

Commercial and Industrial

Application Solutions

Electrical Maintenance, Repair, and Operations

About 3M Electrical Markets Division

3M originated as a mining company in 1902 and now proudly supports the industry with our innovative technology, products and service. Our primary products are used to bolster your electrical cabling network, including insulating, protecting, connecting, splicing, and terminating of power cables as well as a number of other applications.

Support from Start to Finish

Whether you are in the midst of a new project or maintaining operations, we are with you every step of the way. Maintaining electrical power is critical in a mining operation, and the cost of downtime extreme.

What you get with us?

Trusted Products

Your reputation depends on reliability. That's why we're committed to providing you with proven, reliable electrical solutions.

Technical Salesforce

You need products that meet your specific requirements. Our technically trained salesforce will help you make an educated decision.

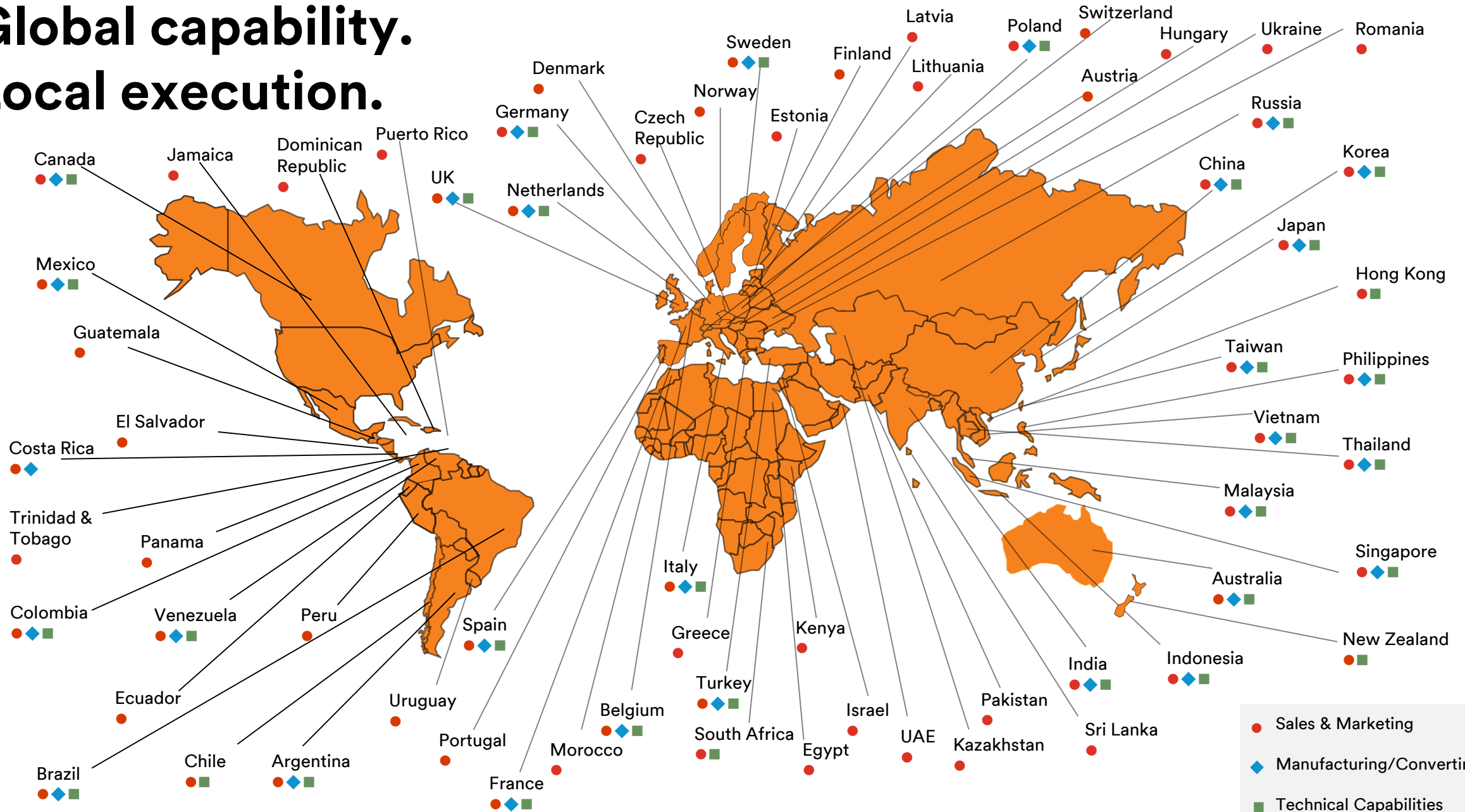
Hands-On Training

Our team of application engineers and sales specialists are available to tackle your challenges and assist with installation training.

70+ years of industry experience.
70 international subsidiaries.
Operations in 200+ countries.

Expert support where you need it.
When you need it.

Global capability. Local execution.



Target Applications for 3M™ EMRO Products

Keep your Facility Running and Reduce Downtime with 3M Professional Grade Solutions

1	<u>Insulate & repair low voltage (≤ 1 kV) wires and cables (1)</u>	9	<u>Repair bus bar insulation</u>
2	<u>Insulate low voltage (≤ 1 kV) wires and cables (2)</u>	10	<u>Help protect cables from water and corrosion</u>
3	<u>Splice low voltage (≤ 1 kV) cables</u>	11	<u>Help protect cables from abrasion and metals from corrosion</u>
4	<u>Connect low voltage (≤ 1 kV) wires and cables</u>	12	<u>Help protect cables from fire and arcing</u>
5	<u>Rejacket and protect medium voltage (5 kV – 35 kV) cables</u>	13	<u>General maintenance</u>
6	<u>Terminate medium voltage (5 kV – 35 kV) cables</u>	14	<u>Be safe on the job (1)</u>
7	<u>Splice medium voltage (5 kV – 35 kV) cables</u>	15	<u>Be safe on the job (2)</u>
8	<u>Motors and electrical equipment splice connections</u>	16	<u>Help protect your facility from fire, smoke and toxic gases</u>

Insulate and repair low voltage (≤ 1 kV) wires and cables

Failures from damaged insulation risk plant downtime. These solutions can help restore insulation for long-term reliability.



Minor Repairs to Cable Insulation

Applicable Products:

- Scotch® Super 33+™ Vinyl Tape – Electrical Insulation & Outer Jacket (600V)
- Scotch® Super 88 Vinyl Tape – Electrical Insulation & Heavy Duty Outer Jacket (600V)
- Temflex™ 1700 General Use Vinyl Tape (600V)

Good when:

- No access to end of cable
- Small/confined space



Fully Repair / Replace Cable Insulation

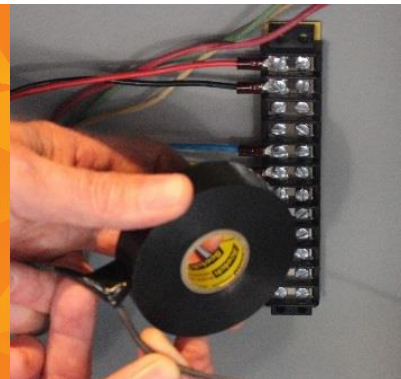
Applicable Products:

- Scotch® 130C Liner less Rubber Splicing Tape + Scotch® Super 33+™ Vinyl Tape
- Scotch® Mastic 2229 + Scotch® Super 33+™ Vinyl Tape
- Scotch® Rubber 2228 + Scotch® Super 33+™ Vinyl Tape (Water Seal)

Good when:

- No access to end of cable
- Small/confined space

Most Common Plant Locations:



Application:

Minor damage to low voltage cable is most common where multi-conductor cables are broken out (ex. junction boxes, control panels, etc.).

Plant Locations:

- Substation Room
- Control and Electrical Equipment Rooms
- Production Area



Application:

Major damage to low voltage cables can also occur in junction boxes and control panels. It is also common when a crane or man-lift collides with the cables in a cable bridge, or when outdoor cable is exposed to UV.

Plant Locations:

- Control and Electrical Equipment Rooms
- Production Area
- Cable bridges

Unless otherwise stated all products are rated to ≤ 1000 V

Insulate low voltage (≤ 1 kV) wires and cables

Failures due to extreme conditions risk plant downtime. These professional grade solutions help get you back online quickly, easily and stay that way.



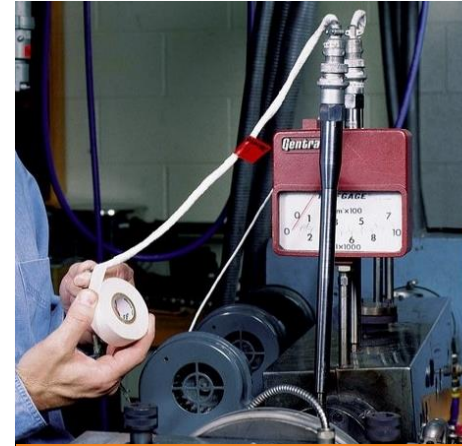
Repair Bus Bar Insulation

Applicable Products:

- Scotch® 66R Bus Bar Vinyl Tape (600V)
- Scotch® 22 Heavy Duty Vinyl Tape (600V)
- Scotch® 130C Liner less Rubber Splicing Tape & Scotch® Super 33+™ Vinyl Tape
- Scotch® Varnished Cambric 2510 + Scotch® 130C Liner less Rubber Splicing Tape + Scotch® Super 33+™ Vinyl Tape (Use Method for Re-entry)

Alternative Solution:

- Heat shrink tubing (non-adhesive) – FP301 (Heavy Wall 1000V)



Protect and Insulate for Extreme Conditions

Applicable Products:

Cold Weather Cable Insulation

- Scotch® Super 33+™ Vinyl Tape, Scotch® Super 88 Vinyl Tape (0°F) – (600V)

High temperature operation and mechanical vibration resistance:

- Scotch® 69 Glass Cloth Electrical Tape or Scotch® 29 Glass Cloth Tape (600V)

Mechanical Vibration Resistance :

- Scotch® Varnished Cambric 2520 + Scotch® Super 88 Vinyl Tape (600V)

Most Common Plant Locations:



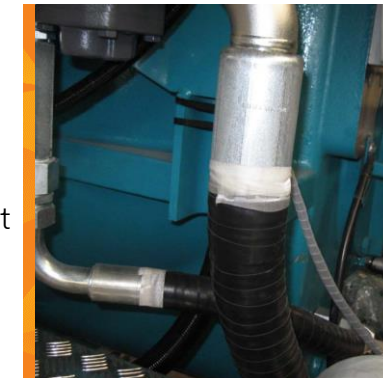
Electrical Equipment Room:

- Bus bar is found inside motor control centers and switchgear



Site-wide:

- High temperature rated insulation should be used when connecting ballasts to cables in indoor and outdoor light fixtures (lighting runs hot)



Production Area:

- On motors with a high amount of vibration or high temperatures, it's important to protect insulation from cut-through.

Splice Low Voltage (≤ 1 kV) Cables

Failures from damaged insulation risk plant downtime. These solutions can help restore insulation for long-term reliability.



Rapid Connection and Insulation

Applicable Products:

- 3M™ 8420 Cold Shrink Insulators – Torch Not Required
- 3M™ QI Cold Shrink Insulators & QSLV-M Cold Shrink Splices
- 3M™ 5730 Cold Shrink Splice Kits – 3C
- 3M™ Heat Shrink ITCSN Heavy-Wall Cable Sleeves – Torch required
- **Good when:**
 - Access to end of cable, Rapid Installation and long term reliability



HD Mechanical Protection and waterproof

Applicable Products:

- 3M™ Scotchcast™ Resin power cable inline splice kits 82-AN, 72-N, & 82-F
- 3M™ Scotchcast™ Wye Resin Splice kits 82-BN, 90-B1 (Split Bolt or Parallel)
- 3M™ Scotchcast™ Multi-Mold Splice kits 85 Series for irregular shapes
- **Good when:**
 - No access to end of cable
 - Permanent Solution needed

Most Common Plant Locations:



Application:

- Outdoor direct bury splices, low voltage splices in junction boxes, control panels, cable bridges, service drops, non abrasion resistant

Plant Locations:

- Outdoor bury
- Substation Room
- Control and Electrical Equipment Rooms
- Production Area
- Cable Bridges
- Overhead pole drops



Application:

- Permanent outdoor direct bury splices. Drag Resistant, split bolt and tap splices, irregular shapes. Water proof and fully submersible.

Plant Locations:

- Outdoor direct bury
- Man Holes and Subsurface
- Pipes and under water Pumps
- Electric Powered Mobile Equipment

Connect low voltage (≤ 1 kV) wires and cables

Tape flagging, cracking and poor protection from outdoor conditions can cause failures and create downtime. These professional grade solutions can help provide longer-term protection than tapes alone.



Connect and Insulate
Indoor

Applicable Products:

- 3M™ Scotchlok™ Inline Insulated Butt connectors (Vinyl, Nylon, Heat Shrink)
- 3M™ Scotchlok™ Terminals (Vinyl, Nylon, Heat Shrink)
- **For faster installation for many connections, like lighting:**
- 3M™ Performance Plus Wire Connectors (B/G, O/B, R/Y, T/R, 512G)
- 3M™ Scotchlok™ IDC connectors (Pigtail, Run/Tap, T-Tap, Butt, MGC)



Connect and Insulate
Outdoor

Applicable Products:

- 3M™ Direct bury splice kits DBO/B-6 and DBR/Y-6
- 3M™ Scotchlok™ Inline Insulated Butt connectors (Heat Shrink)
- 3M™ Scotchlok™ Terminals (Heat Shrink)
- **For faster installation:** 3M™ Scotchlok® IDC Pigtail Connector 314 and 316IR and MGC (contains grease for water resistance)

Most Common Plant Locations:



Applications:

- Crimp and butt connectors connect light switches, breakers, terminal blocks
- Spring connectors are used for bundling neutral wires in switches and outlets.
- IDC's are used to tap into main run in lighting, and for connecting control wires.

Plant Locations:

- Administration Building
- Control Rooms in Production Area
- Control Building
- Substation



Applications:

- Help protect from moisture and other outdoor conditions in underground applications, such as irrigation systems.

Plant Locations:

- Facility Exterior especially around the Administration building and plant entrance.

Rejacket and protect medium voltage (5 kV – 35 kV) cables

Damaged cable jackets can cause a failure. Rely on insulation and protection from these field-tested 3M solutions.



Minor Repairs to Jacket

Applicable Products:

- Scotch® 130C Liner less Rubber Splicing Tape + Scotch® Re-Jacketing Tape 2234 or Scotch® Heavy Duty Tape 31 (Use Scotch® Super 33+™ Vinyl Tape to secure ends)
- Scotch® 130C Liner less Rubber Splicing Tape + Scotch® Super 88 Vinyl Tape in wide width

Alternative Solution:

- HDCW Heat Shrink



Full Jacket Replacement

Applicable Products:

- Scotch® 130C Liner less Rubber Splicing Tape + Scotch® Super 33+™ Vinyl Tape + Scotch® Re-Jacketing Tape 2234 (Use Scotch® Super 33+™ Vinyl Tape to secure ends)

Additional Abrasion and/or Chemical Resistance:

- Scotchrap™ 51 Corrosion Protection Tape
- HDCW Heat Shrink

Most Common Plant Locations:



Applications:

- Minor damage to MV jacket is more common when pulling wire into a cable bridge or manhole, or when other trades damage the jacket accidentally.

Plant Locations:

- Manholes
- Cable Bridges
- Electrical Equipment Room (inside switchgear)



Applications:

- Jacket replacement is most common after installing a splice.
- Extra abrasion resistance would be needed in areas with vibration, such as large compressors or motors.

Plant Locations:

- Cable Bridges
- Manholes



Note: For Cable Jacket Replacement Only. Please contact your local sales representative should there be damage to primary Insulation, Semi-Con, or Shielding.

Terminate medium voltage (5 kV – 35 kV) cables

Reliably terminate incoming medium voltage power to your facility and equipment with these 3M™ Terminations.



Terminating in
Switchgear and other
electrical equipment

Applicable Products:

- 3M™ QT-III Medium Voltage Termination kits
- 3M™ QT-II Medium Voltage Termination kits
- 3M™ Separables
- **Also available:** Rubber, Silicone, and Semi-conducting tapes



Outdoor Terminating

Applicable Products:

- 3M™ QT-III Medium Voltage Termination kits
- 3M™ QT-II Medium Voltage Termination kits
- **Also available:** Rubber, Silicone, and Semi-conducting tapes

Most Common Plant Locations:

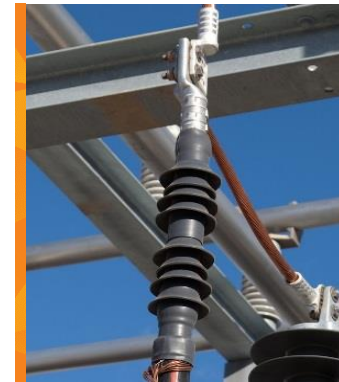


Applications:

- Terminations inside switchgear
- Medium voltage motor connection boxes

Plant Locations:

- Electrical Equipment Room
- Substation & Transformer
- Production Area



Applications:

- Where power comes in from overhead utility line to the underground cable to the facility

Plant Locations:

- Onsite and offsite at the utility substation

Splice medium voltage (5 kV – 35 kV) cables

Reliably splice medium voltage power cables throughout your facility with long term solutions.



Overhead Splicing

Applicable Products:

- 3M™ QS-III Medium Voltage Splice kits
- 3M™ EPDM Cold Shrink Breakout kits
- 3M™ HDBB Heat Shrink Heavy Duty Breakout Boots (with splice or tape)
- **Additional Abrasion Resistance:**
 - 3M™ Sheath Wrap

Also available: Rubber, Copper Mesh, Copper Braid, Vinyl, and Semi-Con Tapes



Underground Splicing

Applicable Products:

- 3M™ QS-III Medium Voltage Splice kits
- 3M™ QS-II Medium Voltage Splice kits

Also available: Rubber, Copper Mesh, Copper Braid, Vinyl, and Semi-conducting tapes

Most Common Plant Locations:

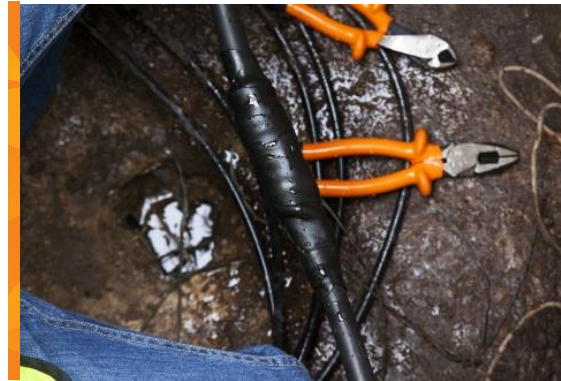


Applications:

- Overhead splicing is common in cable bridges throughout the facility, especially when very long runs are needed, or when a section of the cable is damaged.

Plant Locations:

- Medium Voltage Cable Bridges from the Electrical Equipment Room to Production Area
- Substation & Transformer
- Manholes & Vault



Applications:

- Splicing underground is common when cables are subject to damage, or very long runs are needed.

Plant Locations:

- Manholes
- Tunnels
- Cable Bridges

Motors and electrical equipment splice connections

Reliably protect, insulate and waterproof motor lead connections for long-term use or re-entry.



Insulate Motor Lead Connections

Applicable Products:

≤ 1kV Motors

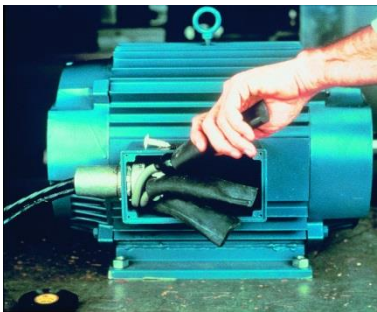
- 3M™ Motor Lead Splice Kits 5300 – 5303 Series (for pigtail & moisture seal)
- Back-Wrap Scotch® Super 33+™ Vinyl Tape + Scotch® 130C Liner less Rubber Splicing Tape + Scotch® Super 33+™ Vinyl Tape (600V)
- Scotch® Mastic 2229 + Scotch® Super 33+™ Vinyl Tape (600V)
- Scotch® Rubber Mastic 2228 + Scotch® Super 33+™ Vinyl Tape

Back-wrapping Tape allows for clean re-entry. Rubber tape provides moisture resistance and insulation, which is critical for outdoor use.

5 – 8 kV:

- 3M™ Motor Lead Splice kits 5316 – 5384 for shielded/non-shielded cables (5381-5384 are re-usable) or 3M QT-III Medium Voltage Termination kits for shielded cable. 3M™ Motor Lead Splice Kits

Most Common Plant Locations:



Applications:

- LV motors will drive pumps, fans and agitators across the facility.

Plant Locations:

- Production Area: LV motors are used for the pumps and agitators.
- Administrative Building & Control/Electrical Equipment Room: LV motors for AC compressors, air handling blowers, etc.
- Substation Motors
- Conveyors Belts, Lifts, Storage Tanks, Cooling Towers



Unless otherwise stated all products are rated to ≤1000V

Repair bus bar insulation

Reliably insulate the bus bar around critical equipment to protect against failures and arcing.



Low Voltage Bus Bar Insulation Repair

Applicable Products:

For straight bus bar:

- Heat shrink tubing FP301 (600V)

For bends and bolted connections:

- Scotch® Electrical Insulation Putty + Scotch® 130C Liner less Rubber Splicing Tape and Scotch® Super 88 Vinyl Tape
- Note: Scotch® Varnished Cambric 2510/20 can be used for additional mechanical protection



Medium Voltage Bus Bar Insulation Repair

Applicable Products:

For straight bus bar:

- BBI Heat Shrink tubing (up to 110°C and 35 kV)

For bends and bolted connections:

- Scotch® 130C Liner less Rubber Splicing Tape and Scotch® Super 88 Vinyl Tape

Most Common Plant Locations:



Applications:

- Bus bar connects transformers to switchgear (inside bus duct), and is also found inside switchgear.

Plant Locations:

- Electrical Equipment Room

Help protect cables from water and corrosion

Help protect your connections and equipment from environmental elements and contamination to minimize costly repairs.



Resist Water

Applicable Products:

Good for small/confined area:

- Scotch® Mastic 2229 + Scotch® Super 33+™ Vinyl Tape (600V)
- Scotch® Rubber Mastic 2228 + Scotch® Super 33+™ Vinyl Tape
- 3M™ QI Cold Shrink Insulators & QSLV-M Cold Shrink Splices
- 3M™ Electrical Resins (Scotchcast™)
- Scotch® Super 33+™ Vinyl Tape + 3M™ Scotchkote® FD Electrical Coating



Resist Oils and Chemicals

Applicable Products:

- 3M™ Electrical Insulating Resins (Long term Solution)
- Scotch® Super 33+™ Vinyl Tape + 3M™ Scotchkote® FD Electrical Coating
- 3M™ Heat Shrink Tubing (Splashes and Medium Term Solution)
- Scotchrap™ 51 Corrosion Protection Tape

Most Common Plant Locations:



Applications:

- Help protect splices from water and excess moisture, for example manholes often fill with water.

Plant Locations:

- Manholes
- Production Area
- Outdoors



Applications:

- Help protect splices on cables located in areas subjected to oil and corrosive chemicals in the facility.

Plant Locations:

- Production Area

Help protect cables from abrasion and metals from corrosion

Environmental threats are common to Industrial facilities' cables and pipes. Help protect your electrical systems and infrastructure with these reliable 3M solutions.



Resist Abrasion,
Puncture, and Cut
through

Applicable Products:

Good for small/confined area

- 3M™ Sheath Wrap Structural Material
- Scotch® Heavy Duty Tape 31(MSHA)
- Scotch® Heavy Duty Re-Jacketing Tape 2234
- Scotchrap™ 51 Corrosion Protection Tape (HD PVC)

Alternative Option:

- HDCW Heat Shrink



Resist Pipe Corrosion

Applicable Products:

- 3M™ Scotchrap™ Pipe Primer + 3M Scotchrap 50 or 51 Corrosion Protection Tapes for environmental seal and abrasion resistance

Or

- 3M™ Scotchrap™ Pipe Primer + 3M™ Temflex™ 1100 & 1200 Corrosion Protection Tape for environmental seal and abrasion resistance (General)
- Scotch® Rubber tape 23 + Scotch® Super 33+™ Vinyl Tape (Short Term)

Most Common Plant Locations:



Applications:

- Help protect cables from extra rough handling, such as when dragged across the ground, from things being dropped on them, or just everyday rough wear and tear.

Plant Locations:

- Cable Bridges
- Manholes
- Outdoors



Applications:

- Help protect important metal assets, including pipes, conduit, metal stands for motor controls and instrumentation, etc. from corrosive environments, especially in coastal areas.

Plant Locations:

- Production Area
- Outdoors (short run)

Help protect cables from fire and arcing

Industrial facilities have inherent fire safety risks. Without the proper precautions such hazards can result in very expensive equipment and facility repairs. 3M solutions can help.



Arc Proofing

Applicable Products:

- Scotch® 77 Fire-Retardant and Electric Arc-Proofing Tape
- Scotch® 70 Self Fusing Silicon Arc & Track Resistant Tape



Resist Fire and Explosion

Applicable Products:

- FP 301 VW1 Flame-retardant heat shrink
- Scotch® 77 Fire-Retardant and Electric Arc-Proofing Tape (in black or white for LV and MV cables)

Most Common Plant Locations:



Applications:

Arc-proofing is especially critical when there are multiple unarmored MV feeds/circuits in a small space. One fault can arc and shut down others.

Plant Locations:

- Manholes
- Tunnels
- Outdoor cable bridges
- Electrical Equipment Room



Applications:

- Use on splices up to 10KV to protect adjacent cables from damage if the splice fails. Can also help avoid secondary damage and fire around the failed splice.

Plant Locations:

- Manholes
- Production Area

General maintenance

Quality products for electrical and non-electrical general maintenance and repair jobs.



Cleaning and Lubrication

Applicable Products:

- 3M™ Novec™ Contact Cleaners and Lubricants
- 3M™ Citrus Base Cleaner
- 3M™ 5-Way Penetrant



Cable Identification and Color Coding

Applicable Products:

- Scotch® 35 Color Coding Vinyl Electrical Tapes (Outdoor, Long Term Fade Resist)
- Scotchcode™ wire marking
- 3M™ FP301 Heat Shrink Tubing



Hazard Marking and Barricading

Applicable Products:

- Scotch® Barricade Tape
- Scotch® Detectable Barricade Tape
- 3M™ Floor Marking 471 Tape

Most Common Plant Locations:

Applications:

- Help prevent contact corrosion, lubricate and clean machinery and electrical equipment.

Plant Locations:

- Production Area
- Switchgear
- Cable bridges

Applications:

- Visual marking of electrical phases on cables and wires.
- Marking of wires in panel boxes and terminal blocks

Plant Locations:

- Production Area
- Control and Electrical Equipment Room
- Cooling Towers
- Blending and Storage Tanks

Applications:

- Identifying and marking important, restricted, hidden, or hazardous locations.

Plant Locations:

- Production Area
- Outdoors
- Manholes
- Underground cables and pipes

Be safe on the job

Safety hazards can result in serious injury to employees. Protect your workers with valuable precautions. 3M solutions can help.



Everyday Hand Protection

Applicable Products:

- 3M™ GU Comfort Grip General Use Gloves
- 3M™ Gripping Material Work Gloves (High Dexterity)

Good when:

- Working conditions are wet or oily



Cut Resistance

Applicable Products:

- 3M™ Comfort Grip Cut Resistant Gloves

Good when:

- Working with abrasive or sharp materials, such as conductors or tape-shielded cable.

Most Common Plant Locations:



Applications:

- Help protect hands during general material handling, while maintaining dexterity.

Plant Locations:

- All locations, especially the non-administrative areas such as the Production Area



Applications:

- Help protect hands against cuts, punctures and tears without loss of dexterity.

Plant Locations:

- All locations, especially the non-administrative areas such as the Production Area

Be safe on the job

Personal Safety hazards can result in serious injury to employees. Protect your workers with valuable precautions.



Head and Eye Protection

Applicable Products:

- 3M™ Hard Hat H-700 & 800 Series
- 3M™ SecureFit™ Protective Eye wear 400 Series

Meet Safety Regulations and proactively protect your workers.



Hearing Protection

Applicable Products:

- 3M™ Peltor™ Ear Muffs
- 3M™ Disposable Foam Earplugs (E-A-R™ or E-A-Rsoft™)

Protect your workers from environments with elevated decibel exposure levels.



Respiratory Protection

Applicable Products:

- 3M™ Particulate Respirator N Series
- 3M™ Particulate Respirator R & P Series for Oil & Non Oil particles

Protect your workers from respiratory hazards



Fall Protection

Applicable Products:

- 3M™ Full Body Harnesses
- 3M™ Retractable Lanyards
- 3M™ Anchorage Connectors

Protect your workers from accidental fall injury

Help protect your facility from fire, smoke, and toxic gases

With our knowledge of Fire Detection, Containment and Suppression 3M can help create preventative and affordable fire stopping solutions.



3M™ Fire Barrier Foams



3M™ Fire Barrier Packing Material



3M™ Fire Barrier Sealants



3M™ Fire Barrier Mortar



3M™ Fire Barrier Pillows



3M™ Fire Barrier Composite Sheeting



3M™ Fire Barrier Moldable Putty



3M™ Fire Barrier Wraps



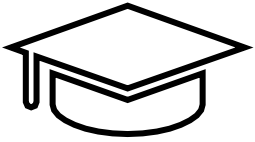
3M™ Pass-Through Devices (Round, Square)



3M™ Fire Barrier Wrap Strips and Collars



Additional Resources



Energy Academy

Take expert-led, online electrical training anytime, anywhere 24x7.

[Sign Up Today](#)



3M Electrical App

View our full product portfolio, create shareable project lists, and more with our 3M Electrical App.

Available on:



[Learn More](#)

[Also visit us at 3M.com/Electrical](https://www.3m.com/Electrical)

3M is a trademark of 3M Company.

Important Notice

Before using any of these products, you must evaluate them and determine if they are suitable for your intended application. You assume all risks and liability associated with such use.

Warranty; Limited Remedy; Limited Liability.

3M's product warranty is stated in its Product Literature available upon request. 3M MAKES NO OTHER WARRANTIES INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. If this product is defective within the warranty period stated above, your exclusive remedy shall be, at 3M's option, to replace or repair the 3M product or refund the purchase price of the 3M product. Except where prohibited by law, 3M will not be liable for any direct, indirect, special, incidental or consequential loss or damage arising from this 3M product, regardless of the legal theory asserted.



Caution: Working around energized electrical systems may cause serious injury or death. Installation should be performed by personnel familiar with good safety practice in handling electrical equipment. De-energize and ground all electrical systems before installing product.