

3M™ Aluminum Conductor Composite Reinforced (ACCR)

3M™ ACCR

More Amps
More Confidence





3M is a diversified technology company serving customers and communities with innovative products and services.

- *Established in 1902*
- *2013 worldwide sales of \$30.8 billion*
- *88,667 employees*
- *Over 40,000 products*
- *Products sold in 200 countries, 64% outside USA*
 - Offices in more than 70 countries
 - Laboratories in 35 countries; 8,400 researchers worldwide
 - Manufacturing in 38 countries



3M Electrical Markets Division

Serving the electrical industry for over 60 years

- High voltage splice and termination kits
- Medium voltage splice and termination kits
- Low voltage solutions
- Wildlife outage protection products
- Tapes and mastics
- 3M ACCR



3M ACCR is...



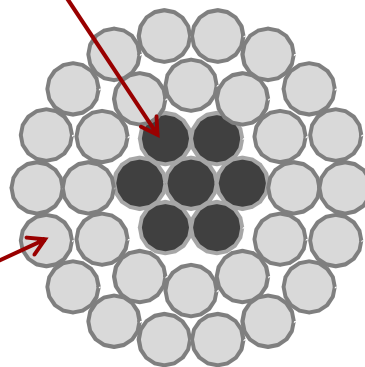
- A high voltage, overhead transmission conductor...
- ...designed as a direct replacement for ACSR and ACSS on existing, thermally limited lines
- ...allowing utilities to use existing structures...
- ...and capable of carrying 2 or more times the current...
- ...reliably for decades.

Improving Performance of a Proven Conductor Design

ACSR

Coated Steel Core Wires

- Strength: 1275 MPa
- Density: 7.8 g/cm³
- Coefficient of Thermal Expansion: $12.0 \times 10^{-6}/^{\circ}\text{C}$

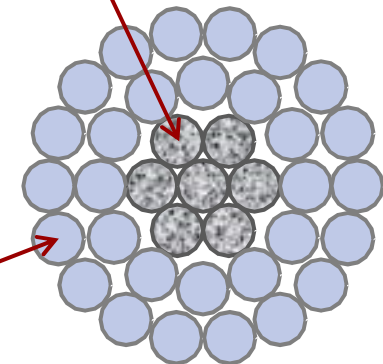


Hardened 1350 H19 Aluminum Conductor Wires

- Rated to 93 °C

Aluminum Composite Core Wires

- Strength: 1380 MPa
- Density: 3.3 g/cm³
- Coefficient of Thermal Expansion: $6.3 \times 10^{-6}/^{\circ}\text{C}$



Hardened Aluminum Zirconium Conductor Wires

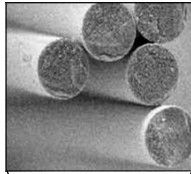
- Rated to 210 °C continuous,
240 °C for 1,000 hours

- A century of proven reliability
- Ampacity limited by sag and conductor temperature

- Same reliable design as ACSR
- Reduced sag and higher temperature rating → ~2 times higher ampacity
- All-aluminum core improves corrosion resistance and conductivity

ACCR Composite Core Wire

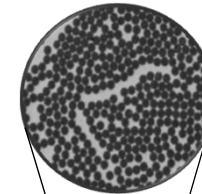
~ 20,000 continuous
aluminum oxide fibers



Infiltrated with
pure, ductile
aluminum



Aluminum matrix
composite wire



Fiber Properties:

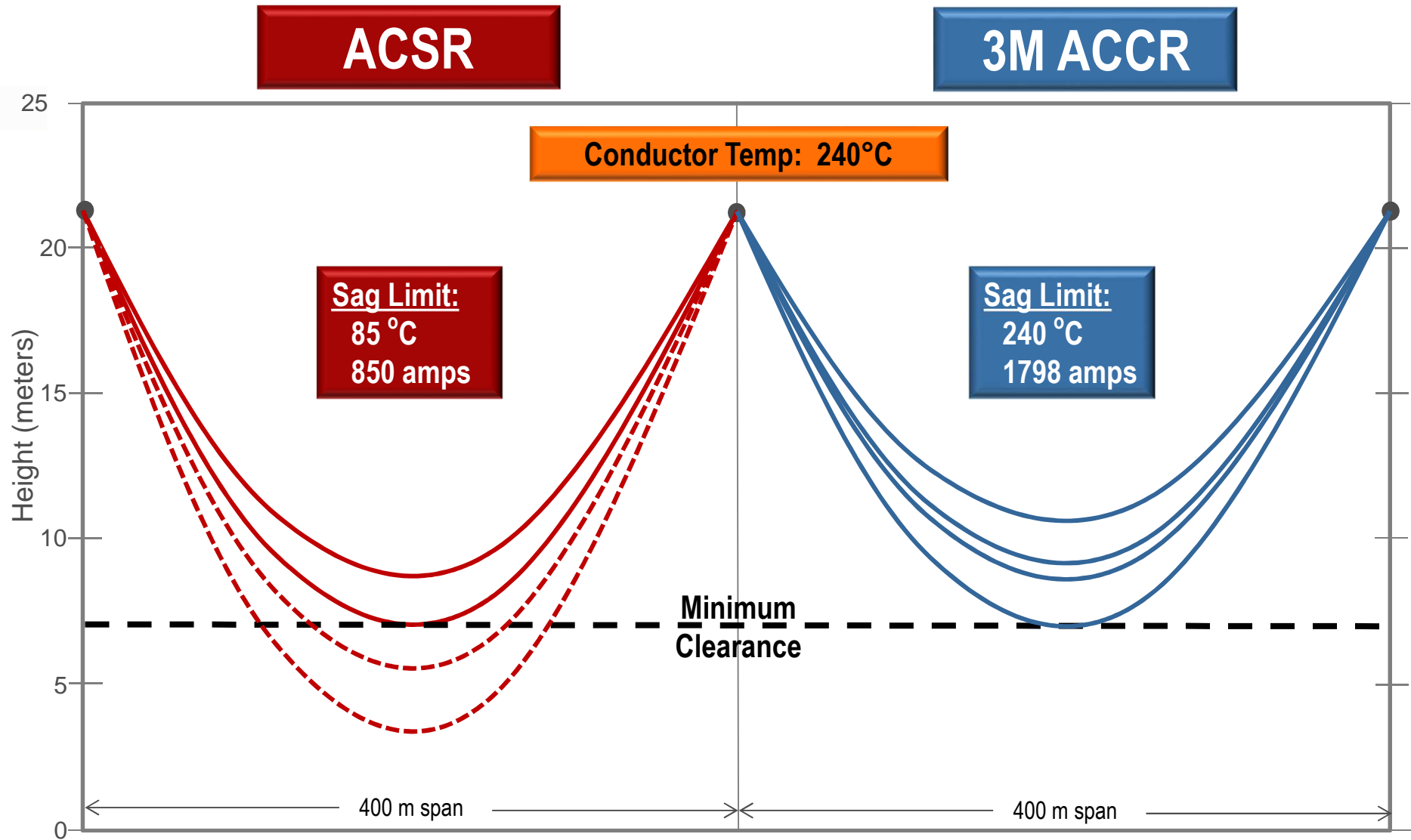
- Lightweight and strong
- Low thermal expansion
- Extremely stable and heat resistant

Composite Wire Properties:

- Strength of steel with half the weight
- Coefficient of thermal expansion half of steel
- Superior stability and corrosion resistance



3M ACCR Maximizes Ampacity of Thermally Constrained Lines



Assumes ACSR and 3M ACCR at 396 m ruling span, initial tension 2,948 kg @ 15° C, max. loading @ -1° C, no ice, 0.5 kg/m² wind; ambient conditions: 0.6m/s wind, 35° C, perpendicular wind direction, 0.5 emissivity and solar absorption.

Properties for Equivalent Diameter Conductors

ACSR, 3M ACCR, 3M ACCR-TW

English Units

Diameter Equivalent Conductors	Diameter	Weight	Strength	Resistance			Ampacity		
				DC @ 20°C	AC @ 75°C		amps	ACCR - ACSR	
				ohms/mile	ohms/mile	ACCR - ACSR			
in	lbs/1,000 ft	lbs	ohms/mile	ohms/mile	%	amps	%		
Hawk 477	ACSR	0.858	656	19,500	0.1880	0.2302		659	
	ACCR	0.852	533	19,200	0.1855	0.2274	-1.2%	1,255	90.4%
Calumet	ACCR-TW	0.861	640	23,000	0.1537	0.1888	-18.0%	1,383	109.9%
Drake 795	ACSR	1.107	1,093	31,500	0.1267	0.1420		907	
	ACCR	1.128	930	32,200	0.1060	0.1307	-8.0%	1,821	100.8%
Suwannee	ACCR-TW	1.099	1,075	37,000	0.0910	0.1125	-20.8%	1,946	114.6%
Martin 1351	ACSR	1.424	1,735	46,300	0.0671	0.0861		1,232	
	ACCR	1.415	1,460	45,300	0.0667	0.0836	-2.9%	2,470	100.5%
Pecos	ACCR-TW	1.411	1,774	55,500	0.0547	0.0690	-19.8%	2,719	120.7%

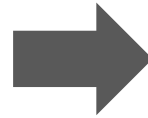
Because the trapezoidal shape of the outer wires incorporates more aluminum, the weight and sag may increase slightly compared to diameter equivalent round wire designs. Your 3M rep can help you choose the optimal combination of properties for your application. Ampacity at 40°C, 2.0 ft/s (0.6 m/s) wind (at 90° angle between wind and conductor), elevation at sea level, solar radiation at 92.499 Watt/ft², 0.5 emissivity and absorptivity at sea level., using IEEE Std. 738-2006.



ACCR Advantage

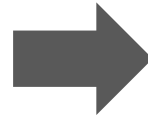
ACCR Maximizes Ampacity

- Typically doubles ampacity of ASCR lines
- Provides significantly more ampacity than other high capacity conductors for most lines



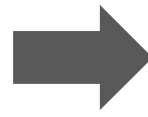
ACCR Avoids Tower Rebuilds

- Lower weight and thermal expansion of ACCR reduces sag without increasing loads on towers



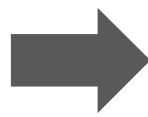
ACCR is Extremely Robust

- Resistant to heat, cold, corrosion, NO₂, UV
- Resistant to fatigue and creep
- Modulus matches ACSR (low strain under load)



ACCR is Reliable

- ~140 installations around the world
- 13 years of very reliable field history



Value to Utility

Maximizes Value of Existing Lines

- More revenue from more power
(200 amp upgrade on 220 kV line can deliver energy worth \$3M/year)
- Flexibility to accommodate changing power flows
- Quick access to renewables
- Increased grid robustness and reliability

Saves Time and Money --- Easier

- Significantly reduced construction costs
- Much shorter outages
- Less impact on communities and environment
- Reduced or eliminated permitting

ACCR Works Everywhere







- Deserts, wetlands, coasts, and mountains
- Congested cities and long water crossings
- Heavy ice and wind loads

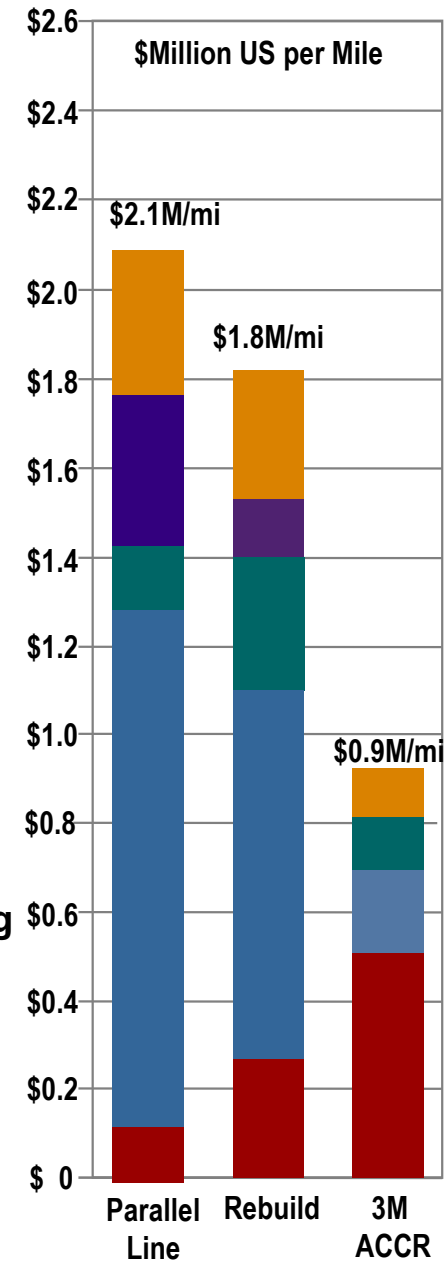
Confidence

- Over a decade of reliable, successful installations

Transmission Upgrade Cost Comparison

100% ampacity upgrade, double circuit 230 kV line, \$U.S./mile

Conductor ¹	Structures ²	Stringing	Substation	Development ³	Construction Outage
					
Build parallel line					None, but 2 to 5 years to build
\$120,000	\$1,150,000	\$126,000	\$335,000	\$356,000	
Rebuild existing line					Up to 2 years
\$240,000	\$916,000	\$251,000	\$108,000	\$287,000	
Reconductor with 3M ACCR					Two 2-month outages during low demand periods
\$584,000	\$81,000	\$126,000	--	\$108,000	



Based on costs from U.S. utility projects and represent U.S. costs only.

1 Includes conductor plus installation accessories.

2 Includes structures, foundations and labor.

3 All costs up to start of construction – engineering, land, permitting, procurement, etc.

3M ACCR Delivers More Amps and More Confidence Than Alternative Conductors



- Metal high capacity conductors (ACSS, GAP, ACIR/Invar)
 - Generally deliver more power by reducing sag due to thermal expansion
 - **Ampacity gains are modest (30-60% typical)**
- Polymer composite conductors (ACCC™, ACFR)
 - Low thermal expansion and low weight, but ampacity increase has other limitations:
 - *Conductor operating temperature must be limited to avoid polymer degradation*
 - *Lower modulus can cause excess sag under ice loading*
 - Conductor is supported by a single polymer rod with numerous failure modes including high temperature, UV light exposure, moisture, NO₂, and compression cracking
 - **Multiple failures have occurred during installation and operation**
- 3M ACCR delivers more ampacity because...
 - The aluminum composite core reduces conductor weight and thermal expansion
 - The composite core and AlZr conductor wires are very heat tolerant
 - The conductor has less sag than ACSR under ice loads

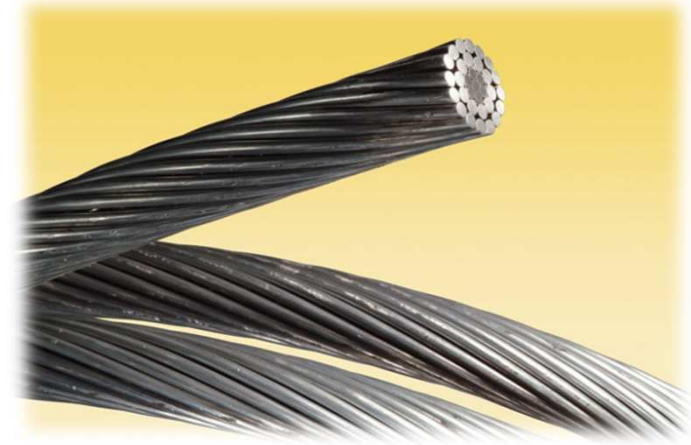
and 3M ACCR has proven to be reliable in the field



3M Provides More than a Conductor to Ensure a Successful Upgrade



- Stable materials of construction
- Robust, proven conductor design
- Complete system of accessories
- Extensive testing in lab and field
- Rigorous manufacturing quality control
- Engineering support provided to optimize line design
- Crew training and on-site support to ensure successful installations
- Backed by 3M's 110 year reputation for innovation and quality

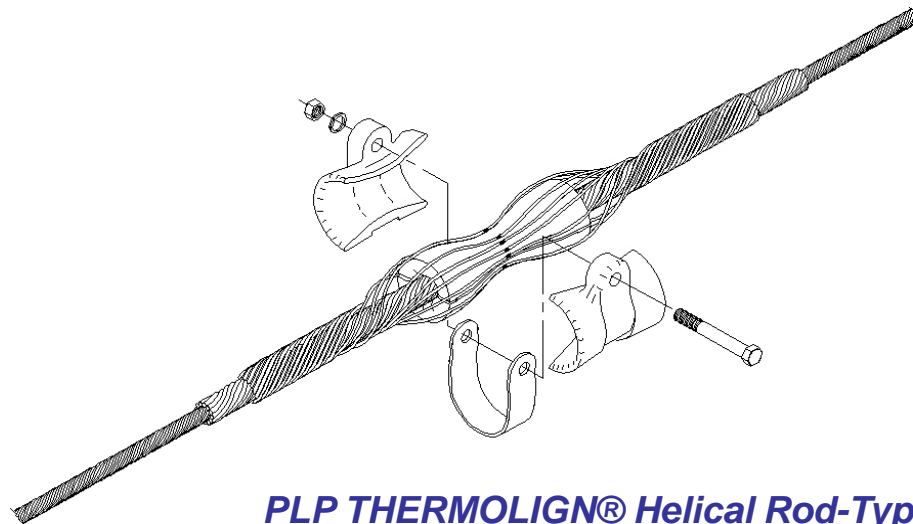


Complete System of Proven Accessories

- Design and installation is very similar to conventional ACSR accessories
- ACCR accessories are somewhat larger to carry more current
- Industry leading companies are sources
- 3M provides as part of a complete solution



AFL HiTemp™ Series Compression Accessories



PLP THERMOLIGN® Helical Rod-Type Hardware



Extensive Product Testing



Conductor Mechanical Design

Conductor strength
Dead end strength
Joint strength
Stress-strain behavior
Stiffness
Thermal expansion

Conductor Electrical Design

Conductor resistance

Installation

Sheave testing
Torsion

High Temperature Performance

Validate sag / tension calculations
Validate stability of conductor and accessories during thermal cycling

Accessory Design

Dead end strength
Joint strength
Current cycle
Dampers
Repair sleeve
Galloping
Aeolian vibration
Corona RIV
Spacer
Repair splice
Suspension - turn angle
Suspension - unbalanced load
Suspension – high temp profile

Long-term Confidence

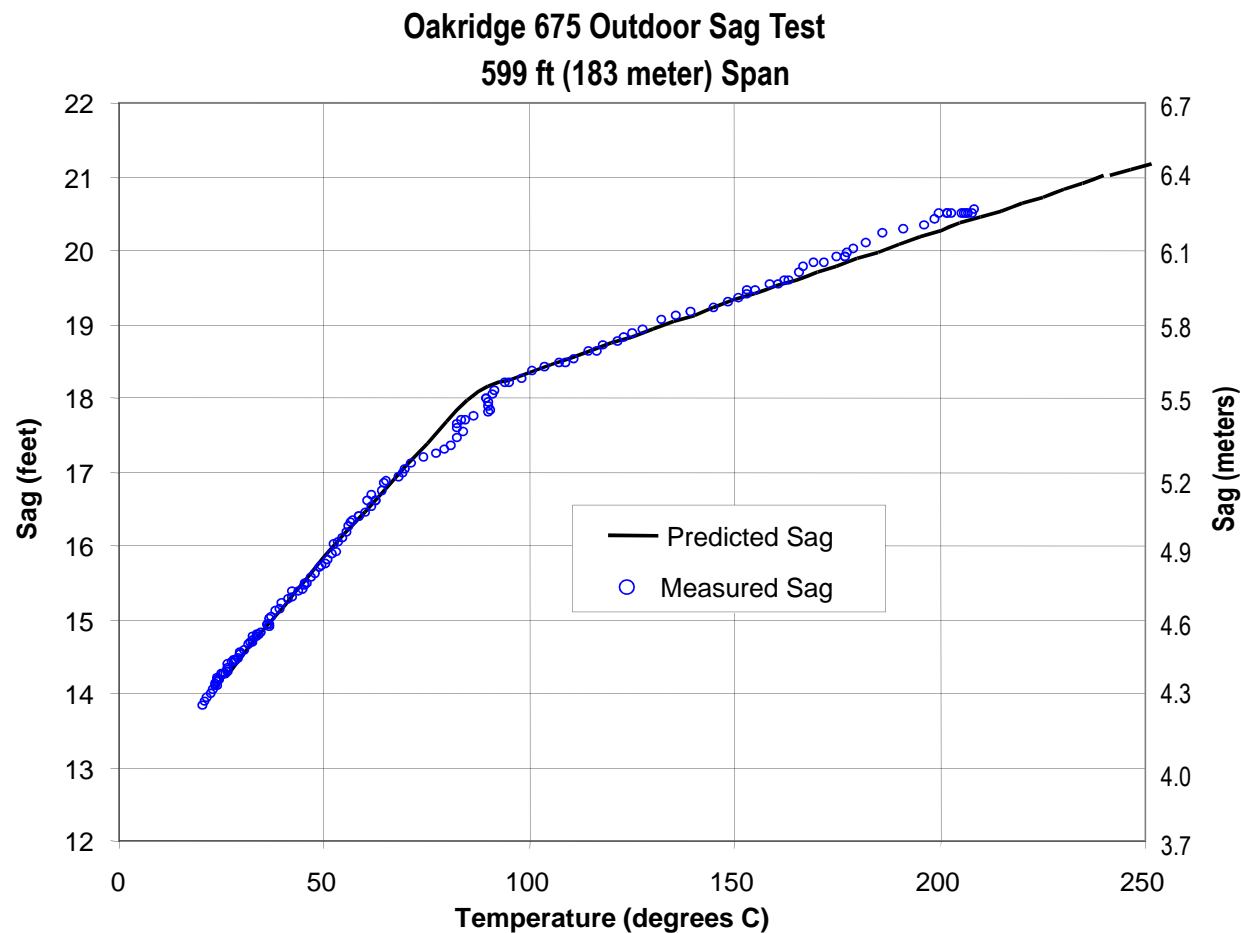
Creep
Aeolian vibration
Damping
Galloping
Impact
Corrosion resistance
Lightning resistance
Fault current
Shotgun
Suspension slip and strength
Hardware temperature
Dead end sustained load
– room temp, high temp
Thermal/current cycling

See the Conductor
Test Results at
www.3m.com/accr

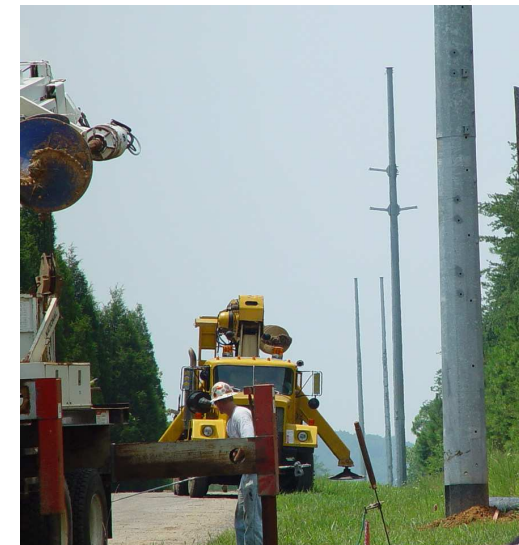


Validated that Field Performance Matched Predicted Performance

- Sag/tension vs. temperature
- Thermal cycling
- High temp performance of conductor and accessories



Oakridge National Lab Conductor Test Facility



6 conductor tests completed
2002 - 2009

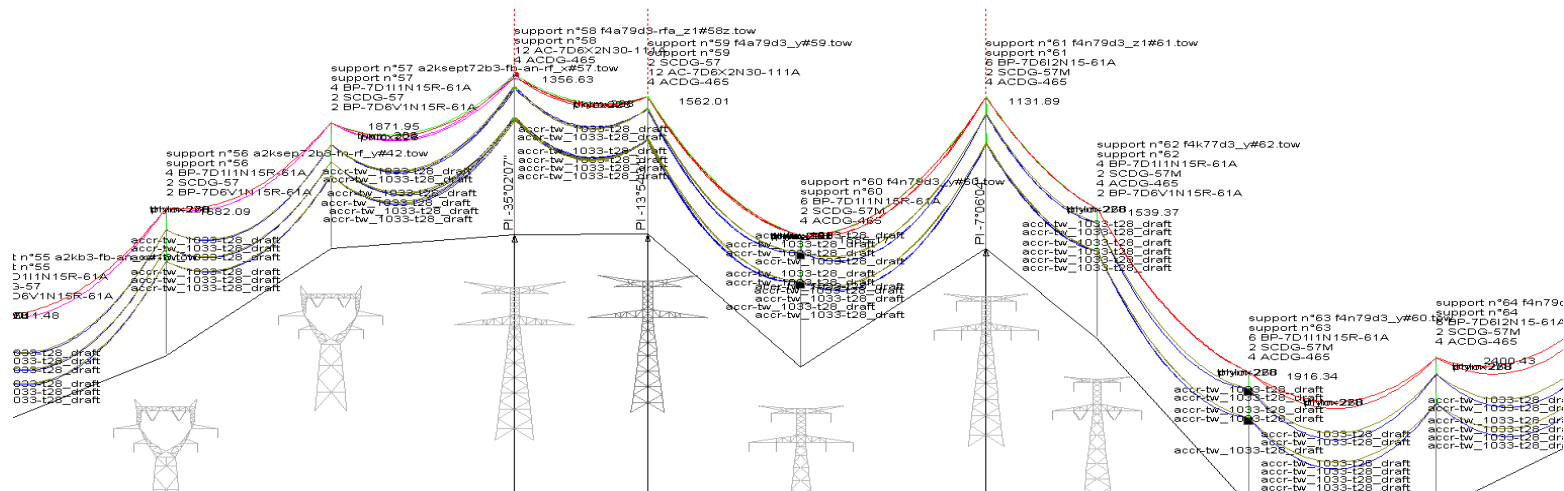
3M ACCR Manufacturing Quality



- Proven 3M quality systems including Six Sigma
- ISO registered 3M manufacturing facilities
- Extensive quality control testing--- every inch of every wire tested
- Industry leader partnerships
 - Southwire
 - AFL
 - PLP
- Numerous customer audits successfully completed

3M Line Design Support

- Experienced, global team to support customer's engineering work
 - Engineers in North America, Europe, Asia, South America
- Provide design data in common, easy-to-use design software
 - Validate sags, tensions, clearances
 - PLS-Cadd™, SAG10®, TLS Pro
- 3M proprietary design software for optimizing conductor selection



Installation Support



- Installing ACCR is similar to installing ACSR and easier than ACSS
- Installation procedures are tested and validated
- 3M provides complete bill of materials and list of required tools
- 3M trains installation crews and monitors the project until it's complete
- More than a decade of reliable, successful installations



High Value Applications for 3M ACCR

- Large ampacity upgrades (50% or more) on existing lines
 - Often the best alternative for larger ampacity increases (50% or more)
 - Typically used to upgrade existing lines, but has been used for new construction to overcome issues with tower heights or long spans
- Lines where rebuilding or adding towers is difficult
 - Congested cities, mountains, and wetlands
 - Structures with other utilities attached beneath the transmission conductors (underbuild)
 - Restricted access or difficult permitting (private land, environmentally protected areas)
- Long spans such as water crossings
- Upgrades that must be completed quickly or with short outage windows
- Clearance violations that require quick resolution
- Almost any environmental condition
 - High or low temperatures
 - Heavy wind or ice loads
 - Corrosive environments such as coastal regions or industrialized areas



3M ACCR has been Successfully Installed by Leading Utilities Around the World

3M™ ACCR

North America

Southern Company (9) Duke Energy
PEPCO (4) Dominion Power
Xcel Energy(4) Allegheny Power
BC Hydro (2) Central Maine Power/Iberdrola
Altalink PSE&G
US Dept. of Energy Platte River Power
– WAPA (4) Silicon Valley Power(5)
– BPA Palo Alto (3)
– TVA Guadalupe Valley Power
AEP CFE
PG&E Cross Texas Transmission
National Grid U.S. (4)
APS
Gray's Harbor PUD

South & Central America

CPFL (8)
Eletropaulo
CTEEP
Ecelsea
EDP Bandeirante
Grand Bahamas

Europe

RTE (EDF)(3) MOESK (3)
RWE /Amprion (2) Irkutsk Energo (3)
E.ON ZSMK (3)
REN Komerovo RSK (2)
50 Hertz Volgada Energia
TransNet Perm

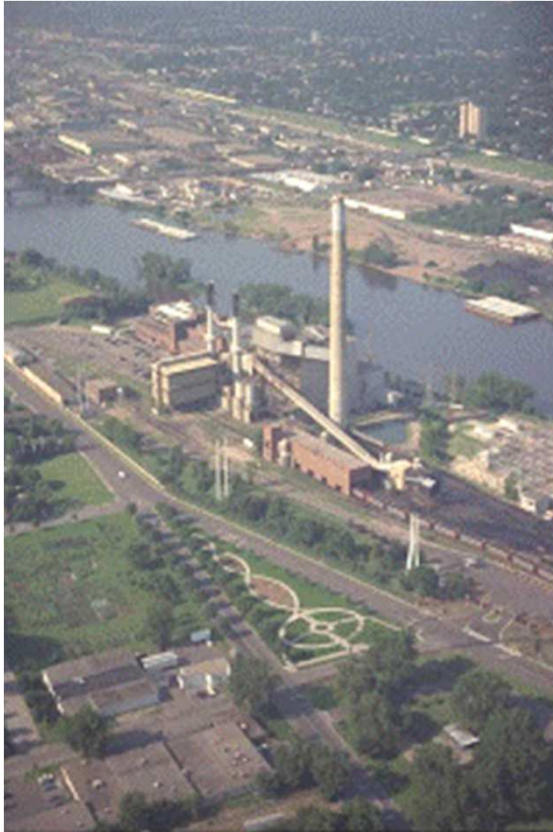
Middle East / Africa

SNE, The Congo

Asia Pacific

Shanghai Power (4)
Chongqing Power (4)
Chengdu Power (2)
Guangdong Shenzhen Power
Henan Zhengzhou Power
Henan Ping Mining
Hubei Huangshi Power
Sinkiang Dushanzi
Yunnan Dai Electric
Yingchuan (2)
Meralco (2)
Tata Power (3)
Chita Energo

Project Profile: First ACCR Field Installation



- Xcel Energy, Minneapolis, MN
- 115 kV, 477 kcmil (238 mm²)
- Riverside Plant
- Installation validation
- Operating flawlessly since 2001



Project Profile: Field Test Corrosive Environment

Project Overview

- Customer: Hawaii Electric Company (HECO)
- Project: Pole 810 to Pole 818, Kahuku
- Location: Hawaii
- Year installed: 2002
- Length: 1 conductor mile (1.6 km), 0.32 line miles (0.5 km)
- Voltage: 46 kV line

Solution: 3M ACCR 477-T16 Hawk (238 mm²)

Results:

- Used same tension on existing towers as old conductor
- Eliminated need for intersets
- Installed with limited access to line
- Continuously operating for several years beyond the expected life of steel or polymer core conductors in salt water environment



Project Profile: Field Test Harsh Environment

Project Overview:

- Customer: Western Area Power Administration (WAPA)
- Project: Jamestown to Fargo
- Location: Fargo, North Dakota
- Year installed: 2002
- Length: 2.5 conductor miles (4 km), 0.8 line miles (1.3 km)
- Voltage: 230 kV

Solution: 3M ACCR 795 T-16 Drake (418 mm²)

Results:

- Operated over several years with at least 2 heavy ice loading events with no failures or measurable degradation
- Operated through extreme cold and hot ambient conditions and high winds



Project Profile: Aging Infrastructure

Project Overview:

- Customer: National Grid
- Project: A127/B128
- Location: Massachusetts near Worcester
- Year installed: 2011 - 2014
- Length : 464.8 conductor miles (748.0 km), 84.8 line miles (136.4 km) , double circuit,
- Voltage: 115 kV
- Existing conductor: 4/0 copper installed in 1924

Solution: 3M ACCR 477-T16 Hawk (238mm²)

Results:

- Replaced deteriorated copper conductor
- Eliminated potential clearance violations
- Increased ampacity by approximately 20%
- Minimized tower reinforcement and replacement
- Minimized environmental impact and outage window



Project Profile: Environmentally Protected Area

Project Overview:

- Customer: Georgia Power
- Project: Kraft-McIntosh White and Black Line;
McIntosh-Meldrim
- Location: Savannah, GA
- Year installed: 2011, 2012
- Length : 225.4 conductor miles (362.8 km), 73.1 line miles (117.6 km)
- Voltage: 230 kV

Solution: 3M ACCR 1622 TW-T13 Pecos (823mm²)

Results:

- Doubled capacity of lines while maintaining clearances
- Used existing towers with few modifications
- Maintained existing right of way (additional right-of-way was not available)
- Minimized impact on wet land
- Installed quickly within the outage window (Only one circuit could be out at a time - 10 weeks in the spring and fall, each)
- Saved several million dollars



Project Profile: Large Ampacity Upgrade

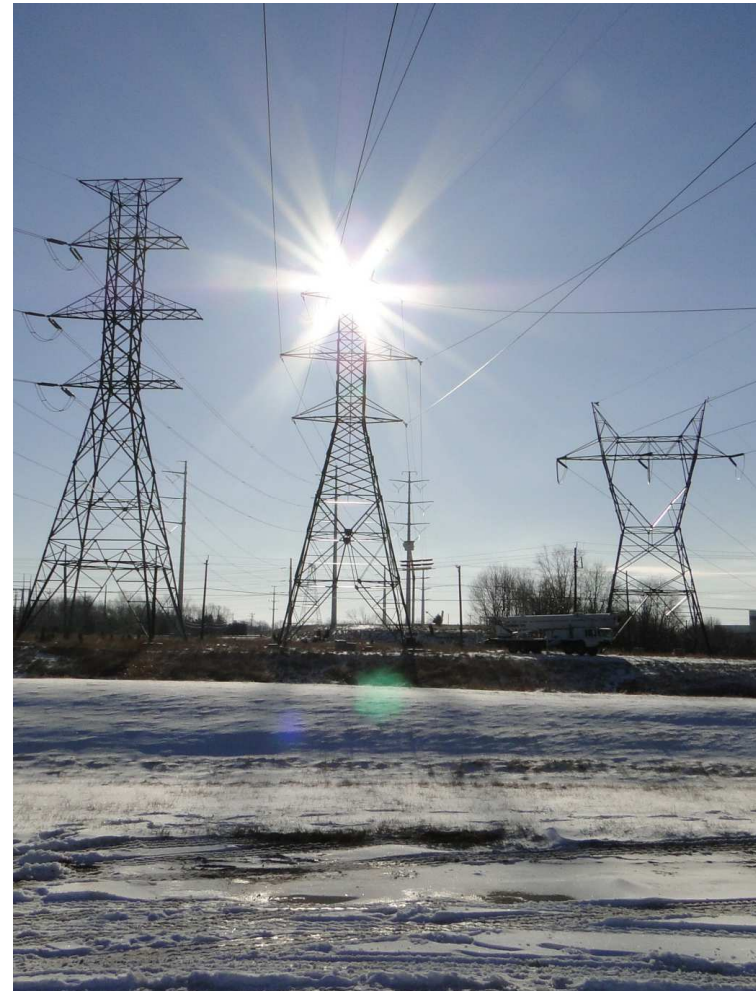
Project Overview:

- Customer: PEPCO
- Project: Dickerson-Quince Orchard and Dickerson-Pleasantview
- Location: Maryland/Suburban D.C.
- Year Installed: 2011
- Length: 108.2 conductor miles (173.8 km); 18.0 line miles (28.9 km)
- Voltage: 230 kV

Solution: 3M ACCR 1590 T-11 and 3M ACCR 1033 T-13

Results:

- Increased ampacity by approximately 84%
- Minimized environmental impacts
- Minimized permitting
- Saved time – timing was an issue



Project Profile: Long-span Water Crossings

Project Overview:

- Customer: BC Hydro/BCTC
- Project: Vancouver Island Transmission Reinforcement, Montague and Samsun Crossings
- Location: Vancouver Island
- Year installed: 2008
- Length : 13.6 conductor miles (21.9 km), 4.4 line miles (7.1 km)
- Voltage: 230 kV



Solution: 3M ACCR 788 kcmil (400mm²)

Results:

- Completed challenging upgrade in remote location, avoiding extensive use of helicopters, barges and road construction
- Reduced environmental impact and construction costs by re-using existing towers
- Preserved the existing sightline
- Included 5,800 ft (1.8 km) single span



Project Profile: Long River Crossing

Project Overview:

- Customer: BC Hydro
- Project: Fraser River Crossing
- Location: British Columbia, Canada
- Year Installed: 2011
- Length: 2.7 conductor miles (4.35 km) , 0.87 line miles (1.40 km)
- Voltage: 230 kV

Solution: 3M ACCR 588-T73 (283 mm²)

Results:

- Installed 3M ACCR without having to replace tower which had been collapsed due to erosion at the river's edge
- Successfully installed conductor 4,600 ft across river
- Designed, qualified, manufactured, delivered, and helped install a custom conductor in 4 months



Project Profile: Large Ampacity Upgrade in Urban Area

Project Overview:

- Customer: Shanghai Electric Power Company Ltd
- Project: YangGao to XinZhou
- Location: Shanghai, China
- Year installed: 2007
- Length: 60 conductor miles (96.6 km); 10 circuit miles(16.1 km)
- Voltage: 115 kV

Solution: 3M ACCR 795 kcmil (418 mm²)

Results:

- Doubled capacity to meet growing peak demand in the World Expo area of central Shanghai for 2010 World Expo
- Used only existing towers
- Worked within limited outage window and limited pull site access to install in 18 days
- Provided fast, cost-effective option for delivering additional energy



“Based on the October 14 line energizing, 3M ACCR works well. After passing a real project’s running test, we believe 3M’s ACCR will have a brilliant future in field application and will help us enhance the city transmission network.” – Mr. Pan, Shanghai Power Yanggao Project designer.



Project Profile: Congested City, Limited Outage Window

Project Overview:

- Customer: Manila Electric Company (MERALCO)
- Project: Novalishe-Kaybiga Line
- Location: Manila, Philippines
- Year installed: 2010
- Length: 7.2 conductor miles (11.6 km), 2.1 circuit miles (3.4 km)
- Voltage: 115 kV

Solution: 3M ACCR 795 T-16 (418 mm²)

Results:

- Increased line capacity to meet growing demand
- Upgrade completed at night to avoid peak load and minimize disturbance on major city road
- Much faster and less expensive than original plan to replace poles and install bundled 795 ACSR
- Avoided difficult right-of-way issues
- Completed 2nd project in 2012



Project Profile: Large Ampacity Upgrade, River Crossing

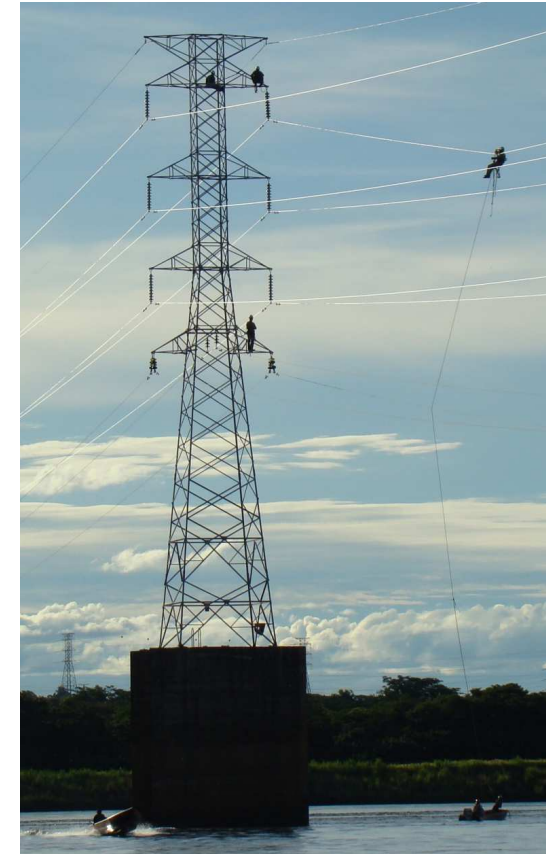
Project Overview:

- Customer: Companhia de Transmissao de Energia Eletrica Paulista (CTEEP)
- Project: Jup-Tri Paraná River crossing
- Year installed: 2009
- Location: Border of São Paulo and Mato Grosso do Sul States, Brazil
- Length: 7.2 conductor miles (11.6 km); 2 line miles (3.2 km)
- Voltage: 138 kV double circuit

Solution: 3M ACCR 300 kcmil (150 mm²)

Results:

- Increased ampacity 220%
- Completed river crossing using only existing towers, avoiding major construction
- Accommodated long span lengths
- Provided operational reliability in high winds and ambient temperatures
- Conductor Installation completed in 6 days



“The 3M ACCR unique features were essential for us to choose 3M as the supplier for this transmission line. We needed a product that could accomplish the TL needs, while being reliable and cost effective.” says CTEEP engineering manager Caetano Cezario Neto.



Project Profile: Environmentally Sensitive Wetlands

Project Overview:

- Customer: CPFL Piratininga
- Project: Henry Borden Jabaquara 1-2 and 3-4
- Location: Cubatão, São Paulo, Brazil
- Year Installed: 2010
- Length: 50 Conductor miles (80 km), 7.5 line miles (12 km)
- Voltage: 138 kV

Solution: 3M ACCR 780-T10 (150 mm²)

Results:

- Installed conductor with the same mechanical characteristics as the old conductor
- Avoided environmental impacts of building a new line through a marshy flood plain
- Reduced installation time to upgrade ampacity
- Performed the upgrade while keeping one circuit live
- Minimized crew time in places with challenging access or critical areas



“We would have required two sets of foundations in that difficult terrain, taking an estimated 10 months to complete. The ACCR stringing needed only 4 months, with no construction time”. – Paulo Ricardo Bombassaro Engineering Director of CPFL Piratininga



Project Profile: Large Ampacity Upgrade in Urban Area

Project Overview:

- Customer: AES Electropaulo
- Project: Bandeirantes - Itaim Line
- Location: Sao Paulo, Brazil
- Year Installed: 2011
- Line Length: 1 mile (1.6 km), double circuit,
- Voltage: 88 kV

Solution: 3M ACCR 795TW T13 Condor

Results:

- >100% ampacity increase
- Night time installation



Project Profile: Large Ampacity Upgrade in Urban Area

Project Overview:

- Customer: MOESK
- Project: Ochakovo-Odintsovo Line
- Location: Moscow, Russia
- Year Installed: 2007
- Line Length: 13.3 km (8.26 miles), double circuit
- Voltage upgraded from 110 kV to 230 kV

Solution: 3M ACCR 477-T16 Hawk (238 mm²)

Results:

- Increased ampacity 98% using existing towers
- Saved time
- Minimum impact on surrounding area
- Provided a reliable solution for area with extreme temperatures and heavy ice and wind loads



Project Profile: Large Capacity Upgrade in Harsh Conditions

Project Overview:

- Customer: ChitaEnergo
- Project: Kharonorskaya Hydro to Turga
- Location: Chita, Siberia, Russia
- Year installed: 2007
- Length: 7.3 miles (11.0 km) conductor length, 1.3 miles (1.7 km) line length
- Voltage: 110 kV double circuit

Solution: 3M ACCR 477-T13 Flicker
(238mm²)

Results:

- Increased capacity by 100% to serve railroad
- Reused existing towers without affecting underbuilt facilities
- Provided a reliable solution in extreme cold and strong winds



“No problems that required any repair were recorded on this section of power line during three years of operation of the conductor . That allows to speak about the high quality of the product and good economical affect of this project.” – Dmitry Popkov, Line Department Manager of Chitaenergo



Project Profile: Load Growth Due to Renewables

Project Overview:

- Customer: E.ON Netz GmbH
- Project: Ostermoor - Marne
- Location: Brunsbüttel, Germany
- Year installed: 2009
- Length: 0.6 miles (0.9 km)
- Voltage: 110 kV

Solution: 3M ACCR 470 kcmil (238 mm²)

Results:

- Increased transmission capacity to support load growth created by renewable energy (on-shore wind farms)
- Preserved clearances to underbuilt 20 kV line owned by another utility
- Achieved accurately predicted sag



Project Profile: Qualification on 400 kV Backbone Line

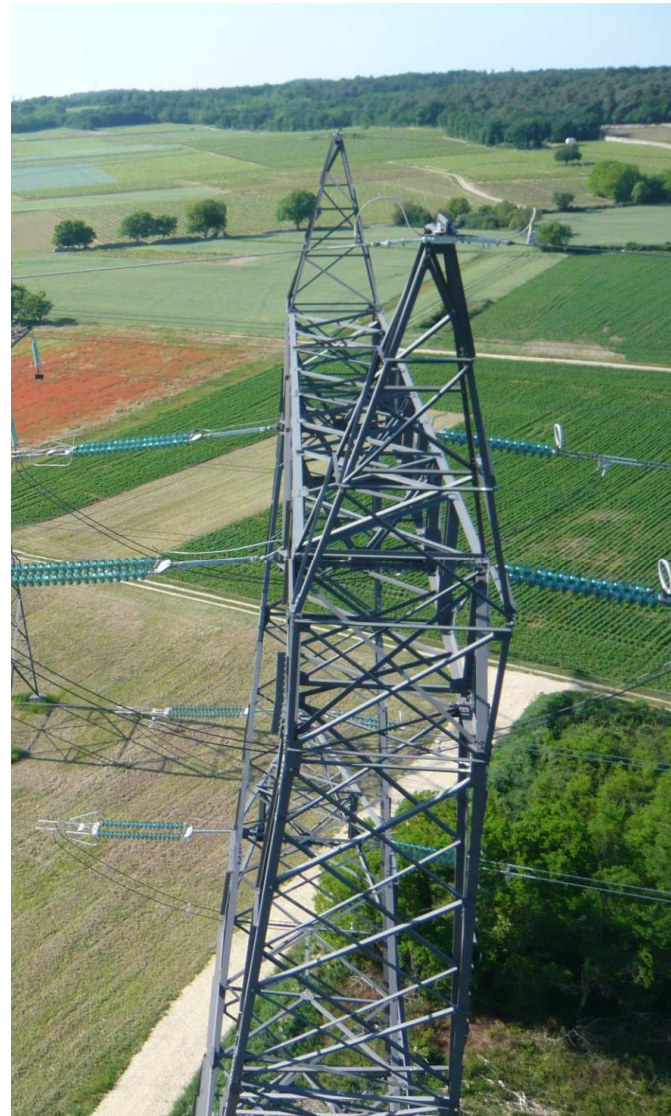
Project Overview:

- Customer: RTE (EDF)
- Project: Avoine-Distré
- Location: Brittany, France
- Year installed: 2010
- Length: 9 miles (15 km) conductor length, 0.75 miles (1.2 km) line length
- Voltage: 400 kV double circuit, double bundled

Solution: 3M ACCR 1033TW T-28 (528mm²)

Results:

- Successfully passed rigorous testing, qualifying conductor for challenging applications in France's backbone grid
- Installed on long spans (400 m), high tension
- 2nd project completed in 2013

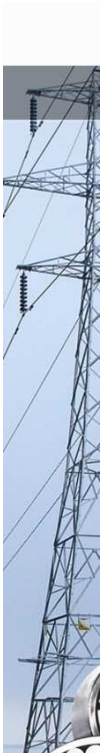




- > 140 Installations Worldwide
- > Years of Field Experience
- > Over a Decade of Successful Installations

Evaluating 3M ACCR for Your Grid

- What are the biggest transmission challenges you face at this time?
- Do you have any thermally constrained lines?
- Do any of your projects include?
 - Large ampacity increases
 - Limited outage window to complete upgrade
 - Need for quick access to renewables
 - Lines through congested cities
 - Difficult to reach terrain (mountains, wetlands, preserves)
 - Long span crossings (rivers, valleys,...)
 - Clearance or compliance issues
- Let 3M engineers help you evaluate ACCR as a potential solution
 - Quickly screen projects for feasibility
 - Recommend optimum solution
 - Assist on engineering studies and cost estimates



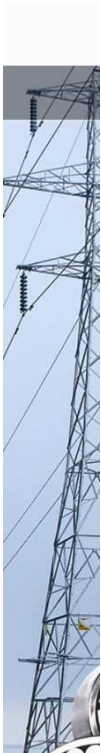
Be Informed, Be Confident

- 3M's team is always available to answer your questions and assist with line designs
- 3M.com/accr gives you easy access to extensive information whenever you need it
 - Conductor performance properties, specifications, and test data
 - Accessory information
 - Design software wire files
 - Installation guidelines
 - Customer installation case studies
- Confer with utilities who have installed ACCR
- Visit an ACCR installation to answer your construction questions
- Visit 3M to see how we design, make, test and deliver ACCR



3m.com/accr

Legal Disclaimer



- **Important notice**

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. Before use, buyer must evaluate and determine whether the 3M product is suitable and appropriate for a particular use and intended application.

- **Warranty**

Unless stated otherwise in 3M's product literature, packaging inserts or product packaging for individual products, 3M warrants that each 3M product meets the applicable specifications at the time 3M ships the product. Individual products may have additional or different warranties as stated on product literature, package inserts or product packages. 3M makes no other warranties, express or implied, including, but not limited to, any implied warranty of merchantability or fitness for a particular purpose or any implied warranty arising out of a course of dealing, custom or usage of trade.

3M™ Aluminum Conductor Composite Reinforced (ACCR)

3M™ ACCR

More Amps
More Confidence

