ANSI O5.1-2002. Use interpolation of diameters corresponding a distance from the top of the pole not shown in the tables.

The pole diameters given in Tables 1 through 3 can be used as a base to determine bolt length. Each washer used with a through-bolt assembly requires adding $\frac{3}{8}$ " to the length of the bolt. Use of a crossarm gain also requires adding $\frac{3}{4}$ " to the length of the bolt.

Table 1—Douglas Fir and Southern Pine Poles (dimensions in inches)

Distance from Top (ft.)	Class 1			Class 2			Class 3			Class 4		
	40 ft.	45 ft.	50 ft.	40 ft.	45 ft.	50 ft.	40 ft.	45 ft.	50 ft.	40 ft.	45 ft.	50 ft.
0	8.6	8.6	8.6	8.0	8.0	8.0	7.3	7.3	7.3	6.7	6.7	6.7
2	8.9	8.9	8.9	8.2	8.2	8.3	7.6	7.6	7.6	6.9	6.9	7.0
4	9.1	9.2	9.3	8.5	8.5	8.6	7.8	7.9	7.9	7.2	7.2	7.3
6	9.4	9.5	9.6	8.7	8.8	8.9	8.1	8.1	8.2	7.4	7.5	7.6
8	9.6	9.8	9.9	9.0	9.1	9.2	8.3	8.4	8.5	7.6	7.7	7.8
10	9.9	10.1	10.3	9.2	9.4	9.5	8.5	8.7	8.8	7.9	8.0	8.1
12	10.2	10.4	10.6	9.5	9.7	9.9	8.8	9.0	9.1	8.1	8.3	8.4
16	10.7	11.0	11.3	10.0	10.3	10.5	9.3	9.5	9.7	8.6	8.8	9.0
20	11.2	11.6	12.0	10.5	10.9	11.1	9.8	10.0	10.3	9.0	9.3	9.6
24	11.7	12.2	12.6	11.0	11.4	11.8	10.2	10.6	10.9	9.5	9.8	10.2
28	12.3	12.8	13.3	11.5	12.0	12.4	10.7	11.1	11.5	10.0	10.4	10.7
32	12.8	13.4	14.0	12.0	12.6	13.1	11.2	11.7	12.1	10.4	10.9	11.3

Table 2—Lodgepole Pine Poles (dimensions in inches)

Distance from Top (ft.)	Class 1			Class 2			Class 3			Class 4		
	40 ft.	45 ft.	50 ft.	40 ft.	45 ft.	50 ft.	40 ft.	45 ft.	50 ft.	40 ft.	45 ft.	50 ft.
0	8.6	8.6	8.6	8.0	8.0	8.0	7.3	7.3	7.3	6.7	6.7	6.7
2	8.9	9.0	9.0	8.3	8.3	8.3	7.6	7.6	7.7	7.0	7.0	7.0
4	9.2	9.3	9.4	8.6	8.6	8.7	7.9	8.0	8.0	7.2	7.3	7.4
6	9.5	9.7	9.8	8.9	9.0	9.1	8.2	8.3	8.4	7.5	7.6	7.7
8	9.9	10.0	10.2	9.2	9.3	9.5	8.4	8.6	8.7	7.8	7.9	8.0
10	10.2	10.4	10.6	9.5	9.6	9.8	8.7	8.9	9.1	8.0	8.2	8.4
12	10.5	10.7	11.0	9.8	10.0	10.2	9.0	9.2	9.5	8.3	8.5	8.7
16	11.1	11.4	11.7	10.4	10.7	11.0	9.6	9.9	10.2	8.9	9.1	9.4
20	11.8	12.2	12.5	11.0	11.3	11.7	10.1	10.5	10.9	9.4	9.7	10.1
24	12.4	12.9	13.3	11.6	12.0	12.5	10.7	11.1	11.6	9.9	10.3	10.7
28	13.1	13.6	14.1	12.2	12.7	13.2	11.3	11.8	12.3	10.5	10.9	11.4
32	13.7	14.3	14.9	12.8	13.4	13.9	11.8	12.4	13.0	11.0	11.5	12.1

Table 3—Western Red Cedar (dimensions in inches)

Distance from Top (ft.)	Class 1			Class 2			Class 3			Class 4		
	40 ft.	45 ft.	50 ft.	40 ft.	45 ft.	50 ft.	40 ft.	45 ft.	50 ft.	40 ft.	45 ft.	50 ft.
0	8.6	8.6	8.6	8.0	8.0	8.0	7.3	7.3	7.3	6.7	6.7	6.7
2	8.9	9.0	9.0	8.3	8.3	8.4	7.6	7.7	7.7	7.0	7.0	7.0
4	9.3	9.4	9.4	8.6	8.7	8.8	7.9	8.0	8.1	7.3	7.3	7.4
6	9.6	9.7	9.9	8.9	9.1	9.2	8.2	8.4	8.5	7.6	7.7	7.8
8	9.9	10.1	10.3	9.3	9.4	9.6	8.6	8.7	8.9	7.8	8.0	8.1
10	10.3	10.5	10.7	9.6	9.8	10.0	8.9	9.1	9.2	8.1	8.3	8.5
12	10.6	10.9	11.1	9.9	10.1	10.4	9.2	9.4	9.6	8.4	8.7	8.8
16	11.3	11.7	12.0	10.6	10.9	11.2	9.8	10.1	10.4	9.0	9.3	9.5
20	12.0	12.4	12.8	11.2	11.6	12.0	10.4	10.8	11.2	9.6	10.0	10.2
24	12.6	13.2	13.6	11.9	12.3	12.8	11.0	11.5	11.9	10.2	10.6	11.0
28	13.3	14.0	14.5	12.5	13.1	13.6	11.6	12.2	12.7	10.7	11.3	11.7
32	14.0	14.7	15.3	13.2	13.8	14.4	12.3	12.9	13.5	11.3	11.9	12.4

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EJ 300 Three-Phase, High-Neutral, Flat, 10-Foot Arms

Scope

This structure should be used where flat framing is required for crossings.

Standard References

- EB 011 Poles—Class Selection
- EJ 001 Three-Phase Primary—General Information

Notes

1. Clamp-top insulators are not suitable for crossings.
2. Only structures with fiberglass arms are suitable for crossing railroads and limited access highways.
3. Pin insulators are not suitable for a change in line tension, or for upstrain.
4. New lines should be built with #2 AAAC or larger conductor.
5. If the structure is used to turn an angle, guying should be added.
6. If grounding is required, you may use DG 201.
7. Avian guards shall be issued separately, using standard EV 971.
8. **California only.** If a system has a common neutral, a "CN" tag shall be installed. See GO 95, Rule 59.3F.
9. Double 35 kV deadend insulators are used to achieve the 36" avian safe distance requirement on structures with deadend insulators.

RCMS Code: CU

		EJ 300		
Loading Area/Grade	Code	•	—	—
NESC Medium/B	A			
NESC Medium/C	B			
NESC Heavy/B	C			
NESC Heavy/C	D			
California Light/A	E			
California Light/B	F			
California Heavy/A	G			
California Heavy/B	H			
Insulator Voltage Class	Code	•	—	—
15 kV normal	A			
25 kV normal	B			
35 kV normal	C			
15 kV contaminated areas	E			
25 kV contaminated areas	F			
35 kV clamp-top	L			
Phase-Neutral	Code		•	—
2 AAAC-2 AAAC	P			
1/0 ACSR-1/0 ACSR or 1/0 AAAC-1/0 AAAC	A			
4/0 AAC-4/0 AAC	B			
477 AAC-477 AAC	F			
795 AAC-795 AAC	G			
4/0 ACSR-4/0 ACSR	J			
397 ACSR-397 ACSR	N			
Pole	Code			•
40 foot	D			
45 foot	E			
50 foot	F			
Pole in place	Z			
Construction Type	Code			•
Tangent	A			
Angle	B			
Angle with deadends	C			
Deadend	D			
Corner structure	E			

Table 1—Maximum Span Lengths and Angles, Single Wood Crossarm with Pin Insulators

	Conductor	NESC Medium Loading				NESC Heavy Loading			
		230 ft. Ruling Max Span (Feet)	Max Angle (Degrees)	350 ft. Ruling Max Span (Feet)	Max Angle (Degrees)	230 ft. Ruling Max Span (Feet)	Max Angle (Degrees)	350 ft. Ruling Max Span (Feet)	Max Angle (Degrees)
15 kV	2 AAAC	330	14	450	13	330	10	400	9
	1/0 ACSR	330	10	450	9	330	6	450	5
	4/0 AAC	330	9	450	8	330	6	355	6
	477 AAC	330	4	450	3	330	3	380†	2
	795 AAC	330	2	445†	2	330	1	335†	1
	1/0 AAAC	330	10	450	9	330	6	450	5
	4/0 ACSR	330	5	450	5	330	3	445†	2
	397 ACSR	330	3	450	2	330	2	380†	1
25 kV	2 AAAC	330	14	450	13	330	10	355	10
	1/0 ACSR	330	10	450	9	330	6	425	5
	4/0 AAC	330	9	400	8	325	7	315	7
	477 AAC	330	4	400	4	330	3	370	2
	795 AAC	330	2	410	2	330	1	335†	1
	1/0 AAAC	330	10	450	9	330	6	450	5
	4/0 ACSR	330	5	450	5	330	3	445†	2
	397 ACSR	330	3	450	2	330	2	380†	1
35 kV	2 AAAC	330	14	450	13	330	10	305	10
	1/0 ACSR	330	10	440	9	330	6	365	6
	4/0 AAC	310	9	350	9	280	7	270	7
	477 AAC	310	4	345	4	285	3	320	3
	795 AAC	325	2	360	2	295	2	330	1
	1/0 AAAC	330	10	450	9	330	6	425	5
	4/0 ACSR	330	5	445	5	330	3	395	3
	397 ACSR	330	3	450	2	330	2	380†	1

† Span length has been reduced to guarantee sufficient class 1 pole strength.

Table 2—Component Assemblies

No.	Standard	Description
1	EB 401	Pole, Wood
2	EE 311	Crossarm Assembly—10-Foot Single
3	EF 101	Pin Insulator Assembly—Crossarm-Mounted
4	EF 401	Tie, Formed, Top, Single-Support
	EF 431	Tie, Formed, Side, Single-Support

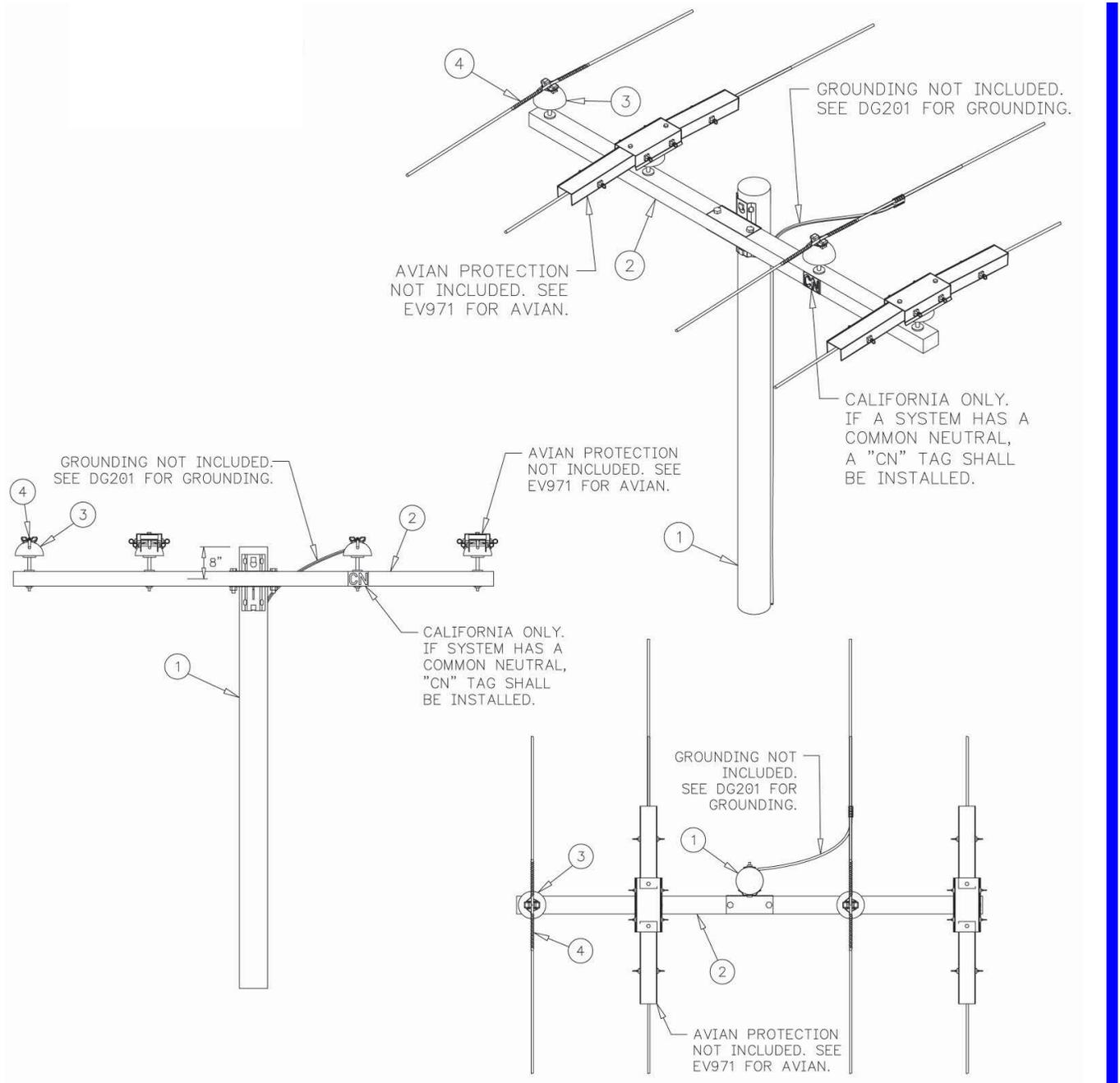


Figure I—Flat Tangent Structure, Single Arm and Pin Insulator

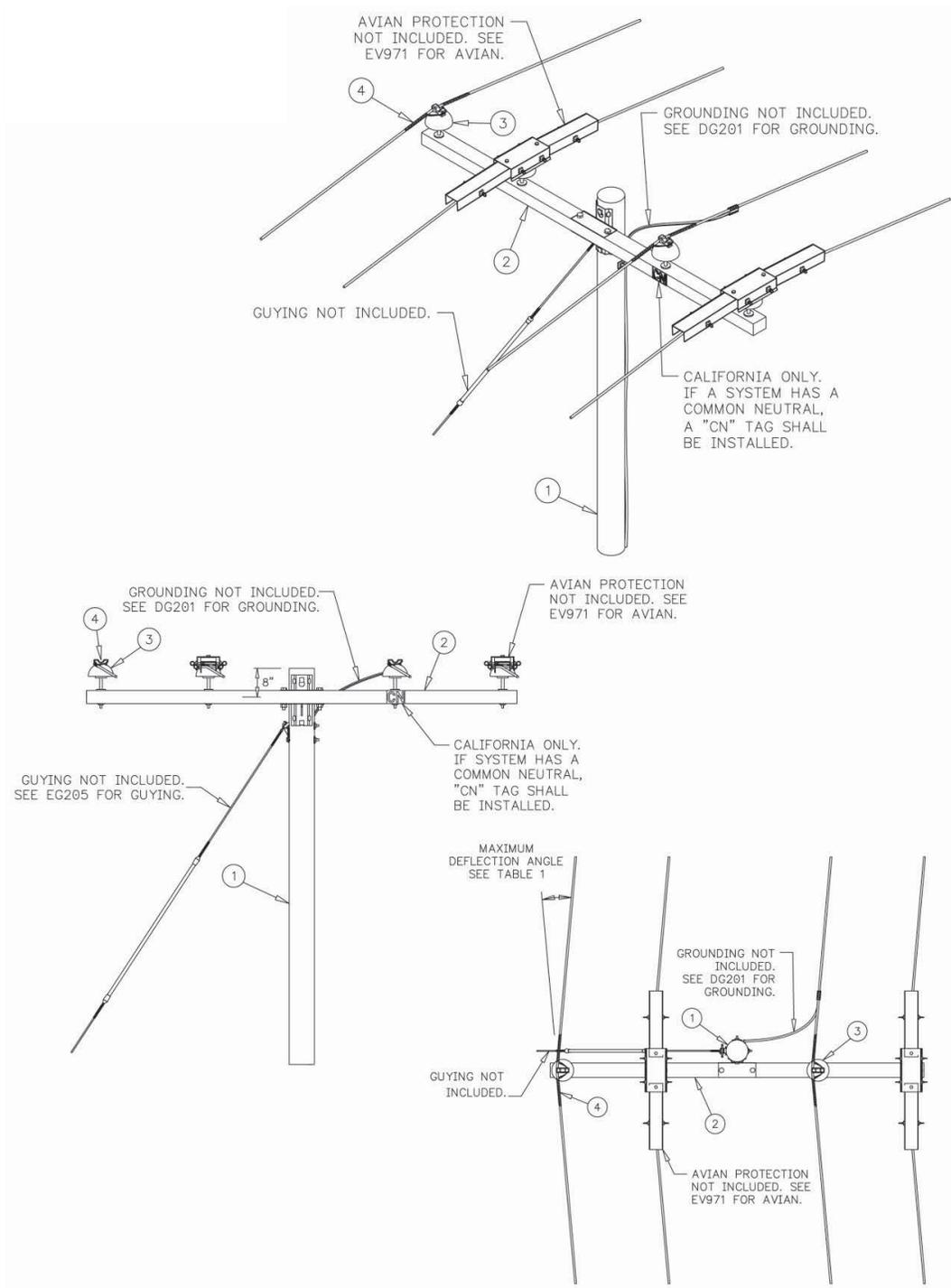


Figure 2—Flat Angle Structure, Single Arm and Pin Insulator

Table 3—Maximum Span Lengths and Angles, Fiberglass Arm and Deadend Insulators

	Conductor	NESC Medium Loading				NESC Heavy Loading			
		230 ft. Ruling Span		350 ft. Ruling Span		230 ft. Ruling Span		350 ft. Ruling Span	
		Max Span (ft.)	Max Angle (deg)						
15 kV	2 AAAC	330	53	450	51	330	42	400	41
	1/0 ACSR	330	37	450	36	330	27	450	26
	4/0 AAC	330	35	450	33	330	30	355	29
	477 AAC	330	19	450	18	330	14	385†	13
	795 AAC	330	12	450	11	330	9	340†	9
	1/0 AAAC	330	37	450	36	330	27	450	26
	4/0 ACSR	330	22	450	21	330	17	450	16
	397 ACSR	330	12	450	11	330	10	385†	9
25 kV	2 AAAC	330	53	450	51	330	42	355	42
	1/0 ACSR	330	37	450	36	330	27	425	26
	4/0 AAC	330	35	400	34	325	30	315	30
	477 AAC	330	19	400	18	330	14	370	14
	795 AAC	330	12	410	12	330	9	340†	9
	1/0 AAAC	330	37	450	36	330	27	450	26
	4/0 ACSR	330	22	450	21	330	17	450	16
	397 ACSR	330	12	450	11	330	10	385†	9
35 kV	2 AAAC	330	53	450	51	330	42	305	42
	1/0 ACSR	330	37	440	36	330	27	365	27
	4/0 AAC	310	35	350	34	280	30	270	30
	477 AAC	310	19	345	19	285	14	320	14
	795 AAC	325	12	360	12	295	10	330	9
	1/0 AAAC	330	37	450	36	330	27	425	26
	4/0 ACSR	330	22	445	21	330	17	395	16
	397 ACSR	330	12	450	11	330	10	385†	9

† Span length has been reduced to guarantee sufficient class 1 pole strength.

Table 4—Component Assemblies

No.	Standard	Description
1	EB 401	Pole, Wood
2	EE 741	Crossarm, Fiberglass
3	EF 101	Pin Insulator Assembly—Crossarm-Mounted
4	EF 181	Deadend Insulator Assembly—Primary
5	EF 186	Deadend Assembly—Neutral
6	EF 951	Tie, Hand, Aluminum
7	DE 341	Connector, Shell-Fired, Yellow Cartridge
	DE 351	Connector, Shell-Fired, Blue Cartridge
	DE 301	Connector, H-Tap, Compression

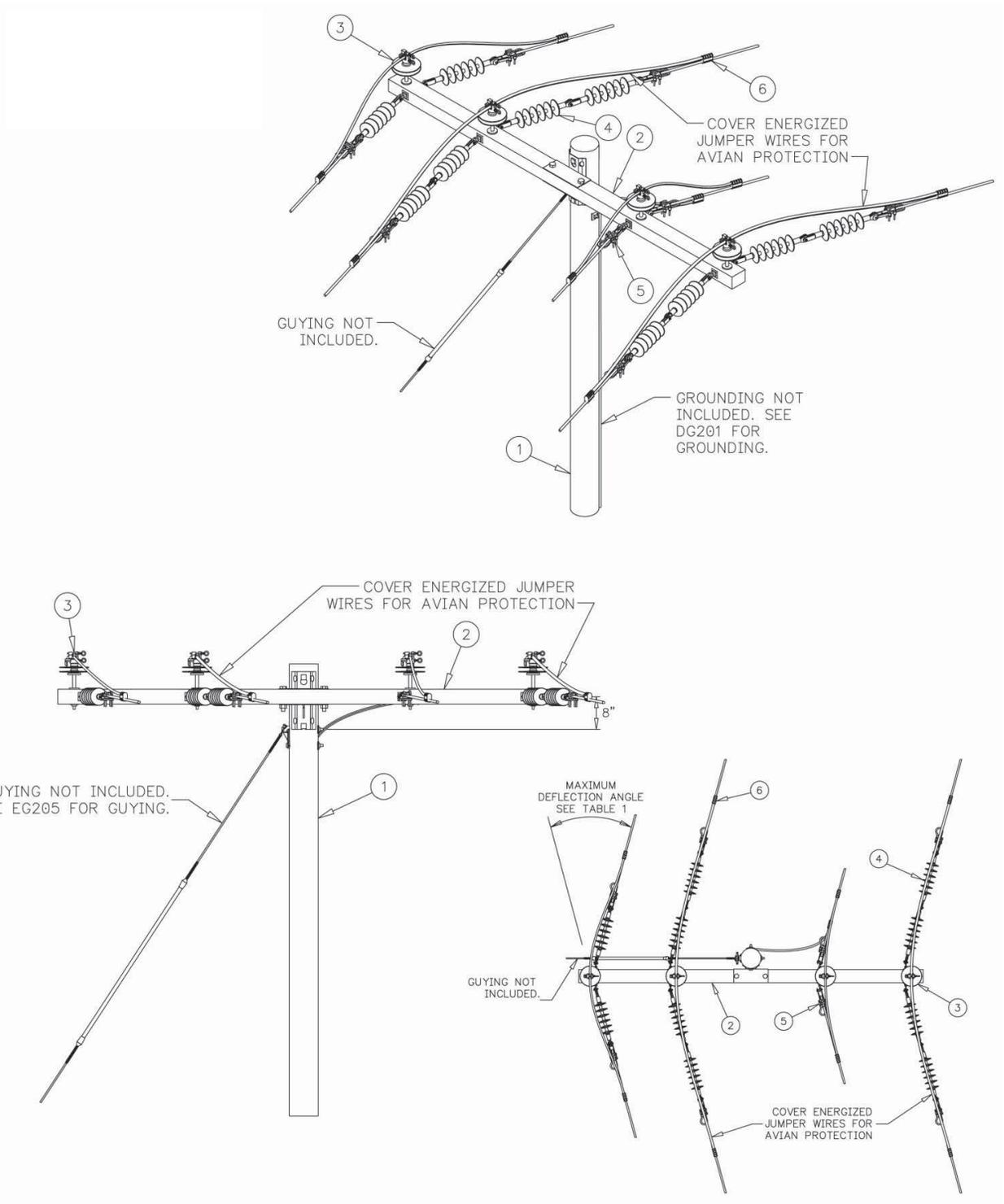


Figure 3—Flat Angle Structure, Fiberglass Arm with Deadends

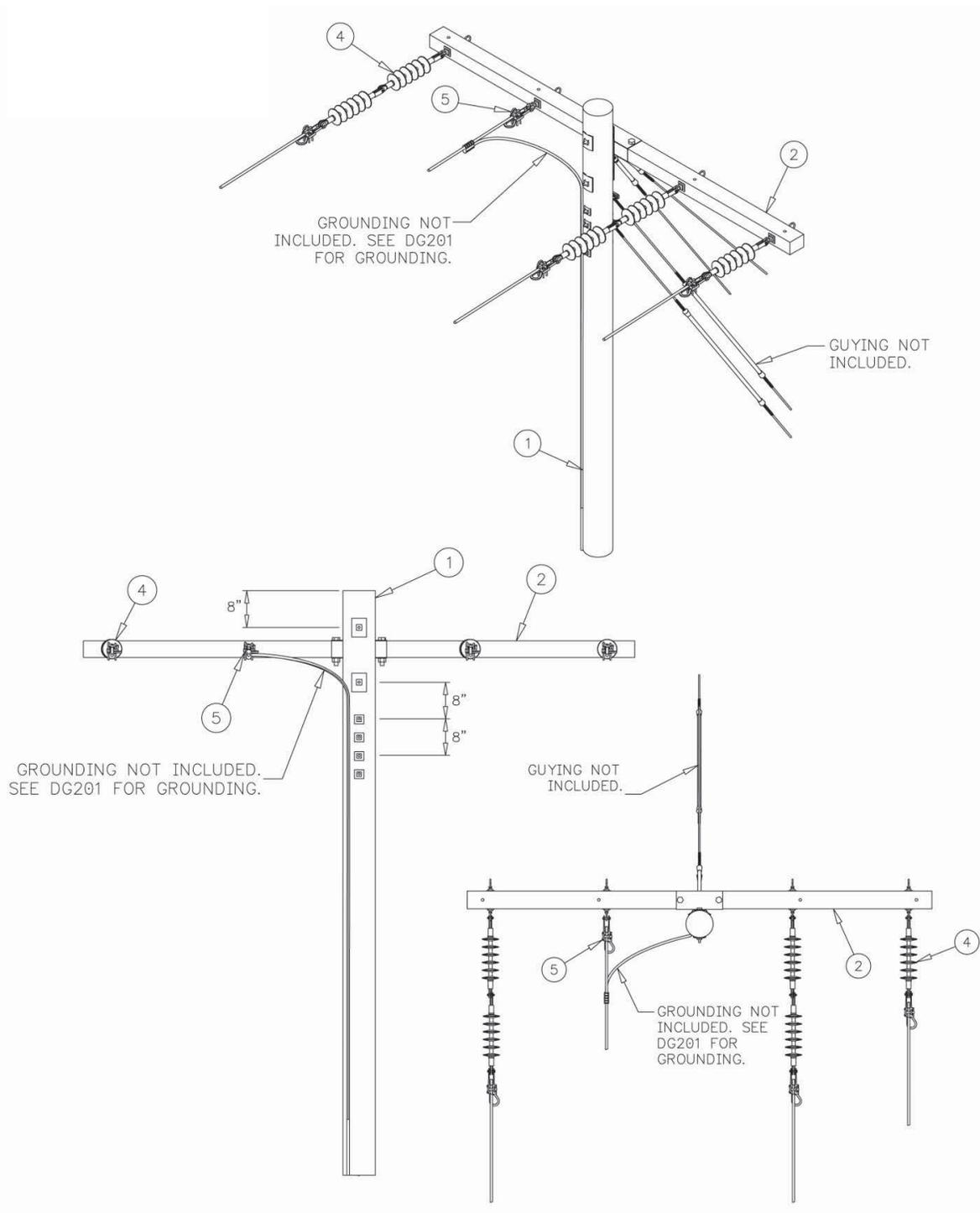


Figure 4—Flat Deadend Structure, 10-Foot Fiberglass Heavy Duty Deadend Arm

Table 5—Maximum Span Lengths for Fiberglass Arm Corner Structures (in Feet)

	Conductor	NESC Medium Loading		NESC Heavy Loading	
		230 ft. Ruling Span	350 ft. Ruling Span	230 ft. Ruling Span	350 ft. Ruling Span
15 kV	2 AAAC	330	450	330	400
	1/0 ACSR	330	450	330	450
	4/0 AAC	330	450	330	355
	477 AAC	330	450	330	385†
	795 AAC	330	450	330	275†
	1/0 AAAC	330	450	330	450
	4/0 ACSR	330	450	330	450
	397 ACSR	330	450	330	385†
25 kV	2 AAAC	330	450	330	355
	1/0 ACSR	330	450	330	425
	4/0 AAC	330	400	325	315
	477 AAC	330	400	330	370
	795 AAC	330	410	330	275†
	1/0 AAAC	330	450	330	450
	4/0 ACSR	330	450	330	450
	397 ACSR	330	450	330	385†
35 kV	2 AAAC	330	450	330	305
	1/0 ACSR	330	440	330	365
	4/0 AAC	310	350	280	270
	477 AAC	310	345	285	320
	795 AAC	325	360	295	275†
	1/0 AAAC	330	450	330	425
	4/0 ACSR	330	445	330	395
	397 ACSR	330	450	330	385†

† Span length has been reduced to guarantee sufficient class 1 pole strength.

Table 6—Component Assemblies

No.	Standard	Description
1	EB 401	Pole, Wood
2	EE 741	Crossarm, Fiberglass
3	EF 101	Pin Insulator Assembly—Crossarm-Mounted
4	EF 181	Deadend Insulator Assembly—Primary
5	EF 186	Deadend Assembly—Neutral
6	EF 951	Tie, Hand, Aluminum
	EF 961	Tie, Hand, Copper
7	DE 341	Connector, Shell-Fired, Yellow Cartridge
	DE 351	Connector, Shell-Fired, Blue Cartridge
	DE 321	Connector, Vise-Type, Bolted
	DE 301	Connector, H-Tap, Compression
8	DY 181	Bolt Assembly, Machine, 3/4", Single Curved Washer

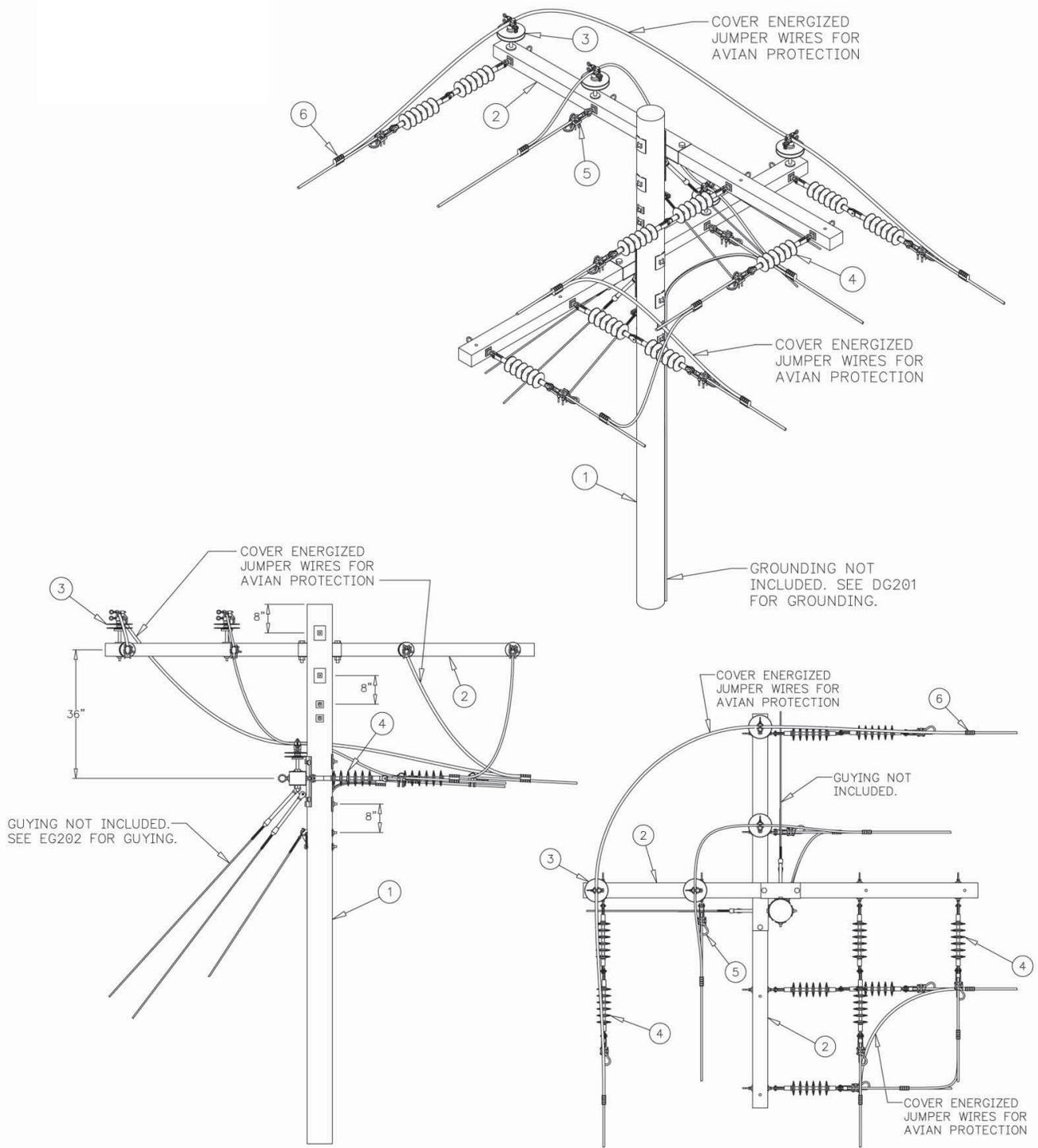


Figure 5—Flat Corner Structure with Two Single 10-foot Fiberglass Arms



EJ 800 Three-Phase, Raptor/Lightning Area, Tangent, Angle, Corner, and Deadend Structures

Scope

Use these structures in raptor and lightning areas.

Standard References

- EA 111 Overhead—Lightning Resistant Construction
- EB 011 Poles—Class Selection
- EJ 001 Three-Phase Primary—General Information
- EV 021 Bird Protection—Avian-Safe Designs and Modifications

Notes

1. Clamp-top insulators are not suitable for crossings.
2. Only structures with fiberglass arms are suitable for crossing railroads and limited access highways.
3. Pin insulators are not suitable for a change in line tension, or for upstrain.
4. This structure is shown with the minimum permitted spacing between the neutral and the primary crossarm. If a transformer is to be installed, the neutral will have to be lower on the pole. This may require a taller pole.
5. New lines should be built with #2 AAAC or larger conductor. Bolted connectors will be issued for deadend insulators with conductor sizes 397 or larger.
6. If the structure is used to turn an angle, guying should be added.
7. If grounding is required, you may use DG 201.
8. Use EJ 901-EJ 903 for non-standard conductors.

RCMS Code: CU

		EJ 800			
Loading Area/Grade	Code	•	—	—	—
NESC Medium/B	A				
NESC Medium/C	B				
NESC Heavy/B	C				
NESC Heavy/C	D				
California Light/A	E				
California Light/B	F				
California Heavy/A	G				
California Heavy/B	H				
Insulator Voltage Class	Code	•			
15 kV Normal	A				
25 kV Normal	B				
35 kV Normal	C				
15 kV Contaminated Areas	E				
25 kV Contaminated Areas	F				
15 kV Vandal Resistant	I				
25 kV Vandal Resistant	J				
35 kV Vandal Resistant	K				
35 kV Clamp-Top	L				
Phase-Neutral	Code		•		
1/0 ACSR-1/0 ACSR or 1/0 AAAC-1/0 AAAC	A				
4/0 AAC-4/0 AAC	B				
477 AAC-477 AAC	C				
477 AAC-477 AAC	F				
795 AAC-477 AAC	D				
795 AAC-795 AAC	G				
4/0 ACSR-4/0 ACSR	J				
4/0 ACSR-1/0 ACSR	M				
397 ACSR-4/0 ACSR	K				
397 ACSR-397 ACSR	N				
2 AAAC-2 AAAC	P				
Pole	Code			•	
40 foot	D				
45 foot	E				
50 foot	F				
55 foot	G				
Pole in Place	Z				
Construction Type	Code				•
Tangent	A				
Angle	B				
Angle Fiberglass Arm with Deadends	C				
Deadend, Fiberglass Arm	D				
Corner Structure, Fiberglass Arms	E				
Vertical Corner Structure	F				

Table I—Maximum Span Lengths and Angles for Single Wood Crossarm and Pin Insulators

	Primary Conductor	Neutral Conductor	NESC Medium Loading				NESC Heavy Loading			
			230 ft. Ruling Span (Feet)	Max Angle (Degrees)	350 ft. Ruling Span (Feet)	Max Angle (Degrees)	230 ft. Ruling Span (Feet)	Max Angle (Degrees)	350 ft. Ruling Span (Feet)	Max Angle (Degrees)
15 kV	2 AAAC	2 AAAC	305	15	385	14	290	11	395	9
	1/0 ACSR	1/0 ACSR	330	10	450	9	330	6	450	5
	4/0 AAC	4/0 AAC	300	9	390	8	290	7	425	5
	477 AAC	4/0 AAC	295	5	385	4	295	3	420†	2
	477 AAC	477 AAC	300	5	395	4	290	3	380	2
	795 AAC	477 AAC	305	3	405	2	295	2	370†	1
	795 AAC	795 AAC	300	3	390	2	290	2	360†	1
	1/0 AAAC	1/0 AAAC	305	10	385	10	295	7	370	6
	4/0 ACSR	1/0 ACSR	330	5	445	5	330	3	450	2
	4/0 ACSR	4/0 ACSR	330	5	445	5	330	3	440	2
	397 ACSR	4/0 ACSR	330	3	450	2	330	2	420†	1
	397 ACSR	397 ACSR	330	3	450	2	330	2	410†	1
25 kV	2 AAAC	2 AAAC	300	15	380	14	285	11	385	9
	1/0 ACSR	1/0 ACSR	330	10	450	9	330	6	450	5
	4/0 AAC	4/0 AAC	295	9	385	8	285	7	420	5
	477 AAC	4/0 AAC	290	5	380	4	290	3	420†	2
	477 AAC	477 AAC	295	5	390	4	285	3	375	2
	795 AAC	477 AAC	300	5	395	5	290	4	370†	1
	795 AAC	795 AAC	290	3	385	2	285	2	360†	1
	1/0 AAAC	1/0 AAAC	300	10	380	10	290	7	365	6
	4/0 ACSR	1/0 ACSR	330	5	440	5	330	3	450	2
	4/0 ACSR	4/0 ACSR	330	5	440	5	330	3	435	3
	397 ACSR	4/0 ACSR	330	3	450	2	330	2	420†	1
	397 ACSR	397 ACSR	330	3	450	2	330	2	410†	1
35 kV	2 AAAC	2 AAAC	295	15	370	14	280	11	380	9
	1/0 ACSR	1/0 ACSR	330	10	440	9	330	6	450	5
	4/0 AAC	4/0 AAC	285	10	380	8	280	7	410	5
	477 AAC	4/0 AAC	285	5	375	4	285	3	420†	2
	477 AAC	477 AAC	290	5	380	4	280	3	370	2
	795 AAC	477 AAC	295	3	390	2	285	2	370†	1
	795 AAC	795 AAC	285	3	380	2	280	2	360†	1
	1/0 AAAC	1/0 AAAC	295	10	370	10	285	7	355	6
	4/0 ACSR	1/0 ACSR	330	5	430	5	330	3	450	2
	4/0 ACSR	4/0 ACSR	330	5	430	5	330	3	425	3
	397 ACSR	4/0 ACSR	330	3	450	2	330	2	420†	1
	397 ACSR	397 ACSR	330	3	450	2	330	2	410†	1

† Span length has been reduced to guarantee sufficient class 1 pole strength.

Table 2— Component Assemblies, Figures 1 and 2

No.	Standard	Description
1	EB 401	Pole, Wood
	TD 030	Pole, Wood
2	EE 311	Crossarm Assembly—10-Foot Single
3	EF 101	Pin Insulator Assembly—Crossarm-Mounted
4	EF 111	Pin Insulator Assembly—Pole-Top
5	EF 141	Neutral Support Assembly—Tangent and Light Angle (double upset bolt)
6	EF 461	Tie, Formed, Spool
7	EF 401	Tie, Formed, Top, Single-Support
8	EF 431	Tie, Formed, Side, Single-Support
9	DY 171	Bolt Assembly, Machine, 5/8", Single Curved Washer
10	DY 631	Washer, Curved Square
11	EF 891	Anti-Roll Bracket, Dog Leg

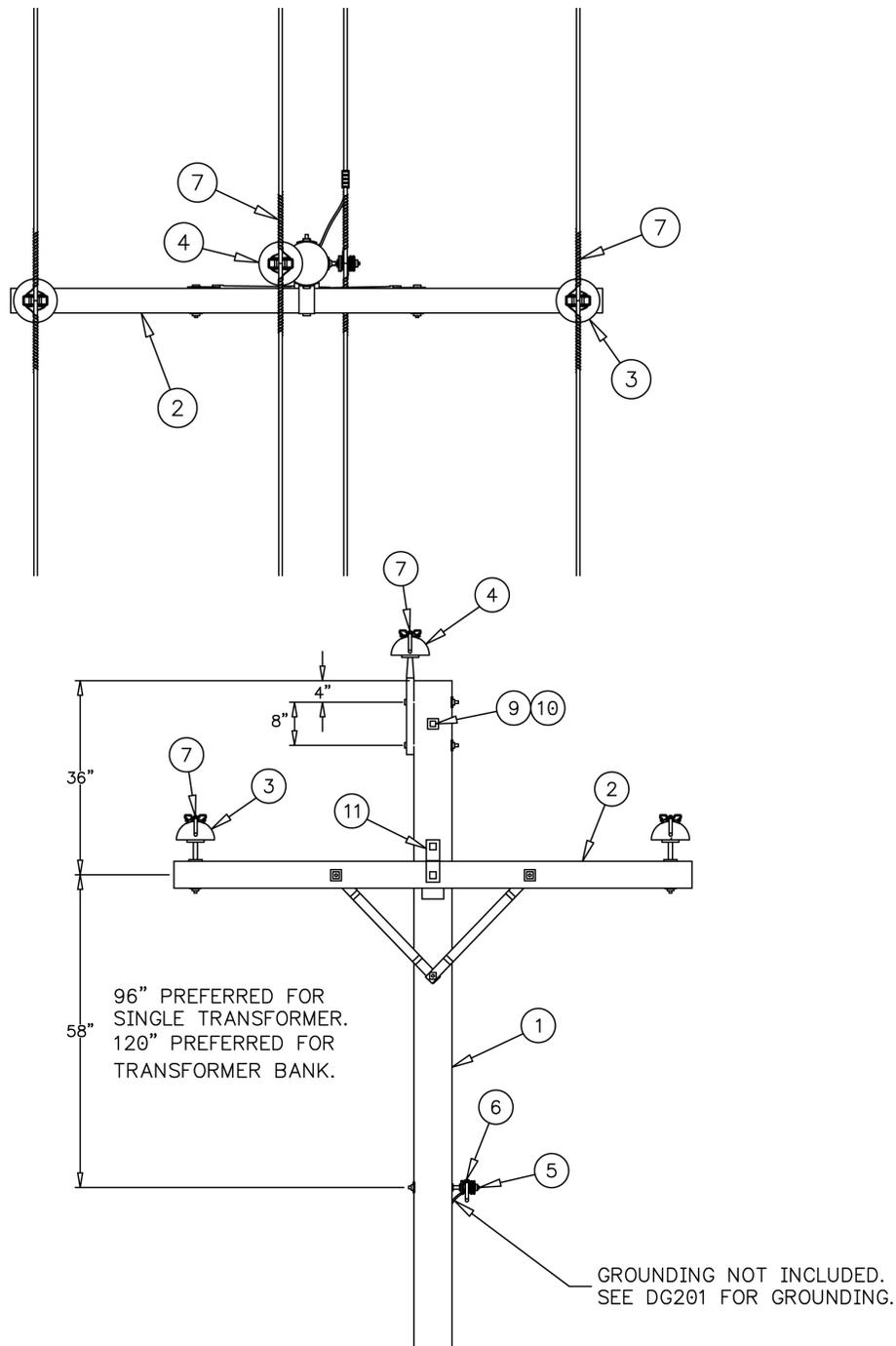


Figure 1—Raptor/Lightning-Area Single 10-Foot Arm and Pin Insulator Tangent Structure, Preferred Framing

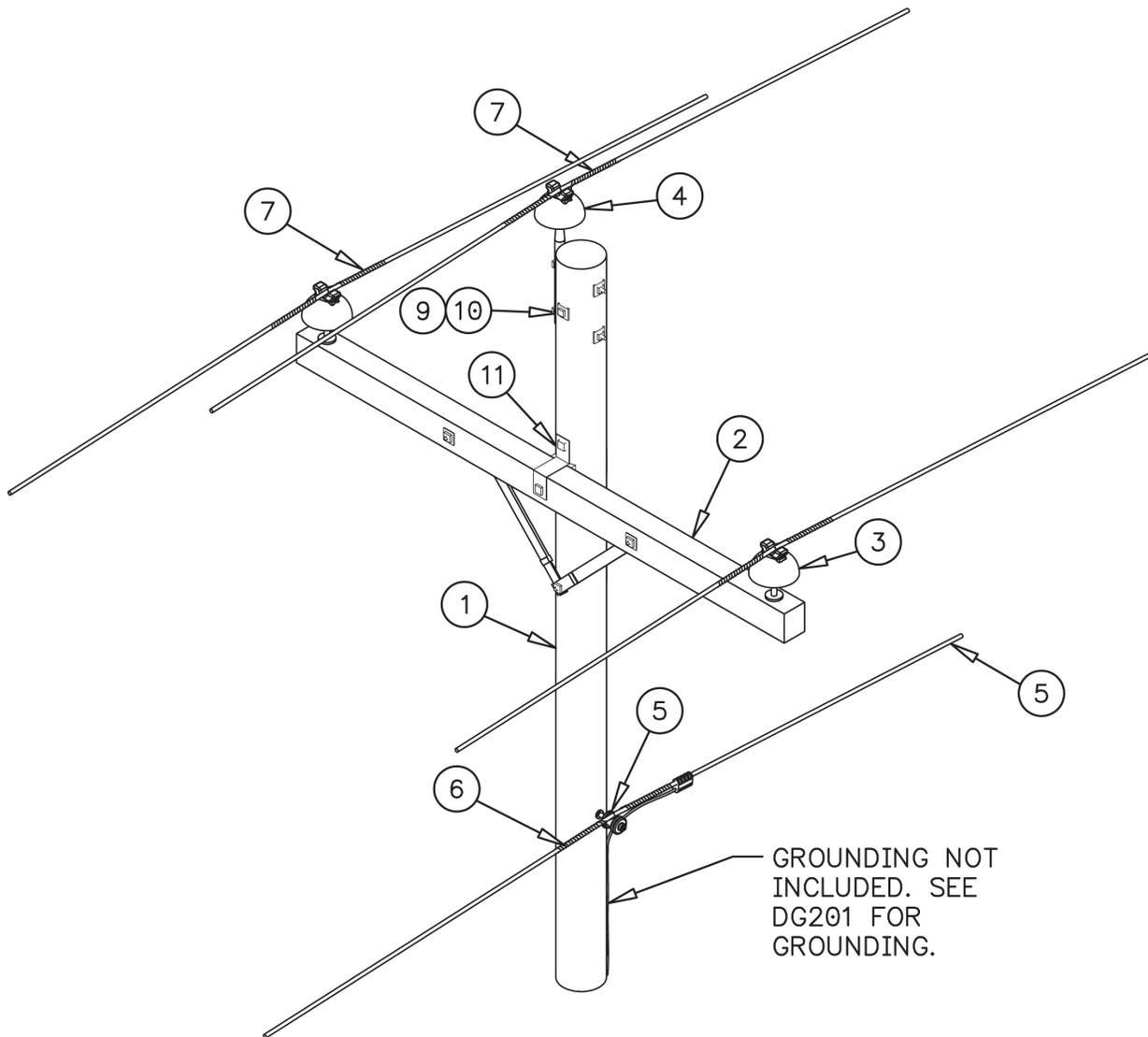


Figure 1A—Raptor/Lightning-Area Single 10-Foot Arm and Pin Insulator Tangent Structure, Preferred Framing (Isometric View)

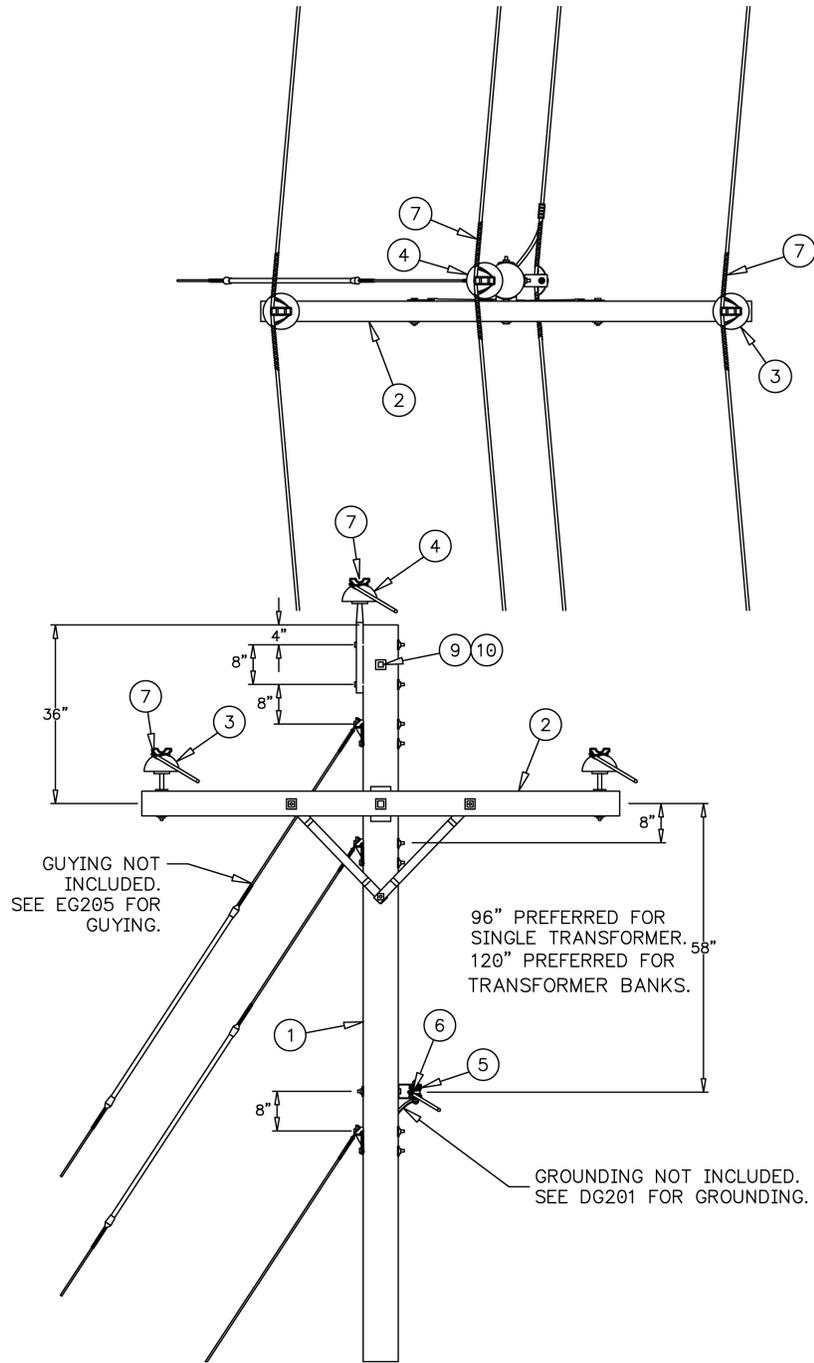


Figure 2—Raptor/Lightning-Area Single 10-Foot Arm and Pin Insulator Angle Structure

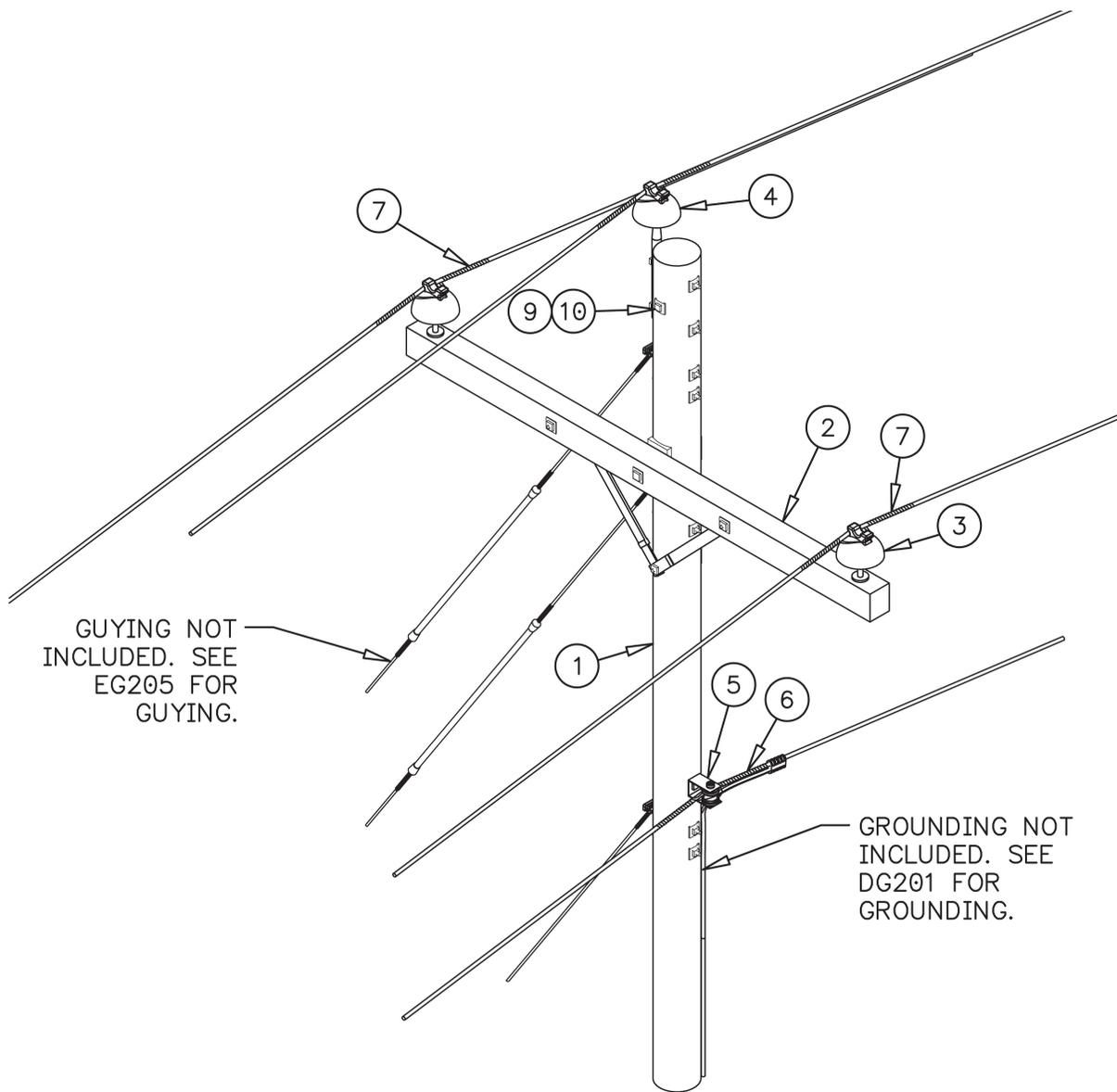


Figure 2A—Raptor/Lightning-Area Single 10-Foot Arm and Pin Insulator Angle Structure (Isometric View)

Table 3—Maximum Span Lengths and Angles for Fiberglass Crossarm and Deadend Insulators

	Primary Conductor	Neutral Conductor	NESC Medium Loading				NESC Heavy Loading			
			230 ft. Ruling Span (Feet)	Max Angle (Degrees)	350 ft. Ruling Span (Feet)	Max Angle (Degrees)	230 ft. Ruling Span (Feet)	Max Angle (Degrees)	350 ft. Ruling Span (Feet)	Max Angle (Degrees)
15 kV	2 AAAC	2 AAAC	270	60	345	60	260	60	350	60
	1/0 ACSR	1/0 ACSR	330	58	405	58	325	43	420	42
	4/0 AAC	4/0 AAC	265	55	350	54	260	48	380	46
	477 AAC	4/0 AAC	265	30	345	29	260	23	430†	21
	477 AAC	477 AAC	265	30	350	29	260	23	340	22
	795 AAC	477 AAC	270	19	360	19	260	16	345	15
	795 AAC	795 AAC	265	20	350	19	255	16	340	15
	1/0 AAAC	1/0 AAAC	270	60	345	59	265	44	330	43
	4/0 ACSR	1/0 ACSR	320	34	400	33	320	27	420	26
	4/0 ACSR	4/0 ACSR	325	34	395	33	315	27	395	26
	397 ACSR	4/0 ACSR	330	19	415	18	330	16	415	15
	397 ACSR	397 ACSR	330	19	415	18	325	16	395	15
25 kV	2 AAAC	2 AAAC	265	60	335	60	255	60	345	60
	1/0 ACSR	1/0 ACSR	325	58	400	58	315	43	410	42
	4/0 AAC	4/0 AAC	260	55	340	54	255	48	370	47
	477 AAC	4/0 AAC	260	30	335	29	255	23	430†	21
	477 AAC	477 AAC	260	30	345	29	250	23	335	22
	795 AAC	477 AAC	265	21	350	21	255	18	340	18
	795 AAC	795 AAC	260	20	340	19	250	16	330	15
	1/0 AAAC	1/0 AAAC	265	60	335	59	255	44	320	43
	4/0 ACSR	1/0 ACSR	315	34	390	33	315	27	410	26
	4/0 ACSR	4/0 ACSR	315	34	390	33	305	27	385	26
	397 ACSR	4/0 ACSR	330	19	410	18	325	16	405	15
	397 ACSR	397 ACSR	330	19	405	18	320	16	390	15
35 kV	2 AAAC	2 AAAC	260	60	330	60	250	60	335	60
	1/0 ACSR	1/0 ACSR	315	59	390	58	310	43	400	42
	4/0 AAC	4/0 AAC	255	55	335	54	245	49	365	47
	477 AAC	4/0 AAC	255	30	330	29	250	23	430†	21
	477 AAC	477 AAC	255	30	335	29	245	23	325	22
	795 AAC	477 AAC	260	20	345	19	250	16	330	15
	795 AAC	795 AAC	255	20	335	19	245	16	325	15
	1/0 AAAC	1/0 AAAC	260	60	330	59	250	44	315	43
	4/0 ACSR	1/0 ACSR	305	34	380	33	305	27	400	26
	4/0 ACSR	4/0 ACSR	310	34	380	33	300	27	375	26
	397 ACSR	4/0 ACSR	325	19	400	18	315	16	395	15
	397 ACSR	397 ACSR	325	19	400	18	310	16	380	15

† Span length has been reduced to guarantee sufficient class 1 pole strength.

Table 4—Component Assemblies, Figures 3 and 4

No.	Standard	Description
1	EB 401	Pole, Wood
	TD 030	Pole, Wood
2	EE 741	Crossarm, Fiberglass
3	EF 101	Pin Insulator Assembly—Crossarm-Mounted
4	EF 111	Pin Insulator Assembly—Pole-Top
5	EF 181	Deadend Insulator Assembly—Primary (crossarm)
6	EF 181	Deadend Insulator Assembly—Primary (pole)
7	EF 186	Deadend Assembly—Neutral (pole)
8	EF 951	Tie, Hand, Aluminum
9	DE 341	Connector, Shell-Fired, Yellow Cartridge
	DE 351	Connector, Shell-Fired, Blue Cartridge
	DE 301	Connector, H-Tap, Compression
10	DY 181	Bolt Assembly, Machine, 3/4", Single Curved Washer

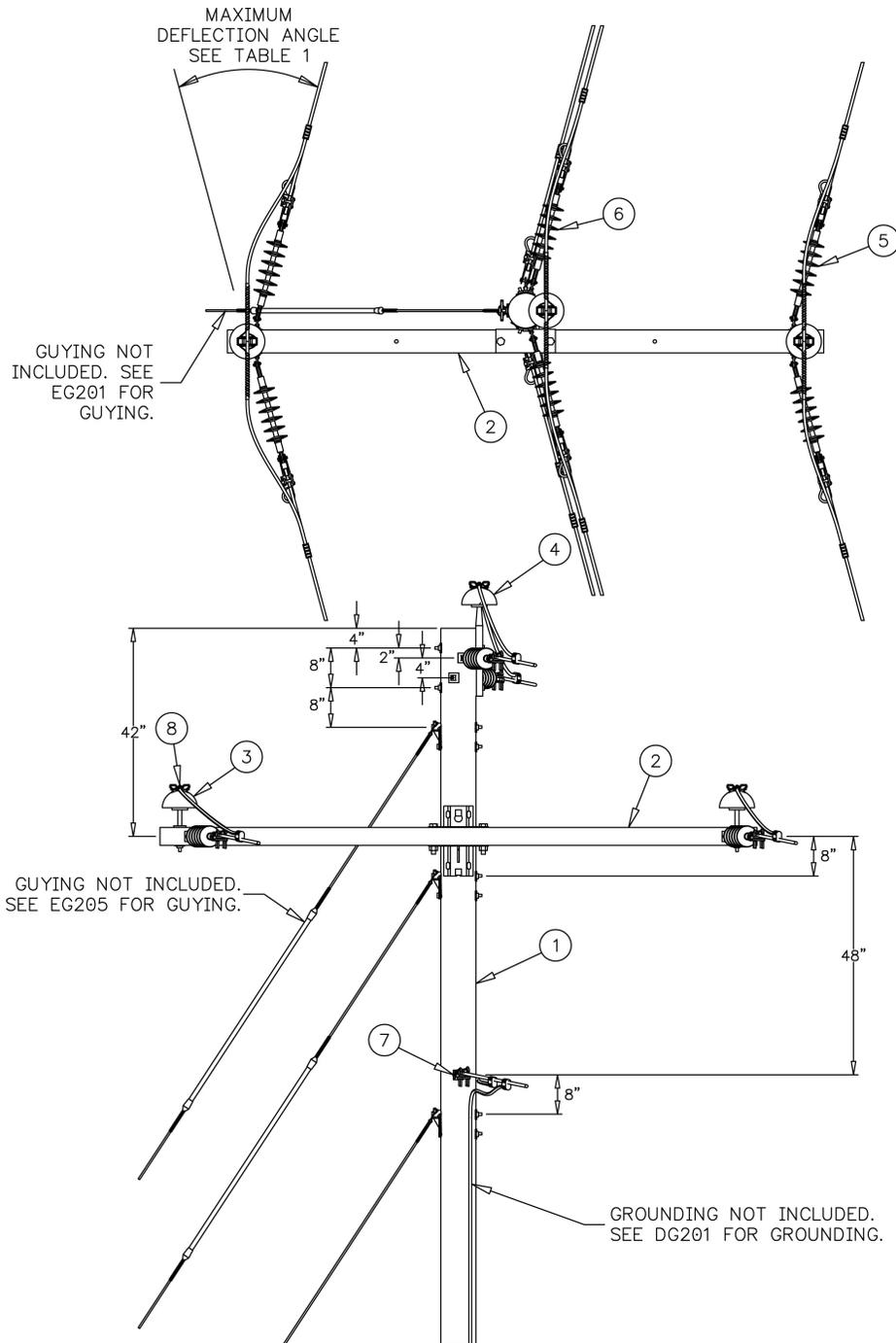


Figure 3—Raptor/Lightning-Area Angle Structure, Single 10-Foot Fiberglass Arms with Deadends

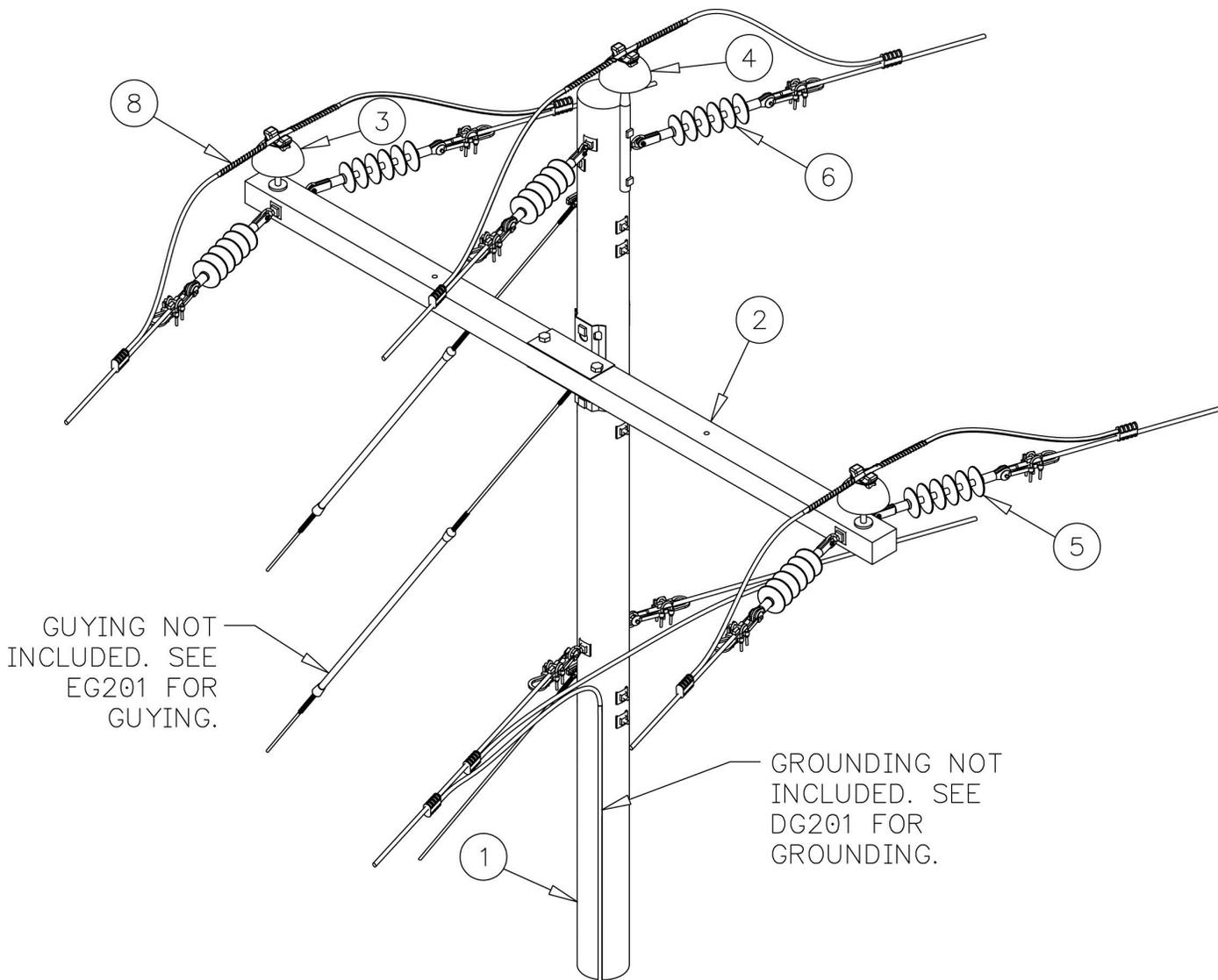


Figure 3A—Raptor/Lightning-Area Angle Structure, Single 10-Foot Fiberglass Arms with Deadends (Isometric View)

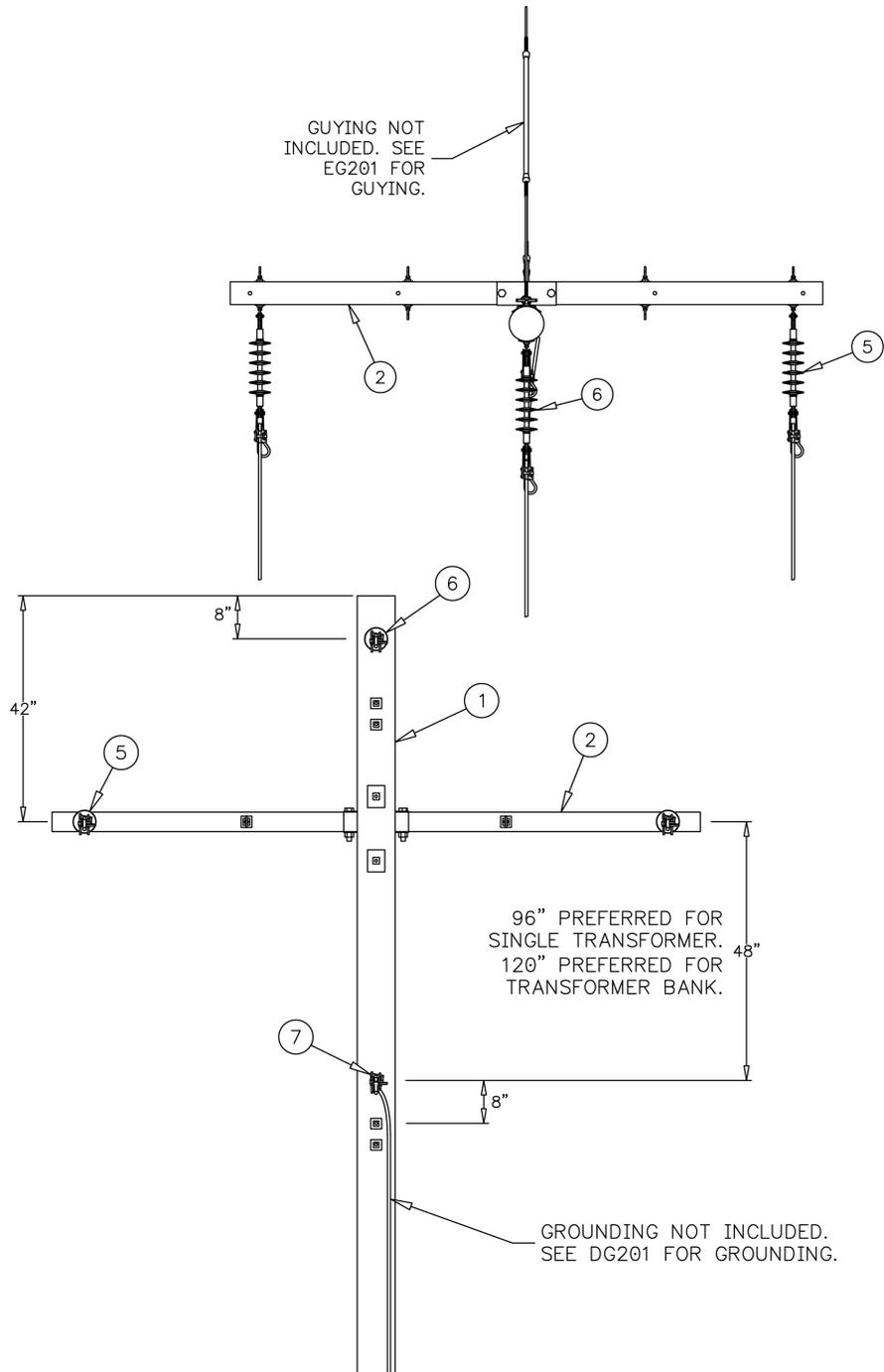


Figure 4—Raptor/Lightning-Area Deadend Structure, Single 10-Foot Fiberglass Arm

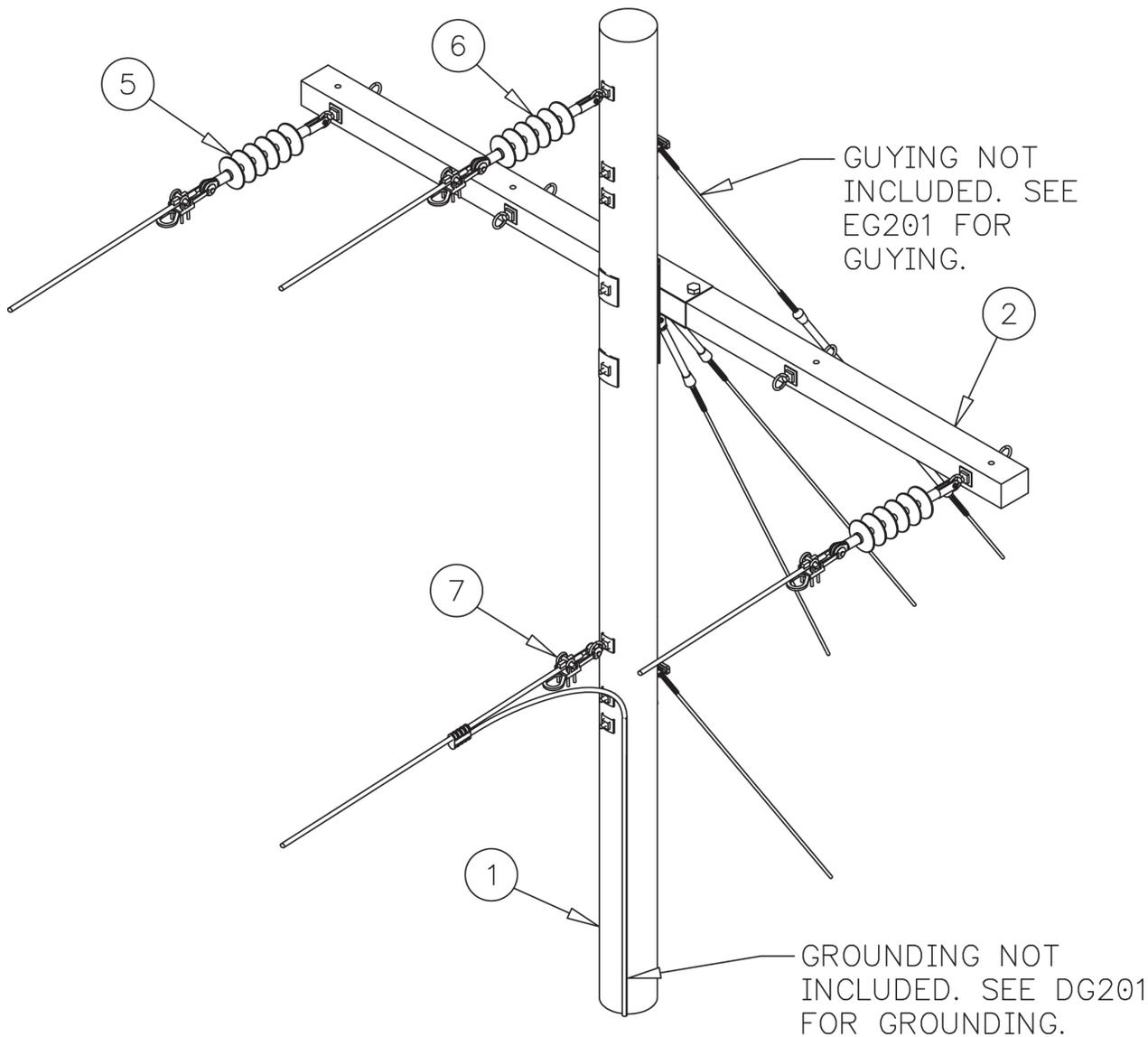


Figure 4A—Raptor/Lightning-Area Deadend Structure, Single 10-Foot Fiberglass Arm (Isometric View)

Table 5—Maximum Span Length for Corner Structures with 48” Vertical Spacing Between Conductors

	Primary Conductor	Neutral Conductor	NESC Medium Loading		NESC Heavy Loading	
			230 ft. Ruling Max Span (Feet)	350 ft. Ruling Max Span (Feet)	230 ft. Ruling Max Span (Feet)	350 ft. Ruling Max Span (Feet)
15 kV	2 AAAC	2 AAAC	190		180	
	1/0 ACSR	1/0 ACSR	230	280	225	295
	4/0 AAC	4/0 AAC	185		180	265
	477 AAC	4/0 AAC	185		180	350
	477 AAC	477 AAC	185		180	
	795 AAC	477 AAC	185	250	180	
	795 AAC	795 AAC	185		180	
	1/0 AAAC	1/0 AAAC	190		180	
	4/0 ACSR	1/0 ACSR	220	275	225	290
	4/0 ACSR	4/0 ACSR	225	275	220	275
	397 ACSR	4/0 ACSR	235	290	230	290
	397 ACSR	397 ACSR	235	290	225	275
25 kV	2 AAAC	2 AAAC	180		170	
	1/0 ACSR	1/0 ACSR	220	270	215	280
	4/0 AAC	4/0 AAC	175		170	255
	477 AAC	4/0 AAC	175		175	330
	477 AAC	477 AAC	175		170	
	795 AAC	477 AAC	180		175	
	795 AAC	795 AAC	175		170	
	1/0 AAAC	1/0 AAAC	180		175	
	4/0 ACSR	1/0 ACSR	210	265	210	280
	4/0 ACSR	4/0 ACSR	215	265	210	260
	397 ACSR	4/0 ACSR	225	275	220	275
	397 ACSR	397 ACSR	225	275	215	265
35 kV	2 AAAC	2 AAAC	170		165	
	1/0 ACSR	1/0 ACSR	205	255	205	265
	4/0 AAC	4/0 AAC	165		165	
	477 AAC	4/0 AAC	165		165	315
	477 AAC	477 AAC	165		160	
	795 AAC	477 AAC	170		165	
	795 AAC	795 AAC	165		160	
	1/0 AAAC	1/0 AAAC	170		165	
	4/0 ACSR	1/0 ACSR	200	250	200	265
	4/0 ACSR	4/0 ACSR	200	250	200	250
	397 ACSR	4/0 ACSR	215	260	210	260
	397 ACSR	397 ACSR	215	260	205	250

Table 6—Component Assemblies, Figure 5

No.	Standard	Description
1	EB 401	Pole, Wood
	TD 030	Pole, Wood
2	EF 181	Deadend Insulator Assembly—Primary (pole)
3	EF 181	Deadend Insulator Assembly—Primary (crossarm)
4	EF 186	Deadend Assembly—Neutral (pole)
5	DE 341	Connector, Shell-Fired, Yellow Cartridge
	DE 351	Connector, Shell-Fired, Blue Cartridge
	DE 301	Connector, H-Tap, Compression
	DE 321	Connector, Vise-Type, Bolted
6	EE 741	Crossarm, Fiberglass

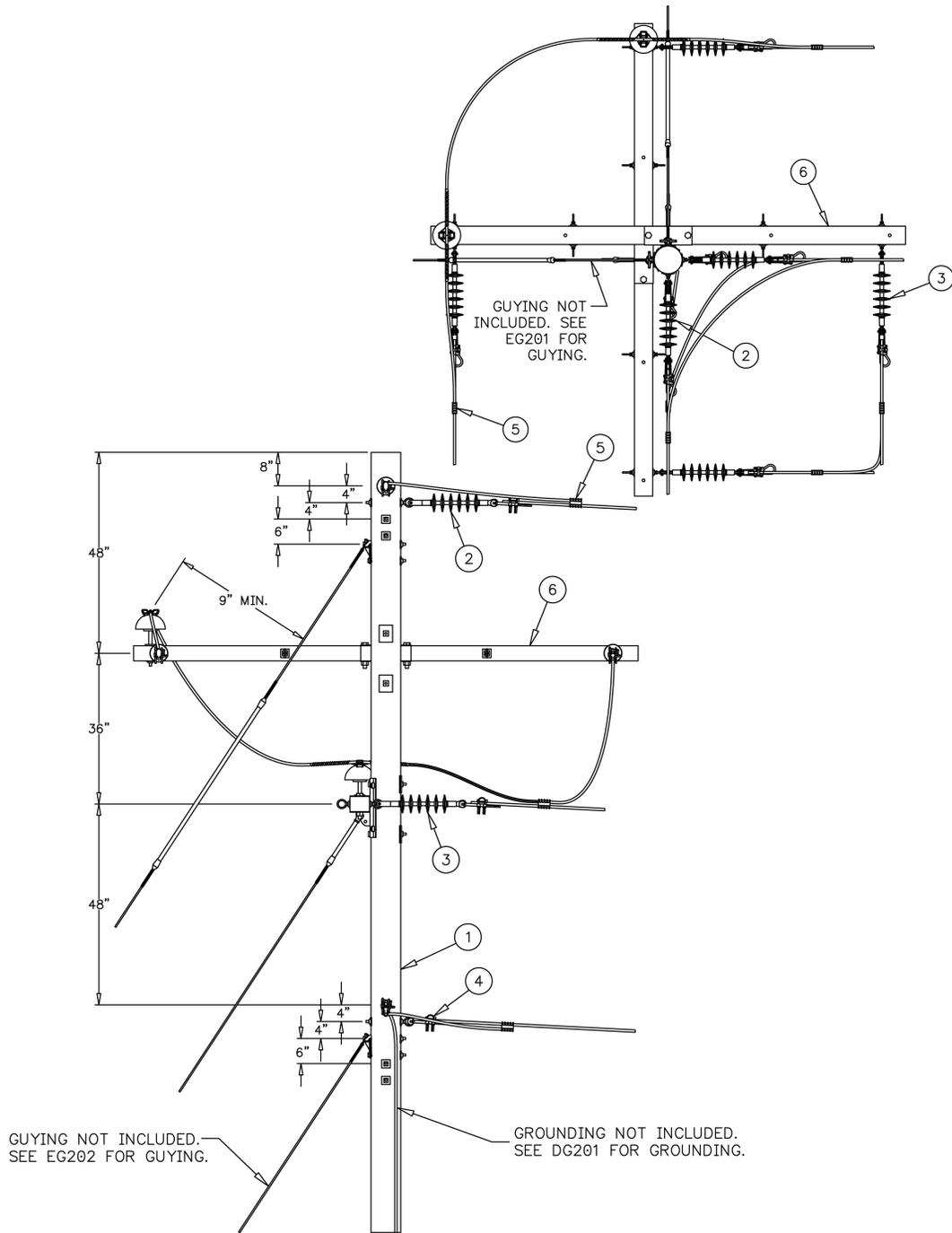


Figure 5—Raptor/Lightning-Area Corner Structure

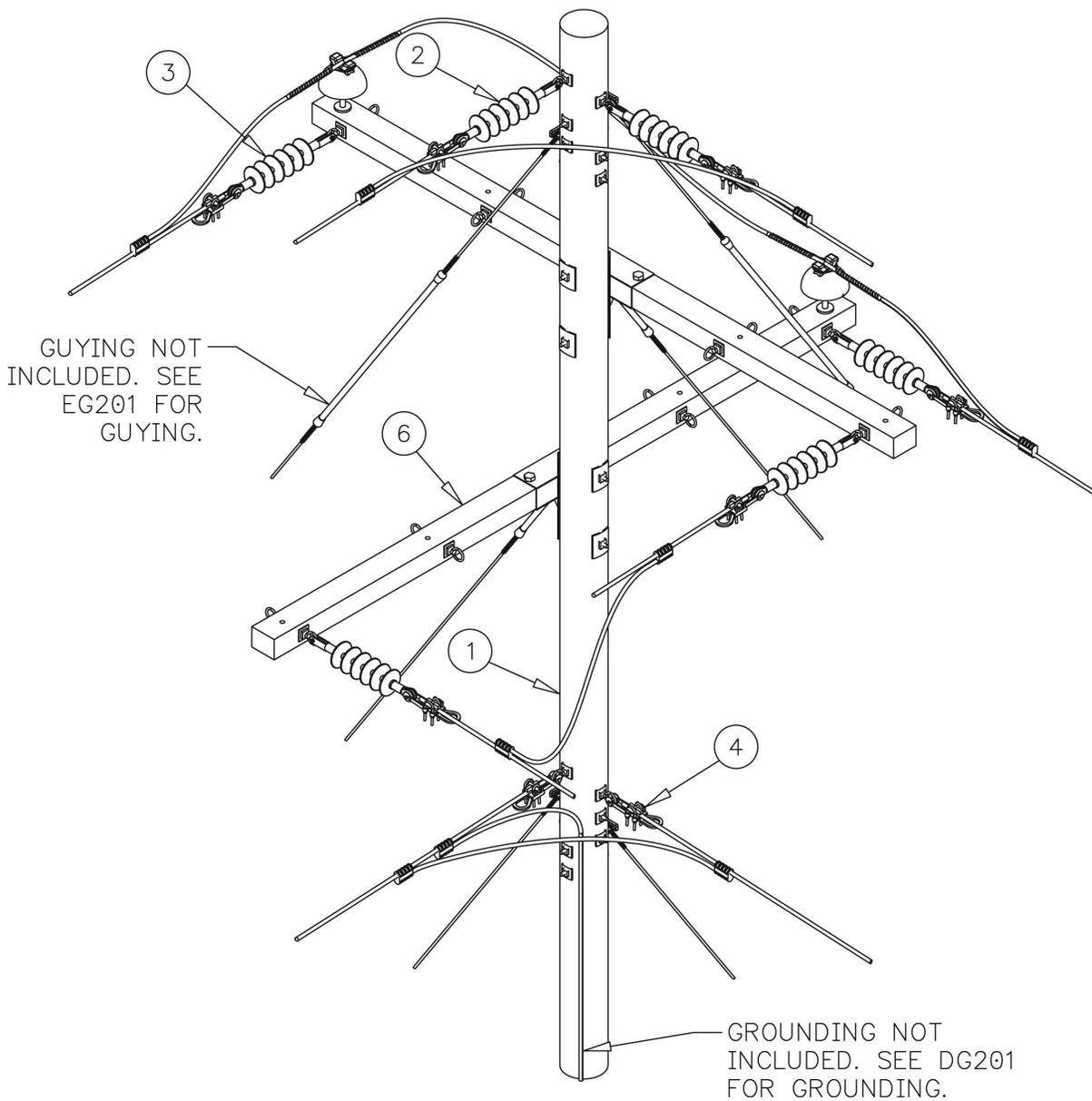


Figure 5A—Raptor/Lightning-Area Corner Structure (Isometric View)

**Table 7—Maximum Span Lengths for Vertical Corner Structures with 60" Vertical Spacing
(See Table 8 for Maximum Spans with 72" Vertical Spacing)**

	Primary Conductor	Neutral Conductor	NESC Medium Loading		NESC Heavy Loading	
			230 ft. Ruling Max Span (Feet)	350 ft. Ruling Max Span (Feet)	230 ft. Ruling Max Span (Feet)	350 ft. Ruling Max Span (Feet)
15 kV	2 AAAC	2 AAAC	220	280	210	285
	1/0 ACSR	1/0 ACSR	265	330	260	340
	4/0 AAC	4/0 AAC	215	280	210	310
	477 AAC	4/0 AAC	215	280	210	405
	477 AAC	477 AAC	215	285	210	275
	795 AAC	477 AAC	220	290	210	280
	795 AAC	795 AAC	215	280	210	275
	1/0 AAAC	1/0 AAAC	220	275	210	265
	4/0 ACSR	1/0 ACSR	260	320	260	340
	4/0 ACSR	4/0 ACSR	260	320	255	320
25 kV	397 ACSR	4/0 ACSR	275	335	270	335
	397 ACSR	397 ACSR	275	335	265	320
	2 AAAC	2 AAAC	215	270	205	275
	1/0 ACSR	1/0 ACSR	260	320	255	330
	4/0 AAC	4/0 AAC	205	270	200	300
	477 AAC	4/0 AAC	205	270	205	390
	477 AAC	477 AAC	210	275	200	265
	795 AAC	477 AAC	210	280	205	270
	795 AAC	795 AAC	205	270	200	265
	1/0 AAAC	1/0 AAAC	210	270	205	260
35 kV	4/0 ACSR	1/0 ACSR	250	310	250	330
	4/0 ACSR	4/0 ACSR	250	310	245	310
	397 ACSR	4/0 ACSR	265	325	260	325
	397 ACSR	397 ACSR	265	325	255	310
	2 AAAC	2 AAAC	205	260	195	265
	1/0 ACSR	1/0 ACSR	250	305	245	320
	4/0 AAC	4/0 AAC	200	265	195	285
	477 AAC	4/0 AAC	200	260	195	380
	477 AAC	477 AAC	200	265	195	255
	795 AAC	477 AAC	205	270	195	260
35 kV	795 AAC	795 AAC	200	260	195	255
	1/0 AAAC	1/0 AAAC	205	260	200	250
	4/0 ACSR	1/0 ACSR	240	300	240	315
	4/0 ACSR	4/0 ACSR	245	300	235	295
	397 ACSR	4/0 ACSR	260	315	250	310
	397 ACSR	397 ACSR	255	315	245	300

Table 8—Maximum Span Lengths for Vertical Corner Structures with 72" Vertical Spacing
 (See EJ 018 for Maximum Spans with Vertical Spacing Greater than 72")

	Primary Conductor	Neutral Conductor	NESC Medium Loading		NESC Heavy Loading	
			230 ft. Ruling Max Span (Feet)	350 ft. Ruling Max Span (Feet)	230 ft. Ruling Max Span (Feet)	350 ft. Ruling Max Span (Feet)
15 kV	2 AAAC	2 AAAC	245	310	235	320
	1/0 ACSR	1/0 ACSR	300	370	295	385
	4/0 AAC	4/0 AAC	240	315	235	345
	477 AAC	4/0 AAC	240	315	240	450
	477 AAC	477 AAC	240	320	235	310
	795 AAC	477 AAC	245	325	235	315
	795 AAC	795 AAC	240	315	235	310
	1/0 AAAC	1/0 AAAC	245	310	240	300
	4/0 ACSR	1/0 ACSR	290	360	290	380
	4/0 ACSR	4/0 ACSR	295	360	285	360
	397 ACSR	4/0 ACSR	310	380	300	375
	397 ACSR	397 ACSR	310	380	295	360
	25 kV	2 AAAC	2 AAAC	240	305	230
1/0 ACSR		1/0 ACSR	290	360	285	375
4/0 AAC		4/0 AAC	235	310	230	335
477 AAC		4/0 AAC	235	305	230	445
477 AAC		477 AAC	235	310	230	300
795 AAC		477 AAC	240	320	230	305
795 AAC		795 AAC	235	310	230	300
1/0 AAAC		1/0 AAAC	240	305	230	290
4/0 ACSR		1/0 ACSR	285	355	285	370
4/0 ACSR		4/0 ACSR	285	350	280	350
397 ACSR		4/0 ACSR	305	370	295	365
397 ACSR		397 ACSR	300	370	290	350
35 kV		2 AAAC	2 AAAC	235	295	225
	1/0 ACSR	1/0 ACSR	285	350	280	365
	4/0 AAC	4/0 AAC	230	300	220	330
	477 AAC	4/0 AAC	225	295	225	430
	477 AAC	477 AAC	230	305	220	295
	795 AAC	477 AAC	230	310	225	300
	795 AAC	795 AAC	225	300	220	290
	1/0 AAAC	1/0 AAAC	235	295	225	285
	4/0 ACSR	1/0 ACSR	275	345	275	360
	4/0 ACSR	4/0 ACSR	280	340	270	340
	397 ACSR	4/0 ACSR	295	360	285	355
	397 ACSR	397 ACSR	295	360	280	340



Table 9—Component Assemblies, Figure 6

No.	Standard	Description
1	EB 401	Pole, Wood
	TD 030	Pole, Wood
2	EF 181	Deadend Insulator Assembly—Primary (pole)
3	EF 186	Deadend Assembly—Neutral (pole)
4	DE 341	Connector, Shell-Fired, Yellow Cartridge
	DE 351	Connector, Shell-Fired, Blue Cartridge
	DE 301	Connector, H-Tap, Compression
	DE 321	Connector, Vise-Type, Bolted

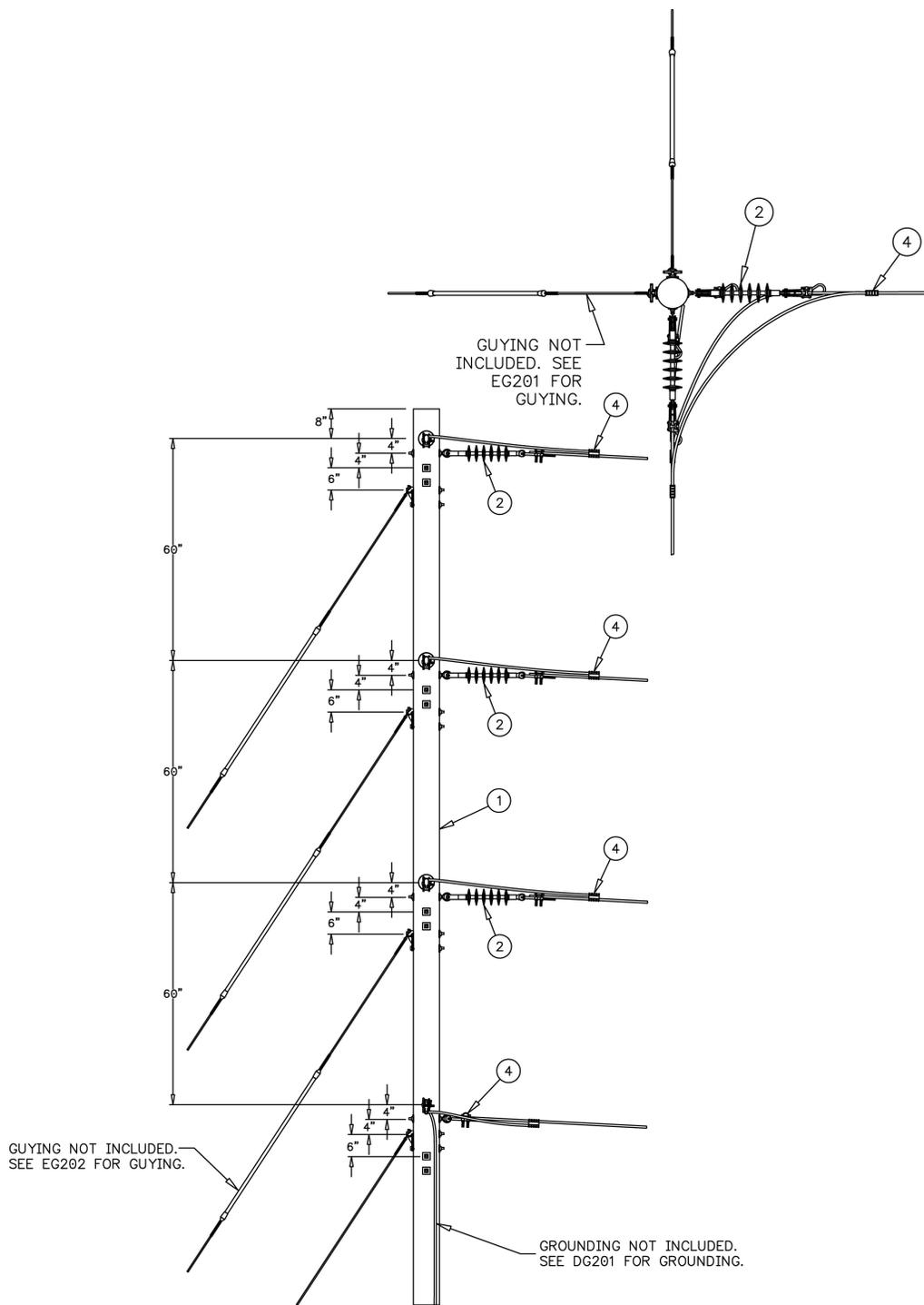


Figure 6—Raptor/Lightning Area Vertical Corner Structure

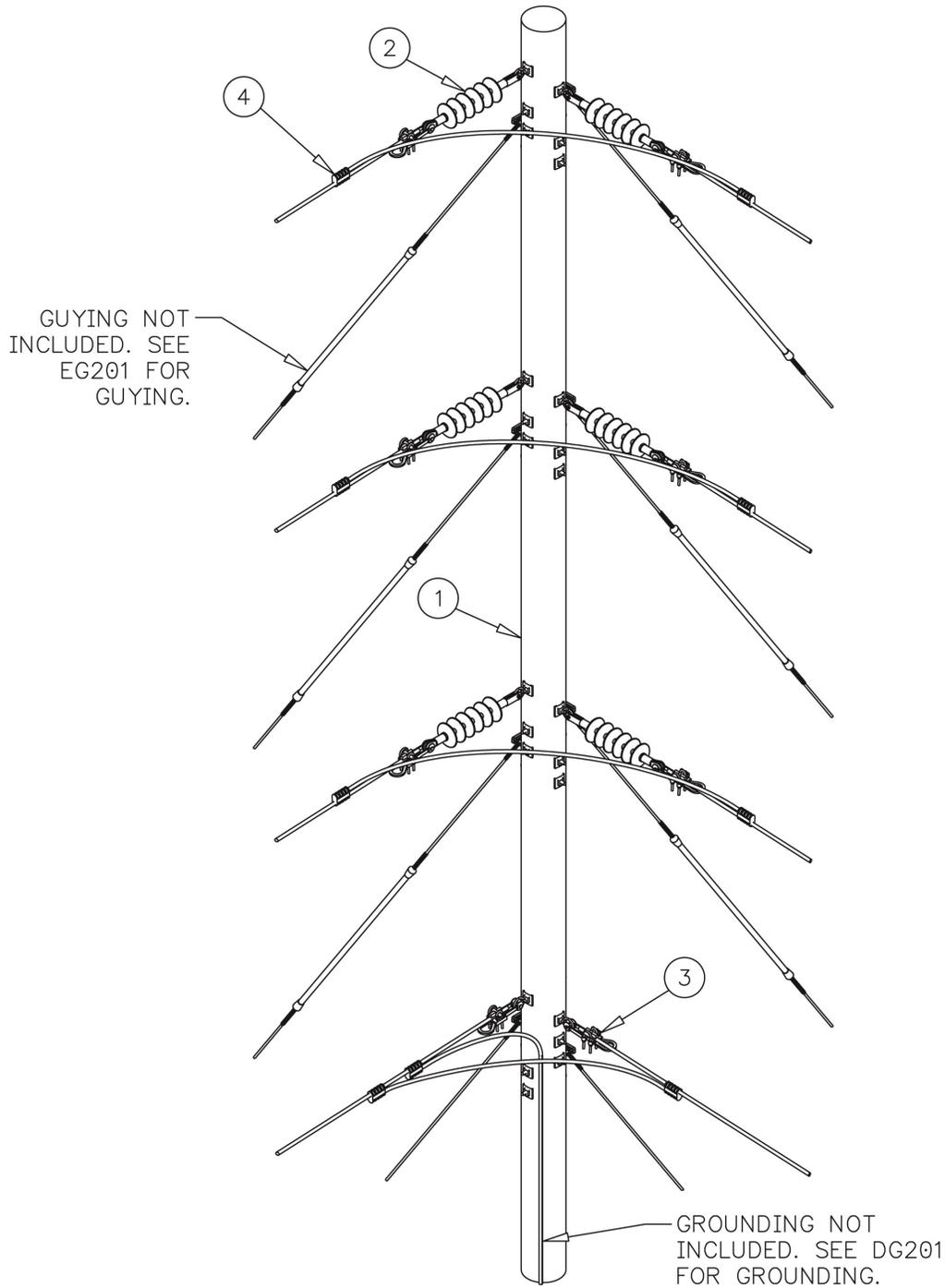


Figure 6A—Raptor/Lightning Area Vertical Corner Structure (Isometric View)