p - Connectors, distribution (Parallel Groove)

Applicable Specification: ANSI C119.4

ACSR to ACSR
To same size or smaller

Bare Conductor

	4/0 - 2/0	1/0	2	4
Alcoa	-	396.6	490.0	490.0
Blackburn	PAE 4141-9	PAE 2121-9	PAE 2121-9	PAE 2121-9
Burndy	KVS28A	UCG25R	UC25R2R	UC25R2R
Connector Mfg.	APC-2/0	APC-2/0	APC-1/0	APC-1/0
Hubbell (Anderson)	LC-53A	LC-51C	LC-51A	LC-51A
Hubbell (Fargo)	GA-9040L	GA-9020L	GA-9002L	GA-9003L
MacLean (Reliable)	APG-3	APG-2	APG-1	APG-1
Penn-Union	PCAA-20BF	PCAA-15BF	PCAA-10BF	PCAA-10BF
Tyco (AMP)	1710521-5	1710521-3	1710521-1	1710521-1

Over Armor Rods

	3/0	2/0	1/0	2	4
Blackburn	-	-	PAA10	PAA10	PAA10
Burndy	-	-	UC32R	UC32R	UC32R
Hubbell (Anderson)	LC-83A	LC-52C	LC-52C	LC-52C	LC-52C
Hubbell (Fargo)	GA-9843	GA-9842	GA-9041L	GA-9020L	GA-9020L
MacLean (Reliable)	-	-	744AL	600AL	600AL
Penn-Union	-	-	ARC-12	ARC-11	ARC-14

av - Conductor, ACSR

Applicable Specification: ASTM Specification B 232

Preferred Sizes:

Distribution	Transmission
4 - 6/1	1/0 - 6/1
4 - 7/1	2/0 - 6/1
2 - 6/1	3/0 - 6/1
2 - 7/1	4/0 - 6/1
1/0 - 6/1	266.8 kcmil - 26/7
2/0 - 6/1	336.4 kcmil - 26/7
3/0 - 6/1	477 kcmil - 26/7
4/0 - 6/1	556.5 kcmil - 26/7
266.8 kcmil 18/1	795 kcmil - 26/7
336.4 kcmil 18/1	954 kcmil - 54/7
477 kcmil 18/1	

NOTE: Larger sizes may be used where the engineer's study shows they are required.

The following manufacturers have shown compliance with the applicable specifications:

Alcan Cable
Conductores Monterrey S.A. de C.V.
Condumex
General Cable
Kobrex S.A. de C.V.
Midal Cables Ltd.
Nehring
Nexans Canada
Nexans Korea
Noranda
Phelps Dodge
Phelps Dodge - Honduras
Prysmian
Southwire
Taihan Electric Wire

NOTES

1. Conductors with 18/1 stranding have different sag characteristics than conductors with 6/1 or 26/7 stranding. This difference in sag characteristics must be taken into consideration in the line design.

2. 266.8 kcmil 26/7, 336.4 kcmil 26/7, and 477 kcmil 26/7 may be used for distribution underbuild on transmission lines.

av - Conductor, Service Cable
(Triplex and Quadruplex)

Manufacturer	Aluminum	Copper
Alcan Cable	x	-
Conductores Monterrey	x	-
Condumex	x	x
General Cable	x	x
Hendrix	x	x
Nehring	x	-
Nexans Canada	x	-
Phelps Dodge	x	x
Phelps Dodge (Honduras)	x	-
Prysmian	x	x
Rome Cable	x	x
Service Wire	-	x
Southwire	x	x

Applicable Specifications: RUS Specification D-2, Specifications for 600 Volt Neutral-Supported Secondary Service Drop Cables.

av - Conductor, Aluminum Alloy

Applicable Specification: ASTM Specification B399

Preferred Sizes:

DISTRIBUTION		TRANSMISSION	
6201	ACSR Equiv.	6201	ACSR Equiv.
48,690 cmil - 7 str.*	4	123,300 cmil - 7 str.**	1/0
77,470 cmil - 7 str.*	2	155,400 cmil - 7 str.**	2/0
123,300 cmil - 7 str.	1/0	195,700 cmil - 7 str.**	3/0
155,400 cmil - 7 str.	2/0	246,900 cmil - 7 str.	4/0
195,700 cmil - 7 str.	3/0	312,800 cmil - 19 str.	266,800 cmil
246,900 cmil - 7 str.	4/0	394,500 cmil - 19 str.	336,400 cmil
		559,500 cmil - 19 str.	477,000 cmil
		652,400 cmil - 19 str.	556,500 cmil
		927,200 cmil - 37 str.	795,000 cmil

*Not recommended for multiphase lines with span lengths exceeding 300 ft.

**Not recommended for suspension type construction.

The following manufacturers have shown compliance with the applicable specifications:

Manufacturer	Type
Alcan	6201
General Cable	6201
Midal Cables Ltd.	6201
Phelps Dodge	6201
Southwire	6201

Conditional List
av(1)
October 2008

av - conductor

Manufacturer	Conditions
Alcan Cable	
Duplex type, with ACSR or AAAC (6201) conductors using preferred conductor sizes.	1. To obtain experience. 2. Conductor handling and installation shall be in accordance with manufacturer's recommendations.
Copperweld Southern	
Alumoweld-aluminum 6/1 ACSR/AW, 2, 1/0, 2/0, 4/0 4/3 AWAC, 4, 2, 1/0	1. To obtain experience.
General Cable	
T-2 type, with ACSR or AAAC (6201) conductors using preferred conductor sizes.	1. To obtain experience. 2. Conductor handling and installation shall be in accordance with manufacturer's recommendations.
ACSR/TW, ACSS or ACSS/TW conductors using preferred conductor sizes.	1. To obtain experience. 2. Conductor handling and installation shall be in accordance with manufacturer's recommendations. 3. Indicate type of steel core wire and class (if applicable) of coating.
Nexans Canada	
ACSR-II (T-2) type, with ACSR conductors using preferred conductor sizes	1. To obtain experience. 2. Conductor handling and installation shall be in accordance with manufacturer’s recommendations.
Phelps Dodge	
T-2 type, with ACSR or AAAC (6201) conductors using preferred conductor sizes.	1. To obtain experience. 2. Conductor handling and installation shall be in accordance with manufacturer's recommendations.
ACSR/TW, ACSS or ACSS/TW conductors using preferred conductor sizes.	1. To obtain experience. 2. Conductor handling and installation shall be in accordance with manufacturer's recommendations. 3. Indicate type of steel core wire and class (if applicable) of coating.
Southwire	
VR type, with ACSR or AAAC (6201) conductors using preferred conductor sizes.	1. To obtain experience. 2. Conductor handling and installation shall be in accordance with manufacturer's recommendations.

be - Recloser, vacuum interrupter

Manufacturer	Conditions
Lexington Switch Single phase, type EV627 rated 400 amp continuous, 6000 amp interrupting, maximum voltage 27 kV for 24.9/14.4 kV	To obtain experience.
Single phase, type EV815 rated 400 amp continuous, 8000 amp continuous, maximum voltage 15.5 kV for 12.9/14.4 kV	To obtain experience.
S&C Electric Single phase, TripSaver (cutout mounting), rated 100 amp continuous, 4000 amp interrupting, maximum voltage 15.5 kV for 12.9/14.4 kV and 27 kV for 24.9/14.4 kV	To obtain experience.
Whipp & Bourne Three-phase, Type GVR, SF6 insulation with vacuum interruption, 560 amps maximum continuous, 12000 amps RMS symmetrical interruption for 15.5 kV and 27 kV, 8000 amps RMS symmetrical for 38 kV. 15.5 kV maximum voltage for 12.5/7.2 kV, 27 kV maximum voltage for 24.9/14.4 kV, 38 kV maximum voltage for 34.5/19.9 kV.	To obtain experience.

NOTES:

1. Series trip reclosers with ratings greater than 100 amp for 12.5/7.2 kV application, greater than 200 amp for 24.9/14.4 kV application, and 280 amp for 34.5/19.9 kV application are acceptable only with ground trip device. Shunt trip reclosers without ground trip devices may not be used with trip settings higher than 200 amp for 12.5/7.2 kV application, greater than 400 amp for 24.9/14.4 kV application, and 560 amp for 34.5/19.9 kV application.

2. Reclosers are not acceptable with load current, bushing CT battery chargers.

cj - Pole Ground Wire

Soft annealed iron, BB Grade, class C galvanizing
(For pole protection only)

Manufacturer	Size 1.15 Ohms/1000 ft., max.
Florida Wire and Cable	3-wire, 5/16 inch
Indiana Steel and Wire	3-wire, 5/16 inch
National Strand Products	3-wire, 5/16 inch
Southwire	3-wire, 5/16 inch

Copper, soft annealed solid
ASTM Specification B3

Manufacturer
(See page av-2)

Aluminum (for above ground use only)
Hard-drawn

Manufacturer
(See page av-1)

Aluminum Alloy (for above ground use only)

Manufacturer	Type
Alcan Cable	6201
American Electrical	6201
Southwire	6201

Copper-Clad Steel, Annealed 40 percent Conductivity

Manufacturer	Size
CommScope BiMetals*	No. 6
Copperweld Southern*	No. 6

* Not for use on distribution when neutral is larger than #1/0 ACSR.

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

(See av-2 for copper grounding conductor)

Manufacturer	Conditions
CommScope BiMetals 40% conductivity copper-clad steel (dead soft annealed) in sizes: 1/2" (7 No. 6 AWG) 9/16" (7 No. 5 AWG) 5/8" (7 No. 4 AWG) 13/16" (19 No. 6 AWG) 7/8" (19 No. 5 AWG)	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.
Copperweld Steel 40% conductivity DSA Copperweld Strand in sizes: 1/2" (7 No. 6 AWG) 9/16" (7 No. 5 AWG) 5/8" (7 No. 4 AWG) 13/16" (19 No. 6 AWG) 7/8" (19 No. 5 AWG)	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.
Indiana Steel & Wire Steel Strand, BB Grade, Class C galvanized 5/8" (19 wire) 1/2" (7 wire) 9/16" (7 wire) 7/16" (7 wire)	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.

Conditional List
U ae(1)
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U ae - Arresters, Surge

(Shielded for Underground System Pad-Mounted Equipment)

CONDITION OF ACCEPTANCE: To Obtain Experience

ELBOW ARRESTERS

Manufacturer	Type	Ratings, kV	Type	Interface
Cooper Power Systems	M.O.V.E.	9/10	MOV	15 kV
	M.O.V.E.	18	MOV	25 kV
	VariGAP	9/10	(1)	15 kV
	VariGAP	18	(1)	25 kV
	Posi-Break M.O.V.E.	3-21	MOV	25 kV
	VariGAP Posi-Break M.O.V.E.	9-15	MOV	25 kV
Elastimold ESNA	167 ESA-10	10	MOV	15 kV
	273 ESA-18	18	MOV	25 kV
Hubbell	PDE	9,10	MOV	15kV
	PDE	18	MOV	25kV
Joslyn	ZE	10	MOV	15 kV
		18	MOV	25 kV

PARKING STAND ARRESTERS

Manufacturer	Type	Ratings, kV	Type	Interface
Cooper Power Systems		9/10	MOV	15 kV
		18	MOV	25 kV
	VariGAP	9/10	(1)	15 kV
	VariGAP	18	(1)	25 kV
Elastimold ESNA	167 PSA-10	10	MOV	15 kV
	273 PSA-18	18	MOV	25 kV

BUSHING ARRESTERS

Manufacturer	Type	Ratings, kV	Type	Interface
Elastimold ESNA	167 BSA-10	10	MOV	15 kV
	273 BSA-18	18	MOV	25 kV

(1) MOV Type (Internally Gapped)

U gu - Pedestal, Power
(Above-Grade)
Refer to Construction Drawing UK5

Applicable Specifications: "RUS Specifications for Secondary Power Pedestals," U-6

Manufacturer	Inside Dimensions Inches	Height Inches	Catalog No.
API	6X6	32	API 6X6
	9X10	25-1/2	API 9 X 10
	10X11	34	API 10 X 11
	10X11	12-1/4	API 10 X FM
	10X11	72	API 10X11XL
	10X14	22-1/2	API 10 X 14
	10X14	26-1/2	API 10 X 14 WB
	16X28	38	API 16X28
	13 Dia.	25	API 176
Coil Sales			
(Charles Industries)	8.25 Dia	31-1/2	CPLP-8
	8.25 Dia	31-1/2	CPLP-8I(Integral Stake)
	10.75 Dia	31-1/2	CPLP-10
	10.75 Dia	31-1/2	CPLP-10I(Integral Stake)
Electrimold	14.5 x 19.5	31.5	EFSO-111630
Highline Products	14 X 9	31	FSP140931AA
	15.5 X 15.5	30	FSP151530AA
	15.5 X 15.5	36	FSP151536AA
	14 X 9	36	FSP140936AA
	9 X 9	31	FSP090931AA
MacLean (Reliable)	8 x 8	38	UP 8HLP
	8 x 8	46	UP 8HP
	10-1/2 x 10-1/2	26	UP 10HLP
	16-1/2 x 10-1/2	36	UP 1016HLP
	10-1/2 x 10-1/2	42	UP 10HP
Nordic	8 x 8	44	PR-50, PR-55
	9 x 14	30	PR-149 (stake)
			PR-150 (stakeless)
	9 x 14	30	PRMC 150 (low profile)
	9 x 14	24	PRMC-160
	9 x 14	30	PRMC-170 (high profile)
	9 x 14	36	PRMC-190
	9 X 13	30	PSP-91330
	10 X 15	38	PSPF-101538
	15 X 15	30	PSP-151530
	21 X 21	15	PHH-212115
	16 X 19	12	PHH-161912
PenCell	11X14	37	AG-15
	13X17	30.5	AG-18

U gu - Power Pedestal
(Below-Grade)
Refer to Drawings UK6

Applicable Specifications: "RUS Specifications for Secondary Power Pedestals," U-6

Manufacturer	Catalog No.
Hubbell (Fargo)	HDPE, B-100R Series ABS, B-200R Series HL51
Malton	Fiberglass secondary pedestal FSP31139, FSP301515
PenCell	PE Series-High Density Polythylene (HDPE) base;lid available in HDPE, fiberglass, aluminum, or stainless steel; PEM Series with modular construction, DT Series – heavy duty HDPE for vehicular traffic
Quazite	Power Pedestal – PV, Boxes - PX/PE Series, PR/LR Series, PC, PG, LG Series
Synertech Moulded Products	S1212, S1118, S1324, S1730, S2436, S3048 and S3660
Thermodynamics	PP91, PP92, PP94, PP96, PP97, PP98, PP03, PPV91, TEVC132415ASY, TEVC121612ASY, and TEVC122016ASY series

U hv - Cable, Underground
15 kV and 25 kV Cable

Applicable Specification:	RUS Specification U-1
Conductor (15 kV):	Copper or Aluminum - #2 AWG through 1000 kcmil
Conductor (25 kV):	Copper or Aluminum - #1 AWG through 1000 kcmil
Insulation:	Crosslinked Polyethylene (XLP) (a) indicates Union Carbide 4201 XLP (b) indicates BP 521 XLP Tree-retardant Crosslinked Polyethylene (XLP-TR) (1) indicates Union Carbide 4202 XLP-TR (2) indicates BP H119Y XLP-TR (3) indicates BP H118Y XLP-TR Ethylene Propylene Rubber (EPR)
Neutral:	Copper Concentric Neutral
Jacket:	High Molecular Weight Polyethylene

Manufacturer	Insulation(s)	Flat Strap Neutral Available
Conductores Monterrey, S.A. de C.V.	XLP (a), XLP-TR (1), EPR	No
Condumex	XLP (a), XLP-TR (1), EPR	No
General Cable	XLP (a,b), XLP-TR (1,3), EPR	Yes
Hendrix	XLP (a), XLP-TR (1, 2, 3), EPR	No
Hubbell (Kerite)	EPR	Yes
Nexans Canada	XLP (a), XLP-TR (1), EPR	No
Nexans Italia	EPR	No
Okonite	XLP (a), XLP-TR (1), EPR	Yes
Phelps Dodge	XLP (a,b), XLP-TR (1,3), EPR	Yes
Prysmian	XLP (a), XLP-TR (1), EPR	Yes
Rome	XLP (a), XLP-TR (1), EPR	Yes
Southwire	XLP (a), XLP-TR (1), EPR	No
Synergy Cables	XLP-TR (1)	No

U hv - Cable, Underground

600 Volt Cable

Applicable Specification: RUS Specification U-2
Conductor: Copper, #4 AWG and larger; Aluminum, #2 AWG and larger
Insulation: Cross-Linked polyethylene (XLPE)

Manufacturer	Type Conductor
Alcan	Aluminum
Conductorres Monterrey, S.A. de C.V.	Copper or Aluminum
Condumex	Copper or Aluminum
Essex	Copper
General Cable	Copper or Aluminum
Nexans Canada	Aluminum
Okonite	Copper or Aluminum
Phelps Dodge	Copper or Aluminum
Prysmian	Copper or Aluminum
Rome Cable	Copper or Aluminum
Service Wire Company	Copper
Southwire	Copper or Aluminum

NOTE: The manufacturers shown above have indicated that their 600 volt cable is suitable for use on 480 volt corner grounded delta circuits.

The above cable may be supplied with UL label for Type USE.

U hv - Cable, Underground

600 Volt Multi-Conductor Cable

Applicable Specification: RUS Specification U-2
Conductor: Copper, #4 AWG and larger; Aluminum, #2 AWG and larger

Insulation: Cross-Linked polyethylene (XLPE)
Cable Configuration: 3 Insulated Conductors Triplexed

Manufacturer	Type Conductor
Alcan	Aluminum
Conductores Monterrey, S.A. de C.V.	Copper or Aluminum
Condumex	Copper or Aluminum
General Cable	Copper or Aluminum
Nexans Canada	Aluminum
Okonite	Copper or Aluminum
Phelps Dodge	Copper or Aluminum
Prysmian	Copper or Aluminum
Rome Cable	Copper or Aluminum
Southwire	Copper or Aluminum

The above cable may be supplied with UL label for Type USE.

U hv - Cable, Underground
15 kV and 25 kV Cable

(Alternative Insulation Compound)

Applicable Specification:	RUS Specification U-1
Conductor (15 kV):	Copper or Aluminum - #2 AWG through 1000 kcmil
Conductor (25 kV):	Copper or Aluminum - #1 AWG through 1000 kcmil
Insulation:	Tree-retardant Crosslinked Polyethylene (XLP-TR) (I) indicates Pirelli IE.7100 XLP-TR (II) indicates AT Plastic PowerGuard 320TR (III) indicates Union Carbide HFDB-4202 (IV) indicates Nova Borealis LE 4212 (V) indicates Dow HFDB 8202
Neutral:	Copper Concentric Neutral
Jacket:	High Molecular Weight Polyethylene
Conditions:	To obtain experience

Manufacturer	Insulation(s)	Flat Strap Neutral Available
General Cable	XLP-TR (II, III, IV, V)	Yes
Hendrix	XLP-TR (III, IV)	No
Nexans Canada	XLP-TR (II, III, IV)	No
Phelps Dodge	XLP-TR (II, III, IV, V)	Yes
Prysmian	XLP-TR (I, IV)	Yes
Southwire	XLP-TR (III, IV)	No

U hv - Cable, Underground

600 Volt Cable

(Alternative Cable Constructions)

Applicable Specification: RUS Specification U-2 (except as indicated below)

NOTE: Manufacturers listed below are conditionally accepted for alternatives A, B, C, D and/or E for the products listed on pages U hv-2 and U hv-3.

Alternative A: 8000 series aluminum alloy in accordance with ASTM B800 or B801.

Alternative B: Stranding in accordance with ASTM B786 for aluminum 1350 conductors or ASTM B787 for copper conductors.

Alternative C: Abuse resistant (ruggedized) (single or two layer) insulation in accordance with ICEA S-81-570.

Alternative D: Self-healing

Alternative E: Stranding in accordance with ASTM B 901 for Compressed Round Stranded Aluminum Conductors Using Single Input Wire Construction

Condition: To obtain experience.

Manufacturer	Alternative
Alcan	(A) (C) (E)
Conductores Monterrey, S.A. de C.V.	(C)
General Cable	(A) (C)
Phelps Dodge	(A) (C)
Prysmian	(A) (C) (D)
Nexans	(C)
Southwire	(A) (B) (C) (D) (E)