

3M Science. Applied to Life.™

3M™ Aluminum Conductor Composite Reinforced (3M ACCR)
High-capacity transmission conductor

Helping Utilities Protect Grid Integrity

More amps, more confidence

Now you have the power.

In today's complex world, protecting grid integrity is a growing challenge. Aging infrastructure is burdened with changing power flows as renewable generation is integrated and traditional sources, such as coal generation, are eventually retired. All of this is happening amid growing environmental and regulatory concerns. 3M offers a fast and potentially cost-saving way to help utilities increase their capacity, achieve greater clearances and meet today's strict reliability standards – helping you keep the lights on for years to come.



Advanced technology to protect your grid

3M™ Aluminum Conductor Composite Reinforced (3M ACCR) was designed as a potential replacement of ACSR and ACSS conductors on existing lines to help maximize capacity. Reconductoring with 3M ACCR can help you alleviate the scheduling, budgetary and regulatory risks of upgrading lines in areas with dense populations, strict permitting requirements or limited land availability.

3M ACCR can replace ACSR or ACSS on existing structures at the same tensions and clearances, giving you the potential of twice the ampacity without the risks of a major construction project. Your line could be back in service fast, within budget, and with minimal community and environmental impacts. And, when installed correctly and per 3M instructions, 3M ACCR has proven its reliability in installations around the world, even in a variety of challenging environments.

Maximize the value of your grid

When utilities increase the amount of electricity (amps) flowing through their current infrastructure, it can lower costs for customers by avoiding expensive upgrades. At the same time, it can increase profits for shareholders by making better use of existing assets. Upgrading with 3M ACCR can potentially relieve your transmission constraints, simplify compliance with regulatory standards, enhance your reliability and provide a robust system to support your advanced grid investments.

Most importantly, 3M ACCR helps you protect the integrity of your grid with the potential for long-term value.



What is 3M ACCR?

This high-capacity transmission conductor has a high-strength, lightweight aluminum matrix composite core. The outer, current-carrying strands are composed of a hardened aluminum-zirconium alloy.

3M ACCR is similar in construction and dimensions to ACSR. 3M ACCR, however, has a higher strength-to-weight ratio and lower thermal expansion than comparably sized steel core conductors – so it is lighter and sags less, even at higher operating temperatures. This in turn allows higher ampacities at equivalent tensions and clearances. 3M ACCR retains its performance over decades of high temperature use and is stable in a wide range of environmental conditions.

Materials in 3M ACCR are strictly inorganic for proven stability at high temperatures over its lifetime. It consists of aluminum and aluminum oxide fibers. 3M ACCR does not contain any organic polymeric materials.

Conductor Core Material	3M ACCR Composite Core	ACSR/ACSS Steel
Strength (ksi)	200	185
Density (lbs/in^3)	0.119	0.282
Strength/Density	1681	656
Coefficient of Thermal Expansion 10^{-6}/°F	3.5	6.7

Note: Not for specification purposes. The information we are furnishing you is being provided free of charge, is based on tests performed at 3M laboratory facilities, and may be based on a limited sample size. While we believe that these test results are reliable, their accuracy or completeness is not guaranteed. Your results may vary due to differences in test types and conditions. This information is intended for use by persons with the knowledge and technical skills to analyze, handle and use such information.

Inside the technology



3M ACCR's high-strength, lightweight core is a fiber-reinforced metal matrix, and contains no polymers or plastics.

The aluminum-zirconium outer strands can be heated to much higher temperatures than traditional ACSR aluminum before annealing. This allows 3M ACCR to retain its strength after high temperature operations.

More amps — more confidence.

In the United States and around the world it is understood that there is an important role of reconductoring with advanced conductors to meet the infrastructure investments needed to improve the electrical grid. 3M ACCR provides both significant upgrade capacity (more amps) and reliability in a variety of harsh environments due to the stability of the aluminum matrix composite (more confidence).

Example:
A customer serving a major U.S. city upgraded with 3M ACCR when, just 4 years after an ACSS upgrade, the line could no longer meet the capacity need.

Example:
3M ACCR is successfully operating in the extreme environments of Norway near the Arctic Circle, Coastal Colombia, the heavily populated cities of Shanghai and Washington, D.C., and the environmentally sensitive Minnesota River Valley and Brazil's Paraná River.

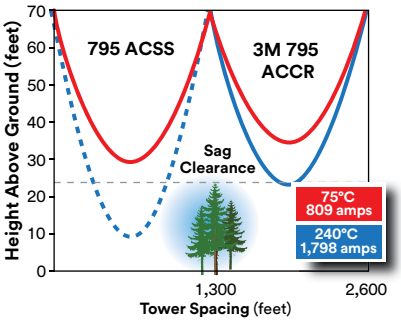
Maximum ampacity with less sag

Compared to the same diameter steel core in ACSR conductor, 3M ACCR can offer:

- Up to 2 times the ampacity or more
- Less thermal expansion, for less sag at high current
- Higher strength-to-weight ratio
- Operating temperatures up to 210°C continuous and 240°C emergency*

*Emergency operating temperature for up to 1,000 hours cumulative.

3M™ ACCR can significantly increase ampacity without increasing sag



Long-term reliability

With 3M ACCR, you can design for acceptable tower tensions and loads while meeting clearance standards.
Its reliability has been demonstrated around the world, with:

- Large capacity increases at the same clearances, tensions and mechanical loads
- Corrosion resistance without coatings or barriers around the core
- Durability similar to ACSR, even when operated at high temperatures over long periods in extreme environments
- Decades of successful, reliable operations

Actual performance may vary depending on a number of variables. The example above assumes ACSS and 3M ACCR with a 1,300 ft. ruling span under the following conditions:

Initial Tension of 6,557 lbs at 15°C, maximum loading at 30°F, no ice and 12 lbs. of wind; and

Ambient Conditions of 35°C, 2 ft/s perpendicular wind, 0.5 emissivity and 0.5 solar absorption.

Fast and easy to use

3M ACCR was designed as a potential replacement for ACSR and ACSS with the goal to help utilities quickly and dramatically increase their capacity on existing structures - while potentially minimizing lengthy construction and permitting processes. Core stranding, hardware and construction procedures are similar to those for ACSR and are familiar to installers. And by avoiding costly rebuilds or extensive structure modifications, reconductoring with 3M ACCR can help you get back to service more quickly.



Lower total project cost

By eliminating the need for expensive new towers, land acquisitions and other factors, upgrading with 3M ACCR can offer substantial savings over ACSR and ACSS – even at a higher conductor cost-per-mile. For many thermal upgrades, 3M ACCR can give you the high-performance, cost-effective solution you've been looking for.

3M ACCR Upgrade Cost Comparison Example (Project Cost in $ USD per Mile)*

	Build Parallel Double Circuit Line with ACSS	Upgrade to Double Circuit, Double Bundled with ACSS	Upgrade Double Circuit with 3M ACCR
Conductor	126,000	234,000	584,000
Stringing	126,000	251,000	126,000
Structures	1,150,000	916,000	81,000
Substation Work	335,000	108,000	0
Development	357,000	287,000	108,000
Total	2,094,000	1,796,000	899,000
Construction Time	2 to 5 years	Up to 2 years	4 months during low demand periods
This is an example from an ACCR customer utility.	**$1,197,605**	**$898,204**	

Example:
In the Southwest U.S., a customer reduced their construction outage by 80% using 3M ACCR instead of building a parallel line. The project took 4 months, instead of the estimated 20.

Example:
A 3M customer analyzed three options – building a new, parallel double circuit line; upgrading the existing double circuit line to double circuit, double bundled; and upgrading the existing line with 3M ACCR. Because of the substantial cost and time savings, they met their capacity requirements by reconductoring with 3M ACCR.

Commitment to quality

3M ACCR and its accessories have been rigorously tested and verified to ASTM B941, B976, B978, B979, B1008, ANSI C119.4, C119.7, IEC 61284, 62818, 62641, 61089, 61897, 61395, 61854, IEEE 524, 664, C135 and 738 specifications, both in the laboratory and in the field. Test conditions included extreme temperatures, heavy icing, heavy loading and corrosive atmospheres. In all cases, 3M ACCR performed up to specifications and showed that the design coefficients accurately predict performance in the field.**

To view our complete library of field tests, organized by both conductor size and test subject, visit our website at **www.3M.com/accr.**

Note: For all case studies, the results and outcomes of case studies or testimonials should not be interpreted as a guarantee or warranty of similar results. You are responsible for evaluating the product and determining whether it is suitable for your application. Please refer to applicable 3M specifications for product and warranty information.

* The cost factors and savings shown are based on certain assumptions, including, without limitation the assumptions listed above, which may or may not be accurate and complete assumptions for your project. The savings shown are only intended to provide an example of savings that may be achieved, based on certain assumptions, and the savings shown are in no way promised or guaranteed by 3M. You are responsible for completing your own diligence and analysis based on specific facts and data particular to your intended product use and application. You assume all risks and liability associated with such use.

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Solve your toughest transmission challenges

Tackle some of your toughest jobs with confidence using 3M ACCR!

Example:
In the U.S. Northwest, ACSR 1780 kcmil running from a generating plant was replaced with a smaller 3M ACCR 675 TW that runs frequently at high loads with no known operational problems or performance changes.

Example:
In a major downtown area, a critical line was upgraded through neighborhoods with many distribution lines installed below transmission lines. 3M ACCR was installed quickly, without disrupting homes or businesses.

Example:
An installation in Minnesota crossed a protected wetland using existing infrastructure and without heavy construction equipment.

Example:
A water crossing in Brazil was installed in just 6 days, compared to the time that would have been required to replace towers and foundations set in the river.

Changing clearance requirements
Reliability standards and clearance requirements over highways, railroads or other shipping lanes may require upgrades. 3M ACCR can provide more capacity with virtually no change in wire diameter or tower load, and often with reduced tension. Because 3M ACCR sags less, line clearances can be significantly improved while delivering the same or greater power, even at high temperatures.

Densely populated or underbuilt areas
In areas that are densely populated, upgrading with 3M ACCR can increase capacity by reusing existing structures with less disruption to the community, and without needing to build new structures. Transmission lines can also be upgraded without having to impact distribution lines underbuilt on the same structures, which can reduce costs and system disruption.

Environmentally sensitive areas
Transmission lines through environmentally sensitive areas require extensive and lengthy reviews and debate before approval. Upgrading with 3M ACCR can allow existing structures to be used without modification - allowing for simplified reviews. The appearance of the line does not change.

Short timelines
3M ACCR can help you avoid major construction projects associated with new lines or significant tower upgrades, with long lead times and permitting delays. Meaning, 3M ACCR can help you streamline your approval process vs a major rebuild or new line - allowing your project to complete faster.



Long spans/river crossings
Rivers and gorges are among some of the most difficult challenges, because of the long spans between towers, limited tower heights and placement options, and clearance requirements over navigable waterways. The high temperature, low-sag properties of 3M ACCR allow for increased capacity, while maintaining or improving clearance and mechanical loads on the existing structures.

Example:
3M ACCR was used in two 230 kV Canadian installations to cross sensitive waterways. The longest span stretched 5,800 feet (1.7 km) between towers; only existing structures were used.

Heavy ice or wind loads
A high strength-to-weight ratio and modulus make 3M ACCR ideal for areas that experience high mechanical loads such as icing. In some cases, a smaller conductor can be used, reducing the conductor profile and potentially mechanical loads during major wind and ice events. 3M ACCR can increase reliability during demanding loading conditions.

Example:
An installation near Fargo, North Dakota has undergone severe wind and icing conditions with no known failures, damage to the conductor, or unexpected changes in sag to date.

Corrosive environments
Because both the wire and the core are made from aluminum, 3M ACCR is resistant to corrosive environments such as high-pollution areas or the damp, salty air near seashores. Unlike steel- or carbon-polymer-core conductors, no special coating is required to avoid chemical interaction between the core and the conductor.

Example:
An installation in Hawaii has been exposed to one of the most corrosive environments in the world for 11 years, with no known corrosion problems.

3M ACCR Typical Properties

Strong, lightweight, high capacity conductor

3M ACCR conductor is available in a round-wire or trap-wire construction composed of a multi-strand, aluminum-matrix core surrounded by aluminum-zirconium outer wires.



Physical Properties	Unit	Junco	Ostrich	Linnet	Lark	Hawk	Oswego TW	Dove	Eagle	Condor TW	Wabash TW	Grosbeak	Stilt	Puffin	Suwanee TW
Designation		ACCR_ 267-T23	ACCR_ 300-T16	ACCR_ 336-T16	ACCR_ 397-T23	ACCR_ 477-T16	ACCR-TW_ 665-T16	ACCR_ 557-T16	ACCR_ 557-T23	ACCR-TW_ 795-T13	ACCR-TW_ 763-T17	ACCR_ 636-T16	ACCR_ 715-T13	ACCR_ 795-T10	ACCR-TW_ 958-T16
Stranding		30/7	26/7	26/7	30/7	26/7	20/19	26/7	30/19	20/19	20/19	26/19	24/7	22/7	24/19
Diameter															
Individual Core Wire	in	0.094	0.083	0.089	0.116	0.105	0.074	0.116	0.083	0.074	0.083	0.074	0.116	0.105	0.089
Individual Aluminum Wire	in	0.094	0.107	0.114	0.116	0.134	N/A	0.149	0.139	N/A	N/A	0.159	0.173	0.188	N/A
Total Core	in	0.283	0.249	0.267	0.347	0.314	0.371	0.347	0.416	0.371	0.416	0.371	0.347	0.314	0.445
Total Conductor	in	0.660	0.677	0.724	0.809	0.852	0.919	0.941	0.970	0.991	0.992	1.006	1.040	1.067	1.103
Area															
Aluminium	in^2	0.210	0.233	0.267	0.314	0.369	0.522	0.450	0.452	0.624	0.599	0.515	0.566	0.613	0.752
Total Area	in^2	0.258	0.271	0.310	0.388	0.429	0.604	0.524	0.555	0.706	0.702	0.597	0.639	0.673	0.870
Weight															
Core	lbs/ft	0.074	0.057	0.065	0.110	0.090	0.122	0.110	0.154	0.122	0.154	0.122	0.110	0.090	0.176
Aluminium	lbs/ft	0.252	0.280	0.320	0.378	0.443	0.624	0.540	0.543	0.746	0.716	0.617	0.679	0.735	0.899
Total Weight	lbs/ft	0.325	0.337	0.385	0.488	0.533	0.747	0.650	0.697	0.869	0.870	0.740	0.788	0.825	1.075
Strength	lbs	13 700	12 100	13 900	20 400	19 200	25 800	23 100	28 300	27 900	31 200	25 600	25 500	23 800	37 000
Thermal Elongation															
Core	10^{-6}/°C	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Aluminium	10^{-6}/°C	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Conductor	10^{-6}/°C	15.3	16.7	16.7	15.3	16.7	16.5	16.7	15.0	17.2	16.2	16.5	17.6	18.5	16.5
Heat Capacity															
Core	W-sec/ft-°C	32	25	28	48	39	53	48	67	53	67	53	48	39	76
Aluminium	W-sec/ft-°C	109	121	139	163	192	270	234	235	323	310	267	294	318	389
Electrical Properties															
Resistance															
DC @ 20°C	ohms/mile	0.3191	0.2944	0.2572	0.2127	0.1858	0.1313	0.1524	0.1483	0.1110	0.1137	0.1335	0.1229	0.1150	0.0911
AC @ 25°C	ohms/mile	0.3260	0.3009	0.2630	0.2176	0.1904	0.1351	0.1565	0.1521	0.1146	0.1172	0.1373	0.1268	0.1190	0.0945
AC @ 50°C	ohms/mile	0.3582	0.3306	0.2890	0.2390	0.2091	0.1482	0.1718	0.1670	0.1257	0.1286	0.1507	0.1391	0.1305	0.1036
AC @ 75°C	ohms/mile	0.3904	0.3603	0.3149	0.2605	0.2278	0.1614	0.1871	0.1819	0.1368	0.1400	0.1641	0.1514	0.1420	0.1127
AC @ 100°C	ohms/mile	0.4226	0.3900	0.3409	0.2819	0.2465	0.1746	0.2024	0.1968	0.1480	0.1515	0.1775	0.1637	0.1535	0.1218
AC @ 210°C	ohms/mile	0.5644	0.5207	0.4551	0.3764	0.3289	0.2328	0.2700	0.2625	0.1971	0.2018	0.2366	0.2181	0.2043	0.1621
AC @ 240°C*	ohms/mile	0.6030	0.5564	0.4862	0.4022	0.3514	0.2487	0.2884	0.2805	0.2105	0.2156	0.2528	0.2330	0.2182	0.1731
Geometric Mean Radius	ft	0.0227	0.0229	0.0245	0.0278	0.0288	0.0311	0.0318	0.0334	0.0331	0.0338	0.0340	0.0348	0.0353	0.0370
Reactance (1 ft spacing, 60 hz)															
Inductive Xa	ohms/mile	0.459	0.458	0.450	0.435	0.430	0.421	0.418	0.413	0.414	0.411	0.410	0.407	0.406	0.400
Capacitive X'a	Mohms-mile	0.1066	0.1059	0.1039	0.1006	0.0990	0.0968	0.0961	0.0952	0.0945	0.0945	0.0941	0.0931	0.0923	0.0914
Ampacity															
210°C	amps	823	863	943	1074	1168	1423	1331	1363	1584	1566	1453	1530	1594	1809
240°C	amps	881	925	1011	1153	1254	1528	1430	1465	1704	1684	1562	1645	1714	1947

* Emergency operating temperature, 1000 hours cumulative over the life of the conductor.

Ampacity ratings were calculated using IEEE Std. 738-2006, with inputs of 40°C (104°F) air temperature; 2.0 ft/s wind speed (at 90° angle between wind and conductor); elevation at sea level; solar radiation at 92.499 Watt/ft2; emissivity of 0.5 and solar absorptivity of 0.5.

Physical Properties	Unit	Condor	Curlew TW	Drake	Hudson TW	Whooper	Curlew	Bittern	Diver	Pecos TW	Martin	Lapwing	Cumberland TW	Falcon	
Designation		ACCR_ 795-T13	ACCR-TW_ 1033-T13	ACCR_ 795-T16	ACCR-TW_ 1158-T13	ACCR_ 1033-T9	ACCR_ 1033-T13	ACCR_ 1272-T11	ACCR_ 1272-T9	ACCR-TW_ 1622-T13	ACCR_ 1351-T13	ACCR_ 1590-T11	ACCR-TW_ 1927-T13	ACCR_ 1590-T13	ACCR_ 1851-T13
Stranding		24/19	22/19	26/19	24/19	48/7	54/19	51/19	48/19	38/19	54/19	51/19	42/19	54/19	54/19
Diameter															
Individual Core Wire	in	0.074	0.083	0.083	0.089	0.116	0.083	0.083	0.077	0.105	0.094	0.094	0.116	0.105	0.111
Individual Aluminum Wire	in	0.185	N/A	0.178	N/A	0.149	0.139	0.156	0.166	N/A	0.157	0.177	N/A	0.174	0.185
Total Core	in	0.371	0.416	0.416	0.445	0.347	0.416	0.416	0.387	0.523	0.472	0.472	0.578	0.523	0.556
Total Conductor	in	1.112	1.128	1.128	1.196	1.238	1.247	1.350	1.382	1.414	1.415	1.532	1.544	1.569	1.667
Area															
Aluminium	in^2	0.647	0.811	0.648	0.909	0.831	0.814	0.972	1.037	1.274	1.048	1.252	1.513	1.289	1.454
Total Area	in^2	0.729	0.914	0.751	1.027	0.905	0.917	1.075	1.126	1.437	1.180	1.385	1.713	1.452	1.638
Weight															
Core	lbs/ft	0.122	0.154	0.154	0.176	0.110	0.154	0.154	0.133	0.242	0.197	0.197	0.295	0.242	0.273
Aluminium	lbs/ft	0.776	0.969	0.777	1.087	0.997	0.980	1.172	1.244	1.531	1.262	1.509	1.819	1.553	1.752
Total Weight	lbs/ft	0.898	1.123	0.930	1.262	1.107	1.134	1.326	1.377	1.774	1.460	1.706	2.114	1.796	2.026
Strength	lbs	28 100	35 600	32 200	40 300	30 600	35 600	38 500	37 300	55 500	45 300	49 500	66 600	55 800	62 200
Thermal Elongation															
Core	10^{-6}/°C	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Aluminium	10^{-6}/°C	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Conductor	10^{-6}/°C	17.4	17.3	16.5	17.3	18.4	17.1	17.8	18.5	17.1	17.1	17.8	17.0	17.1	17.1
Heat Capacity															
Core	W-sec/ft-°C	53	67	67	76	48	67	67	58	106	86	86	129	106	120
Aluminium	W-sec/ft-°C	336	420	336	470	432	424	507	538	662	546	653	786	671	757
Electrical Properties															
Resistance															
DC @ 20°C	ohms/mile	0.0911	0.0856	0.1061	0.0762	0.0851	0.0860	0.0726	0.0683	0.0548	0.0668	0.0564	0.0460	0.0543	0.0481
AC @ 25°C	ohms/mile	0.0945	0.0890	0.1097	0.0797	0.0890	0.0896	0.0764	0.0724	0.0585	0.0706	0.0605	0.0500	0.0583	0.0524
AC @ 50°C	ohms/mile	0.1036	0.0975	0.1203	0.0872	0.0975	0.0982	0.0836	0.0791	0.0638	0.0771	0.0660	0.0544	0.0636	0.0570
AC @ 75°C	ohms/mile	0.1127	0.1061	0.1309	0.0948	0.1059	0.1067	0.0907	0.0858	0.0691	0.0837	0.0714	0.0588	0.0688	0.0616
AC @ 100°C	ohms/mile	0.1218	0.1146	0.1415	0.1024	0.1144	0.1153	0.0979	0.0925	0.0745	0.0903	0.0770	0.0633	0.0741	0.0663
AC @ 210°C	ohms/mile	0.1621	0.1524	0.1884	0.1360	0.1518	0.1531	0.1297	0.1223	0.0984	0.1195	0.1014	0.0832	0.0977	0.0870
AC @ 240°C*	ohms/mile	0.1731	0.1627	0.2012	0.1452	0.1620	0.1635	0.1384	0.1305	0.1050	0.1275	0.1081	0.0887	0.1042	0.0927
Geometric Mean Radius	ft	0.0370	0.0374	0.0381	0.0395	0.0412	0.0421	0.0453	0.0460	0.0468	0.0477	0.0514	0.0511	0.0529	0.0562
Reactance (1 ft spacing, 60 hz)															
Inductive Xa	ohms/mile	0.400	0.399	0.396	0.392	0.387	0.384	0.376	0.374	0.371	0.369	0.360	0.361	0.357	0.349
Capacitive X'a	Mohms-mile	0.0914	0.0907	0.0907	0.0890	0.0879	0.0877	0.0854	0.0847	0.0840	0.0840	0.0816	0.0814	0.0809	0.0791
Ampacity															
210°C	amps	1809	1879	1690	2028	1944	1937	2161	2242	2519	2287	2549	2821	2618	2831
240°C	amps	1947	2023	1819	2184	2094	2087	2331	2419	2719	2468	2753	3049	2829	3062

Ampacity ratings were calculated using IEEE Std. 738-2006, with inputs of 40C (104 F) air temperature; 2.0 ft/s wind speed (at 90° angle between wind and conductor); elevation at sea level; solar radiation at 92.499 Watt/ft2; emissivity of 0.5 and solar absorptivity of 0.5.

TECHNICAL INFORMATION AND DATA; PRODUCT USE.



Technical information and data, recommendations, and other statements provided by 3M are based on information, tests, or experience which 3M believes to be reliable, but the accuracy or completeness of such information is not guaranteed. Some of the standard industry tests conducted by 3M were originally designed for conventional conductors and were adapted by 3M for use with composite conductors; references to such tests should be considered representative only, and not used for specification purposes. Such technical information and data are intended for persons with knowledge and technical skills sufficient to assess and apply their own informed judgment to the information.



* Emergency operating temperature, 1000 hours cumulative over the life of the conductor.

Because the trapezoidal shape of the outer wires incorporates more aluminum, the weight and sag may increase slightly compared to diameter-equivalent round wire designs. Your 3M representative can help you choose the optimal combination of conductor properties for your application.

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Conformance to National Standards

All materials shall conform to the applicable American Society for Testing and Materials (ASTM) Standards B193, B976, B941; or International Annealed Copper Standard (IACS).

Expert technical support

From the lab to the field, 3M's global technical resources are working to help you make your project run smoothly from start to finish. Our highly qualified and experienced technical team can help you find the better solution for your unique application, providing assistance in:

- Balancing capacity, efficiency, mechanical, clearance, economic and environmental objectives
- Evaluating line for developing a bill of materials of conductor lengths and accessories
- Comparing options in PLS-CADD™ and other design software
- Supporting your installation crew with training and consultation

For more information, contact our technical team at **800-364-3577** or **accr@mmm.com**, or visit our website at **www.3M.com/accr**

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