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UNITED STATES DEPARTMENT OF AGRICULTURE
Rural Electrification Administration
Technical Standards Committees
(Electric)

Supplement No. 2, January 1981, to
REA Bulletin 43-5
LIST OF MATERIALS ACCEPTABLE FOR USE ON
SYSTEMS OF REA ELECTRIFICATION BORROWERS

The attached pages for the "List of Materials Acceptable for Use on Systems of REA Electrification Borrowers" are those which have been revised by action of the Technical Standards Committees during the months of September through December 1980. The following changes should be made in order to keep it up to date. Pages with a colon between are on the same sheet, both being changed.

<u>Add</u> <u>New Page</u>	<u>Remove</u> <u>Page</u>	<u>Add</u> <u>New Page</u>	<u>Remove</u> <u>Page</u>
b	b	gy-1:gy-2	gy-1:gy-2
l-1	l-1	gz-1:gz-2	gz-1:gz-2
l(1)	l(1)	sb-1	sb-1
v	v	sb-3	sb-3
w	w	vx	vx
z(Cond.)	z(Cond.)	U ae	U ae
ae-2:ae(Cond.)	ae-2:ae(Cond.)	U ae(1)	U ae(1)
ai-1:ai-2	ai-1:ai-2	U an(1)	U an(1)
an-3.1	an-3.1	U ax	U ax
ax-1	ax-1	U hb(1)	U hb(1)
cg-2	cg-2	U hb(2)	U hb(2)
cg-3	cg-3	U he(1.1):U he(2)	U he(1.1):U he(2)
cg(3)	cg(3)	U he(2.1)	U he(2.1)
cp	cp	U he(3)	U he(3)
cu	cu	U hq(3)	U hq(3)
cy-1	cy-1	U hv-1:U hv-2	U hv-1:U hv-2
cz	cz	U hv(1)	U hv(1)
du	du	U ja(1)	U ja(1)
eq(2.1)	eq(2.1)		
eq(2.2):eq(2.3)	eq(2.2):eq(2.3)		
fc-1	fc-1		
fc-2:fc(1)	fc-2:fc(1)		
fc(2)	fc(2)		
gw-1	gw-1		
gw-2	gw-2		



b - Pin, pole top, steel

DISTRIBUTION

	<u>7.2/12.5 or 7.62/13.2 kV</u>	<u>14.4/24.9 kV</u>
Pin length, inches :	20	20
Thread diameter, inches:	1	1-3/8
Hole spacing, inches :	8	8
REA Specifications :	D-3	DT-3
Chance	2199	2195
Dixie	D-2172	D2195
Joslyn	J740	J720
Kortick		K8086
McGraw-Edison	DP19P6	DP19P5
Utilities Service	36606F-REA	36652

Pins listed below have 4 $\frac{1}{2}$ " offset
which eliminates the use of Item cs

Joslyn	J25179
McGraw-Edison	DP28P1
Utilities Service	36549

TRANSMISSION

Type :	1-1/8" solid steel	Channel
Pin length, inches :	24	24
Thread diameter, inches:	1-3/8	1-3/8
Hole spacing, inches :	8	8
REA Specifications :	None	DT-3
Chance		2196
Dixie	D2125	
Joslyn		J824
Kortick		K8087
McGraw-Edison		DP19P8
Utilities Service		36653F

NOTE 1. Pole top bracket (Item eb) and post insulator (Item ea) may be substituted for pole top pin (Item f) and pin insulator (Item a) for both small and large conductor distribution drawings shown in REA Forms 803 and 804 at the option of the owner.

2. Flared type pins may be mounted with either side against the pole.

^c
July 1980

c - Bolt, machine

Applicable Specifications: Edison Electric Institute
Specification TDJ-1 1969,
"Specifications for Steel
Bolts and Nuts"

Applicable Sizes : 1/2 inch diameter, 6 through
10 inch length

5/8 inch diameter, 6 through
24 inch length

3/4 inch diameter, 6 through
26 inch length

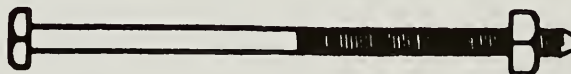
7/8 inch diameter, 6 through
28 inch length

The following manufacturers have shown compliance with the applicable specifications for machine bolts:

A. B. Chance Company
Dixie Electrical Manufacturing Company

Hughes Brothers
*Joslyn Manufacturing and Supply Company
Kortick Manufacturing Company
*McGraw-Edison

Utilities Service Company



*"Static proof" design available.

1 - Clamp, deadend

DISTRIBUTION

Copper 2 through 6 CWC 4A through 8A		ACSR			
		4/0 & 3/0	2/0	1/0	2 & 4
-	ALCOA	302**	302**	302**	302**
-	American Connector Engineering	QDA-63**	QDA-53**	QDA-53**	QDA-53**
MD-52-N	Anderson/Sq.D	PG57N**	PG57**	PG-46N**	PG-46N**
-	Bethea/National	DA-20N**	DA-15-N**	DA-15-N**	DA-15-N**
-	Continental	AQD-63**	AQD-52**	AQD-52**	AQD-52**
-	C & R	CR-20-90**	CR-10-90**	CR-10-90**	CR-10-90**
1437	<u>Gould-Brown Boveri</u> (ITE)	5011 52101**	4060 1655	4060 2050	4060 2050
2111	Joslyn (Brewer-Titchener)	5011 5210**	2116 -	2116 -	2107* 2115
2111	Knox	5011 5210**	2116 -	2116 -	2107* 2115
-	Lapp	306120N**	306118N**	306118N**	306118N**
80500	Ohio Brass	80442 89237**	78500 86534**	88500 86534**	81500 86534**

*Clamp furnished with liner--does not require tape.

**Aluminum clamp--does not require liner or tape.

1-2
July 1980

1 - Deadend for Steel Strand (Overhead Ground Wire)

TRANSMISSION

For High Strength Steel Strand and Aluminum-Clad Steel Strand

<u>Manufacturer</u>	<u>Clamp Type</u>		
	<u>High Strength Steel</u>	<u>Aluminum-Clad Steel</u>	
	<u>3/8" and 7/16"</u>	<u>7 No. 9 AWG</u>	<u>7 No. 8 AWG</u> <u>7 No. 7 AWG</u>
Anderson/Sq. D	SWDE-55N		
Ohio Brass	80437		

1 - Deadend for steel strand (overhead ground wire)

TRANSMISSION

For high strength steel strand and aluminum-clad steel strand

<u>Manufacturer</u>	<u>Compression Type</u>				
	<u>High strength steel</u>		<u>Aluminum-clad steel</u>		
	<u>3/8"</u>	<u>7/16"</u>	<u>7 No. 9 AWG</u>	<u>7 No. 8 AWG</u>	<u>7 No. 7 AWG</u>
Fargo (Alcan)	82S712	82S714	82A79	82A78	82A77
ALCOA	4620.12	4627.14			
Burndy	YTW375E	YTW438E	YTW7M9T	YTW7M8T	YTW7M7T
Somerset	Order by wire size and type.				

Formed Type

Chance			16M AWSBG	20M AWSBG
Helical Line Prod.		HG523-12.5M	HG525-16M	HG528-20M
Preformed Line Products		AWDE-4119	AWDE-4122	AWDE-4125

Automatic Type

Reliable	5202	5203	5202	5203
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Conditional List

1(1)

January 1981

1 - Clamp, deadend

DISTRIBUTION

2-Bolt Straight Line, Aluminum Alloy

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>*Barron Bethea</u> Aluminum alloy deadend Catalog No. SDF-10A (4 through 4/0 ACSR)	871 7/6/67	(a) To obtain experience. (b) Applications limited to replacements under hot line conditions.
<u>*Fargo</u> Aluminum alloy deadend Catalog No. GD-960A (With side opening keeper order GD-961A) (No. 4 and No. 2 ACSR) Catalog No. GD-972A (2/0, 3/0, 4/0 ACSR)	1137 4/20/78 1144 8/3/78 791 4/30/64	Same as above.
<u>*C & R Products</u> Aluminum alloy deadend Catalog No. CR-15-180 (No. 2 and No. 4 ACSR)	918 5/15/69	Same as above.
<u>*Bethea/National</u> Aluminum alloy deadend Catalog No. ASO-684-2 (1/0, 2/0, 3/0 ACSR) Catalog No. ASD-2-N (4-2/1 ACSR) Catalog No. ASD-34-N (3/0. 4/0 ACSR)	961 2/18/71 1201 12/4/80	Same as above. Same as above.
<u>*Anderson/Square D</u> Aluminum alloy deadend Catalog No. ADS-48-N (2/0 ACSR) Catalog No. ADS-60-N (3/0 ACSR)	1130 1/5/78 1148 9/28/78	Same as above.

*Straight line deadend clamps are applicable for urban construction where tensions are moderate and on lines often worked hot.

u - Deadend for alumoweld guy strand

Strand Size	7#12(6M)	7#11(8M)	7#10(10M)	7#9(12.5M)
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Formed Type
Alumoweld Guy Strand

<u>Chance</u> For standard guy	6M-AWSBG	8M-AWSBG	10M-AWSBG	12.5M-AWSBG
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<u>Helical Line Prod.</u> For standard guy	HG517-6M	HG519-8M	HG521-10M	HG523-12.5M
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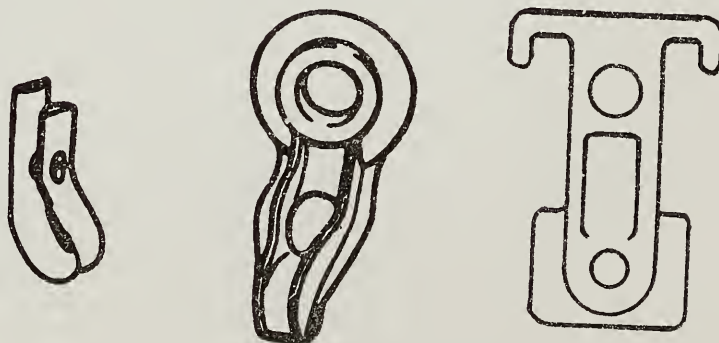
<u>Preformed Line Prod.</u> For standard guy	AWDE-4110	AWDE-4113	AWDE-4116	AWDE-4119
For wrapped guy	WGL-4110	WGL-4113	WGL-4116	WGL-4120

Automatic
Alumoweld Guy Strand

<u>Reliable</u>	5200	5201	5201	5202
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v - Guy attachment
for 5/8" bolt

<u>Type:</u>	<u>Formed Strap</u>	<u>Angle Bolt Eye</u>	<u>Guy Hook</u>	<u>Pole Eye Plate</u>
<u>Maximum Working Load Rating</u>	23,130 N (5200 lbs.)	23, 130 N (5200 lbs.)	23,130 N (5200 lbs.)	37,800 N (8500 lbs.)
Anderson Elec./ Square D	-	-	-	GSP-05
Barron Bethea	-	-	GH-5*	-
Bethea/National	-	-	AG-5*	PE5-6A
Chance	5004	0100	C203-0168*	-
Continental Elec.	-	-	GA-54*	PEP-66-45
Dixie	D5004	D0100	DD-9460, DD9462*	-
Flagg (MIF)	-	-	P135A, P157X*	PX88
Joslyn	J25164	J6500	J6555, J6556	-
Kortick	K4035, K4047	K3140	-	-
Lapp (Line Ware)	-	-	304014*	304021
McGraw-Edison	DG6H1	DG11E1	DG21H1 DG21H2	-
Power Line Hardware	-	-	GA-58C*	GA-548
Util. Service	31030	5531	-	-



*This hook may also be used in place of the wrapped guy arrangement in assemblies E3-2 and E3-3.

July 1980

v - Guy attachment

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Joslyn</u> Pole band, with cone head bolt J-6281 and guy clip J-6275 J-6280(for 6" to 10" pole) J-6270(for 8" to 14" pole)	745 8/16/62	To obtain experience. For distribution line only and 10,000 lbs. maximum loading.

W
July 1980

w - Insulators, guy strain
(These items shall conform to "REA Specifications
for Guy Strain Insulators," D-12)

Max. Strand Dia., inches	3/8	1/2	5/8	5/8
Ult. Strength, pounds	10,000	12,000	20,000	20,000
Flashover, kV, Dry-Wet	25-12	30-15	35-18	40-23
ANSI Class	54-1	54-2	54-3	54-4
<u>Chance</u>	C909-1041	C909-1042	C909-1043	C909-1044
<u>Gould-Brown Boveri (ITE)</u>	502	504	506	556
<u>Joslyn (Pinco)</u>	L502	L504	L506	L289
<u>Ohio Brass</u>	31502	31504	31506	31352
<u>Porcelain Prod. (Knox)</u>	502	504	506	708

Insulators, guy strain
(Fiber Reinforced Plastic)

Ult. Strength, pounds	11,000	15,000	21,000
<u>Anderson/ Sq. D</u>	GS11	GS12	GS13
<u>Barron Bethea</u>	BB-11-CC Series	BB-15-CC Series	BB-21-CC Series
<u>Continental</u>	G-11 Series	G-15 Series	G-21 Series
<u>Dixie</u>	-	GIG-15 Series	GIG-25 Series
<u>Flagg (MIF)</u>	110 Series	150 Series	210 Series
<u>Joslyn-Empire</u>	400 Series	500 Series	650 Series
<u>Kearney</u>	-	321015	321021
<u>Plastigage</u>	HS11-1P Series	HS1-2X Series	HS13-1P Series
<u>Shakespeare</u>	-	692 Series	694 Series

z - Anchors

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Chance</u>		
Screw anchors, power- installed		
11B1 (6,000 & 8,000 lb., 5/8" rod)	692 6/2/60	To obtain experience.
13C1 (10,000 & 12,000 lb., 3/4" rod)		
<u>Dixie</u>		
Screw anchors, power- installed		
D-1162-G (6,000 & 8,000 lb., 5/8" rod)	859 2/9/67	To obtain experience.
D-1375-G (10,000 & 12,000 lb., 3/4" rod)		
<u>Joslyn</u>		
Screw anchors, power- installed		
J11b CA (6,000 & 8,000 lb., 5/8" rod)	973 8/19/71	To obtain experience.
J13C CA (10,000 & 12,000 lb., 3/4" rod)		
<u>McGraw-Edison</u>		
Screw anchors, power- installed		
DALLG621 (6,000 & 8,000 lb., 5/8" rod)	992 5/25/72	To obtain experience.
<u>Foresight</u>		
Duckbill Service Anchor	1202	To obtain experience.
#250 (2500 lbs., 5/8" rod)	12/18/80	
Duckbill Anchor		
#400 (6000 & 8000 lbs., 3/4" rod)		
#800 (10,000 & 12,000 lbs., 1" rod)		

NOTES: Where galvanized anchors are listed, the same anchors ungalvanized (black asphalt coated) are also acceptable.

Catalog numbers shown are for anchors with 1-3/8" hubs. Equivalent anchors with 1-1/2" hubs are also acceptable. (A special installing wrench is required.)

aa, ab
July 1980

aa - Nut, eye
ab - Nut, thimble eye
5/8 inch

	<u>Eye Nut Conventional</u>	<u>Eye Nut Eyelet</u>	<u>Thimble Eye Nut</u>
			
Barron Bethea	OEN-2A	B-14A	EN-4A
Bethea/National	E-5	B-5	NT-5
Chance	6502	-	6510
Continental Electric	EN-5	BE-5	TN-5
Dixie	D6502	DD-6517	D6510
Flagg (MIF)	P125C	P127A	P128A
Hughes	EN60	-	-
Joslyn	J1092	J1126	J6510
Kortick	K4212	K4413	K3111
Lapp (Line Ware)	304008	306267	304010
McGraw-Edison	DG2E3	DG6E1	DG1E1
Power Line Hardware	PLH-OE-1	PLH-BE-1	-
Utilities Service	450	497	C580

ae - Surge Arresters, Substation*
(Lightning Arresters)

<u>Manufacturer</u>	<u>Type</u>	<u>Accepted Ratings - kV</u>	<u>Manufacturer's Classification</u>
General Electric	Alugard	3, 9, 10, 18	Distribution
Joslyn	RS	9, 10, 18	Distribution
	Q	3, 9/10, 18	Distribution
Kearney	Unigap	3, 9, 10, 18	Distribution
McGraw-Edison	ES	3, 9/10, 18	Distribution
	F2	9-120	Intermediate
	G	3-144	Station
Ohio Brass	GP	3-72	Intermediate
	MPA	3-15	Station
	MP	3-48	Station
	MPR	60-312	Station
	DA	3, 9, 10, 18	Distribution
Westinghouse	LV	3-20	Distribution
	IVL	3-120	Intermediate
	CPL	3-312	Station

*For instructions concerning application at substations refer to REA Bulletin 65-1, "Guide for the Design of Substations for Electric Borrowers." In the purchase of arresters, care should be taken to select the type and voltage rating in accordance with the line voltage and the type of construction (grounded or ungrounded).

ae - Surge Arrester, Substation*

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>General Electric</u>		
Surge arrester, station class, metal oxide type, Tranquell, 2.7 kV thru 588 kV	1164 5/24/79	To obtain experience
Surge arrester, intermediate class, metal oxide type, Tranquell, 3 kV thru 120 kV	1197 10/9/80	To obtain experience
<u>Ohio Brass</u>		
Surge arrester, station class, metal oxide type, Dynovar, 52 kV thru 312 kV	1175 11/2/79	To obtain experience

*For instructions concerning application at substation refer to REA Bulletin 65-1, "Guide for the Design of Substations for Electric Borrowers." In the purchase of arresters, care should be taken to select the type and voltage rating in accordance with the line voltage and the type of construction (grounded or ungrounded).

ai - Rods, Ground

Applicable Size: The standard length is 8 feet and catalog numbers listed below are for this length. Longer rods may be required for special conditions.

Copper-covered ground rods are listed with a 13 mil minimum at any point and a 15 mil average covering of copper. All purchases should specify that a factory certification of the thickness of the copper must accompany the shipment of the rods.

Copper-covered steel rods

5/8"

Boggs	EB810
Calpico	CP588
Carolina Glavanizing	P-588
ITT Blackburn	6258
Joslyn	J8338
Kortick	K5428
Knight	858
Power Line Hardware	PLH-588-C
UTM	858PP
Utilities Service	6617
Weaver	W588
Wilcor	WA588C

Stainless Clad Steel

<u>Manufacturer</u>	<u>5/8"</u>	<u>3/4"</u>
Joslyn	J5374	J5377
Teledyne (MEFCO)	"PERMAGROUND"	"PERMAGROUND"

Applicable Size: The standard length is 8 feet and catalog numbers listed below are for this length. Longer rods may be required for special conditions.

Hot Dip Galvanized Steel

<u>Manufacturer</u>	<u>5/8"</u>	<u>3/4"</u>
Boggs	G588 PTG588**	G348 PTG348**
Carolina Galvanizing Chance	R588 8578 C203-0107**	R688 8618 C203-0109**
Dixie Galvan	D8578 GR6258	D8618 GR7508
General Electric Grip-Tite	0982-00002 GT588 GT588PT**	0982-00003 GT348 GT348PT**
Joslyn	J3358B* J5328 J5228**	J3458B* J5338 J5238**
Knight	G-588 G-588PT**	G-348 G-348PT**
Kortick Lloyd McGraw-Edison	K4658 6258H DN5S8 DN6D8*	K4678 7508H DN6S8 DN7D8*
Porcelain Products Power Line Hardware Utilities Service Weaver Wilcor	7338 PLH-588-G 5307 8480G WA8580G	7348 PLH-348-G 6338 8340G -

Electro-Galvanized Steel

	<u>5/8"</u>	<u>3/4"</u>
Calpico LMP	G8580 6258E**	- 7508E**

Stainless Steel

	<u>5/8"</u>	<u>3/4"</u>
Joslyn Teledyne (MEFCO) Wilcor	23821 TDY Sol WA 588-S	23822 TDY Sol WA 348-S

*Rod furnished with clamp.

**Rod furnished with 4 ft., No. 6 tinned or galvanized copper pigtail.

an - Transformers, Power
Three-Phase, Step-Down
for Distribution Substation Use

Primary Voltage-kV	kVA					MVA								
	750	1000	1500	2000	2500	3750	5	7.5	10	12	15	20	25	30
<u>Central Moloney</u>														
34.4	X	X	X	X	X	X	X	X						
43.8	X	X	X	X	X	X	X	X	X					
67.0	X	X	X	X	X	X	X	X	X					
<u>General Electric</u>														
34.4	X	X	X	X	X	X	X	X	X	X	X	X	X	X
43.8	X	X	X	X	X	X	X	X	X	X	X	X	X	X
67.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X
115														
138														

Transformers 5 MVA and larger also accepted as load tap changing transformers using General Electric Types LR72, LR65 and LRT-200 load tap changers.

<u>Kuhlman</u>														
34.4							X	X	X	X	X	X	X	X
43.8							X	X	X	X	X	X	X	X
67.0							X	X	X	X	X	X	X	X
115							X	X	X	X	X	X	X	X
138							X	X	X	X	X	X	X	X

Transformers 5 MVA and larger also accepted as load tap changing transformers using Siemens-Allis Types T1S and TLH-21 load tap changers.

aw - Washer, Spring

$\frac{1}{4}$ x 1-3/4" x 3 $\frac{1}{2}$ "

<u>Manufacturer</u>	<u>Bolt Size</u>		
	<u>5/8"</u>	<u>3/4"</u>	<u>7/8"</u>
Chance	3540	3541	-
Joslyn	J3540	J3541	J3542
Kortick	K2909	-	-
Fastex (ITW) "Ramp Lok"	1-760-21	1-760-31	1-760-41
McGraw-Edison	DF17W3	DF17W4	DF17W5

January 1981

ax - Cutout and Arrester, Combination

Nominal System Voltage Cutout Max. Voltage Rating	For 12.5Y/7.2 kV		For 13.2Y/7.6 kV		For 24.9Y/14.4 kV	
	7.8 kV	15 kV	15 kV	15 kV	18 kV	27 kV
Application	1 ϕ Trans. 50*	3 ϕ Bank 3 ϕ Sect. 100	1 ϕ Trans. 50*	3 ϕ Bank 3 ϕ Sect. 1 ϕ Sect. 100	1 ϕ Trans. 50*	3 ϕ Bank 3 ϕ Sect. 1 ϕ Sect. 100
Cutout Current Rating Type	50*	100	50*	100	50*	100

Manufacturer	Mounting	Catalog Numbers					
Chance	Crossarm Transformer	C70J-2B63 Series	C70J-2F53 Series	C70J-2F53 Series	C70J-2L73 Series		
General Electric	Crossarm (L) Transformer	9F80	9F80	9F78A	9F78A		
Joslyn (valve) (valve) (valve)	Crossarm Crossarm (L) Transformer	J9237-Q6 J9237-Q2/B	J9237-Q2/R J9237-Q2/B/R	J9237-Q6 J9238-1Q	J9267-Q2 J9267-Q2/B		
Kearney	Crossarm Transformer	123502	123511	294073	123512	294074	
McGraw-Edison	Crossarm (L) Transformer	AFS800M010	AFS301B Series	AFS301C Series	AFS800M010	AFS800M018	AFS300D Series

Either normal duty or heavy duty distribution class arresters listed on page ax-1 are acceptable for use with these combination units.

*These cutouts have open links and must not be used where fault currents are high or for sectionalizing.

(L) Indicates loadbreak type is available.

cg - Switch, air, three-pole, group-operated
NEMA standard switches for station and line structures

Manufacturer	Acceptable Mounting on Structure	Titling Ins.		Vertical Break		Side Break		Center Break		Double Break			
		Type	kV	Type	kV	Type	kV	Type	kV	Type	kV		
Gould-Brown Boveri (ITE) Johnson	Horizontal Horizontal	3ST	15-34.5	TTR6	15-161	VIP	15-230	LS	15-69	M	15-230		
Joslyn (Hi-Voltage)	Horizontal Horizontal	RF-2(VL)	15-230	RB-1(VL)	15-25	RB-1*	15-115						
Kearney	Horizontal	NE-2	15-34.5	AR	60-P	15-69							
MEMCO	Horizontal Horizontal	AgF	15-69	EA	15-345			EE	69-230				
H. K. Porter (Delta-Star)	Horizontal	MK-40	15-69	PMB-40A	15-69	LPC	69-230						
Siemens-Allis	Horizontal	TA(VL)	15-69	SSB-T	15-69	CCB	115-230	CBL-2	115-230				

(L) Means gas or solid material full-load interrupters are accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available.

* These switches may be purchased with reduced voltage vacuum interrupters and may be applied for loop sectionalizing duty when peak recovery voltage does not exceed 25 kV.

NOTE: Vertical phase-over-phase mounted switches are not acceptable above 25 kV class unless equipped with full-load interrupters. Switches of 15 kV and 25 kV classes with individual phases mounted on wood crossarms or poles must be supplied with insulated interphase and control rods.

cg - Switch, air, three-pole, group-operated
NEMA standard switches for station and line structures

<u>Manufacturer</u>	<u>Acceptable Mounting on Structures</u>	<u>Tilting Ins.</u>		<u>Vertical Break</u>		<u>Side Break</u>		<u>Center Break</u>		<u>Double Break</u>		
		<u>Type</u>	<u>kV</u>	<u>Type</u>	<u>kV</u>	<u>Type</u>	<u>kV</u>	<u>Type</u>	<u>kV</u>	<u>Type</u>	<u>kV</u>	
Powerdyne (Kearney)	Horizontal							V2-V4	15-230			
	Phase over Phase							V2	15-23			
ANIXTER Royal	Phase over Phase					RG-63(L)	15-69					
	Horizontal					RSL-L(L)	15-69					
S & C	Horizontal			Alduti(L)	15-34.5	Alduti(L)	15-25				Alduti(L)	34.5-46
	Phase over Phase			Alduti(L)	15-25	Alduti(L)	15-25				Alduti(L)	34.5-46
	Vertical			Alduti(L)*	15-34.5	Alduti(L)	15-25				Alduti(L)*	34.5-46
SEECO	Phase over Phase					GOABS(VL)	15-69					
Southern States	Horizontal											
	Phase over Phase											
Turner	Horizontal											
	Phase over Phase											
USCO	Horizontal											
	Horizontal											
	Phase over Phase											

(L) Means gas or solid material full-load interrupters are accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available.

* These switches, except 34.5 kV Alduti vertical break, are available and accepted in combination with the S & C Type SMD substation fuse cutouts listed on page af-3.

** Also available in bronze in some ratings.

NOTE: Vertical phase-over-phase mounted switches are not acceptable above 25 kV class unless equipped with full-load interrupters. Switches of 15 kV and 25 kV classes with individual phases mounted on wood crossarms or poles must be supplied with insulated interphase and control rods.

cg - Switch, air, three-pole, group-operated
(Not Suitable for Substation Use)

<u>Manufacturer</u>	<u>Acceptable Mounting</u>	<u>Vertical Break</u>		<u>Side Break</u>		<u>Center Break</u>	
		Type	kV	Type	kV	Type	kV
Chance	Horizontal Phase-over-phase	D2(L)*	15-34.5				
		D2(L)*	15-34.5				
K-P-F	Horizontal Phase-over-phase Phase-over-phase Phase-over-phase	SV-202	23	A202-A208	15-110		
				A202	15-23		
				W202	15-23		
				MD202	15-23		
Powerdyne (Kearney)	Horizontal Phase-over-phase			S	15-23	V2	15-23
				S	15-23	V2	15-23

*Also available in bronze in some ratings.

(L) Means gas or solid material full-load interrupters are accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available.

MOTE: Phase-over-phase mounted switches are not acceptable above 25 kV class unless equipped with full-load interrupters. Switches of 15 kV and 25 kV classes with individual phases mounted on wood crossarms or poles must be supplied with insulated interphase and control rods.

cg-4
 July 1980

cg - Switch, air, three-pole, group-operated
 (Factory Preassembled)

<u>Manufacturer</u>	<u>Acceptable Mounting on Structures</u>	<u>Vertical Break</u>		<u>Side Break</u>	
		<u>Type</u>	<u>kV</u>	<u>Type</u>	<u>kV</u>
Chance	Horizontal (A)			D4,D5(L)	15-27
	Phase over phase (A)			D4,D5(L)	15-27
S & C	Horizontal (A)			Alduti(L)	15-25
	Vertical (A)			Alduti(L)	15-25
	Phase over phase (B)	Alduti(L)	34.5 (200 kV BIL)#		
	Vertical (B)	Alduti(L)	34.5 (200 kV BIL)#		
	Phase over phase(A)			Alduti(L)	25

(L) Means gas or solid material full-load interrupters are accepted and available.

Accepted for transmission use only, provided the steel crossarm base is grounded with an adequate grounding connector.

(A) Not suitable for substation use.

(B) NEMA standard switches for station and line structures.

NOTE: Switches with factory-assembled crossarm type bases must have nonconducting crossarm type bases, nonconducting braces, and insulated interphase and control rods, except as otherwise noted.

cg - Switch, Air, Three-Pole, Group-Operated

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>K-P-F</u> Type A202 (L) horizontal-mounted and Types A202 (L), W202 (L) and MD202 (L) phase-over-phase mounted with quick break loadbreak device.	1137 4/20/78	1. To obtain experience. 2. For 15 kV distribution lines only. 3. Insulated interphase and control rods required.
<u>SEECO</u> GOABS(VL) Vacuum interrupter type 115-161 kV	1201 12/4/80	To obtain experience
<u>S & C</u> Line-Rupter with SF ₆ interrupter Horizontal mounted 69-230 kV Vertical mounted 69-161 kV	1202 12/18/80	To obtain experience

(L) Means full-load interrupter accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available.

ci
July 1980

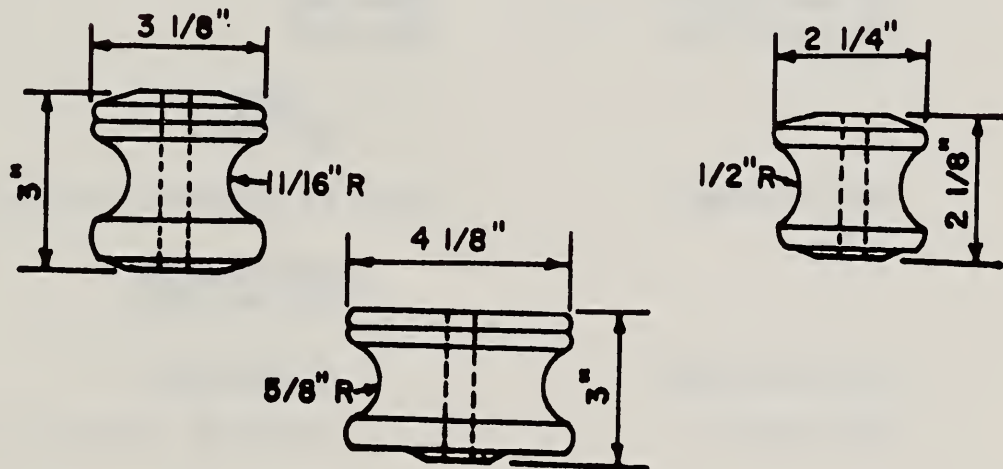
ci - Clevis, Thimble, Side-Opening

Numbers listed will accommodate: No. 6 thru 2/0 Copper
No. 8A thru 2A Copperweld-Copper
No. 4 thru 3/0 ACSR

Gould-Brown Boveri (ITE)	2400
Joslyn (Brewer Titchener)	.2401
Knox	2401
McGraw-Edison	DM5C1
Ohio Brass	82825

cm - Insulator, Spool

Type:	<u>Secondary (Wet Process)</u>		<u>Service</u>	
			<u>Wet Process</u>	<u>Dry Process</u>
Groove Diameter:	<u>1-3/4"</u>	<u>3"</u>	<u>1-3/8"</u>	<u>1-3/8"</u>
Chance	C909-1032	C909-1034	C909-1031	0606
Hughes	2102	-	-	-
Gould-Brown Boveri (ITE)	2012	2026	2011	-
Joslyn	J151	J0101	J150	J100
Kortick	K516	K522	K513	K514
McGraw-Edison	DE4S3	DE5S1	DE2S2	DE2S1
Porcelain Prod. (Knox)	5101	5119	5107	5207
Universal	1082	-	-	-
Utilities Service	205	31221	208	207



cp - Deadend, Compression Type

ACSR

<u>Conductor Size</u>	<u>Alcoa</u>	<u>AMP</u>	<u>Anderson/Sq. D</u>
1/0	Order by Conductor Size and Stranding	Type DE (Order by Conductor Size and Stranding)	VCD-50R
2/0			thru
3/0			VCD-61R
4/0			"
266.8 kcmil 26/7	2-piece		VCD-831-1-RM
336.4 kcmil 26/7	alloy		VCD-831-1-RM
477 kcmil 26/7	compression		VCD-832-2-RM
556.5 kcmil 26/7	"		VCD-833-3-RM
795 kcmil 26/7	"		VCD-835-4RM
954 kcmil 54/7	"		VCD-835-4RM

<u>Conductor Size</u>	<u>Burndy</u>	<u>Fargo(Alcan)</u>	<u>Kearney</u>	<u>Somerset/Homac</u>
1/0	Type Y-W		104000	Order by
2/0	"		thru	Conductor
3/0	"		104000-03	Size and
4/0	"		"	Stranding
266.8 kcmil 26/7	"	SEDA-1109	104000-05	"
336.4 kcmil 26/7	Type YTW	SEDA-1309	thru	"
477 kcmil 26/7	"	SEDA-1809	104000-14	"
556.5 kcmil 26/7	"	SEDA-2209	"	"
795 kcmil 26/7	"	SEDA-3309		
954 kcmil 54/7	"	SEDA-4121		

ACSR
Adjustable

Somerset/Homac

Order by conductor size and stranding.

Aluminum Alloy
(6201 and 5005)

Conductor Size:

4 thru 4/0

Anderson/Sq. D

Type VOD, Order by conductor size.

Copper

Conductor Size:

2 x 3

4

6

National Tel. Supply

71-258/3X

71-204-P

71-162-J

Copperweld-Copper

Conductor Size:

6A

8A

National Tel. Supply

71-6A-P

71-8A-P

ct
July 1980

ct - Plate, Double Arming

Transmission

<u>Manufacturer</u>	<u>4" x $\frac{1}{2}$" x 24"</u>	<u>4" x $\frac{1}{4}$" x 17"</u>
Chance	5844	5819
Dixie	D5844	D5845
Joslyn	J1600	J1607
Kortick	K1454	K1465
McGraw-Edison	DP21A1	DP23A3
Power Line Hardware	-	DAP-17
Utilities Service	4117	-

cu
January 1981

cu - Brace, crossarm, wood

Span, inches	60	60
Drop, inches	<u>18</u>	<u>30</u>
Aluma-Form	6018	6030
American Crossarm & Conduit Company	220	225
Brooks Lumber Company	34680	34681
Hatheway Patterson	16018	-
Hughes	2000CC	2001-D
Joslyn	J23339	J23623
Dis-Tran	DT-60	DT-601

Braces listed below have 26-inch hole spacing. They are interchangeable with the flat steel braces listed on page h.

Aluma-Form	AF626
American Crossarm & Conduit	600
Brooks Lumber Company	58128
Dis-Tran	DT-28
Hatheway Patterson	7026
Hughes	2023
Joslyn	J5526

Brace, crossarm, fiber reinforced plastic

Continental	CRB-28
Joslyn	RP-26
Plastigage	CAB-28
Shakespeare	533

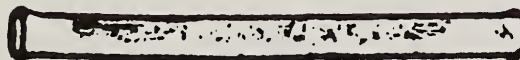
cx
July 1980

cx - Splice, oval tube

<u>Conductor Size:</u>	<u>4</u>	<u>2</u>	<u>ACSR</u>	<u>1/0</u>	<u>2/0</u>
ALCOA	544	542		540	529

<u>Conductor Size:</u>	<u>0 x 7</u>	<u>2 x 3</u>	<u>Copper</u>	<u>4</u>	<u>6</u>
MEMCO	63	62		58	56
National Tel. Supply	464	463		459	457

<u>Conductor Size:</u>	<u>Copperweld-Copper</u>		<u>8A</u>
	<u>6A</u>		
MEMCO		170	168
National Tel. Supply		460	459



cy-1
January 1981

cy - Splice, Compression
ACSR

<u>Conductor Size</u>	<u>AMP</u>	<u>Alcoa</u>	<u>Anderson/ Sq. D</u>	<u>Burndy</u>
4 6/1		2-piece	VC-36R	"Unisplice"
4 7/1		Order	VC-36R	(1-piece)
2 6/1		by	VC-36R	or Y-S
2 7/1		Conductor	VC-36R	(2-piece)
1/0		Size	VC-50R	Order by
2/0		and	VC-50R	Conductor
3/0		Stranding	VC-61R	Size and
4/0		"	VC-61R	Stranding
266.8 kcmil 26/7		2-piece	VC-831-1-RM	2-pc.
336.4 kcmil 26/7		Compression	VC-831-1-RM	Type YTS
477 kcmil 26/7	Type SP	Alloy (Order	VC-832-2-RM	"
556.5 kcmil 26/7	(Order by	by Conductor	VC-833-3-RM	"
795 kcmil 26/7	Conductor Size	Size and	VC-835-4RM	"
954 kcmil 54/7	and Stranding)	Stranding)	VC-835-4RM	"

<u>Conductor Size</u>	<u>Fargo (Alcan)</u>	<u>ITT Blackburn</u>	<u>Kearney</u>
4 6/1		Type RC	OH4-61A
4 7/1		1-piece	OH4-71A
2 6/1		Order	OH2-61A
2 7/1		by	OH2-71A
1/0		Conductor	OH1/0-61A
2/0		Size	OHR2/0-61A
3/0		and	OHR3/0-61A
4/0		Stranding	HR4/0-61A
266.8 kcmil 26/7	TJA-1109	Type DT	HR-266-267A
336.4 kcmil 26/7	TJA-1309	2-piece	HR-336-267A
477 kcmil 26/7	TJA-1809	for	HR-477-267A
556.5 kcmil 26/7	TJA-2209	kcmil sizes	HR-556-267A
795 kcmil 26/7	TJA-3309		
954 kcmil 54/7	TJA-4121		

<u>Conductor Size</u>	<u>Nat. Tel. Supply</u>	<u>Somerset/ Homac</u>
4 6/1	"Nicopress"	"Tension
4 7/1	(1-pc. or 2-pc.)	splicer"
2 6/1	Order by Conduc-	(1-piece or
2 7/1	tor Size and	2-piece)
1/0	Stranding	Order by
2/0	2-pc.	Conductor
3/0	"	Size and
4/0	"	Stranding
266.8 kcmil 26/7	"	2-pc.
336.4 kcmil 26/7	"	"
477 kcmil 26/7	"	"
556.5 kcmil 26/7	"	"
795 kcmil 26/7		
954 kcmil 54/7		

cy - Splice, compression

1-piece splice for ACSR

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
*ALCOA "Jiffy Joint"	704 11/10/60	To obtain experience.

1-piece splice for AWAC

<u>Burndy</u> AWAC 4-4/3 YDS7MLOT AWAC 2-4/3 YDS7M9T AWAC 1/0-4/3 YDS7M7T	1050 9/19/74	To obtain experience.
---	-----------------	-----------------------

*Satisfactory for use with 6201 and 5005 all aluminum alloy conductor through 4/0 and 19 strand conductors of sizes 26,800 CM and 477,000 CM.

cz - Splice for Steel Strand (Overhead Ground Wire)

Compression

Single Sleeve Only

	<u>High Strength Steel 3/8"</u>	<u>7/16"</u>	<u>Extra High Strength 3/8"</u>	<u>Aluminum Clad Steel 7 No. 9 AWG 7 No. 8 AWG 7 No. 7 AWG</u>
Alcoa	4012.377	4014.453	4914.386	
Burndy	YTS375E	YTS438E		YDS7M9T YDS7M8T YDS7M7T
Fargo (Alcan)	81390	81468		81375 81421 81468
Kearney	HR-3/8-3-7S			
National Tel. Supply	5-7/120G92	5-7/145J22		
Somerset/Homac	29714			

Steel and Aluminum Sleeves

	<u>Automatic</u>	<u>Bolted Type</u>	<u>Formed Type</u>
Alcoa	4727.14		
Somerset/Homac	29714 & 28414 (Two piece)	5003	
Reliable	5002		
Electroline	GD-537		
Helical Line Products		HS-310-3/8"	HS-311-7/16"

du
January 1981

du - Link, Extension

DISTRIBUTION

<u>Manufacturer</u>	<u>Catalog Number</u>
Chance	C207-0112
Flagg (MIF)	PA320
McGraw-Edison	DC33B6
Utilities Service	495

Transmission

Gould Inc. (ITE)	3074A
Joslyn (Bolted) (High Strength)	J7712 J22609
Knox	3074A
McGraw-Edison	DC152B1

Guy Extension Link
(For "H" Structure)

<u>Manufacturer</u>	<u>One Guy Attachment</u>	<u>Two Guy Attachment</u>
Joslyn	J22421	J22523

NOTE: The distribution extension links may be substituted for anchor shackle (Item bo), eye bolt (Item o) and eye nut (Item aa) for both small and large conductor drawings shown in REA Forms 803 and 804 at the option of the owner.

Conditional List
du(1)
July 1980

du - Connecting Links

Strength Rating: 25,000 lbs. ultimate loading

<u>Manufacturer</u>	<u>Link to guy</u>	<u>Size</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
Hughes	3154	3/8" x 2" x 9-1/2"	1172 9/20/79	To obtain experience
	<u>Link to Insulators</u>			in conjunction
Hughes	3176	3/8" x 3" x 9-1/2"	1172 9/20/79	with pole bands (Item fv(1))

eq - Narrow Profile Brackets and Special Arm Assemblies
(See REA Bulletin 61-12)

FIBERGLASS REINFORCED PLASTICFor 12.5/7.2 kV

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Shakespeare</u>		
Two-phase angle bracket 761-36-8	1032 12/20/73	1. To obtain experience.
Two-phase pin bracket 813-36		2. For use only in scenic areas and locations where right-of-way is limited.
Standoff insulator, 560-13		
Standoff insulator, 560-18		
Suspension bracket, 615-18		
Deadend arm, 540-36	1063(4/17/75)	3. Not to be used where conductor galloping may be expected.
Standoff bracket, 892-18	1089(4/29/76)	
		4. Not to be used in contaminated atmospheres.
<u>Chance</u>		
Two-phase pin bracket C653-0638	1043 6/13/74	Same as above.
Standoff insulator C653-0621		
Deadend arm C653-1023	1049(9/5/74) 1141(6/15/78)	
Two-phase angle bracket C653-1003	1061 3/20/75	
<u>Continental</u>		
Two-phase pin bracket GPB2-568M-36V	1181 2/14/80	Same as above.
Two-phase angle bracket GPB2-568M-36E		
Standoff insulator GPB-58M-13		
Standoff insulator GPB-58M-18		
Deadend arm GDEA-58-3.0-36-2E		
Suspension bracket GPB-58M-18E		

Conditional List
eq(2.1)
January 1981

eq - Narrow Profile Brackets and Special Arm Assemblies
(See REA Bulletin 61-12)

FIBERGLASS REINFORCED PLASTIC

For 12.5/7.2 kV

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Flagg (MIF)</u>		
Two phase angle bracket 7561-336E	1201 12/4/80	1. To obtain experience
Two phase pin bracket 7561-436		2. For use only in scenic areas and locations where right-of-way is limited.
Standoff insulator 7561-012		
Standoff insulator 7561-018		3. Not to be used where conductor galloping may be expected.
Suspension bracket 7561-818		
Standoff bracket 7561-218		4. Not to be used in con- taminated atmospheres.

eq - Narrow Profile Brackets and Special Arm Assemblies
(See REA Bulletin 61-12)

FIBERGLASS REINFORCED PLASTIC

For 24.9/14.4 kV

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Chance</u>		
Two-phase pin bracket C653-0987	1049 9/5/74	1. To obtain experience.
Standoff insulator C653-0988	1141	2. For use only in scenic areas and locations where right-of-way is limited.
Deadend arm, C653-1024	6/15/78	
Two-phase angle bracket C653-1004	1061 3/20/75	3. Not to be used where conductor galloping may be expected.
		4. Not to be used in con- taminated atmospheres.
<u>Shakespeare</u>		
Deadend arm, 540-48	1063(4/17/75)	Same as above.
Standoff insulator, 880-20	1081	
Two-phase pin bracket, 883-48	1/8/76	
Standoff insulator, 870-19	1089	
Two-phase pin bracket, 862-44	4/29/76	
Standoff bracket, 892-18		
<u>Continental</u>		
Two-phase pin bracket GPB2-568M-44-1.375V	1181 2/14/80	Same as above.
Two-phase pin bracket GPB2-558H-48-1.375V		
Standoff insulator GPB-58M-19-1.375V		
Standoff insulator GPB-58H-20-1.375V		
Standoff bracket GIACB-58M-18		
Deadend arm GDEA-58-3.0-48-2E		

Conditional List
eq(2.3)
January 1981

eq - Narrow Profile Brackets and Special Arm Assemblies
(See REA Bulletin 61-12)

FIBERGLASS REINFORCED PLASTIC

For 24.9/14.4 kV

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Flagg (MIF)</u>		
Standoff insulator 7581-120X	1201 12/4/80	1. To obtain experience
Standoff insulator 7561-118X		2. For use only in scenic areas and locations where right-of-way is limited.
Two phase pin bracket 7561-448X		3. Not to be used where conductor galloping may be expected.
Standoff bracket 7561-218		4. Not to be used in con- taminated atmospheres.

ex - Splice, formed type

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Preformed Line Products</u>		
Splice for ACSR	654	To obtain experience.
FTS full tension splice	10/16/58	For repair only.
Splice for AWAC	999	To obtain experience.
LS-0185 for 4-4/3	8/31/72	For repair only where
LS-0188 for 2-4/3		alumoweld strands are
LS-0191 for 1/0-4/3		not broken.

fc-1
January 1981

fc - Capacitors, Shunt
12470/7200 Volts

<u>Manufacturer</u>	<u>Size</u>	<u>1 Bushing</u>	<u>2 Bushing</u>	<u>3 Bushing</u>
General Electric	25 kvar	52L226KC	52L206KC	
	50 kvar	51L226KC	51L206KC	
	100 kvar	54L226KC	54L206KC	
	150 kvar	54L526KC	54L506KC	
	200 kvar	58L126KC	58L106KC	
Sangamo	50 kvar	346356	346306	
	100 kvar	346006	346036	
	150 kvar	346106	346136	
	200 kvar	346656	346606	
	300 kvar			347118
	400 kvar			348218

fc - Capacitors, Shunt
24900/14400 Volts

<u>Manufacturer</u>	<u>Size</u>	<u>1 Bushing</u>	<u>2 Bushing</u>	<u>3 Bushing</u>
General Electric	50 kvar	51L252KC		
	100 kvar	54L252KC		
	150 kvar	54L552KC		
	200 kvar	58L154KC		
Sangamo	50 kvar	346365	346318	
	100 kvar	346016	346052	
	150 kvar	346115	346150	
	200 kvar	346676	346615	

Conditional List
fc(1)
January 1981

fc - Capacitors, shunt
12470/7200 volts

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>McGraw-Edison</u>		
All film type, 1 bushing	1109	To obtain experience
CEP131B6 (100 kvar)	3/3/77	
CEP132B6 (150 kvar)		
CEP140B6 (200 kvar)		
CEP160B6 (300 kvar)	1186 (5/8/80)	Same as above
All film type, 2 bushing		
CEP131A6 (100 kvar)		
CEP132A6 (150 kvar)		
CEP140A6 (200 kvar)		
CEP160A6 (300 kvar)	1186 (5/8/80)	Same as above
 <u>Sangamo</u>		
All-film type, 1 bushing	1200	To obtain experience
356356 (50 kvar)	11/20/80	
356006 (100 kvar)		
356106 (150 kvar)		
356656 (200 kvar)		
All-film type, 2 bushing		
356306 (50 kvar)		
356036 (100 kvar)		
356136 (150 kvar)		
356606 (200 kvar)		
 <u>Westinghouse</u>		
Film type, 1 bushing	1116	Same as above
1N02050A09 (50 kvar)	6/9/77	
1N02100A09 (100 kvar)		
1N02150A09 (150 kvar)		
1N02200A09 (200 kvar)		
Film type, 2 bushing		
1N02050A10 (50 kvar)		
1N02100A10 (100 kvar)		
1N02150A10 (150 kvar)		
1N02200A10 (200 kvar)		
Film type, 3 bushing 3Ø		
1N02150A47 (150 kvar)		
1N02303A07 (300 kvar)		
1N02403A07 (400 kvar)		

January 1981

fc - Capacitors, shunt
24900/14400 volts

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>McGraw-Edison</u>		
All film type, 1 bushing	1109	To obtain experience
CEP138B4 (100 kvar)	3/3/77	
CEP137B4 (150 kvar)		
CEP142B4 (200 kvar)		
CEP162B4 (300 kvar)	1186 (5/8/80)	Same as above
<u>Sangamo</u>		
All-film type, 1 bushing	1200	Same as above
356365 (50 kvar)	11/20/80	
356016 (100 kvar)		
356115 (150 kvar)		
356676 (200 kvar)		
All-film type, 2 bushing		
356318 (50 kvar)		
356048 (100 kvar)		
356148 (150 kvar)		
356618 (200 kvar)		
<u>Westinghouse</u>		
Film type, 1 bushing	1116	Same as above
1N02050A31 (50 kvar)	6/9/77	
1N02100A31 (100 kvar)		
1N02150A31 (150 kvar)		
1N02200A31 (200 kvar)		
Film type, 3 bushing 3Ø		
1N02303A29 (300 kvar)		
1N02403A29 (400 kvar)		
<u>General Electric</u>		
Film/Foil Type, 1 bushing	1192	Same as above
51L252RC (50 kvar)	8/7/80	
54L252RC (100 kvar)		
54L552RC (150 kvar)		
58L154RC (200 kvar)		

fd
July 1980

fd - Hangers, capacitor

Crossarm Mounting

	<u>1 unit</u>	<u>2 units</u>	<u>3 or 4 units</u>
General Electric	39F41	39F53	39F54
McGraw-Edison	CH1A1	CH2A2	CH4A1
Sangamo	94346	94345	94347
Westinghouse	85B397G01	7910644G01	7910644G02

Pole Mounting

	<u>Single Phase</u>	<u>Three Phase</u>	
		<u>In Line</u>	<u>Cluster</u>
Aluma-Form	CR-3* thru CR-6*		3-CR-3/4*
Joslyn	J6744, J6744A		
General Electric	39F83G1	39F86G1	
Sangamo	97650		
Westinghouse	278C928G01 (3 units) 278C928G02 (6 units)	(1∅ units) 278C928G01 (3 units) 278C928G02 (6 units) 278C928G03 (9 units) (3∅ units) 279C310G03 (1 unit) 279C310G04 (2 units) 279C310G05 (3 units) 279C310G01 (4 units) 279C310G06 (5 units)	

* Available with oil switch mounting bracket.

gj - Crossarm Assemblies and Arm Spacers

Distribution

Wood crossarm assembly complete with braces
and attaching hardware, fittings and bolts

Crossarm Assembly

<u>Manufacturer</u>	<u>Crossarm Size</u> (inches)	<u>Catalog No.</u>
Hughes Brothers	$3\frac{1}{2} \times 4\frac{1}{2} \times 8'-0''$	2890A
	$3-3/4 \times 5-3/4 \times 8'-0''$	2890B
	$3-3/4 \times 7-3/4 \times 8'-0''$	2892-A
	$3-3/4 \times 7-3/4 \times 10'-0''$	2892-B

Twin Arm Spacer*

To be used with standard hardware, 8' x 3-5/8" x 4-5/8" crossarm
and 28" wood braces

Flagg

PX240

*Restricted to applications where the conductor's maximum design
tension is less than 1250 lbs. and to conductor sizes 1/0 ACSR and
below.

gw-1

January 1981

gw - Crossarm Assembly for H-Frame Construction :

Applicable Specification: REA Specification T-7, Revision dated November 1962

Applicable Drawing : TH-11B Series (161 kV maximum)
No braces (TH-11B)
Two vee braces on outside (TH-11BVO)
Two vee braces on inside (TH-11BVI)
Four vee braces (TH-11BV4)

3-5/8" x 9-3/8" x 33' wood crossarm assembly complete with attaching hardware, fittings, bolts and 3-3/8" x 5-3/8" braces.

Catalog Nos. or Drawing Nos.

	<u>TH-11B</u>	<u>TH-11BVO</u>	<u>TH-11BVI</u>	<u>TH-11BV4</u>
(Assemblies)	<u>Items</u> gw	<u>Items</u> gw and vo	<u>Items</u> gw and vi	<u>Items</u> gw and vv
American Crossarm and Conduit Co. (1)	70250	7025VO	7025VI	7025V4
Brooks Lumber (1)	6411	6411-1	6411-2	6411-3
Cascadian (1)	CCC11B72	CCC11B72-VO	CCC11B72-VI	CCC11B72-V4
Hughes Brothers (1,2)	C3316-B	C3316-B	C3316-B	C3316-B
United (Ky. AEC)(1)	SW16111-0	SW16111-VO	SW16111-VI	SW16111-V4

1 - Fixed spacer fitting sizes as required

2 - Adjustable spacers are available

January 1981

gw - Crossarm Assembly for H-frame Construction
(Double Arm) 230 kV (Small Angle)

Applicable Specification: REA Specification T-8
Drawing : TH-231B

Assembly complete with attaching hardware, fittings, bolts and braces.

Crossarm 3-5/8" x 9-3/8"

<u>Manufacturer</u>	<u>Catalog No.</u>
American Crossarm & Conduit (1)	8026VB
Brooks (1)	64231
Cascadian (1)	CCC231B82
Hughes (1,2)	C-3338-B
Koppers (1)	REA-230B

Crossarm 5-1/8" x 7-1/2"

Hughes (1,2)	C-3338-BL
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- 1 - Fixed spacer fitting sizes as required.
- 2 - Adjustable spacers are available.

Conditional List
gx(1)
July 1980

gx - Single Pole Steel Structures with Arms

Applicable Specification: REA Specification for Single Pole Steel Structures Complete with Arms, T-9

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Union Metal</u> Single circuit, delta conductor arrangement - Type D Single circuit, vertical conductor arrangement - Type E Double circuit conductor arrangement - Type H Single circuit, large angle arrangement - Type K	994 6/29/72	1. To obtain experience. 2. For use only in scenic and urban areas where right-of-way is limited.
<u>Meyer</u> Single circuit, delta conductor arrangement - Type 1 Single circuit, vertical conductor arrangement - Type 2 Double circuit conductor arrangement - Type 3 Single circuit, large angle arrangement - Type 4	994 6/29/72	1. To obtain experience. 2. For use only in scenic and urban areas where right-of-way is limited.
<u>Bruce Lake</u> Single circuit, delta conductor arrangement - Type SCSUSP1 Single circuit vertical conductor arrangement - Type SCSUSP2 Double circuit conductor arrangement - Type DCSUSP3 Single circuit, large angle arrangement - Type SCHA4	1078 11/26/75	1. To obtain experience. 2. For use only in scenic and urban areas where right-of-way is limited.

January 1981

**gy - Crossarm Assembly for H-frame Construction
(Double Arm)**

Applicable Specification: REA Specification T-7, Revision dated
November 29, 1962
Applicable Drawing : TH-10 Series
No braces (TH-10)
Two vee braces on outside (TH-10VO)
Two vee braces on inside (TH-10VI)
Four vee braces (TH-10V4)

3-5/8" x 9-3/8" x 32' wood crossarm assembly complete with
attaching hardware, fittings, bolts and 3-3/8" x 5-3/8"
braces.

		<u>Catalog Nos. or Drawing Nos.</u>			
		<u>TH-10</u>	<u>TH-10VO</u>	<u>TH-10VI</u>	<u>TH-10V4</u>
		<u>Items</u>	<u>Items</u>	<u>Items</u>	<u>Items</u>
(Assemblies)		gy	gy and vo	gy and vi	gy and vv
American Crossarm & Conduit Company (1)	70208	70228	702281	70248	
Brooks Lumber (1)	6410	6410-1	6410-2	6410-3	
Cascadian (1)	CCC1071	CCC1071-VO	CCC1071-VI	CCC1071-V4	
Hughes Brothers (1,2)	C-3316-A	C-3316-A	C-3316-A	C-3316-A	
Niedermeyer-Martin(1)	N-6710	N-6711	N-6712	N-6713	
United (Ky. AEC) (1)	SW16110-0	SW16110-VO	SW16110-VI	SW16110-V4	

- 1 - Fixed spacer fitting sizes as required
2 - Adjustable spacers are available

gy-2
January 1981

gy - Crossarm Assembly for H-frame Construction
(Double Arm) 230 kV (Tangent)

Applicable Specification: REA Specification T-8
Drawing : TH-230

Assembly complete with attaching hardware, fittings, bolts and braces.

Crossarm 3-5/8" x 9-3/8"

<u>Manufacturer</u>	<u>Catalog No.</u>
American Crossarm & Conduit (1)	8025V4
Brooks (1)	64230
Cascadian (1)	CCC23081
Hughes (1,2)	C-3338-A
Koppers (1)	REA-230S
Niedermeyer-Martin (1)	N-6720

Crossarm 5-1/8" x 7-1/2"

Hughes (1,2)	C-3338-AL
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- 1 - Fixed spacer fitting sizes as required.
- 2 - Adjustable spacers are available.

gz - Crossarm Assembly for Wishbone Construction, "Z" Type
(Single Arm)

Applicable Specification: REA Specification T-5
Applicable Drawings : REA Drawings TSZ-1 and TMZ-1

3-5/8" x 5-5/8" wood crossarm assembly complete with
brace and attaching hardware, fittings, and bolts

The following manufacturers have shown compliance with the applicable
specifications for this assembly:

<u>Manufacturer</u>	<u>Catalog Nos. or Drawing Nos.</u>
American Crossarm & Conduit Co.	601TSZ and 602TSZ
Brooks Lumber	64Z1
Hughes Brothers	C-3162-A and C-3162.10

gz-2

January 1981

gz - Crossarm Assembly for Wishbone Construction, "Z" Type
(Double Arm)

Applicable Specification: REA Specification T-5
Applicable Drawings : REA Drawings TSZ-2 and TMZ-2

3-5/8" x 5-5/8" wood crossarm assembly complete with
brace and attaching hardware, fittings and bolts

The following manufacturers have shown compliance with the applicable
specifications for this assembly:

<u>Manufacturer</u>	<u>Catalog Nos. or Drawing Nos.</u>
American Crossarm & Conduit Co.	602TSZ
Brooks Lumber	64Z2
Hughes Brothers	C-3162-B and C-3162.10

January 1981

sb - Switch, disconnect (single-pole, hook-operated station class)

NEMA standard switches for station or line
structure use where single-pole switching is permissible

<u>Manufacturer</u>	<u>Type</u>	<u>Voltage Ratings</u>	<u>System Voltages Line-to-Line</u>
ANIXTER Royal	BT	15 thru 69 kV	12.5 thru 69 kV
	BLT(PL)	15 and 23 kV	12.5 thru 24.9 kV
Bridges	EH	15 thru 69 kV	12.5 thru 69 kV
	EHL(L)	15 thru 69 kV	12.5 thru 69 kV
	HA	15 thru 69 kV	12.5 thru 69 kV
Gould-Brown Boveri (ITE)	HPL	15 thru 69 kV	12.5 thru 69 kV
	DS(PL)	15 and 23 kV	12.5, 13.2, 24.9 kV
Hi-Voltage (Joslyn)	HU	15 thru 69 kV	12.5 thru 69 kV
	HI	15 thru 69 kV	12.5 thru 69 kV
Johnson	HPT	15 thru 69 kV	12.5 thru 69 kV
Kearney	M-72(PL)	15 thru 69 kV	12.5 thru 69 kV
McGraw-Edison	D2(PL)	15 and 23 kV	12.5, 13.2, 24.9 kV
MEMCO	STV	15 thru 69 kV	12.5 thru 69 kV
	STU	15 thru 69 kV	12.5 thru 69 kV
Morgan	DHS	15 thru 69 kV	12.5 thru 69 kV
	(PL included in 15 kV)		
H. K. Porter (Delta-Star)	B-2M	15 thru 69 kV	12.5 thru 69 kV
	EV(PL)	15 thru 34.5 kV	12.5 thru 34.5 kV
S & C	LBD(PL)	15 thru 34.5 kV	12.5 thru 34.5 kV
	Alduti(L)	15 and 25 kV	12.5 thru 24.9 kV
Siemens-Allis	HA	15 thru 69 kV	12.5 thru 69 kV
	HS(PL)	15 and 25 kV	12.5 thru 24.9 kV

(L) Means solid material load interrupters are available and accepted.

(LV) Means vacuum interrupters are available and accepted.

(PL) Means hooks for portable load interrupters are available.

October 1980

sb - Switch, disconnect (single-pole, hook-operated station class)

NEMA standard switches for station or line
structure use where single-pole switching is permissible

<u>Manufacturer</u>	<u>Type</u>	<u>Voltage Ratings</u>	<u>System Voltages Line-to-Line</u>
Southern States	PBO	15 thru 69 kV	12.5 thru 69 kV
	*PBN	15 thru 23 kV	12.5, 13.2, 24.9 kV
USCO	HH(PL)	15 thru 69 kV	12.5 thru 69 kV

(L) Means solid material load interrupters are available and accepted.

(LV) Means vacuum interrupters are available and accepted.

(PL) Means hooks for portable load interrupters are available.

* With steel base only.

sb - Switch, disconnect (single-pole, hook-operated
distribution class)*

For distribution line use where power class insulation is not required
and single-phase switching is permissible.

(Not suitable for substation use)

<u>Manufacturer</u>	<u>Type</u>	<u>Voltage Rating</u>	<u>System Voltage Line-to-Line</u>
ANIXTER Royal	BLT(PL)	15 and 23 kV	12.5, 13.2, 24.9 kV
Chance	M3(PL)	15 and 27 kV	12.5 thru 24.9 kV
Gould-Brown Boveri (ITE)	DS(PL)	15 and 23 kV	12.5, 13.2, 24.9 kV
Kearney	D-73(PL)	15 and 23 kV	12.5, 13.2, 24.9 kV
McGraw-Edison	D2(PL)	15 and 25 kV	12.5, 13.2, 24.9 kV
Morgan	DHS (PL included in 15 kV)	15 and 23 kV	12.5, 13.2, 24.9 kV
H. K. Porter	EV(PL)	15 kV	12.5 kV
S & C	LBD(PL)	15 and 25 kV	12.5, 13.2, 24.9 kV
Siemens-Allis	HD(PL)	15 and 25 kV	12.5 thru 24.9 kV
Southern States	PD-2 PDJ-2(PL)	15 and 23 kV 15 and 23 kV	12.5, 13.2, 24.9 kV 12.5, 13.2, 24.9 kV

NOTE: Switches on this page must be furnished with four bolts for
double crossarm mounting.

(L) Means solid material load interrupters are available and accepted.

(PL) Means hooks for portable load interrupters are available.

(LV) Means vacuum interrupters are available and accepted.

*Steel bases only.

sc-1
July 1980

sc - Regulators, Voltage
12.5/7.2 kV
13.2/7.62 kV

Applicable Specification: REA "Specification for Substation Regulators,"
S-2

<u>Type</u>	<u>Size</u>	<u>Description</u>
<u>General Electric</u>		
ML-32	19.1 - 509 kVA	(SL) Single phase - step type
MLT	500 - 1000 kVA	(S) Three phase - step type
VML-32	500 - 833 kVA	(S) Single phase - vacuum step type
VMLT-32	1200 - 2800 kVA	(S) Three phase - vacuum step type

McGraw-Edison

RSAA	19.1 - 500 kVA	(SL) Single phase - step type
RAB	50 amp.	(L) Single phase - step type (Auto-Booster)

Siemens-Allis

JFR	38.1 - 667 kVA	(SL) Single phase - step type
LFRR	50 amp.	(L) Single phase - step type

Westinghouse

UTS, UTT	167 - 1000 kVA	(S) Three phase - step type
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(L) Indicates line use
(S) Indicates substation use

sr - Steel for Substation Grounding, Copper-Clad or Galvanized

(See page av-2 for copper grounding conductor)

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Copperweld Steel</u>		
40% conductivity DSA	954	1. To obtain experience.
Copperweld Strand in sizes:	10/29/70	
1/2" (7 No. 6 AWG)		2. When used in soil with resistivity of 25 ohm-meters (2500 ohms per centimeter cube) or less, cathodic protection must be incorporated into the grounding design.
9/16" (7 No. 5 AWG)		
5/8" (7 No. 4 AWG)		
13/16" (19 No. 6 AWG)		
7/8" (19 No. 5 AWG)		
<u>Indiana Steel & Wire</u>		
Steel strand, BB grade, Class C galvanized	1004	1. To obtain experience.
5/8" (19 wire)	11/16/72	
1/2" (7 wire)	1133	2. When used in soil with resistivity of 25 ohm-meters (2500 ohms per centimeter cube) or less, cathodic protection must be incorporated into the grounding design.
9/16" (7 wire)	2/16/78	
7/16" (7 wire)		
<u>Bethlehem Steel</u>		
7/16" and 1/2" steel strand, BB grade, Class C galvanized	1015 4/26/73	1. To obtain experience.
		2. When used in soil with resistivity of 25 ohm-meters (2500 ohms per centimeter cube) or less, cathodic protection must be incorporated into the grounding design.

vx

January 1981

vx - Cross brace assembly, 3-3/8" x 5-3/8"
with hardware & fittings (Dwg. TM-110, REA Spec. T-7)

<u>Manufacturer</u>	<u>Catalog No.</u>
<u>American Crossarm & Conduit</u>	
Item 1-vx	1100-1
Item 2-vx	1100-2
<u>Hughes Bros.</u>	
Item 1-vx	1042-1
Item 2-vx	1042-2
<u>Brooks Lumber</u>	
Item 1-vx	X6685-1
Item 2-vx	X6685-2
<u>Joslyn</u>	
Item 1-vx	1-J6046
Item 2-vx	2-J6046
<u>United (Ky. AEC)</u>	
Item 1-vx	SW1042-1
Item 2-vx	SW1042-2
<u>Niedermeyer-Martin</u>	
Item 1-vx	N-6714-1
Item 2-vx	N-6714-2
<u>Cascadian</u>	
Item 1-vx	CCC-67-1
Item 2-vx	CCC-67-2

Cross Brace Assembly, 3-5/8" x 7-1/2" Min.
with hardware and fittings.

Applicable Specification: T-8
Drawing: TM-110A

<u>Manufacturer</u>	<u>Catalog No.</u>
Brooks	X-6695
Hughes	2061 A
American Crossarm & Conduit	1200
Joslyn	J6048
Niedermeyer-Martin	N-6721

PART II

Underground Distribution Equipment

The realm of underground distribution has made quite significant advances in the past few years. Due to these advances and the increasing feasibility of underground rural distribution, most REA borrowers have placed some distribution equipment underground, are presently planning to, or are anticipating doing so in the future. If borrowers are to obtain reliable and economical underground systems, approved standards for construction and equipment must be observed.

Underground equipment considered suitable is being included in the "List of Materials Acceptable for Use on Systems of REA Electrification Borrowers." Specifications have been written and are available on much of this equipment. It must be realized that very little operating experience is available on this type equipment. Therefore, much of the underground equipment will be listed as "Conditional" until such experience is obtained that will warrant removing the "Conditional" listing. Listing of an item as "Conditional" does not mean that the item is inferior. Conditional means that service experience is desired so the item can be properly evaluated and demonstrates satisfactory performance before consideration for final acceptance.

Any comments or suggestions regarding the use or operation of the listed underground equipment will be welcome.

U ae - Surge Arresters, Distribution
for Underground System Pole Risers
(Lightning Arresters)

<u>Manufacturer</u>	<u>Arrester Class</u>	<u>Arrester Type</u>	<u>Ratings - kV</u>
General Electric	Distribution, heavy duty	Alugard	9, 10, 18
Joslyn	Distribution, normal duty	Q	9/10, 18
	Distribution, heavy duty	J	9/10, 18
	Intermediate*	RS	9, 10, 18
Kearney	Distribution, heavy duty	Unigap	9, 10, 18
McGraw-Edison	Distribution, normal duty	ES	9/10, 18
	Distribution, heavy duty	EL	9, 10, 18
Ohio Brass	Distribution, normal duty	DA-III	9/10, 18
	Distribution, heavy duty	DA-IV	9, 10, 18
	Intermediate	GP	18
Westinghouse	Distribution, normal duty	LV	9/10, 18
	Distribution, heavy duty	LVBB	9/10, 18
	Intermediate	IVL	9, 10, 18

*Has intermediate class arrester characteristics but does not have intermediate class venting capability.

NOTE: The arresters listed on this page may be used singly or in parallel, but must be applied in accordance with paragraph VI.A., in REA Bulletin 61-3, "Underground Rural Distribution." Other arresters listed on pages ae-1 and ae-2 may be used for underground systems when applied in accordance with this bulletin.

U ae - Arresters, Surge
(For underground system pole risers or pad-mounted equipment)

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>RTE</u>		
Metal oxide M.O.V.E. 9 & 18 kV	1185 4/24/80	To obtain experience
<u>General Electric</u>		
Metal oxide, Tranquell UD 9, 10, 18 kV	1185 4/24/80	Same as above
Metal oxide, Tranquell Intermediate class 9, 10, 18 kV	1197 10/9/80	
<u>McGraw-Edison</u>		
Metal oxide, RP2 9, 10, 18	1193 8/21/80	Same as above

U an - Transformers, distribution
pad-mounted, dead-front

(For underground application)

Applicable Specifications: "REA Specifications for Pad-Mounted
Transformers," U-5

<u>Manufacturer</u>	<u>Single Phase</u>	<u>Three-Phase</u>
Central Moloney (2,4)	"REA-LP" 25-167 kVA	
Chance (2)	"Turf Hugger-R" 15-167-kVA	"Turf Hugger-R" 75-500 kVA
Dowzer (3,4)	"METRI-PAD" 25-167 kVA	"PM3W-R" 75-500 kVA
ERMCO (1) (4,6) (2,4)	"Trimline" 10-50 kVA "Low-Profile" 10-50 kVA "Low-Profile" 75 kVA	
General Electric (2,4)	"Mini-Pad III - REA" 10-167 kVA	"Compad II - REA" 75-2500 kVA
Howard (2,4)	"HiPad REA" 10-167 kVA	"HiPad 3 REA" 45-2500 kVA
Kuhlman (2,4)	"Lo-Pak ALR" 25-167 kVA	
McGraw-Edison (2,4)	Series 20/30 REA 25-167 kVA	"REA Pad-Mount" 75-2500 kVA
NECO (2)	HMM-R, 10-50 kVA SP-R, 75-167 kVA	TP-R, 45-1000 kVA
H. K. Porter (2,4) (Delta-Star)	"Low Profile U 5-R" 25-167 kVA	"Porter U5-R3" 225-2500 kVA
RTE (2,4)	"REA Shrubline" 15-167 kVA	"REA Terra-Tran" 45-2500 kVA
Standard (3,4,5)		"Mini-Pad RE010" 75-300 kVA "Stan-Pad RE010" 500-1500 kVA
United (Ky. AEC) (2,4)	"Pad-Mount" 15-75 kVA	

- (1) 7.2/12.5 and 7.6/13.2 kV
- (2) 7.2/12.5, 7.6/13.2 and 14.4/24.9 kV
- (3) 7.2/12.5 and 7.6/13.2 kV (conditional listing for 14.4/24.9 kV)
- (4) Dual voltage - same as for 14.4/24.9 kV, single phase
- (5) Three-phase listing applies to 7.2/12.5 and 7.6/13.2 kV only
- (6) 14.4/24.9 kV

U an - Transformers, distribution
pad-mounted, dead-front

(For underground application)

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Hevi-Duty</u> Three phase SBI-DF 750-2500 kVA 7.2/12.5 & 7.6/13.2 kV	970 7/1/71 1153 12/21/78	1. To obtain experience. 2. Test reports on 750 and 2000 kVA to be submitted as available.

Conditional List
U an(2)
July 1980

U an - Transformers, distribution, submersible

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Central Moloney</u> Type URD, 25-100 kVA	843 6/16/66	To obtain experience.
<u>General Electric</u> Type RST, 25-100 kVA	847 8/11/66	To obtain experience.
<u>Howard</u> 25-100 kVA	1139 5/18/78	To obtain experience
<u>Kuhlman</u> 25-100 kVA	901 9/12/68	To obtain experience.
<u>McGraw-Edison</u> 25-100 kVA	857 1/12/67	To obtain experience.
<u>RTE</u> "VaulTran Type H" 15-100 kVA	870 6/29/67	To obtain experience.
<u>Standard</u> Type L5-U, 10-100 kVA	1007 1/4/73	To obtain experience.
<u>Westinghouse</u> Type SPB, 25-100 kVA	843 6/16/66	To obtain experience.

U an - Transformers, Distribution,
Direct Burial*

(5-25 kVA only)

Conditions: To obtain experience.

<u>Manufacturer</u>	<u>Metallic Tank</u> (Cathodic protection required)	<u>Nonmetallic Tank</u> (Cathodic protection not used)
Central Moloney (Meeting 993, 6/8/72)	"Trenchmite" 15-25 kVA Radial Feed or Loop Feed (same end) only	-
Sargent-Tyee (Meeting 1016, 5/10/73)	-	"No-Korrod" 10-25 kVA

*Direct burial transformers are at an early stage in their development. Large numbers of direct burial transformers should not be purchased from any one manufacturer by any one borrower in any one year. Carefull location records should be kept.

U ax
January 1981

U ax - Cutout and Arrester, Combination
for Underground System Pole Risers

Nominal System Voltage	For 12.5Y/ 7.2 kV	For 13.2Y/ 7.6 kV	For 24.9Y/ 14.4 kV	
Cutout Maximum Voltage Rating	7.8 kV	15 kV	15 kV	27 kV
Application	1 ϕ Risers	3 ϕ Risers	1 ϕ and 3 ϕ Risers	1 ϕ and 3 ϕ Risers
Cutout Current Rating	100 amps	100 amps	100 amps	100 amps
<u>Manufacturer</u>	<u>Catalog Numbers</u>			
Chance	C70J-2B64 Series	C70J-2F54 Series	C70J-2F54 Series	C70J-2L74 Series
General Electric	9F80	9F80	9F80	
Joslyn	J9237-P2	J9237-P2/R	J9237-P2-R	J9267-D2
McGraw-Edison	AFS300B Series	AFS300C Series	AFS300C Series	AFS301D Series
Southern States	CA Series	CA Series	CA Series	CA Series

NOTE: The units listed on this page may be used with single arresters or arresters in parallel, but must be applied in accordance with paragraph VI.A. in REA Bulletin 61-3, "Underground Rural Distribution." Other arresters listed on pages ae-1 and ae-2 may be used for underground systems when applied in accordance with this bulletin.

Cutouts used on underground riser poles should be loadbreak type or have hooks for portable load interrupters.

Either normal duty or heavy duty distribution class arresters listed on page ae-1 are acceptable for use with these combination units.

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U hb - Cable Accessories

(When ordering specify conductor size, type, whether copper or aluminum and insulation diameter)

200 Ampere Continuous Current Rating

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>ITT Blackburn</u>		
15 kV, used with loadbreak connectors		To obtain experience.
Type LB2BA bushing plug		
Type ABOC insulating cap	1012 (3/15/73)	
Type JLB2BA bushing plug*		
25 kV, used with non-loadbreak connectors	1042 (5/30/74)	
Type LB2CA bushing plug	1110 (3/17/77)	
Type ABOCC insulating cap	1193(8/21/80)	
<u>Burndy</u>		
15 kV, used with loadbreak connectors	1019 6/21/73	To obtain experience.
Type LBP82 bushing plug		
Type LBPC82-11 insulating cap		
<u>Elastimold (ESNA)</u>		
15 kV, used with loadbreak connectors		To obtain experience.
Style 1601-CL cable lead	921 (6/26/69)	
Style 1602A3R feedthru insert*	1171	
Style 1601-A3R bushing plug*	9/6/79	
Style 160-DR insulating cap	924 (8/7/69)	
Style 1601CIBA3R	1174 (10/18/79)	
15 kV, used with non-loadbreak connectors	921	
Style 1501-A1 bushing plug	6/26/69	
Style 150-DP deadend plug	842	
Style 150-DR deadend receptacle	6/2/66	
25 kV, used with loadbreak connectors	964	
Style 2701-A1 bushing plug*	4/8/71	
25 kV, used with non-loadbreak connectors	921	
Style K-1501-A1 bushing plug	6/26/69	
Style K-150-DR deadend receptacle	945 (6/11/70)	
25 kV used with loadbreak connectors	1199	
Style 270-DR deadend receptacle	11/6/80	

*Note: Asterisk indicates single or three phase. Other bushing plugs for use with loadbreak connectors are single phase only.

U hb - Cable Accessories

(When ordering specify conductor size, type, whether
copper or aluminum and insulation diameter)

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>General Electric</u>		
15 kV, used with loadbreak connectors		To obtain experience
Switch module 9U02AAA001	930(10/30/69)	
Switch module 9U02AAB001*	1133(2/16/78)	
Basic connector module 9U05 Series	930(10/30/69)	
25 kV, used with loadbreak connector		
Switch module 9U02BAA001	1016(5/10/73)	
Switch module 9U02BAB001*	1133(2/16/78)	
Insulating cap 9U01BEB001	1016(5/10/73)	
 <u>RTE</u>		
15 kV, used with loadbreak connectors		To obtain experience
No. 2603711A12 protective cap	1033(1/17/74)	
No. 2604797B01 bushing well insert*	1126(11/3/77)	
No. 2625194A01 two-way bushing well insert*		
No. 2604231B01 bushing well plug		
25 kV, used with loadbreak connectors		
No. 2606591A02 protective cap	1033(1/17/74)	
No. 2604982B01M bushing well insert*	1148(9/28/78)	
No. 2604975B01M two-way bushing well insert*		
35 kV, used with loadbreak connectors		
No. 2606630A01 protective cap	1048(8/22/74)	

*NOTE: Asterisk indicates single or three phase. Other bushing plugs for use
with loadbreak connectors are single phase only.

U hb - Cable Accessories
(When ordering specify conductor size, type, whether
copper or aluminum and insulation diameter)

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Kearney</u> 25kV, used with loadbreak connectors No. 112500 bushing plug*	966 5/6/71	To obtain experience.

*NOTE: Asterisk indicates single or three phase. Other bushing plugs
for use of loadbreak connectors are single phase only.

Conditional List

U hb(2)
January 1981

U hb - Cable Accessories

(When ordering specify conductor size, type, whether
copper or aluminum and insulation diameter)

600 Ampere Continuous Current Rating

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Elastimold (ESNA)</u>		
15 kV, used with non-loadbreak connectors 600, 650 Series	1016 5/10/73	To obtain experience
25 kV, used with non-loadbreak connectors K600, K650 Series		
35 kV, used with non-loadbreak connectors 750LR Series	1064 5/1/75	
<u>RTE</u>		
15 kV, VBT Tee connector No. 2604360B Series	1126 11/3/77	To obtain experience.
15 kV, Protective cap No. 2625041A01		
<u>ITT Blackburn</u>		
15 kV, used with non-loadbreak connectors Types 6B and 65B	1131 1/19/78	To obtain experience
25 kV, used with non-loadbreak connectors Types 6C and 65C		
<u>Burndy</u>		
15 kV, used with non-loadbreak connectors PES86/PSS86	1197 10/9/80	To obtain experience
25 kV, used with non-loadbreak connectors PES86--S/PSS86--S		

January 1981

U he - Enclosures, Sectionalizing Equipment

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
	<u>7.2/12.5 kV</u>	
<u>McGraw-Edison</u> EH3A Series, single- phase, pad-mounted	1065 5/15/75	To obtain experience.
<u>Malton</u> MEF21	1108 2/17/77	To obtain experience.
<u>S & C</u> Mark III, Models PMS (with option G- 7) and PMC (with option G- 7) 200 ampere three-pole switching and 200 ampere single-pole switching	1112 4/14/77 1198 10/23/80 1202 12/18/80	To obtain experience.
<u>Westinghouse</u> UTE, PAD-PAK pad-mounted switching device, single and three-phase, 300 amp	1151 11/16/78	To obtain experience.
<u>Kearney</u> Fuse Pod, Cat. No. 1115 FP submersible fuse cover, 8.3 kV, 100 amp maximum	1184 4/10/80	To obtain experience
<u>G & W</u> PLDR, PFLDR (submersible and pad-mounted) single-phase and three-phase, fused or unfused switchgear. (Choice of deep well or deadbreak bushings) (must specify pentahead security bolt when ordering)	1200 11/20/80	To obtain experience

NOTE 1: Enclosures on this page must comply with the deadfront requirements of REA Spec. U-4.

NOTE 2: Single-pole switching of three-phase underground circuits may cause ferroresonance. Refer to REA Bulletin 61-3.

January 1981

U he - Enclosures, Sectionalizing Equipment

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
	<u>14.4/24.9 kV</u>	
<u>Elliott</u>		
Type EPMR, single- and three-phase, pad-mounted	1030 11/21/73	To obtain experience.
<u>Gerard</u>		
Mod-Brk 6-125 and 6-325 Series, single- and three-phase pad-mounted	1047 8/8/74	To obtain experience.
<u>Powercon</u>		
Type PMF, single-phase pad-mounted	998 8/17/72	To obtain experience.
Type PMF, three-phase pad-mounted		
<u>RTE</u>		
Type LBS, single- and three-phase, pad- mounted, 300 amp	1095 8/11/76	To obtain experience.
<u>S & C</u>		
Mark III, Model PMC (with option G-7) 200 ampere single-pole switching	1112(4/14/77) 1198(10/23/80) 1202(12/18/80)	To obtain experience.
<u>Inter-Alloys</u>		
Uni-Versal single- and three-phase pad-mount fusible switchgear and loadbreak switches Series UV-FL	1133 2/16/78	To obtain experience.
<u>Westinghouse</u>		
UTE, PAD-PAK pad-mounted switching device, single and three-phase, 200 amp	1151 11/16/78	To obtain experience.

NOTE 1: Enclosures on this page must comply with the dead-front requirements of REA Specification U-4.

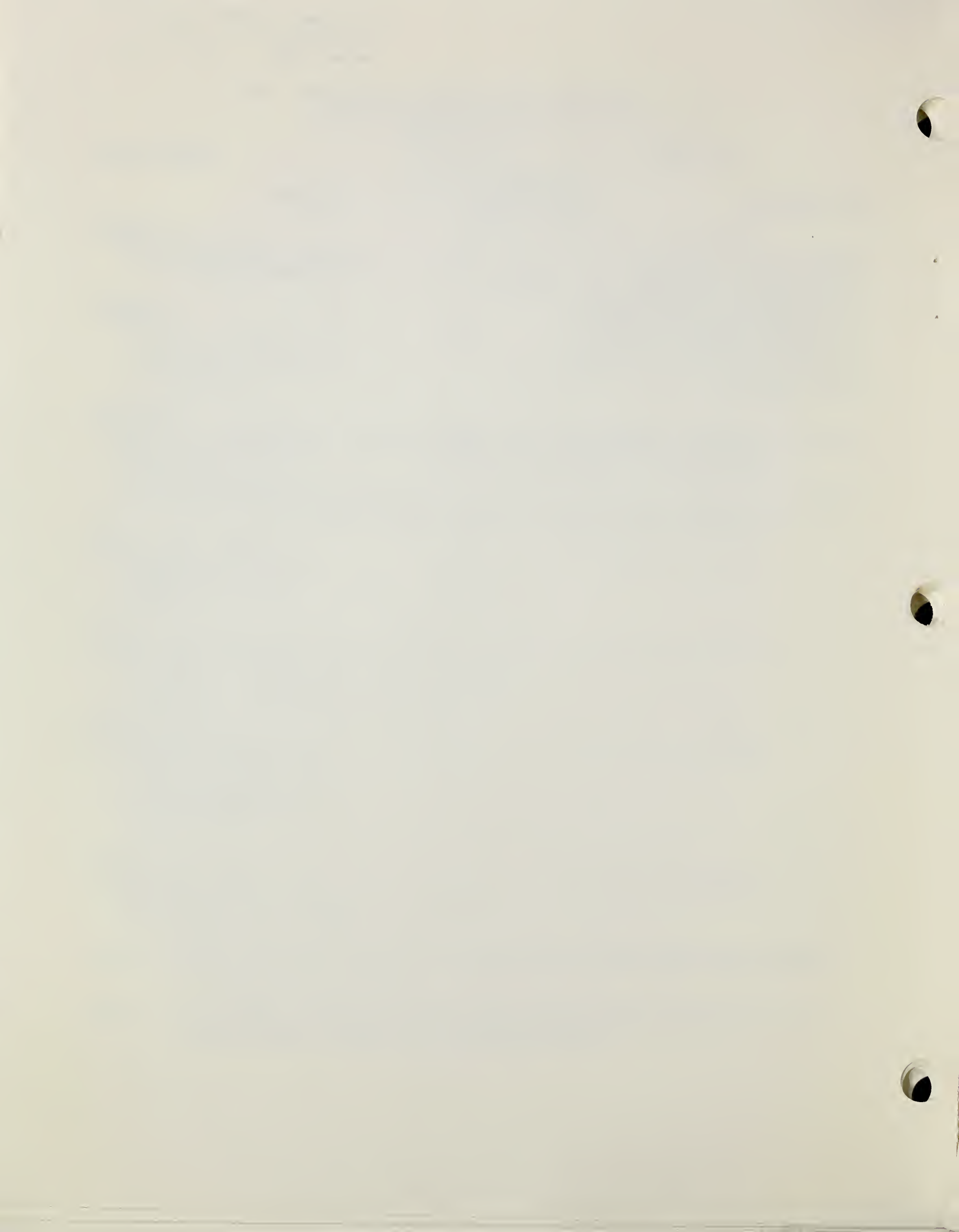
NOTE 2: Single-pole switching of three-phase underground circuits may cause ferroresonance. Refer to REA Bulletin 61-3.

U he - Enclosures, Sectionalizing Equipment

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>G & W</u> PLDR, PFLDR (submersible and pad-mounted) single-phase and three-phase, fused or unfused switchgear (Choice of deep well or deadbreak bushings) (must specify pentahead security bolt when ordering)	1200 11/20/80	To obtain experience

NOTE 1: Enclosures on this page must comply with the deadfront requirements of REA Specification U-4.

NOTE 2: Single-pole switching of three-phase underground circuits may cause ferroresonance. Refer to REA Bulletin 61-3.



U he - Enclosures, Sectionalizing Equipment
 (600 amp.)

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>S & C</u>		
Mark III, Model PMH (with option G-7) 15-25 kV, 600 amp., three-phase switching and 200 amp. single-pole switching	1112(4/14/77) 1198(10/23/80) 1202(12/18/80)	To obtain experience.
<u>General Electric</u>		
Series PSB (pad-mounted) and SSB (submersible) three-phase switching equipment, 200 or 600 amp., 15 or 27 kV	1022 8/2/73	To obtain experience.
<u>Trayer</u>		
800 Series, pad-mounted three phase vacuum switching equipment, 200 and 600 amps., 15-25 kV with or without fusing	1160 3/29/79	To obtain experience.
501 submerisble vacuum fuse enclosure, deadfront 200 or 600 amp., 15-25 kV	1160 3/29/79	
Type SSA (submersible, fused and unfused) 200 and 600 amp., 15-25 kV	1034 1/31/74	
<u>Chance</u>		
Type LVS (submersible and pad- mounted) single phase and three phase, vacuum switching equipment, fused or unfused, 200 or 600 amp., 15 kV	1074 9/25/75 1108 2/17/77 1202 12/18/80	To obtain experience.
<u>Electrical Equipment</u>		
Type PSI 15 kV, 25 kV 600 amp, three-phase switching, and 200 amp, single-phase switching. (when ordering add suffix B-3)	1196 9/18/80	To obtain experience

NOTE 1: Enclosures on this page must comply with the deadfront requirements of REA Specification U-4.

NOTE 2: Single-pole switching of three-phase underground circuits may cause ferroresonance. Refer to REA Bulletin 61-3.

Conditional List

U he(3.1)

July 1980

U he - Enclosures, Sectionalizing Equipment
(600 amp.)

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>RTE</u> Type LBS, single and three phase, pad-mounted 15 kV	1095 8/11/76	To obtain experience.
<u>ITT Blackburn</u> Type SG6 (submersible) three-phase switching equipment, 600 amp., 15 or 25 kV	1112 4/14/77	To obtain experience
<u>Kearney</u> Series QE, QEE, QEI (all with option D1) pad-mounted 15 kV, 600 amp three-phase switching and 200 amp single pole switching	1184 4/10/80	To obtain experience.
Series VE - pad-mounted, 15 kV and 25kV, single phase and three-phase vacuum switching, fused or unfused 200 or 600 amps	1184 4/10/80	To obtain experience.
Series VP - submersible, single phase and three- phase, vacuum switching, 200 or 600 amp, 15 and 25 kV, with or without VACOP remote operator	1184 4/10/80	To obtain experience.

NOTE 1. Enclosures on this page must comply with the deadfront requirements of REA Spec. U-4.

NOTE 2: Single-pole switching of three-phase underground circuits may cause ferroresonance. Refer to REA Bulletin 61-3.

U hq - Terminations, Multipoint

Use With Non-loadbreak Connectors
(When ordering specify conductor size, type, whether
copper or aluminum and insulation diameter)

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Elastimold (ESNA)</u>		
Style 150-T, T-Tap (15 kV)	873 7/27/67	To obtain experience
Style K-150-T, T-Tap (25 kV)	921 6/26/69	
271J2, 2-way bushing, 25 kV	1199	To obtain experience
271J3, 3-way bushing, 25 kV	11/6/80	
271J4, 4-way bushing, 25 kV		
<u>ITT Blackburn</u>		
J2CA (2, 3, 4-way) 25 kV	1110 3/17/77	To obtain experience
<u>RTE</u>		
VBJ-2, 2-way bushing, 15 kV, 2604670B01	1126 11/3/77	To obtain experience
VBJ-3, 3-way bushing, 15 kV, 2604670B02		
VBJ-4, 4-way bushing, 15 kV, 2604670B03		

U hr
October 1980

U hr - Secondary tap or splice cover, submersible

<u>Manufacturer</u>	<u>Type or Catalog No.</u>
Bishop	Splice-Wrap
Blackburn	Type DBS
Elastimold (ESNA)	Style 86
Homac	FSS Series
Kearney	Aqua-Seal Kit
3M	PST Series 8400
RTE	Aqua-Guard

Heat Shrink Tubing (with sealant throughout)

<u>Manufacturer</u>	<u>Type or Catalog No.</u>
AMP	Black heat-shrink tubing
Electrical Spec. Prod.	HSB
Panduit	Heat shrink Insulating Cover
Raychem	WCS cable sleeves
Sigmaform Corporation	Sigmaform heat-shrinkable products

U hv - Cable, Underground
15 kV Cable

Applicable Specification: REA Specification U-1
 Conductor : Copper or Aluminum
 #2 AWG through 1000 kcmil
 Insulation : High Molecular Weight (HMW) or cross-
 linked (XL) polyethylene
 Neutral : Copper Concentric Neutral

<u>Manufacturer</u>	<u>Insulation</u>	<u>Flat Strap Neutral Available</u>	<u>Stabilized Neutral Design*</u>
Alcoa	HMW or XL	Yes	Ridg-lok
Essex (Paranite)	XL	Yes	
Hendrix	HMW or XL	No	Neu-lok
Okonite	XL	Yes	
Phelps Dodge	XL	Yes	
Pirelli	HMW or XL	Yes	STA-SERVE
Reynolds	HMW or XL	Yes	Secure-Neutral
Rome	HMW or XL	Yes	Serve-Lock
Southwire	XL	No	
Triangle	XL	Yes	

*Accepted design meeting the requirements of 7.5.2 REA Specification U-1,
for a minimum neutral with a maximum lay.

U hv - Cable, Underground
25 kV Cable

Applicable Specification: REA Specification U-1
Conductor : Copper or Aluminum
 #2 AWG through 1000 kcmil
Insulation : High Molecular Weight (HMW) or cross-
 linked (XL) polyethylene
Neutral : Copper Concentric Neutral

<u>Manufacturer</u>	<u>Insulation</u>	<u>Flat Strap Neutral Available</u>	<u>Stabilized Neutral Design*</u>
Alcoa	HMW or XL	Yes	Ridg-Lok
Essex (Paranite)	XL	Yes	
Hendrix	HMW or XL	No	Neu-Lok
Okonite	XL	Yes	
Phelps Dodge	XL	Yes	
Pirelli	HMW or XL	Yes	STA-SERVE
Reynolds	HMW or XL	Yes	Secure-Neutral
Rome	HMW or XL	Yes	Serve-Lock
Southwire	XL	No	
Triangle	XL	Yes	

*Accepted design meeting the requirements of 7.5.2 REA Specification U-1,
for a minimum neutral with a maximum lay.

U hv - Cable, Underground
(15 or 25 kV cable)

TREE RETARDANT

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Reynolds</u>		
Reynotree HMW	1114(5/12/77)	To obtain experience
	1134(3/2/78)	
	1196(9/18/80)	
DFDA-6202 HMW	1151(11/16/78)	
	1196(9/18/80)	
<u>Rome Cable</u>		
Treban 100 HMW	1146(8/31/78)	To obtain experience
	1196(9/18/80)	
DFDA-6202 HMW	1155(1/18/79)	
	1196(9/18/80)	
<u>Hendrix</u>		
DFDA 6202 HMW	1151(11/16/78)	To obtain experience
	1198(10/23/80)	
<u>Alcoa</u>		
DFDA 6202 HMW	1148(9/28/78)	To obtain experience
	1198(10/23/80)	
<u>Pirelli</u>		
DFDA-6202 HMW	1152(12/7/78)	To obtain experience
	1202(12/18/80)	

U hw
July 1980

U hw - Warning sign

Applicable Specifications: REA Drawings UML2-1 and UML2-2

<u>Manufacturer</u>	<u>Size (inches)</u>	<u>Danger Sign Catalog No.</u>	<u>Caution Sign Catalog No.</u>
Brady*	7 x 10	46133	46043
	10 x 14	46131	46041
Dun-Lap*	7 x 10	DL-D710	DL-C710
	10 x 14	DL-D1014	DL-C1014
	14 x 20	DL-D1420	DL-C1420
	20 x 28	DL-D2028	DL-C2028
Eastern Metal*	7 x 10	REA 12-1-710	REA 12-2-710
	10 x 14	REA 12-1-1014	REA 12-2-1014
	14 x 20	REA 12-1-1420	REA 12-2-1420
	20 x 28	REA 12-1-2028	REA 12-2-2028
Lyle*	7 x 10	UM12-1-710	UM12-2-710
	10 x 14	UM12-1-1014	UM12-2-1014
	14 x 20	UM12-1-1420	UM12-2-1420
	20 x 28	UM12-1-2028	UM12-2-2028
May Advertising	7 x 10	MY710C	MY710B
	10 x 14	MY1014C	MY1014B
	14 x 20	MY1420C	MY1420B
	20 x 28	MY2028C	MY2028B
For pressure sensitive decal add "D" prefix to catalog number.			
Truck Sign Service*	7 x 10	TSD-710	TSC-710
	10 x 14	TSD-1014	TSC-1014
	14 x 20	TSD-1420	TSC-1420
	20 x 28	TSD-2028	TSC-2028

*Reflective signs also available.

The signs listed on this page are to be secured to equipment and transformer enclosures by means of an adhesive or by welding. Screws and rivets are not to be used.

U hy - Splice, Underground, Permanent

(When ordering specify conductor size, type, whether
copper or aluminum and insulation diameter)

600 Ampere Continuous Current Rating

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Elastimold (ESNA)</u>		
Style 650-S, straight splice (15 kV)	1016 5/10/73	To obtain experience.
Style 650-Y, Y-splice (15 kV)		
Style K650-S, straight splice (25 kV)		
Style K650-Y, Y-splice (25 kV)		
Style M650S, straight splice (35 kV)	1064 5/1/75	To obtain experience.
<u>RTE</u>		
15 kV - 2604904B Series straight splice (MPS-600)	1122 9/8/77	To obtain experience.
25 kV - 2604905B Series straight splice (MPS-600)		
<u>Joslyn</u>		
E7662 One-Man Splice (15 and 25 kV)	1111 3/31/77	To obtain experience.
<u>ITT Blackburn</u>		
15 kV - S65B straight splice	1131	To obtain experience.
25 kV - S65C straight splice	1/19/78	

Conditional List
U ja(1)
January 1981

U ja - Transformer Pad

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Carolina Dielectrics</u> Model 0502-1 Fiberglass Size: 40" x 44"	1000 9/14/72	To obtain experience.
<u>Chance</u> C107-0162 and C107-0171 Fiberglass Size: 40" x 44"	994 6/29/72	To obtain experience.
<u>Fiberglass Specialists</u> Molded polyethylene Size: approx. 41" x 41"	989 4/13/72	To obtain experience.
<u>Highline</u> HL-46B, Fiberglass Size: approx. 42" x 42"	989 4/13/72	To obtain experience.
<u>Plastic Structures</u> No. 40402012 Molded polyethylene Size: 40" x 40"	997 7/27/72	To obtain experience.
<u>Thermodynamics</u> Poly-Pad, PR Series* Molded polyethylene	998(8/17/72) & 1009(2/1/73)	To obtain experience.
<u>Carlton</u> Composolite - PH Series	1141 6/15/78	To obtain experience
<u>Cyclo</u> Dwg. No. 730126-2 Molded polyethylene Size: 42" x 42"	1147 9/14/78	To obtain experience
<u>Associated Plastics</u> API 4000 Series RPM	1191 7/24/80 1194 9/4/80	To obtain experience

*Order by catalog number and size.