Carolprene® Jacketed Type SOOW

90°C, 600 Volt, UL/CSA Portable Cord

NOW WITH TRU-Mark® Footage Marking System PRECISION

Product Construction:

Conductors:
- 18 through 2 AWG fully annealed stranded bare copper

Insulation:
- Premium-grade, color-coded 90°C EPDM
- Color code: See chart below

Jacket:
- Carolprene®, black
- Temperature range: -40°C to +90°C

Jacket Marking:
- CAROL (SIZE) (mm²) 90°C (UL) WATER RESISTANT SOOW CSA (-40°C) FT2 P-7K-123033 MSHA 600 VOLT ROHS MADE IN USA (TRU-MARK SEQUENTIAL FOOTAGE)

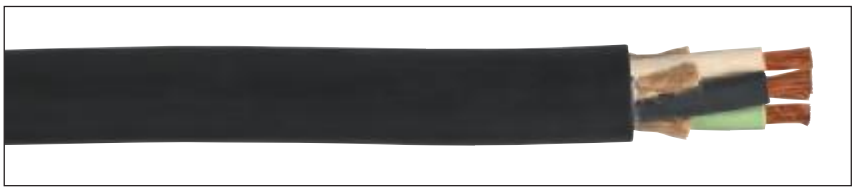
Applications:
- Portable tools and equipment
- Portable appliances
- Small motors and associated machinery

Features:
- Excellent resistance to oil and moisture
- Good tensile strength, elongation and aging characteristics
- High flexibility
- Excellent abrasion resistance
- Water-resistant*
- UL Listed and CSA Certified for indoor and outdoor use
- Ozone-, sunlight (UV)- and weather-resistant
- TRU-Mark® sequential footage marking

Industry Approvals:
- UL Flexible Cord - UL 62
- CSA Flexible Cord - C22.2-49
- MSHA Approved
- RoHS Compliant

Packaging:
- 250' (76.2 m), 500' (152.4 m), 1000' (304.8 m)
- Other put-ups available on special order

* Suitable for immersion in water if properly sealed and terminated.



TYPE SOOW – 600 VOLT – UL/CSA

CATALOG NUMBER	NO. OF COND.	AWG SIZE	COND. STRAND	NOMINAL INS. THICKNESS		NOMINAL O.D.		CURRENT AMPS†	APPROX. NET WT. LBS/M[(S)]	STD. CTN.
				INCHES	mm	INCHES	mm			
02763	2	18	16/30	0.030	0.76	0.345	8.76	10	65	250'
02769	3	18	16/30	0.030	0.76	0.365	9.27	10	80	250'
02770	4	18	16/30	0.030	0.76	0.390	9.91	7	94	250'
02722	2	16	26/30	0.030	0.76	0.370	9.40	13	77	250'
02765	3	16	26/30	0.030	0.76	0.390	9.91	13	94	250'
02766	4	16	26/30	0.030	0.76	0.420	10.67	10	114	250'
02723	2	14	41/30	0.045	1.14	0.510	12.95	18	154	250'
02762	3	14	41/30	0.045	1.14	0.535	13.59	18	171	250'
02768	4	14	41/30	0.045	1.14	0.575	14.61	15	209	250'
02724	2	12	65/30	0.045	1.14	0.570	14.48	25	168	250'
02725	3	12	65/30	0.045	1.14	0.595	15.11	25	223	250'
02726	4	12	65/30	0.045	1.14	0.650	16.51	20	276	250'
02767	2	10	104/30	0.045	1.14	0.620	15.75	30	230	250'
02728	3	10	104/30	0.045	1.14	0.660	16.76	30	289	250'
02727	4	10	104/30	0.045	1.14	0.715	18.16	25	351	250'
16063	3	8	133/29	0.060	1.52	0.840	21.33	40	450	250'
16064	4	8	133/29	0.060	1.52	0.945	24.00	35	580	250'
16065	5	8	133/29	0.060	1.52	1.030	26.16	28	700	250'
16073	3	6	133/27	0.060	1.52	0.980	24.89	55	637	250'
16074	4	6	133/27	0.060	1.52	1.080	27.43	45	830	250'
16075	5	6	133/27	0.060	1.52	1.200	30.48	36	1015	250'
16083	3	4	133/25	0.060	1.52	1.140	28.96	70	926	250'
16084	4	4	133/25	0.060	1.52	1.260	32.00	60	1145	250'
16085	5	4	133/25	0.060	1.52	1.365	34.67	48	1419	250'
16093	3	2	133/23	0.060	1.52	1.330	33.78	95	1367	250'
16094	4	2	133/23	0.060	1.52	1.460	37.08	80	1699	250'
16095*	5	2	133/23	0.060	1.52	1.580	40.13	64	2066	250'

Cord furnished with UL and CSA labels.
* Non-stock item; minimum quantity purchase required.
† Green conductor for grounding only. Ampacities based on NEC Table 400.5(A)(1).
(S) Actual shipping weight may vary.

COLOR CODE CHART

NO. OF CONDUCTORS	COLOR
2	Black, White
3	Black, White, Green
4	Black, White, Red, Green
5	Black, White, Red, Green, Orange

General Cable

RoHS Compliant Directive 2002/95/EC

MSHA Mine Safety and Health Administration

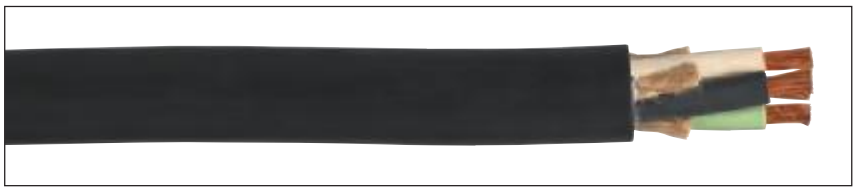
Certified Canadian Standard Association

UL LISTED

CAROL BRAND

Carolprene® Jacketed Type SJOOW

90°C, 300 Volt, UL/CSA Portable Cord



TYPE SJOOW – 300 VOLT – UL/CSA

CATALOG NUMBER	NO. OF COND.	AWG SIZE	COND. STRAND	NOMINAL INS. THICKNESS		NOMINAL O.D.		CURRENT AMPS†	APPROX. NET WT. LBS/M[(S)]	STD. CTN.
				INCHES	mm	INCHES	mm			
01310	2	18	16/30	0.030	0.76	0.285	7.24	10	46	1000'
01311	3	18	16/30	0.030	0.76	0.305	7.75	10	60	1000'
01344	4	18	16/30	0.030	0.76	0.330	8.38	7	72	250'
01312	2	16	26/30	0.030	0.76	0.310	7.87	13	56	1000'
01342	3	16	26/30	0.030	0.76	0.330	8.38	13	72	250'
01343	4	16	26/30	0.030	0.76	0.365	9.27	10	89	250'
01358	2	14	41/30	0.030	0.76	0.340	8.64	18	75	250'
01360	3	14	41/30	0.030	0.76	0.370	9.40	18	100	250'
01364	4	14	41/30	0.030	0.76	0.410	10.41	15	128	250'
01379	2	12	65/30	0.030	0.76	0.410	10.41	25	108	250'
01380	3	12	65/30	0.030	0.76	0.430	10.92	25	136	250'
01381	4	12	65/30	0.030	0.76	0.475	12.07	20	177	250'
01382*	2	10	104/30	0.045	1.14	0.560	14.22	30	190	250'
01383	3	10	104/30	0.045	1.14	0.580	14.73	30	236	250'
01384	4	10	104/30	0.045	1.14	0.655	16.64	25	296	250'

Cord furnished with UL and CSA labels.
* Non-stock item; minimum quantity purchase required.
† Green conductor for grounding only. Ampacities based on NEC Table 400.5(A)(1).
(S) Actual shipping weight may vary.

Product Construction:

Conductors:
- 18 through 10 AWG fully annealed stranded bare copper

Insulation:
- Premium-grade, color-coded 90°C EPDM
- Color code: See chart below

Jacket:
- Carolprene®, black
- Temperature range: -40°C to +90°C

Jacket Marking:
- CAROL (SIZE) (mm²) 90°C (UL) WATER RESISTANT SJOOW CSA (-40°C) FT2 P-7K-123033 MSHA 300 VOLT ROHS MADE IN USA (TRU-MARK SEQUENTIAL FOOTAGE)

Applications:
- Portable tools and equipment
- Portable appliances
- Small motors and associated machinery

Features:
- Excellent resistance to oil and moisture
- Good tensile strength, elongation and aging characteristics
- High flexibility
- Excellent abrasion resistance
- Water-resistant*
- UL Listed and CSA Certified for indoor and outdoor use
- Ozone-, sunlight (UV)- and weather-resistant
- TRU-Mark® sequential footage marking

Industry Approvals:
- UL Flexible Cord - UL 62
- CSA Flexible Cord - C22.2-49
- MSHA Approved
- RoHS Compliant

Packaging:
- 250' (76.2 m), 500' (152.4 m), 1000' (304.8 m)
- Other put-ups available on special order

*Suitable for immersion in water if properly sealed and terminated.

COLOR CODE CHART

NO. OF CONDUCTORS	COLOR
2	Black, White
3	Black, White, Green
4	Black, White, Red, Green

Carolprene® Jacketed Type SOOW

90°C, 600 Volt, Non-UL Portable Cord

Product Construction:

Conductors:
- 8 through 2 AWG fully annealed stranded bare copper

Insulation:
- Premium-grade, color-coded 90°C EPDM
- Color code: See chart below

Jacket:
- Carolprene®, black
- Temperature range: -40°C to +90°C

Jacket Marking:
- CAROL (SIZE) TYPE SOOW 90°C P-7K-123033 MSHA 600 VOLT ROHS MADE IN USA

Applications:
- Portable tools and equipment
- Temporary and portable power
- Motors and associated machinery

Features:
- Excellent resistance to oil and moisture
- Good tensile strength, elongation and aging characteristics
- High flexibility
- Excellent abrasion resistance
- Ozone-, sunlight (UV)- and weather-resistant

Industry Approvals:
- MSHA Approved
- RoHS Compliant

Packaging:
- 250' (76.2 m), 500' (152.4 m), 1000' (304.8 m)
- Other put-ups available on special order

TYPE SOOW, NON-UL – 600 VOLT

CATALOG NUMBER	NO. OF COND.	AWG SIZE	COND. STRAND	NOMINAL INS. THICKNESS		NOMINAL O.D.		CURRENT AMPS†	APPROX. NET WT. LBS/M'(S)	STD. CTN.
				INCHES	mm	INCHES	mm			
01811*	2	8	65/26	0.050	1.27	0.660	16.76	40	278	250'
01812	3	8	65/26	0.050	1.27	0.695	17.65	40	343	250'
01827	4	8	65/26	0.050	1.27	0.760	19.30	35	442	250'
98267	5	8	65/26	0.050	1.27	0.840	21.34	28	542	250'
01825	3	6	101/26	0.050	1.27	0.790	20.07	55	482	250'
01824	4	6	101/26	0.050	1.27	0.865	21.97	45	599	250'
98270	5	6	101/26	0.050	1.27	0.945	24.00	36	750	250'
01823*	2	4	119/25	0.050	1.27	0.870	22.09	70	515	250'
01822	3	4	119/25	0.050	1.27	0.925	23.49	70	683	250'
01821	4	4	119/25	0.050	1.27	1.015	25.78	60	851	250'
98463	5	4	119/25	0.050	1.27	1.115	28.32	48	1039	250'
01819	3	2	133/.0211	0.055	1.40	1.085	27.56	95	1003	250'
01818	4	2	133/.0211	0.055	1.40	1.170	29.72	80	1248	250'
98187	5	2	133/.0211	0.055	1.40	1.390	35.31	64	1684	250'

* Non-stock item; minimum quantity purchase required.
† Green conductor for grounding only. Ampacities based on NEC Table 400.5(A)(1).
(S) Actual shipping weight may vary.

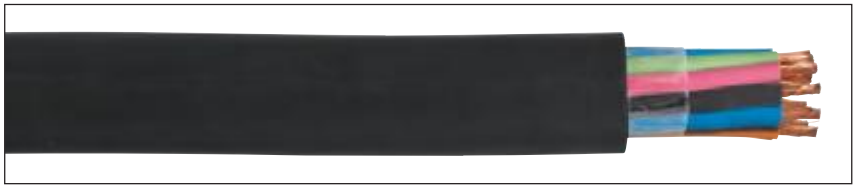
COLOR CODE CHART

NO. OF CONDUCTORS	COLOR
2	Black, White
3	Black, White, Green
4	Black, White, Red, Green
5	Black, White, Red, Green, Orange

Super Vu-Tron® Multi-Conductor Type SOOW

90°C, 600 Volt, UL/CSA Portable Cord

NOW WITH TRU-Mark® Footage Marking System PRECISION



TYPE S00W – 600 VOLT – UL/CSA

CATALOG NUMBER	NO. OF COND.	AWG SIZE	COND. STRAND	NOMINAL INS. THICKNESS		NOMINAL O.D.		CURRENT AMPS†	APPROX. NET WT. LBS/M[(S)]
				INCHES	mm	INCHES	mm		
09805	5	18	16/30	0.030	0.76	0.465	11.81	5.6	141
09806	6	18	16/30	0.030	0.76	0.495	12.57	5.6	152
09807	7	18	16/30	0.030	0.76	0.520	13.21	5.6	172
09808	8	18	16/30	0.030	0.76	0.530	13.46	4.9	177
09810	10	18	16/30	0.030	0.76	0.595	15.11	4.9	225
09812	12	18	16/30	0.030	0.76	0.600	15.24	3.5	240
09814	14	18	16/30	0.030	0.76	0.630	16.00	3.5	265
09816	16	18	16/30	0.030	0.76	0.700	17.78	3.5	310
09818*	18	18	16/30	0.030	0.76	0.760	19.30	3.5	345
09820	20	18	16/30	0.030	0.76	0.795	20.19	3.5	382
09822*	22	18	16/30	0.030	0.76	0.805	20.45	3.1	400
09824	24	18	16/30	0.030	0.76	0.850	21.59	3.1	451
09827*	27	18	16/30	0.030	0.76	0.865	21.97	3.1	475
09830*	30	18	16/30	0.030	0.76	0.915	23.24	3.1	533
09605	5	16	26/30	0.030	0.76	0.495	12.57	8.0	167
09606	6	16	26/30	0.030	0.76	0.520	13.21	8.0	182
09607	7	16	26/30	0.030	0.76	0.540	13.72	8.0	194
09608	8	16	26/30	0.030	0.76	0.575	14.61	7.0	218
09609	9	16	26/30	0.030	0.76	0.600	15.24	7.0	243
09610	10	16	26/30	0.030	0.76	0.620	15.75	5.0	255
09612	12	16	26/30	0.030	0.76	0.660	16.76	5.0	296
09614	14	16	26/30	0.030	0.76	0.730	18.54	5.0	352
09616	16	16	26/30	0.030	0.76	0.740	18.80	5.0	383
09618*	18	16	26/30	0.030	0.76	0.770	19.56	5.0	417
09620	20	16	26/30	0.030	0.76	0.810	20.57	5.0	457
09622*	22	16	26/30	0.030	0.76	0.900	22.86	4.5	510
09624	24	16	26/30	0.030	0.76	0.925	23.50	4.5	563
09626*	26	16	26/30	0.030	0.76	0.965	24.51	4.5	611
09630	30	16	26/30	0.030	0.76	1.010	25.65	4.5	767

† Values shown are for current-carrying conductors. A grounding conductor, or one which carries only the unbalance current from other conductors, is NOT counted in determining current-carrying capacity. Ampacities based on NEC Table 400.5(A)(1).

* Non-stock item; minimum quantity purchase required.

(S) Actual shipping weight may vary.

COLOR CODE CHART

NO. OF COND.	COLOR	TRACER	NO. OF COND.	COLOR	TRACER	NO. OF COND.	COLOR	TRACER
1	Black	–	**8**	Red	Black	**15**	Blue	White
2	White	–	**9**	Green	Black	**16**	Black	Red
3	Red	–	**10**	Orange	Black	**17**	White	Red
4	Green	–	**11**	Blue	Black	**18**	Orange	Red
5	Orange	–	**12**	Black	White	**19**	Blue	Red
6	Blue	–	**13**	Red	White	**20**	Red	Green
7	White	Black	**14**	Green	White	**21**	Orange	Green

Note: Colors repeat after 21 conductors.

Product Construction:

Conductors:
- 18 and 16 AWG fully annealed stranded bare copper

Insulation:
- Premium-grade, color-coded 90°C EPDM
- Color code: See chart below

Jacket:
- Super Vu-Tron® 90°C, black
- Temperature range: -40°C to +90°C

Jacket Marking:
- CAROL SUPER VU-TRON® (SIZE) (mm²) 90°C (UL) WATER RESISTANT SOOW CSA (-40°C) FT2 P-7K-123033 MSHA 600 VOLT ROHS MADE IN USA (TRU-MARK SEQUENTIAL FOOTAGE)

Applications:
- Control circuits
- Tools
- Heavy industrial, processing and construction equipment

Features:
- Extra-flexible stranding
- Abrasion-resistant
- Resists oils and solvents
- Flame-resistant
- Ozone-resistant
- 90°C rated conductors and jacket
- Water-resistant*
- UL Listed and CSA Certified for indoor and outdoor use
- Ozone-, sunlight (UV)- and weather-resistant
- TRU-Mark® sequential footage marking

Industry Approvals:
- UL Flexible Cord - UL 62
- CSA Flexible Cord - C22.2-49
- MSHA Approved
- RoHS Compliant

Packaging:
- 5- through 8-conductor available on 250' (76.2 m), 500' (152.4 m), and 1000' (304.8 m) reels
- 9+ cond. available on long-length reels
- Other put-ups available on special order

* Suitable for immersion in water if properly sealed and terminated.

CAROL BRAND

UL LISTED

CSA Certified Canadian Standard Association

MSHA Mine Safety and Health Administration

RoHS Compliant Directive 2002/95/EC

General Cable

Super Vu-Tron® Multi-Conductor Type SOOW

90°C, 600 Volt, UL/CSA Portable Cord

Product Construction:

Conductors:
- 14 through 10 AWG fully annealed stranded bare copper

Insulation:
- Premium-grade, color-coded 90°C EPDM
- Color code: See chart below

Jacket:
- Super Vu-Tron® 90°C, black
- Temperature range: -40°C to +90°C

Jacket Marking:
- CAROL SUPER VU-TRON® (SIZE) (mm^2) 90°C (UL) WATER RESISTANT SOOW CSA (-40°C) FT2 P-7K-123033 MSHA 600 VOLT ROHS MADE IN USA

Applications:
- Control circuits
- Tools
- Heavy industrial, processing and construction equipment

Features:
- Extra-flexible stranding
- Abrasion-resistant
- Resists oils and solvents
- Flame-resistant
- Ozone-resistant
- 90°C rated conductors and jacket
- Water-resistant*
- UL Listed and CSA Certified for indoor and outdoor use
- Ozone-, sunlight (UV)- and weather-resistant

Industry Approvals:
- UL Flexible Cord - UL 62
- CSA Flexible Cord - C22.2-49
- MSHA Approved
- RoHS Compliant

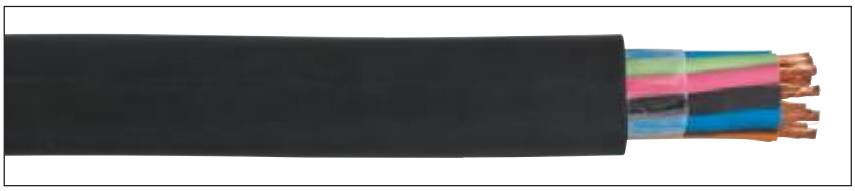
Packaging:
- 5- through 8-conductor available on 250' (76.2 m), 500' (152.4 m), and 1000' (304.8 m) reels
- 9+ cond. available on long-length reels
- Other put-ups available on special order

*Suitable for immersion in water if properly sealed and terminated.

COLOR CODE CHART

NO. OF COND.	COLOR	TRACER	NO. OF COND.	COLOR	TRACER
1	Black	–	12	Black	White
2	White	–	13	Red	White
3	Red	–	14	Green	White
4	Green	–	15	Blue	White
5	Orange	–	16	Black	Red
6	Blue	–	17	White	Red
7	White	Black	18	Orange	Red
8	Red	Black	19	Blue	Red
9	Green	Black	20	Red	Green
10	Orange	Black	21	Orange	Green
11	Blue	Black			

Note: Colors repeat after 21 conductors. Refer to page 37 for color diagram.



TYPE S00W – 600 VOLT – UL/CSA

CATALOG NUMBER	NO. OF COND.	AWG SIZE	COND. STRAND	NOMINAL INS. THICKNESS		NOMINAL O.D.		CURRENT AMPS†	APPROX. NET WT. LBS/M'(S)
				INCHES	mm	INCHES	mm		
09405	5	14	41/30	0.045	1.14	0.645	16.26	12.0	269
09406	6	14	41/30	0.045	1.14	0.710	18.03	12.0	317
09407	7	14	41/30	0.045	1.14	0.755	19.18	12.0	347
09408	8	14	41/30	0.045	1.14	0.810	20.57	10.5	430
09409*	9	14	41/30	0.045	1.14	0.860	21.84	10.5	417
09410	10	14	41/30	0.045	1.14	0.875	22.23	10.5	427
09412	12	14	41/30	0.045	1.14	0.900	22.86	7.5	493
09414	14	14	41/30	0.045	1.14	1.000	25.40	7.5	601
09416	16	14	41/30	0.045	1.14	1.030	26.16	7.5	678
09418*	18	14	41/30	0.045	1.14	1.100	27.94	7.5	720
09420	20	14	41/30	0.045	1.14	1.155	29.34	7.5	806
09424	24	14	41/30	0.045	1.14	1.260	32.00	6.7	1003
09428*	28	14	41/30	0.045	1.14	1.330	33.78	6.7	1080
09430*	30	14	41/30	0.045	1.14	1.335	33.97	6.0	1153
09205	5	12	65/30	0.045	1.14	0.715	18.16	16.0	333
09206	6	12	65/30	0.045	1.14	0.740	18.80	16.0	412
09207	7	12	65/30	0.045	1.14	0.790	20.07	16.0	465
09208	8	12	65/30	0.045	1.14	0.825	20.96	14.0	526
09209	9	12	65/30	0.045	1.14	0.900	22.86	14.0	517
09210	10	12	65/30	0.045	1.14	1.000	25.40	14.0	649
09212	12	12	65/30	0.045	1.14	1.010	25.65	10.0	669
09214	14	12	65/30	0.045	1.14	1.020	25.91	10.0	731
09216	16	12	65/30	0.045	1.14	1.135	28.83	10.0	933
09218*	18	12	65/30	0.045	1.14	1.175	29.85	10.0	920
09220	20	12	65/30	0.045	1.14	1.175	29.84	10.0	989
09224	24	12	65/30	0.045	1.14	1.360	34.54	9.0	1273
09226	26	12	65/30	0.045	1.14	1.380	35.05	9.0	1324
09227*	27	12	65/30	0.045	1.14	1.390	35.30	9.0	1325
09228*	28	12	65/30	0.045	1.14	1.455	36.95	9.0	1355
09230	30	12	65/30	0.045	1.14	1.455	36.96	9.0	1492
09005	5	10	104/30	0.045	1.14	0.770	19.56	20.0	472
09006	6	10	104/30	0.045	1.14	0.875	22.23	20.0	565
09007	7	10	104/30	0.045	1.14	0.900	22.86	20.0	552
09008*	8	10	104/30	0.045	1.14	0.935	23.75	17.5	682
09010	10	10	104/30	0.045	1.14	1.020	25.91	17.5	758
09012	12	10	104/30	0.045	1.14	1.070	27.18	12.5	871
09016*	16	10	104/30	0.045	1.14	1.230	31.24	12.5	1147
09020*	20	10	104/30	0.045	1.14	1.325	33.66	12.5	1445

† Values shown are for current-carrying conductors. A grounding conductor, or one which carries only the unbalance current from other conductors, is NOT counted in determining current-carrying capacity. Ampacities based on NEC Table 400.5(A)(1).

* Non-stock item; minimum quantity purchase required.

(S) Actual shipping weight may vary.

General Cable

RoHS Compliant Directive 2002/95/EC

MSHA Mine Safety and Health Administration

Certified Canadian Standard Association

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Technical Information 4

As mining cable applications have evolved, the process of specifying mining cables to meet these requirements has become more time consuming and complex.

Today's mine supervisors and engineers must be aware of not only the type of power distribution utilized but also the physical, environmental and electrical capabilities of each type of cable being specified. With this in mind, General Cable offers the most complete line of cables to serve the mining industry.

This technical section is presented to aid in the selection of the appropriate mining cable that best suits the application for which it is used.

For technical issues and questions, please contact your local General Cable distributor or our customer service department.

Installation and Engineering Information

Proper Splices

While it is true that no splice is as good as a new cable, the use of quality materials and proven techniques can dramatically improve the service life of the cable splice. A well-made splice has the following characteristics:

1. High tensile strength — the splice cannot be easily pulled in two
2. Balanced conductors — equal tension on each conductor
3. Small outside diameter — the splice can be passed easily through existing cable guides
4. Low electrical resistance
5. Adequate insulation
6. High resistance to fatigue
7. A covering that is capable of keeping moisture from entering the cable interior

Shielding

Remember that an ungrounded shield is dangerous and should be treated as an energized conductor. The shield must be grounded at least at one end and preferably at two or more locations. It is recommended that shields be grounded at all cable terminations and splices. Stress cones should be installed at all high-voltage shield terminations.

Working Tension

The maximum working tension per conductor should not exceed 10 percent of the rated conductor strength. To determine the approximate tensile strength of the cable, multiply the total power conductor area (in^2) by 30,000 psi.

Bending Radius

Industry standard guidelines vary slightly regarding recommended bending radii for flexible cables. The table below shows the recommended bending radii of flexible mining cables from both ICEA and CSA:

	ICEA S-75-381	CSA 22.2 96
Braid-shielded portable cables ≤ 5000 V	6 times the cable diameter	8 times the cable diameter
Braid-shielded portable cables > 5000 V	8 times the cable diameter	8 times the cable diameter
Non-shielded portable cables	6 times the cable diameter	6 times the cable diameter
Flat non-shielded cables	6 times the minor dimension	6 times the cable diameter

The ICEA and CSA agree that the recommended bend radius of copper tape shielded mine power feeder cables is 12 times the cable diameter.

AMPACITY CORRECTION FACTORS APPROXIMATE FOR ALL CABLE VOLTAGES

Correction factors are listed below for various ambient temperatures.

AMBIENT TEMPERATURE	CORRECTION FACTORS FOR INSULATIONS RATED AT:
°C	90°C
10	1.26
20	1.18
30	1.10
40	1.00
50	0.90

When cables are used with one or more layers wound on a reel, the ampacities should be derated as follows:

NUMBER OF LAYERS	MULTIPLY AMPACITIES BY
1	0.85
2	0.65
3	0.45
4	0.35

VOLTAGE DROP

Approximate for all cable voltages — three conductor cables

90°C			
60-CYCLE PHASE-TO-PHASE VOLTAGE DROP PER AMPERE PER 1,000 FT AT POWER FACTORS OF:			
CONDUCTOR SIZE (AWG or kcmil)	80%	90%	100%
6	0.82	0.90	0.95
4	0.54	0.58	0.60
2	0.35	0.38	0.38
1	0.29	0.31	0.30
1/0	0.24	0.25	0.24
2/0	0.20	0.20	0.19
3/0	0.16	0.17	0.15
4/0	0.14	0.14	0.12
250	0.12	0.12	0.10
300	0.11	0.11	0.08
350	0.10	0.09	0.07
400	0.09	0.08	0.06
500	0.08	0.07	0.05

Installation and Engineering Information & AWG-to-Metric Conversion Chart

AMPACITIES FOR PORTABLE POWER CABLES, AMPERES PER CONDUCTOR

POWER CONDUCTOR SIZE	SINGLE CONDUCTOR				TWO CONDUCTOR ROUND AND FLAT	THREE CONDUCTOR ROUND AND FLAT	THREE CONDUCTOR ROUND			FOUR CONDUCTOR	FIVE CONDUCTOR	SIX CONDUCTOR
AWG or kcmil	0-2000 VOLTS NONSHIELDED	2001-8000 VOLTS* SHIELDED	8001-15000 VOLTS* SHIELDED	15001-25000 VOLTS* SHIELDED	0-2000 VOLTS	0-5000 VOLTS NON-SHIELDED	0-8000 VOLTS SHIELDED	8001-15000 VOLTS SHIELDED	15001-25000 VOLTS SHIELDED	0-2000 VOLTS	0-2000 VOLTS	0-2000 VOLTS
8	83	-	-	-	72	59	-	-	-	54	50	48
6	109	112	-	-	95	79	93	-	-	72	68	64
4	145	148	-	-	127	104	122	-	-	93	88	83
3	167	171	-	-	145	120	140	-	-	106	100	95
2	192	195	195	-	167	138	159	164	178	122	116	110
1	223	225	225	222	191	161	184	187	191	143	136	129
1/0	258	260	259	255	217	186	211	215	218	165	-	-
2/0	298	299	298	293	250	215	243	246	249	192	-	-
3/0	345	345	343	337	286	249	279	283	286	221	-	-
4/0	400	400	397	389	328	287	321	325	327	255	-	-
250	445	444	440	430	363	320	355	359	360	280	-	-
300	500	496	491	480	400	357	398	-	-	310	-	-
350	552	549	543	529	436	394	435	-	-	335	-	-
400	600	596	590	572	470	430	470	-	-	356	-	-
450	650	640	633	615	497	460	503	-	-	377	-	-
500	695	688	678	659	524	487	536	-	-	395	-	-
550	737	732	-	-	-	-	-	-	-	-	-	-
600	780	779	-	-	-	-	-	-	-	-	-	-
650	820	817	-	-	-	-	-	-	-	-	-	-
700	855	845	-	-	-	-	-	-	-	-	-	-
750	898	889	-	-	-	-	-	-	-	-	-	-
800	925	925	-	-	-	-	-	-	-	-	-	-
900	1010	998	-	-	-	-	-	-	-	-	-	-
1000	1076	1061	-	-	-	-	-	-	-	-	-	-

*These ampacities are based on a single isolated cable in air, operated with an open-circuited shield.

NOTE – These ampacities are based on a conductor temperature of 90°C and an ambient air temperature of 40°C.

AWG-TO-METRIC CONVERSION CHART

SIZE (AWG)	mm²	SIZE (AWG or kcmil)	mm²
18	0.82	1/0	53.5
16	1.31	2/0	64.4
14	2.08	3/0	85.0
12	3.31	4/0	107.0
10	5.26	250	127.0
9	6.63	300	152.0
8	8.37	350	177.0
6	13.30	500	253.0
4	21.15	600	304.0
2	33.62	750	380.0
1	42.40	1000	507.0

Why and How Mining Cables Fail

Cable breakdowns are neither mysterious nor unaccountable and almost without exception can be traced to one or more of the following causes:

1. Excessive tension
2. Mechanical damage
3. Current overload
4. Improper splicing and termination techniques

Excessive Tension

Many cable failures are the direct result of excessive tension. A cable that has been “stretched” no longer has the balanced construction that is so vital to long life. Tension on the conductors subjects the individual wires in the strand to compression and shear. These thin wires are damaged and will break more easily when bent or flexed.

Tension also elongates the conductor insulation. The elongated insulation is then vulnerable to compression cutting. It will rupture more easily when it is crushed against the stranded conductor during runovers. The insulation will also have a tendency to creep over the conductor at a splice.

Jackets under tension lose a considerable part of their resistance to mechanical damage. A jacket under tension is much more likely to be cut or torn. Stretching also causes the copper conductors to take a permanent set. Of course, the insulation and jacket are stretched as well, but they will return to their original length when the tension is removed. This difference in the properties of rubber and copper when subjected to tension will cause the conductors to be wavy and fail prematurely.

To reduce tension on the cable:

1. Avoid backspooling, if possible.
2. If backspooling is unavoidable, locate the tie point as far back from the haulageway as possible.
3. Tram slowly when passing the tie point.
4. Set hydraulic tension on the cable reel so that approximately 12-15 feet of cable is picked up off the mine bottom when starting to tram.

Mechanical Damage

This is one of the most prevalent sources of trailing cable failures. Factors initiating mechanical damage include cutting, compression (crushing), punctures and abrasion. In extreme cases of mechanical damage, the failure is instant, and the cause can be assigned on the spot. Many times, however, the cable components are merely “injured” and become latent failures. At that point, it may be more difficult to pinpoint the exact cause and to take remedial action.

Why and How Mining Cables Fail

Current Overload

The temperatures of the conductors, insulation and jacket are, of course, elevated when cables are subjected to an electrical load. The resistance of the copper is increased, voltage drop in the cable is increased, and therefore, a reduced voltage is supplied to the machine. As a result, the machine calls for more current, which adds further to cable heating. A trailing cable's insulation and jacket materials exhibit maximum resistance to physical abuse at the rated conductor temperature of 90°C or less. The ability of these components to withstand damage decreases as the temperature increases. Conditions which normally cause few cable failures suddenly become a problem. At elevated temperatures, the jacket has lost much of its resistance to cutting, crushing, tearing and abrasion. The section of the cable that remains on the reel is most likely to be damaged by electrical overload. Layering on the reel hinders ventilation and heat dissipation. Continued exposure to elevated temperatures will age the jacket, making it hard and brittle and causing crazing or cracking upon subsequent reeling.

Improper Splicing and Termination Techniques

Over the years, much work has been done to improve both splicing materials and techniques.

The following items have been found to be primarily responsible for unsatisfactory splice service:

1. Ending up with a grounding or ground-check conductor which is shorter than the power conductors
2. Semi-conducting residue on the insulation surface was not removed
3. Gaps, voids or soft spots in insulating tape build-up
4. Improper termination of shielding system, leaving inward-pointing projections
5. Damage to factory insulation by improper removal of shielding systems
6. Excessive slack in one or more individual conductors
7. Splice has low tensile strength and is easily pulled in two
8. Individual wires are damaged during application of connector
9. Splice is too bulky — will not pass through cable guides or over sheaves
10. Improper application of the outer covering, allowing water to enter the cable interior

By choosing a cable with an adequate current rating, avoiding excessive tension and mechanical damage, and using proper splicing techniques, it is not unreasonable to reduce cable-related downtime by 50 percent or more. This will, of course, translate into increased production and profits.