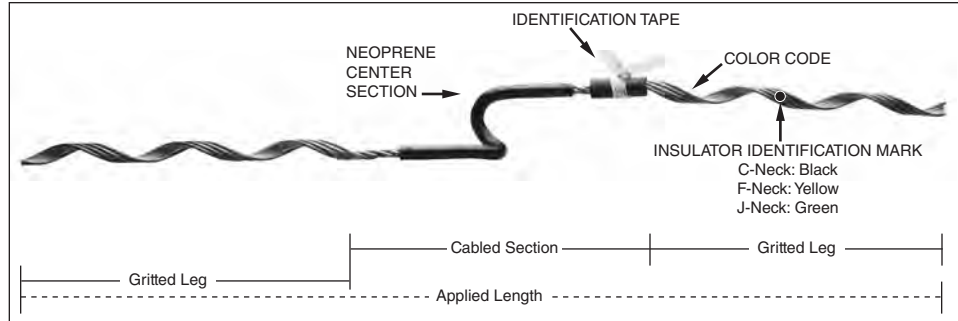




WRAPLOCK® Tie

NOMENCLATURE

RUS Accepted



WRAPLOCK Tie Tube: Component is detached and placed in the saddle groove of the insulator.

Molded Center Section: Together with tubes, completely surrounds conductor with protective cushion.

Insulator Identification Mark: Identifies the correct insulator head-style by colors corresponding to information on Catalog Specification pages.

Color Code: Assists in identification of conductor diameter and indicates starting point for application, corresponding to tabular information appearing on Catalog pages.

Applied Length: Assists in identification of conductor size, corresponding to tabular information appearing on Catalog pages.

Identification Tape: Shows catalog number, nominal sizes.

GENERAL RECOMMENDATIONS

INTENDED USE: WRAPLOCK Ties secure conductors in the top groove of interchangeable head-style insulators.

WRAPLOCK Ties provide an improved method of securing conductor compared to clamp-top insulators or hand ties over Armor Rods.

WRAPLOCK TIE TUBE: WRAPLOCK Ties provide superior abrasion protection for the conductor under all types of motion, including low frequency sway oscillation, high frequency aeolian vibration, and galloping.

The elastomer components are recommended because they surround the bare conductor with a resilient cushion where the conductor would come into contact with the insulator and with the center section of the tie. The WRAPLOCK Tie provides superior protection by eliminating abrasion rather than sacrificing outside surfaces to abrasion.

VIBRATION DAMPERS: By using WRAPLOCK Ties, the vibration fatigue life is maximized to the extent that the original endurance limit of the conductor is not reduced by abrasion on its outside surface. However, on selected lines where experience indicates that prolonged periods of vibration might approach the fatigue life of the conductor, or cause inner wire fretting, it will be necessary to supplement with dampers.

The following are guideline definitions for vibration activity. They should be applied to a Utility's own experience on lines in a given area.

“Excessive” Vibration: Areas where abrasion damage has been known to require replacement of both hand tie wire and protective rods, or where fatigue has been found under clamps. Protective rods should be replaced when visual inspection shows approximately half or more of the rod diameter has been abraded.

“Severe” Vibration: Areas where abrasion has required replacement of hand tie wire, but damage to protective rods has not progressed to the point where replacement is necessary.

“Moderate” Vibration: Areas where replacement of hand tie wire has not been required, and damage is minor.

WRAPLOCK Ties provide protection on areas of **“severe”** or **“moderate”** vibration. For areas experiencing **“excessive”** vibration, supplemental use of dampers is recommended. Spiral Vibration Damper's single purpose is to prevent the unlimited accumulation of aeolian vibration.

(Continued)

WRAPLOCK® Tie

GENERAL RECOMMENDATIONS CONTD.

INTERCHANGEABLE HEAD-STYLE INSULATOR: To insure proper fit and service life, it is recommended that only insulators corresponding to C-neck, F-neck, or J-neck be used. These neck-diameter and groove-height dimensions appear on ANSI standards.

Consult the Factory for engineering recommendations on non-interchangeable head-style insulators. A sample of the insulator in question is desirable.

CONDUCTOR SIZE: Conductor sizes up to 1.240" O.D. can be accommodated depending on the insulator's top groove radius.

MECHANICAL STRENGTH: The WRAPLOCK tie is designed to provide longitudinal holding strength in excess of values required by the National Electric Safety Code. The maximum holding strength is usually sufficient to contain the broken conductor to a single span, however, the WRAPLOCK Tie is designed to relieve the load before severe damage is done to the pole's structural components.

The WRAPLOCK Tie is designed to permit controlled and limited movement of unbroken conductor, reducing cantilever loading at the base of the insulator or bracket, then restore itself. We refer to this unique feature as "resilience." **TM-169E** covers the mechanical testing of the WRAPLOCK Tie and is available upon request.

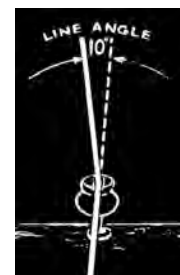
RADIO INTERFERENCE: The RIV characteristics of WRAPLOCK Ties are equivalent to those of a well-made hand tie when originally installed. During service life the precontoured tie assures continued fit, which would have better RIV than a loosened tie wire.

TAPPING: Compared to the use of protective rods, placing hot-line clamps directly over the applied legs of Wraplock Ties cannot be recommended. Tapping over protective rods will remain permissible, however, there are now stirrups available that provide a superior method of making hot-line taps.



LINE ANGLES – GENERAL GUIDELINES:

On vertically-mounted insulators, WRAPLOCK Ties can normally accommodate line angles up to 10°. Larger angles may be accommodated when the insulator is mounted at varying degrees of cant from the vertical, depending upon the actual cant of the insulator. Combining Side Ties with WRAPLOCK Ties on a single structure can also affect the acceptable line angles for that structure.



A technical report (**TM-197E**) is available which describes these various permissible line angles of WRAPLOCK Ties as a function of the insulator cant.

In all cases the conductor should rest in the preferred insulator groove, independently of the tie, so the tie is not required to force the conductor to remain in that groove. The largest practical angle a tie can accommodate depends upon limiting factors such as conductor size, tension, span lengths, sag angles, insulator style and orientation, etc. Consult PLP for further guidance on line angle issues not covered in the above test report.

DOUBLE SUPPORTS: At double crossarms PREFORMED™ Double-Support Tie can be used to cross major highways and railroads, or turn angles where it is practical to hold the conductor in the top groove during installation.

SAFETY CONSIDERATIONS

1. This product is intended for a single (one-time) use and for the specified application. **CAUTION: DO NOT REUSE OR MODIFY THIS PRODUCT UNDER ANY CIRCUMSTANCES.**
2. This product is intended for use by trained craftspeople only. This product **SHOULD NOT BE USED** by anyone who is not familiar with and trained in the use of it.
3. When working in the area of energized lines with this product, **EXTRA CARE** should be taken to prevent accidental electrical contact.
4. For **PROPER PERFORMANCE AND PERSONAL SAFETY** be sure to select the proper size WRAPLOCK Tie before application.
5. WRAPLOCK Ties are precision devices. To insure proper performance, they should be stored in cartons under cover and handled carefully.



WRAPLOCK® Tie

For use on:
ACSR, Compacted ACSR,
Aluminum Alloy
All-Aluminum, AWAC®
Compacted All-Aluminum

C-Neck Interchangeable
Headstyle Insulators

ANSI 55-2 Pin
ANSI 55-3 Pin **2-1/4" Neck Diameter**



Catalog Number	Diameter Range (inches)		Nominal Conductor Size	Units Per Carton	Wt./Lbs.	Applied Length (inches)	Insulator Identification Mark	Color Code
	Min.	Max.						
9/16" R Groove (See Note 2)								
WTC-0100	.248	.259	#4, 6/1-7/1 #4, 7W Alum. Alloy	100	21	19	Black	Orange
WTC-0101	.260	.269	#4, AWAC, 5/2 #3, 7W, All-Alum. #2, 7W, Comp.	100	21	19	Black	Green
WTC-0102	.270	.280	#3, 7W, Alum. Alloy #3, AWAC, 6/1	100	21	19	Black	Yellow
WTC-0103	.281	.291	#4, AWAC, 4/3 #3, 6/1 #2, 6/1, Comp.	100	24	20-1/2	Black	White
WTC-0104	.292	.303	#3, AWAC, 5/2 #2, 7W, All-Alum. #2, 7/1, Comp.	100	24	20-1/2	Black	Purple
WTC-0105	.304	.314	#4, AWAC, 3/4 #2, AWAC, 6/1	100	24	21-1/2	Black	Brown
WTC-0106	.315	.327	#2, 6/1-7/1 #2, 7W, Alum. Alloy	100	24	21-1/2	Black	Red
WTC-0107	.328	.340	#2, AWAC, 5/2 #1, 7W, All-Alum. 1/0, 7W, Comp.	100	25	22-1/2	Black	Blue
WTC-0108	.341	.353	#3, AWAC, 3/4 #1, 7W, Alum. Alloy	100	25	22-1/2	Black	Orange
WTC-0109	.354	.367	#2, AWAC, 4/3 #1, 6/1, 1/0, 6/1, Comp.	100	26	23-1/2	Black	Green
WTC-0110	.368	.381	1/0, 7W, All-Alum. 2/0, 7W, Comp.	100	26	20	Black	Black
WTC-0111	.382	.394	#2, AWAC, 3/4 1/0, AWAC, 6/1	100	27	21	Black	White
WTC-0112	.395	.411	1/0, 6/1 1/0, 7W, Alum. Alloy	100	27	21	Black	Yellow
WTC-0113	.412	.437	2/0, 7W-19W, All-Alum. 3/0, 7W-19W, Comp.	100	27	22	Black	Brown
WTC-0114	.438	.463	2/0, 6/1-7/1 2/0, 7W, Alum. Alloy	100	28	23	Black	Blue
WTC-0115	.464	.492	3/0, 7W-19W, All-Alum. 4/0, 7W-19W, Comp.	50	18	24-1/2	Black	Green
WTC-0116	.493	.522	3/0, 6/1 3/0, 7W, Alum. Alloy 4/0, 7W, All-Alum.	50	18	24-1/2	Black	Orange
WTC-0117	.523	.554	3/0, AWAC, 5/2 4/0, 19W, All-Alum. 266.8, 7W-19W, Comp.	50	18	26-1/2	Black	Black
WTC-0118	.555	.594	4/0, 6/1 4/0, 7W, Alum. Alloy 266.8, 7W-19W, All-Alum.	50	19	27-1/2	Black	Red
WTC-0119	.595	.630	266.8, 18/1 300, 18W-37W, All-Alum.	50	21	28-1/2	Black	Purple

Right-hand lay standard

(Continued on next page)

EXPLANATORY NOTES:

- (1) Nominal Conductor size indicates one of various conductors within each range.
- (2) For the succeeding conductors ranges, the insulator's top groove radius should be at least as large as shown above.
- (3) AWAC is a registered trademark of the Copperweld Co.

WRAPLOCK® Tie

For use on:

**ACSR, Compacted ACSR,
Aluminum Alloy
All-Aluminum, AWAC®
Compacted All-Aluminum**

**C-Neck Interchangeable
Headstyle Insulators**

**ANSI 55-2 Pin 2-1/4" Neck Diameter
ANSI 55-3 Pin**



Catalog Number	Diameter Range (Inches)		Nominal Conductor Size	Units Per Carton	Wt./Lbs.	Applied Length (Inches)	Insulator Identification Mark	Color Code
	Min.	Max.						
5/8", R. Groove (See Note 2)								
WTC-0120	.631	.664	266.8, 26/7 266.8, 19W, Alum. Alloy	50	21	28-1/2	Black	Yellow
WTC-0121	.665	.705	336.4, 18/1-36/1 336.4, 19W, All-Alum. 350, 19W-37W, All-Alum.	50	21	29-1/2	Black	Brown
WTC-0122	.706	.747	336.4, 26/7-30/7 397.5, 19W, All-Alum.	50	22	30-1/2	Black	Green
3/4" R. Groove (See Note 2)								
WTC-0123	.748	.795	397.5, 24/7, 26/7 397.5, 19W, Alum. Alloy 477, 19W, 37W, All-Alum.	50	20	33	Black	Orange
WTC-0124	.796	.846	477, 18/1, 36/1 500, 19W, All-Alum.	50	21	37	Black	Purple
WTC-0125	.847	.900	556.5, 18/1, 36/1 556.5, 19W, 37W All-Alum.	50	21	39	Black	Blue
WTC-0126	.901	.958	636, 18/1, 36/1 636, 37W All-Alum. 556.5M, 19W Alum. Alloy	50	22	41	Black	Green
WTC-0127	.959	1.018	666.6, 24/7, 54/7 750, 37W All-Alum. 636, 37 Alum. Alloy	50	23	43	Black	White
13/16" R. Groove (See Note 2)								
WTC-0128	1.019	1.083	795, 36/1, 45/7 795, 37W Alum. Alloy	50	24	45	Black	Brown
7/8" or 1" R. Groove (See Note 2)								
WTC-0129	1.084	1.151	954, 36/1 954, 37W All-Alum. 795, 37W Alum. Alloy	50	25	47	Black	Orange
WTC-0130	1.152	1.223	954, 45/7, 54/7 1033.5, 37W All-Alum. 954, 37W Alum. Alloy	50	27	49	Black	Purple
WTC-0131	1.224	1.240		50	29	59	Black	Black

Right-hand lay standard

EXPLANATORY NOTES:

- (1) Nominal Conductor size indicates one of various conductors within each range.
- (2) For the succeeding conductors ranges, the insulator's top groove radius should be at least as large as shown above.
- (3) AWAC is a registered trademark of the Copperweld Co.



WRAPLOCK® Tie

For use on:

ACSR, Compacted ACSR, Aluminum Alloy
All-Aluminum, AWAC® Compacted All-Aluminum
F-Neck Interchangeable Headstyle Insulators

ANSI 55-4 Pin
ANSI 55-5 Pin
ANSI 57-1 Post
ANSI 57-2 Post
ANSI 57-3 Post

2-7/8"
Neck Diameter



Catalog Number	Diameter Range (inches)		Nominal Conductor Size	Units	Wt./Lbs.	Applied Length (inches)	Insulator Identification Mark	Color Code
	Min.	Max.		Per Carton				
9/16" R Groove (See Note 2)								
WTF-0200	.248	.259	#4, 6/1-7/1 – #4, 7W, Alum. Alloy	100	24	20-3/4	Yellow	Orange
WTF-0201	.260	.269	#4, AWAC, 5/2 – #3, 7W, All-Alum. – #2, 7W, Comp.	100	24	20-3/4	Yellow	Green
WTF-0202	.270	.280	#3, 7W, Alum. Alloy – #3, AWAC, 6/1	100	24	20-3/4	Yellow	Yellow
WTF-0203	.281	.291	#4, AWAC, 4/3 – #3, 6/1 – #2, 6/1, Comp.	100	26	21-3/4	Yellow	White
WTF-0204	.292	.303	#3, AWAC, 5/2 – #3, 7W, All-Alum. – #2, 7/1, Comp.	100	26	21-3/4	Yellow	Purple
WTF-0205	.304	.314	#4, AWAC, 3/4 – #2, AWAC, 6/1	100	27	22-3/4	Yellow	Brown
WTF-0206	.315	.327	#2, 6/1-7/1 – #2, 7W, Alum. Alloy	100	27	22-3/4	Yellow	Red
WTF-0207	.328	.340	#2, AWAC, 5/2 – #1, 7W, All-Alum. 1/0, 7W, Comp.	100	27	23-3/4	Yellow	Blue
WTF-0208	.341	.353	#3, AWAC, 3/4 – #1, 7W, Alum. Alloy	100	27	23-3/4	Yellow	Orange
WTF-0209	.354	.367	#2, AWAC, 4/3 – #1, 6/1 1/0, 6/1, Comp.	100	28	24-3/4	Yellow	Green
WTF-0210	.368	.381	1/0, 7W, All-Alum. – 2/0, 7W, Comp.	100	29	21-1/2	Yellow	Black
WTF-0211	.382	.394	#2, AWAC, 3/4 – 1/0, AWAC, 6/1	100	29	22-1/2	Yellow	White
WTF-0212	.395	.411	1/0, 6/1 1/0, 7W, Alum. Alloy	100	29	22-1/2	Yellow	Yellow
WTF-0213	.412	.437	2/0, 7W-19W, All-Alum. 3/0, – 7W-19W, Comp.	100	30	23-1/2	Yellow	Brown
WTF-0214	.438	.463	2/0, 6/1-7/1 2/0, – 7W, Alum. Alloy	100	31	24-1/2	Yellow	Blue
WTF-0215	.464	.492	3/0, 7W-19W, All-Alum. 4/0, – 7W-19W, Comp.	50	20	25-1/2	Yellow	Green
WTF-0216	.493	.522	3/0, 6/1 3/0, 7W, Alum. Alloy 4/0, – 7W, All-Alum.	50	20	25-1/2	Yellow	Orange
WTF-0217	.523	.554	3/0, AWAC, 5/2 4/0, 18/1 4/0, 19W, All-Alum. 266.8, 7W-19W, Comp.	50	20	25-1/2	Yellow	Black
WTF-0218	.555	.594	4/0, 6/1 4/0, 7W, Alum. Alloy 266.8, 7W-19W, All-Alum.	50	20	26-1/2	Yellow	Red
WTF-0219	.595	.630	266.8, 18/1 300, – 19W-37W, All-Alum.	50	22	28	Yellow	Purple
5/8" , R. Groove (See Note 2)								
WTF-0220	.631	.664	266.8, 26/7 266.8, 19W, Alum. Alloy	50	22	29	Yellow	Yellow
WTF-0221	.665	.705	336.4, 18/1-36/1 336.4, 19W, All-Alum. 350, 19W-37W, All-Alum.	50	22	29	Yellow	Brown
WTF-0222	.706	.747	336.4, 26/7-30/7 397.5, 19W, All-Alum.	50	23	30	Yellow	Green
3/4" R. Groove (See Note 2)								
WTF-0223	.748	.795	397.5, 24/7-26/7 397.5, 19W, Alum. Alloy 477, 19W-37W, All-Alum.	50	24	32-1/2	Yellow	Orange

Right-hand lay standard

(Continued on next page)

EXPLANATORY NOTES:

- (1) Nominal Conductor size indicates one of various conductors within each range.
- (2) For the succeeding conductors ranges, the insulator's top groove radius should be at least as large as shown above.
- (3) AWAC is a registered trademark of the Copperweld Co.

WRAPLOCK® Tie

For use on:

ACSR, Compacted ACSR,
Aluminum Alloy
All-Aluminum, AWAC®
Compacted All-Aluminum

F-Neck Interchangeable
Headstyle Insulators

ANSI 55-4 Pin

ANSI 55-5 Pin

ANSI 57-1 Post

ANSI 57-2 Post

ANSI 57-3 Post

2-7/8"
Neck Diameter



Catalog Number	Diameter Range (Inches)		Nominal Conductor Size	Units	Wt./Lbs.	Applied Length (Inches)	Insulator Identification Mark	Color Code
	Min.	Max.		Per Carton				
WTF-0224	.796	.846	477, 18/1, 36/1 500, 19W, All-Alum.	50	20	37	Yellow	Purple
WTF-0225	.847	.900	556.5, 18/1, 36/1 556.5, 19W, 37W All-Alum	50	21	39	Yellow	Blue
WTF-0226	.901	.958	636, 18/1, 36/1 636, 37W All-Alum. 556.5, 19W Alum. Alloy	50	22	41	Yellow	Green
WTF-0227	.959	1.018	666.6, 24/7, 54/7 750, 37W, All-Alum. 636, 37W, Alum. Alloy	50	22	43	Yellow	White
13/16" R. Groove (See Note 2)								
WTF-0228	1.019	1.083	795, 36/1, 45/7 795, 37W, All-Alum.	50	23	45	Yellow	Brown
7/8" R. or 1" R. Groove (See Note 2)								
WTF-0229	1.084	1.151	954, 36/1 954, 37W, All-Alum. 795, 37W, Alum. Alloy	50	24	47	Yellow	Orange
WTF-0230	1.152	1.223	954, 45/7, 54/7 1033.5, 37W, All-Alum. 954, 37W, Alum. Alloy	50	25	49	Yellow	Purple
WTF-0231	1.224	1.240		50	29	59	Yellow	Black

Right-hand lay standard

EXPLANATORY NOTES:

- (1) Nominal Conductor size indicates one of various conductors within each range.
- (2) For the succeeding conductors ranges, the insulator's top groove radius should be at least as large as shown above.
- (3) AWAC is a registered trademark of the Copperweld Co.



WRAPLOCK® Tie

For use on:
ACSR, Compacted ACSR, Aluminum Alloy
All-Aluminum, AWAC® Compacted All-Aluminum
J-Neck Interchangeable Headstyle Insulators

ANSI 55-6
Single Skirt Pin
ANSI 55-7 **3-1/2" Neck Diameter**
Single Skirt Pin
ANSI 56-1
Double Skirt Pin



Catalog Number	Diameter Range (Inches)		Nominal Conductor Size	Units	Wt./Lbs.	Applied Length (Inches)	Insulator Identification Mark	Color Code
	Min.	Max.		Per Carton				
9/16" R Groove (See Note 2)								
WTJ-0400	.248	.259	#4, 6/1-7/1 – #4, 7W, Alum. Alloy	100	29	21	Green	Orange
WTJ-0401	.260	.269	#4, AWAC, 5/2 – #3, 7W, All-Alum. – #2, 7W, Comp.	100	29	21	Green	Green
WTJ-0402	.270	.280	#3, 7W, Alum. Alloy – #3, AWAC, 6/1	100	29	21	Green	Yellow
WTJ-0403	.281	.291	#4, AWAC, 4/3 – #3, 6/1 – #2, 6/1 Comp.	100	32	21	Green	White
WTJ-0404	.292	.303	#3, AWAC, 5/2 – #2, 7W, All-Alum. – #2, 7/1, Comp.	100	32	22	Green	Purple
WTJ-0405	.304	.314	#4, AWAC, 3/4 – #2, AWAC, 6/1	100	33	22	Green	Brown
WTJ-0406	.315	.327	#2, 6/1-7/1 – #2, 7W, Alum. Alloy	100	33	23	Green	Red
WTJ-0407	.328	.340	#2, AWAC, 5/2 – #1, 7W, All-Alum. 1/0, 7W, Comp.	100	33	23	Green	Blue
WTJ-0408	.341	.353	#3, AWAC, 3/4 – #1, 7W, Alum. Alloy	100	33	24	Green	Orange
WTJ-0409	.354	.367	#2, AWAC, 4/3 – #1, 6/1 1/0, 6/1, Comp.	100	33	24	Green	Green
WTJ-0410	.368	.381	1/0, 7W, All-Alum. 2/0, 7W, Comp.	100	33	25	Green	Black
WTJ-0411	.382	.394	#2, AWAC, 3/4 1/0, AWAC, 6/1	100	34	23	Green	White
WTJ-0412	.395	.411	1/0, 6/1 1/0, 7W, Alum. Alloy	100	34	24	Green	Yellow
WTJ-0413	.412	.437	2/0, 7W-19W, All-Alum. 3/0, 7W-19W, Comp.	100	35	25	Green	Brown
WTJ-0414	.438	.463	2/0, 6/1-7/1 2/0, 7W, Alum. Alloy	100	35	26	Green	Blue
WTJ-0415	.464	.492	3/0, 7W-19W, All-Alum. 4/0, 7W-19W, Comp.	50	21	28	Green	Green
WTJ-0416	.493	.522	3/0, 6/1 3/0, 7W, Alum. Alloy 4/0, 7W, All-Alum.	50	21	28	Green	Orange
WTJ-0417	.523	.554	3/0, AWAC, 5/2 4/0, 18/1 4/0, 19W, All-Alum. 266.8, 7W-19W, Comp.	50	21	28	Green	Black
WTJ-0418	.555	.594	4/0, 6/1 4/0, 7W, Alum. Alloy 266.8, 7W-19W, All-Alum.	50	22	29	Green	Red
WTJ-0419	.595	.630	266.8, 18/1 300, 19W-37W, All-Alum.	50	24	30	Green	Purple
5/8" R Groove (See Note 2)								
WTJ-0420	.631	.664	266.8, 26/7 266.8, 19W, Alum. Alloy	50	24	31	Green	Yellow
WTJ-0421	.665"	.705"	336.4, 18/1-36/1 336.4, 19W, All-Alum. 350, 19W-37W, All-Alum.	50	24	31	Green	Brown
WTJ-0422	.706"	.747"	336.4, 26/7-30/7 397.5, 19W, All-Alum.	50	25	32	Green	Green
3/4" R Groove (See Note 2)								
WTJ-0423	.748"	.795"	397.5, 24/7-26/7 397.5, 19W, Alum. Alloy 477M, 19W-37W, All-Alum.	50	26	34	Green	Orange
WTJ-0424	.796	.846	477, 18/1, 36/1 500, 19W, All-Alum.	50	32	39-1/2	Green	Purple
WTJ-0425	.847	.900	556.5, 18/6, 36/1 556.5, 19W, 37W, All-Alum.	50	33	41	Green	Blue
WTJ-0426	.901	.958	636, 18/1, 36/1 636, 37W, All-Alum. 556.5, 19W, Alum. Alloy	25	18	43	Green	Green
WTJ-0427	.959	1.018	666.6, 24/7, 54/7 750, 37W, All-Alum. 636, 37W, Alum. Alloy	50	35	45	Green	White
13/16" R Groove (See Note 2)								
WTJ-0428	1.019	1.083	795, 36/1, 45/7 795, 37W, All-Alum.	25	18	47	Green	Brown
7/8" or 1" Groove (See Note 2)								
WTJ-0429	1.084	1.151	954, 36/1 954, 37W, All-Alum. 795, 37W, Alum. Alloy	25	19	49	Green	Orange
WTJ-0430	1.152	1.223	954, 45/7, 54/7 1033.5, 37W, All-Alum.	25	19	51	Green	Purple
WTJ-0431	1.224	1.240		25	20	59-1/2	Green	Black

Right-hand lay standard

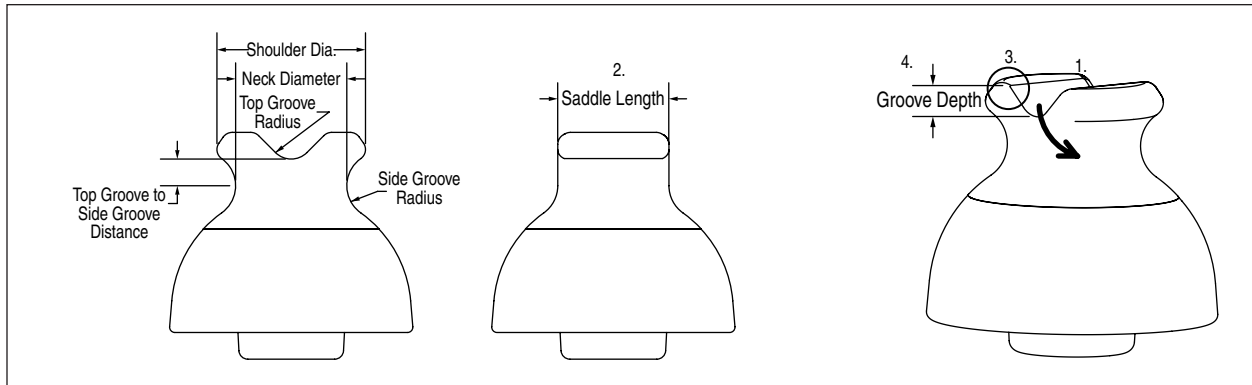
EXPLANATORY NOTES:

- (1) Nominal Conductor size indicates one of various conductors within each range.
- (2) For the succeeding conductors ranges, the insulator's top groove radius should be at least as large as shown above.
- (3) AWAC is a registered trademark of the Copperweld Co.



Insulator Fit

Interchangeable Insulators for use with PLP® Ties Dimensional Factors that affect Tie Application and Performance



It is recommended that only insulators meeting the dimensional requirements of the most recent ANSI® C29.3, C29.5, C29.6, and C29.7 specifications be used with the appropriate PLP ties.

ANSI C29 Insulator Specifications and their Affects on PLP Ties

ANSI C29 specifies and defines dimensions for insulator heads that are crucial to the proper application and lifetime performance of PLP factory formed ties. These dimensions include:

- Neck Diameter - nominal
 - C-neck – 2-1/4"
 - F-neck – 2-7/8"
 - J-neck – 3-1/2"
 - K-neck – 4"
- Top groove radius (minimum)
- Side groove radius (minimum)
- Maximum shoulder diameter (maximum)
- Top groove to side groove vertical spacing

Some of the specified dimensions are simply maximum or minimum allowable values. The dimensions for the vertical distance from the bottom of the top groove to the middle of the side groove and the neck diameter have minimum and maximum values designated.

These dimensions and insulator designations determine the proper tie to be used and the maximum conductor size for the groove application. Review the individual tie sections for groove/conductor diameter limitations.

Insulator characteristics that are not part of the ANSI C29 Specifications

Some of the insulator characteristics that have an impact on the application and performance of PLP Ties are not included in the ANSI specification. These characteristics include:

1. The transition contour of the top groove into side groove
2. Length of the saddle or top groove
3. Extension of shoulders past the edge of the top groove.
4. Depth of the top groove

Each of these items has different results on a factory formed tie's performance. Combinations of several of these characteristics could result in initial tie damage and incorrect application.

1. The transition contour of the top groove into the side groove is important due to the tie's shape. If an edge is created instead of a smooth rounded transition, the tie's formed wire is forced to bend over a fulcrum point resulting in a high concentration of stress. This is detrimental for both the insulator and tie.

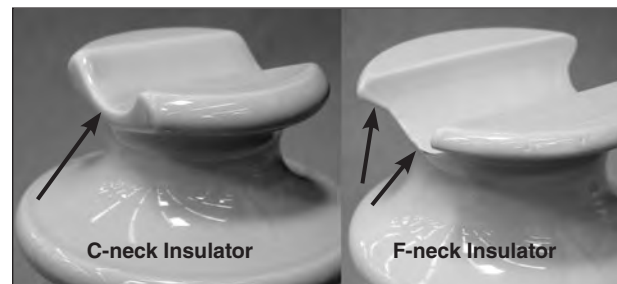


Figure 1a

Note the edge that exists between the top groove and the side groove above. Figure 1b shows a smooth transition.



Figure 1b

Insulator Fit

2. A top groove length longer than the insulator's neck diameter results in an edge. This edge creates a high stress contact point and results in an abnormal tie application. As an example, Figure 2 illustrates how a Distribution Tie reacts to this configuration (the tie tube was omitted to illustrate the gap beneath the conductor). Note the point contact at the insulator/tie interface.

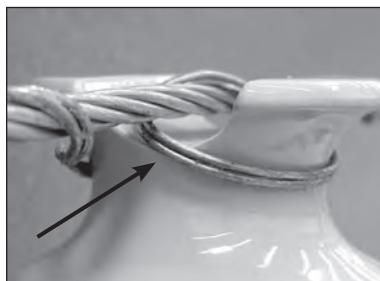


Figure 2

3. The shoulder extensions result in difficulty in application of top ties. As the tie is rotated, the added protrusions from the shoulders past the end of the top groove provide catch points for the tie (see F-neck Insulator in Figure 1a).

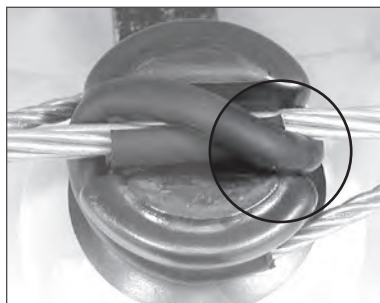


Figure 3

4. The top groove of the insulator can cause installation difficulties of top ties when its diameter is at the minimum ANSI designation. This is especially troublesome when installing the WRAPLOCK® Tie. Figure 3 illustrates the application on a C-neck insulator on 1/0 ACSR 6/1 conductor.

The circled area illustrates that the covered center section of the WRAPLOCK® Tie is wedged between the conductor and the inner surface of the insulator. This increases the installation difficulty of the tie.

In many instances the transition of the grooves can have a great impact on the form, fit, and function of a factory formed tie and hand tie wire. The sharp edge of a long top groove saddle (see Figure #1) can be especially hazardous to the soft hand tie wire as well as a factory formed tie.

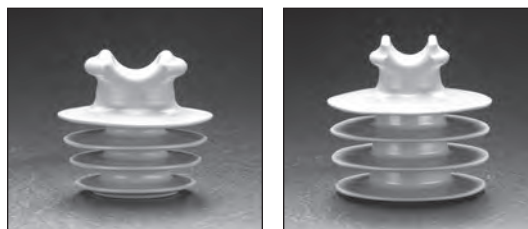
Insulator Review and Trial Applications

It is recommended the user conduct a thorough review of the insulator size, shape and geometry and conduct trial fits with the ties, prior to full scale field installations. Consult PLP for assistance, especially if there are any doubts concerning tie and insulator fit or performance.

Non-ANSI C29 Insulators

Some insulators that do not technically meet all the ANSI C29 Wet Process Porcelain Insulator standards may be suitable for use with PLP factory formed ties depending on their head and neck dimensions and geometry.

An example is the PLP polymer C & F-neck tie top insulators. These insulators have head and neck designs for use with PLP factory formed ties or PLP Ring Ties. The head and neck dimensions of the PLP Polymer C & F-neck insulators have been designed to match critical ANSI C29 dimensional specifications and meet or exceed most of the mechanical and electrical performance requirements specified in that standard.



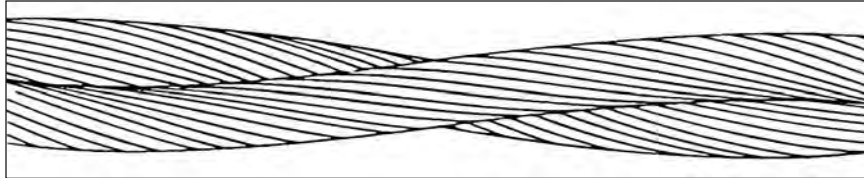
PLP Polymer 15kV and 35kV Insulators



Helical Ties for T2 Conductor

CONSTRUCTION

T2 conductor consists of two identical conductors twisted together in a left-hand lay direction at an approximate nine foot pitch length. Generally the conductors used are standard ACSR, AAC or AAAC construction but can be conductors of any configuration.



THEORY

The spiral shape of the two conductors twisted together disrupts the forces created by the steady crosswinds that can cause cable motion. The forces are disrupted by the continuously changing profile exposed to the wind. This spiral shape, together with less torsional stiffness and varying bending stiffness also reduces or can minimize cable galloping due to ice and wind loads.

APPLICATION

T2 conductor can be used in regions that are subject to galloping due to wind and ice. T2 conductor is also designed to reduce the requirement for vibration protection when installed within accepted tension limits.

Helical Ties for T2 Conductor

GENERAL RECOMMENDATIONS

T2 conductor is designed to prevent “typical” conductor motion activity like aeolian vibration and galloping, however, the non-circular configuration and unusual cable movement of T2 conductors requires special consideration of tie devices. When choosing products for T2 conductor, it is important not to mistake standard concentric conductor products listed in the catalog for similarly name T2 conductor. The T2 conductor equivalents require substantially larger sized products for similarly named conductor sizes. If a desired product is not listed in the product table in this section, contact Preformed Line Products to determine if the product has been reviewed. In many cases, Preformed Line Products can recommend products for a particular installation.

INTENDED USE. Manufactured formed wire ties secure conductors in the grooves of interchangeable headstyle insulators.

PREFORMED™ ties provide an improved method of securing conductor compared to clamp-top or hand-ties over Armor Rods.

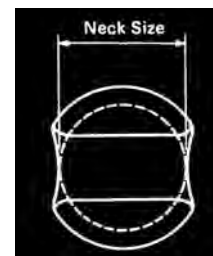
DEAD-ENDING. T2 conductor can be terminated in the same manner as a single conductor except both of the elements of the T2 conductor requires its own Dead-end device. The two Dead-end devices should be terminated on separate hardware on the structure.

CONDUCTOR REPAIR. When repairing T2 conductor, the individual elements of the span must be analyzed and repaired separately. To accomplish this, it is important to know the construction of the T2 conductor so the correct repair components can be chosen.

ARMOR RODS/ARMOR-GRIP® SUSPENSION/SUPPORT. When using Armor Rods or ARMOR-GRIP Suspensions or Supports, the introduction of a third piece of conductor is advisable. This short section of conductor is equal to one of the conductor elements of the T2 conductor. The additional piece of conductor is placed in the interstices of the two conductor elements of the T2 conductor assembly in order to create an assembly that is closer to the shape of the circle. The appropriately sized Armor Rod or ARMOR-GRIP Suspensions or Supports can then be easily installed over this new assembly. The additional piece of conductor should be held in place by a few pieces of tape prior to the installation of the Armor Rods. For specific information on this installation including the length of the additional piece of conductor and the appropriate Armor Rods or ARMOR-GRIP Suspension or Supports catalog number, contact Preformed Line Products.

INTERCHANGEABLE HEADSTYLE INSULATOR. To insure proper fit and service life, it is recommended that only insulators corresponding to C-Neck, F-Neck, J-Neck, K-Neck, or spool insulators be used. These neck diameter and groove height dimensions appear in ANSI standards.

Consult Preformed Line Products for engineering recommendations on non-interchangeable headstyle insulators. A sample of the insulator in question is desirable.



SAFETY CONSIDERATIONS

1. These products are intended for a single (one-time) use and for the specified application. **CAUTION: DO NOT REUSE OR MODIFY THESE PRODUCTS UNDER ANY CIRCUMSTANCES.**
2. This product is intended for use by trained craftspeople only. This product **SHOULD NOT BE USED** by anyone who is not familiar with and trained in the use of it.
3. When working in the area of energized lines with this product, **EXTRA CARE** should be taken to prevent accidental electrical contact.
4. For **PROPER PERFORMANCE AND PERSONAL SAFETY** be sure to select the proper size PREFORMED products before application.
5. PREFORMED products are precision devices. To insure proper performance, they should be stored in cartons under cover and handled carefully.



Helical Ties for T2 Conductor

PREFORMED™ TIES FOR T2 CONDUCTOR



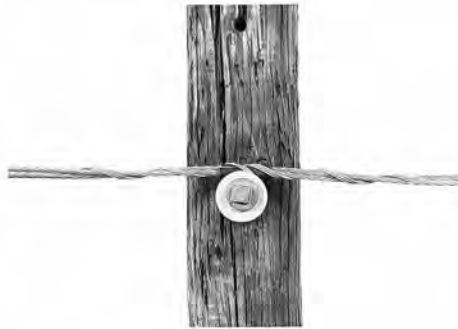
WRAPLOCK® Tie



Distribution Tie



EZ-WRAP® Spool Tie



Spool Tie



Double Support Tie



Side Tie



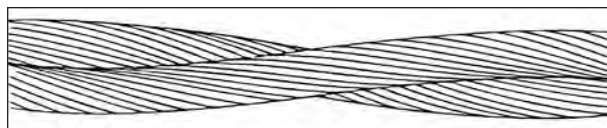
Double Side Tie

BENEFITS:

- Elastomeric tubes/pads cushion to protect T2 conductor.
- No special equipment or installation techniques required.
- Reduces time required to tie in T2 conductor
- Minimizes possibility of mistakes during tie installations.
- Complete line of ties readily available for popular T2 conductors and insulators.
- Over 15 years successful experience with support devices on T2 conductor
- Superior ability to hold T2 conductor to insulator
- Meets NESC longitudinal holding requirement
- Provides resiliency under all potential motion conditions
- Provides stability during twisting motion

Helical Ties for T2 Conductor

For use on:
**ACSR, Compacted ACSR,
 Aluminum Alloy,
 All-Aluminum, AWAC®,
 Compacted All-Aluminum**



T2 Conductors	Distribution Tie	Wraplock Tie	Spool Tie	Ez Wrap Spool Tie	Double Support Tie	Double Side Tie	Side Tie
2 x #4 (6/1) ACSR (7/1) ACSR (7/W) AAAC	UTC-1106 UTF-1206 UTJ-1306 UTK-1606	WTC-0112 WTF-0212 WTJ-0412	SPL-1356-P	EZSP-4376	DST-0154 (C&F) DST-0354 (J)	DBST-1104 (C&F) DBST-1304 (J)	STC-1256-P STF-1156-P STJ-1506-P
2 x #3 (6/1) ACSR	UTC-1107 UTF-1207 UTJ-1307 UTK-1607	WTC-0114 WTF-0214 WTJ-0414	SPL-1357-P	EZSP-4376	DST-0155 (C&F) DST-0355 (J)	DBST-1105 (C&F) DBST-1305 (J)	STC-1257-P STF-1157-P STJ-1507-P
2 x #2 (6/1) ACSR (7/1) ACSR (7/W) AAAC	UTC-1108 UTF-1208 UTJ-1308 UTK-1608	WTC-0116 WTF-0216 WTJ-0416	SPL-1358-P	EZSP-4377	DST-0156 (C&F) DST-0356 (J)	DBST-1106 (C&F) DBST-1306 (J)	STC-1258-P STF-1158-P STJ-1508-P
2 x #1 (7/W) AAAC	UTC-1109 UTF-1209 UTJ-1309 UTK-1609	WTC-0118 WTF-0218 WTJ-0418	SPL-1359-P	EZSP-4378	DST-0157 (C&F) DST-0357 (J)	DBST-1107 (C&F) DBST-1307 (J)	STC-1259-P STF-1159-P STJ-1509-P
2 x 1/0 (6/1) ACSR (7/W) AAAC	UTC-1110 UTF-1210 UTJ-1310 UTK-1610	WTC-0119 WTF-0219 WTJ-0419	SPL-1360-P	EZSP-4379	DST-0158 (C&F) DST-0358 (J)	DBST-1108 (C&F) DBST-1308 (J)	STC-1260-P STF-1160-P STJ-1510-P
2 x 2/0 (6/1) ACSR (7/W) AAAC	UTC-1111 UTF-1211 UTJ-1311 UTK-1611	WTC-0122 WTF-0222 WTJ-0422	SPL-1361-P	EZSP-4380	DST-0159 (C&F) DST-0359 (J)	DBST-1109 (C&F) DBST-1309 (J)	STC-1261-P STF-1161-P STJ-1511-P
2 x 3/0 (6/1) ACSR (7/W) AAAC	UTC-1112 UTF-1212 UTJ-1312 UTK-1612	WTC-0124 WTF-0224 WTJ-0424	SPL-1362-P	EZSP-4381	DST-0160 (C&F) DST-0360 (J)	DBST-1110 (C&F) DBST-1310 (J)	STC-1262-P STF-1162-P STJ-1512-P
2 x 4/0 (6/1) ACSR	UTC-1112 UTF-1212 UTJ-1312 UTK-1612	WTC-0125 WTF-0225 WTJ-0425	SPL-1362-P	EZSP-4382	DST-0160 (C&F) DST-0360 (J)	DBST-1110 (C&F) DBST-1310 (J)	STC-1263-P STF-1163-P STJ-1513-P
2 x 266.8 (18/1) ACSR (26/7) ACSR	UTC-1113 UTF-1213 UTJ-1313 UTK-1613	WTC-0126 WTF-0226 WTJ-0426	*	*	DST-0161 (C&F) DST-0361 (J)	DBST-1111 (C&F) DBST-1311 (J)	STC-1263-P STF-1163-P STJ-1513-P
2 x 336.4 (18/1) ACSR	UTC-1113 UTF-1213 UTJ-1313 UTK-1613	WTC-0127 WTF-0227 WTJ-0427	*	*	DST-0161 (C&F) DST-0361 (J)	DBST-1111 (C&F) DBST-1311 (J)	STC-1264-P STF-1164-P STJ-1514-P
2 x 336.4 (26/7) ACSR 2 x 397.5 (19W) AAC	UTC-1114 UTF-1214 UTJ-1314 UTK-1614	WTC-0128 WTF-0228 WTJ-0428	*	*	DST-0161 (C&F) DST-0361 (J)	DBST-1112 (C&F) DBST-1312 (J)	STC-1264-P STF-1164-P STJ-1514-P

*Insulator groove not large enough for these T2 sizes.

EXPLANATORY NOTES:

- (1) User should make sure insulator groove radius is large enough for T2 conductor and PLP tie with pad.
- (2) This table represents application of the PLP ties on T2 conductor only.
- (3) Consideration should be made of the physical fit of the actual T2 conductor plus PLP tie on a specific insulator because variances in individual insulators can affect application.
 - a. Only insulators with ANSI accepted dimensions should be used with PLP ties.
 - b. PLP suggests application trials be conducted on actual T2 conductor, PLP ties and insulators prior to installation.
- (4) Consult PLP for application with Armor Rod, ARMOR-GRIP® Suspensions or Supports, or T2 conductor not shown.