

**LIST OF MATERIALS
Acceptable for Use on Systems
of USDA Rural Development
Electrification Borrowers**

**United States Department of Agriculture
Rural Development Utilities Programs
Electric Programs**

**Informational Publication 202-1
Quarterly Update – January 2011
(October 1, 2010 – December 31, 2010)**

DISCLAIMER

*Every effort has been made to ensure the accuracy of this document.
However, in case of discrepancies, records of Technical Standards
Committee "A" are the authoritative source.*

Revision Summary

1. Page d-1
 - a. ADDED Allied Bolt, Inc. 11003 and 11557
2. Page j-1
 - a. ADDED Allied Bolt, Inc.
3. Page af-1
 - a. ADDED Cooper L(polymer) 15kV, 27kV
4. Page an-1.2
 - a. ADDED Moloney Electric, Inc.
5. Page av(4)
 - a. REMOVED Condition 4. "If applicable, indicate type of steel core wire and class of coating."
6. Page aw-1
 - a. ADDED Allied Bolt 7013 and 7014
7. Page cg-1
 - a. ADDED Royal Switchgear AVT 15-230kV and SBF 15-46kV.
8. Pages rp(1) and rp(1.1)
 - a. ADDED Preformed Line Products RPC-0800 RAPTOR PROTECTOR™
 - b. MOVED Tripp (Eco Electrical Systems, Inc.), Tyco Electronics, Universal Thermography, Inc., and W. H. Salisbury & Co. listing to new page rp(1.1).
9. Page sb-2
 - a. ADDED Siemens Energy, Inc. Type LER 15kV and 25kV.
10. Page sb(1)
 - a. REVISED the manufacturer name from AMP to Tyco Electronics
 - b. REVISED AMPACT to AMPACT (ILD-II)
11. Page Ufz-1
 - a. ADDED Polaris PSMTLSC

d - Washers, Flat

Flat Rolled Steel

Size, inches:	2-1/4 x 2-1/4	3 x 3	4 x 4	4 x 4	1-3/8 round	1-3/4 round
Thickness, in.:	3/16	1/4	3/16	1/2	12 gauge	10 gauge
Hole Diam., in.:	13/16	13/16	13/16	13/16	9/16	11/16
Allied Bolt, Inc.	11550	11551	11557	-	104	1103
C & C Spacer	4	-	-	-	-	-
FWC	FW1076	-	FW1080	-	FW1086	FW1088
Hubbell (Chance)	6814	6817	6818	6819-1/2	6803	6805
Hughes	SW2-1/4-70-3/16	SW3-70	SW4-70	SW4-70(1/2)	RW1-3/8-50	-
Joslyn	J1076	J1079	J1080	-	J1086	J1088
Kortick	K1553	K1555	K1557	K1559-1/2	K1524	K1525
Line Hardware	SWF-225B	SWF-300B	SWF-400A	-	-	-
MacLean (Continental)	U5485	U5487A	U5488	U5490A	U5478	U5479
Wrought Washer	011206	-	-	-	-	-

Flat Cast

Size, inches:	3 x 3
Thickness, in.:	1/4
Hole Diam., in.:	13/16

Hubbell (Chance) (N)	BB214
Joslyn (Flagg) (N)	P56A

Spurred - 3" Round, 3/16" Thick, 13/16" Hole

MacLean (Continental)	TCSF-30-6
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- (A) Aluminum Alloy
- (M) Malleable Iron
- (N) Nodular Iron

j – Screw, lag

Applicable Specifications: ANSI C135.3 “Standard for Zinc Coated Ferrous Lag Screws”

Applicable Sizes: 1/2 inch diameter, 4 inch length
 1/2 inch diameter, 5 inch length
 5/8 inch diameter, 4 inch length
 5/8 inch diameter, 5 inch length

The following manufacturers have shown compliance with the applicable specifications for lag screws:

Allied Bolt, Inc.
Hubbell (Chance)
Joslyn Manufacturing Company
Kortick Manufacturing Company
MacLean (Continental)

af – Cutouts, Distribution, Open

Manufacturer	Type	Voltage Rating
ABB	ICX	15, 27 kV
	LBU-II	15, 27 kV
Cooper Power Systems	S1	15, 27 kV
	L (porcelain)	15, 27 kV
	L (polymer)	15, 27 kV
Hubbell (Chance)	C	15, 27, 35 kV
	C (loadbreak)	15, 27, 35 kV
	C-Polymer	15 kV
	C-Polymer (Loadbreak)	15 kV
Kearney/Cooper Power Systems	HX	15, 27 kV
Power Line Hardware	DHC	15, 27 kV
	SIL (polymer)	15, 27 kV
S & C Electric	XS-Polymer	15, 27 kV
Southern States	Series 66	15, 27 kV
	Series 70	15 kV
United Copper Industries	APD1516100110	15 kV
	APD2712100125	27 kV

NOTE: The buyer should specify the load rating, voltage rating, interrupting rating and required accessories. Cutouts used on underground riser poles should be loadbreak type or have hooks for portable load interrupters.

af - Cutout, open-link fuse support

Manufacturer	Mounting	12.5/7.2 kV	24.9/14.4 kV
		50 amp.	50 amp.
Cooper Power Systems	Crossarm	FT1A2	FT1A4
	Bushing	FT10A3	-
Kearney/Cooper Power Systems	Crossarm	6484-55	-
	Bushing	6483-59	-

NOTE: The open link fuse supports listed above are fuse supports only and have no inherent interrupting capacity. They should be used with fuse links capable of interrupting at least 1200 amperes and for transformer protection only.

an - Transformers, distribution, pole type
Primary Voltages 7.2/12.5, 7.62/13.2 and 14.4/24.9 kV

	7.2/12.5 & 7.62/13.2	14.4/24.9	Dual Voltage
<u>ERMCO¹</u>			
Conventional, single bushing	CONV	CONV	CONV
Conventional, two bushing	CONV	CONV	CONV
Self-protected, single bushing	CSP	CSP	CSP

The single bushing transformer may also be obtained with double gap and internal fuse (Type DG) or lightning arrester and external cutout (Type COLA).

Dead-front for use in enclosure: Add "R" (Radial) or "LF" (Loop feed) to designation

Howard Industries

Conventional, single bushing	REC-C	REC-C	REC-C
Conventional, two bushing	Conv-2B	Conv-2B	Conv-2B
Self-protected, single bushing	REC-P	REC-P	REC-P

Kuhlman

Conventional, single bushing	I	I	I
Conventional, two bushing	B	B	B
Self-protected, single bushing	H	H	H

Type I may also be purchased with internal fuse, with internal fuse and double gap (Type G), and with bushing mounted cutout and lightning arrester (Type J).

Moloney Electric, Inc.

Conventional, single bushing	CONV	CONV	CONV
Conventional, two bushing	CONV	CONV	CONV
Self-protected, single bushing	CSP	CSP	CSP

Note:

1. Available with optional covers insulated for 15 kV dielectric strength at additional cost. (Transformer covers with higher electrical insulation, together with other coordinated electrical insulating protective measures, should help to significantly lessen shock and electrocution hazards to raptors, other birds, and small mammals.)

av – Conductor, High Temperature

Preferred Conductor Sizes
(equivalent in diameter to the following ACSR conductors)*

Transmission Lines

- 336.4 kcmil - 26/7
- 477 kcmil - 26/7
- 556.5 kcmil - 26/7
- 795 kcmil - 26/7
- 954 kcmil - 54/7
- 1272 kcmil - 54/19

<u>Manufacturer</u>	<u>Conditions</u>
<u>3M</u> ACCR – Aluminum Conductor Composite Reinforced	1. To obtain experience. 2. Conductor handling and installation shall be in accordance with the manufacturer's recommendations. 3. Use high temperature accessories approved by the manufacturer and accepted by RUS.
<u>CTC Cable Corporation</u> ACCC – Aluminum conductor Composite Core	
<u>General Cable</u> ACSS – Aluminum Conductor Steel Support	
<u>Viakon</u> ACSS - Aluminum Conductor Steel Support	

NOTES:

1. Larger sizes may be used where the engineer's study shows they are required.
2. Conductor diameter should be within 10% of ACSR equivalent diameter size.

aw - Washer, spring

Clip
1/4" x 1-3/4" x 3-1/2"

Manufacturer	Bolt Size		
	5/8"	3/4"	7/8"
Allied Bolt, Inc.	7013	7014	-
Hubbell (Chance)	3540	3541	-
Joslyn	J3540	J3541	J3542
Kortick	K2909	-	-
Line Hardware	SCW-58	SCW-34	SCW-78

Double Coil Lock

Manufacturer	Bolt Size			
	5/8"	3/4"	7/8"	1"
Electrical Materials Company	#MW 5/8"	#MW 3/4" #MW3/4EXT	#MW 7/8"	#MW 1"

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

Manufacturer	Acceptable Mounting on Structures	Tilting Ins.		Vertical Break		Side Break		Center Break		Double Break	
		Type	kV	Type	kV	Type	kV	Type	kV	Type	kV
ABB	Horizontal			TTR6	345						
	Horizontal			TTR8	15-230						
G & W Electric Co.	Horizontal			MK-40	15-69	PMB-40A	15-69	LPC	69-230		
Hubbell (Chance)	Horizontal			D6(L)	15-34.5						
	Phase over Phase			D6(L)	15-34.5						
	Vertical			D6(L)	15-34.5						
Johnson	Horizontal			VIP	15-230	LS	15-69	M	15-230		
Joslyn (Hi-Voltage)	Horizontal			RF-2(VL)	15-230	RB-1(VL)	15-25				
	Horizontal					RB-1*	15-115				
Kearney/Cooper Power Systems	Horizontal	AR 60-P	15-69								
MEMCO	Horizontal	AgF	15-69	EA	15-345			EE	69-230		
	Horizontal	AgC	15-69			RI4-C	15-46				
MORPAC (Morgan)	Horizontal			VBV (VL)	15-230			CBV	15-230		
	Vertical			VBV (VL)	15-230			CBV	15-230		
	Phase over Phase							CBV	15-25		
Royal Switchgear	Horizontal			AVT	15-230	SBF	15-46	V	15-230		
	Phase over Phase							V	15-23		

(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: 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.

rp - Wildlife Guards
Bushings and Live Parts Covers

<u>Manufacturer</u>	<u>Conditions</u>
<u>Chris Kaye (Critter Guard)</u> 201 - "L" Bracket 202 – Roller 203 - Wheel	To obtain experience.
<u>Hendrix Wire & Cable</u> BG-9 Bushing Cover	To obtain experience.
<u>Hendrix (Eco Electrical Systems, Inc.)</u> EICG-1 Insulator/Conductor Cover EICG-1-WLPT Insulator/Conductor Cover EICG-1-20 Insulator/Conductor Cover EICG-1-32 Insulator/Conductor Cover	To obtain experience.
<u>Kaddas Enterprises Inc.</u> KE1045A* Birdguard KE1066* Arrester cap KE1077* Bushing cover KE1053* Arrester cap KE1064* Bushing cover KE 1049* Birdguard	To obtain experience.
<u>Preformed Line Products</u> RPC-0800 RAPTOR PROTECTOR™	To obtain experience.

NOTE: The material composition of these items does not contain a flame-retardant unless specified by the manufacturer.

*Specified by manufacturer as being flame-retardant

rp - Wildlife Guards
Bushings and Live Parts Covers

<u>Manufacturer</u>	<u>Conditions</u>
<u>Tripp (Eco Electrical Systems, Inc.)</u>	
ECC-1 Cutout Cover	
ECC-2-27-150BIL-S&C-Version 10 Cutout Cover	To obtain experience.
ECC-3-27-150BIL-S&C-Version 9 Cutout Cover	
ECC-4-27-125BIL-S&C-Kearney HX Cutout Cover	
ECC-5-ABB-LBU Cutout Cover	
<u>Tyco Electronics</u>	
BCAC Bushing Connection Animal Covers	To obtain experience.
BCIC Bus Connection Insulating Covers	
BISG Bus Insulator Squirrel Guard	
MVLC Medium Voltage Line Cover (5-25kV)	
<u>Universal Thermography, Inc.</u>	
TGB-50007 Bushing Cover	To obtain experience.
TGB-65010 Bushing Cover	
TGB-82512 Bushing Cover	
<u>W. H. Salisbury & Co.</u>	
21116 Bushing Cover	To obtain experience.
21317 Tri-Port Bushing Cover	
BC512 Cone Bushing Cover	
38-2SC Stinger Cover 3/8" IDx2'	
38-12SC Stinger Cover 3/8" IDx12'	
38-18SC Stinger Cover 3/8" IDx18'	
38-50SC Stinger Cover 3/8" IDx50'	
38-100SC Stinger Cover 3/8" IDx100'	
58-12SC Stinger Cover 5/8" IDx12'	
58-50SC Stinger Cover 5/8" IDx50'	
58-100SC Stinger Cover 5/8" IDx100'	
34-12SC Stinger Cover 3/4" IDx12'	
34-25SC Stinger Cover 3/4" IDx25'	

NOTE: The material composition of these items does not contain a flame-retardant unless specified by the manufacturer.

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>
Cooper Power Systems	D2(PL)	15 and 25 kV	12.5, 13.2, 24.9 kV
G & W Electric Company	EV(PL)	15 kV	12.5 kV
Hubbell (Chance)	M3(PL)	15 and 27 kV	12.5 thru 24.9 kV
Kearney/Cooper Power Systems	D-73(PL)	15 and 25 kV	12.5, 13.2, 24.9 kV
Morgan	DHS(PL)	15 and 23 kV	12.5, 13.2, 24.9 kV
Royal Switchgear	BLT-F(PL)	15 and 23 kV	12.5, 13.2, 24.9 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
Siemens Energy, Inc.	LER (L)(PL)	15 and 25 kV	12.5 thru 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.

**Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators through 34.5 kV on request.

sb - Switch, hookstick
(line tension switches)

for use on 12.5/7.2 kV systems only

<u>Manufacturer</u>	<u>Conditions</u>
<u>Tyco Electronics</u> <u>AMPACT (ILD-II)</u>	To obtain experience.
<u>Bridges</u> 127	To obtain experience.
<u>Hubbell (Chance)</u> ALTD06200R	To obtain experience.
<u>Royal Switchgear</u> IL6B-H (available with silicone polymer insulators as catalog number IL6NP)	To obtain experience.

NOTE: All switches listed on this page have hooks for portable load interrupters.

U fz - Transformer Connector Block, Insulated
Multiple Cable Connectors

Watertight - For use in all locations

Manufacturer	Connection Type	Catalog Number
Blackburn	Lug	SCU, with lugs and sleeves
Burndy	Lug	Stud Mole with sealing sleeve
Utilco	Set Screw	PTF-SS, Watertight insulated transformer connector block

Non-Watertight - For use in above grade locations only

Alcoa	Lug	Interchange 1 ABBD Series (Disconnectable) Use with A9 insulating boots
Alcon	Set Screw	VBTT Series with double sealing sleeve
Blackburn	Set Screw	TSB-J58C (Permanent)
	Set Screw	TSB-D58C (Disconnectable)
Burndy	Set Screw	K-D Series (Disconnectable) K-DF Series (Permanent)
Carr Industries, Inc.	Set Screw	UB Series
Connector Mfg. Co.	Set Screw	Uni-Joint Bar Connectors, (Series RLS, NSM-C, NDS-C, NSC, ZS-C, ZSU-C, RLUS) (Permanent)
	Set Screw	Uni-Joint Bar Connectors, (Series RLSS, NSSM-C, NSSC, ZQC, ZQU-C, RLUS) (Disconnectable)
ESP	Lug	Types SUR and RDSR(Removable) (With Types LA and AL-lugs and Sleeve kits)
	Set Screw	Type UPSO-I (Permanent) Type UPM-I (Disconnectable)
Homac	Lug	DF Series
	Lug	FTU 125 Series(Disconnectable) with flood seal sleeve kit
	Set Screw	ABD, ABK, ABS, ABW, CLRTR, CSW, CSS, LRT, RAU, EZC, Z series; ZBK with SB covers; ZVW with boot
Hubbell (Fargo)	Bolted	GUC Series
	Set Screw	GUS-460S Series
MacLean (Reliable)	Set Screw	15912-REA (Disconnectable)
Penn Union	Lug	Type DBAT (Permanent)
	Lug	Type DBAT-LH (Disconnectable) Use with Series DBTB, DBTBF and DBTH lug and Sleeves kits
Polaris	Set Screw	PLTZ-CC, PSMTLCC, PSMTLSC
Preformed	Set Screw	SC-C series (Permanent)
	Set Screw	CSC-Q-C Series, SC-Q-C series (Disconnectable)
Utilco	Set Screw	PTF-IN (Permanent)
	Set Screw	PTF-CJNU, PSS Series (Disconnectable)
Vector Connectors Corp.	Set Screw	TQL Series (Disconnectable) (with insulating boot)

Note: Additional insulation may be required with some of the above-listed secondary terminal blocks due to the irregularity of mating surfaces between various secondary studs being supplied by the transformer manufacturers.