



# Wind Energy Update New Brochure



# Wind mill parks. Description



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MV compact station  
located at the base



# Wind mill parks. Description



MV compact station  
located at the base



### Separable Connectors

#### 630A T

12/20KV

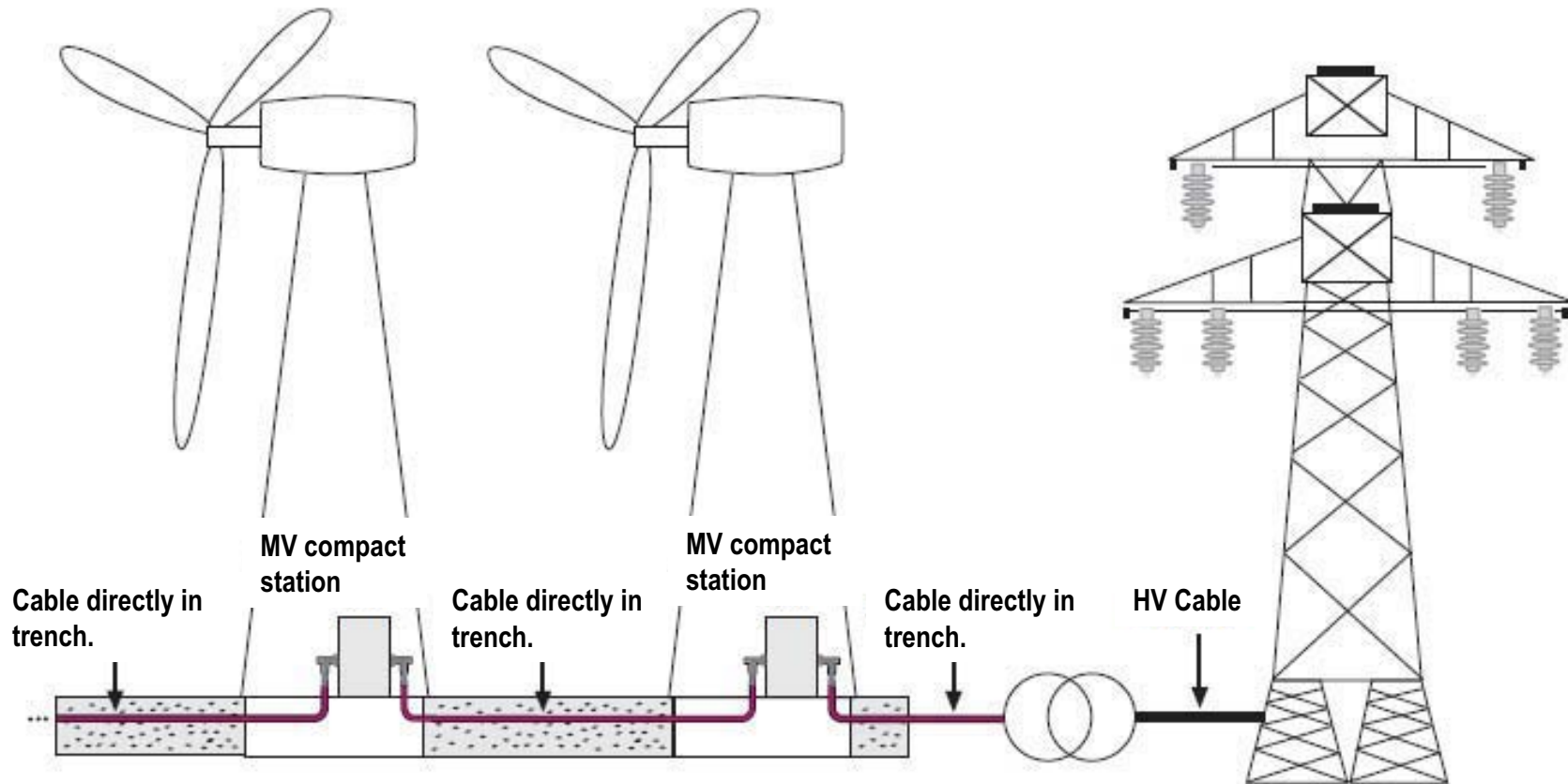
50/95 93-EE-705-6/95

150/240 93-EE-705-6/240

400 93-EE-715-6/400



# Wind mill parks. Connection to Grid



**Generators interconnection cable (12/20kV or 18/30 kV) is pulled and buried directly in the trench to evacuate the energy generated.**



# Wind mill parks. Description



# Wind mill parks. Description



LV/MV transformer located at the wind turbine level



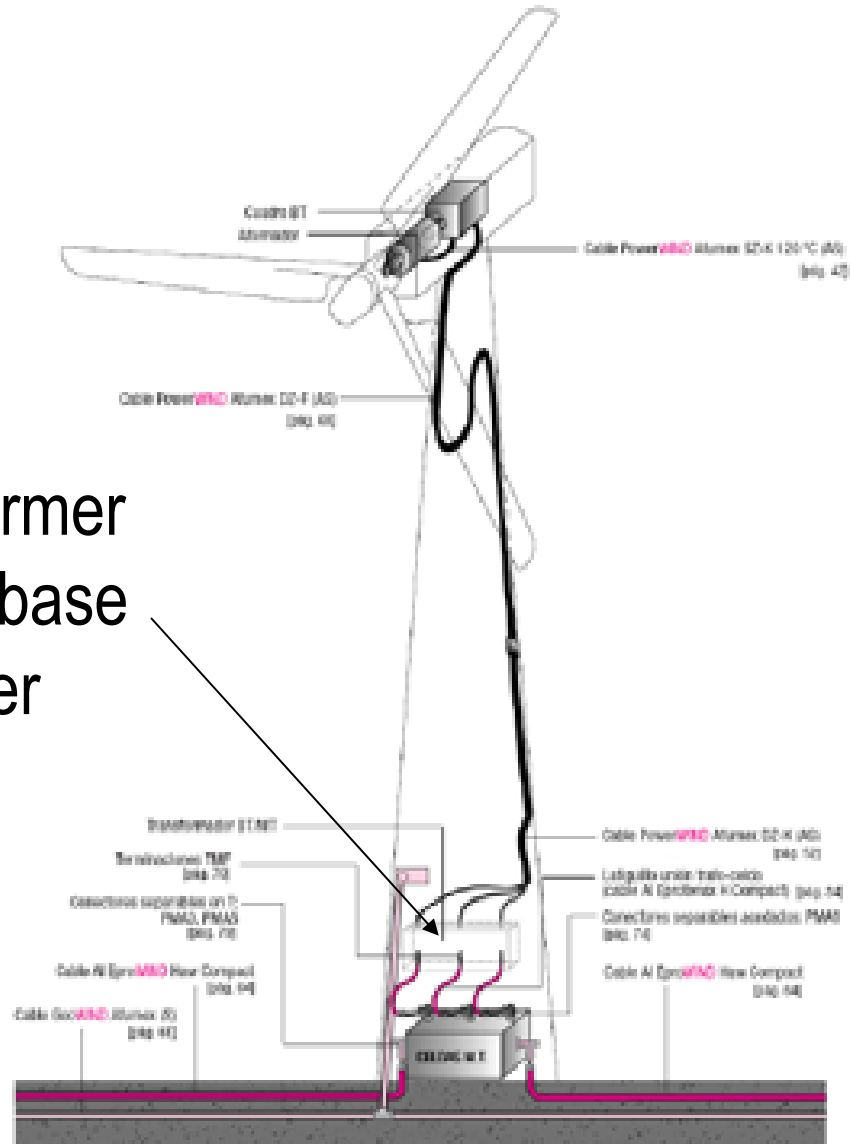
| Conventional Terminations |          |
|---------------------------|----------|
| Indoor                    |          |
| 12/20KV                   |          |
| 25/95                     | QT-II J4 |
| 95/240                    | QT-II K4 |
| 240/400                   | QT-II L4 |



# Low Voltage Cable and Connections



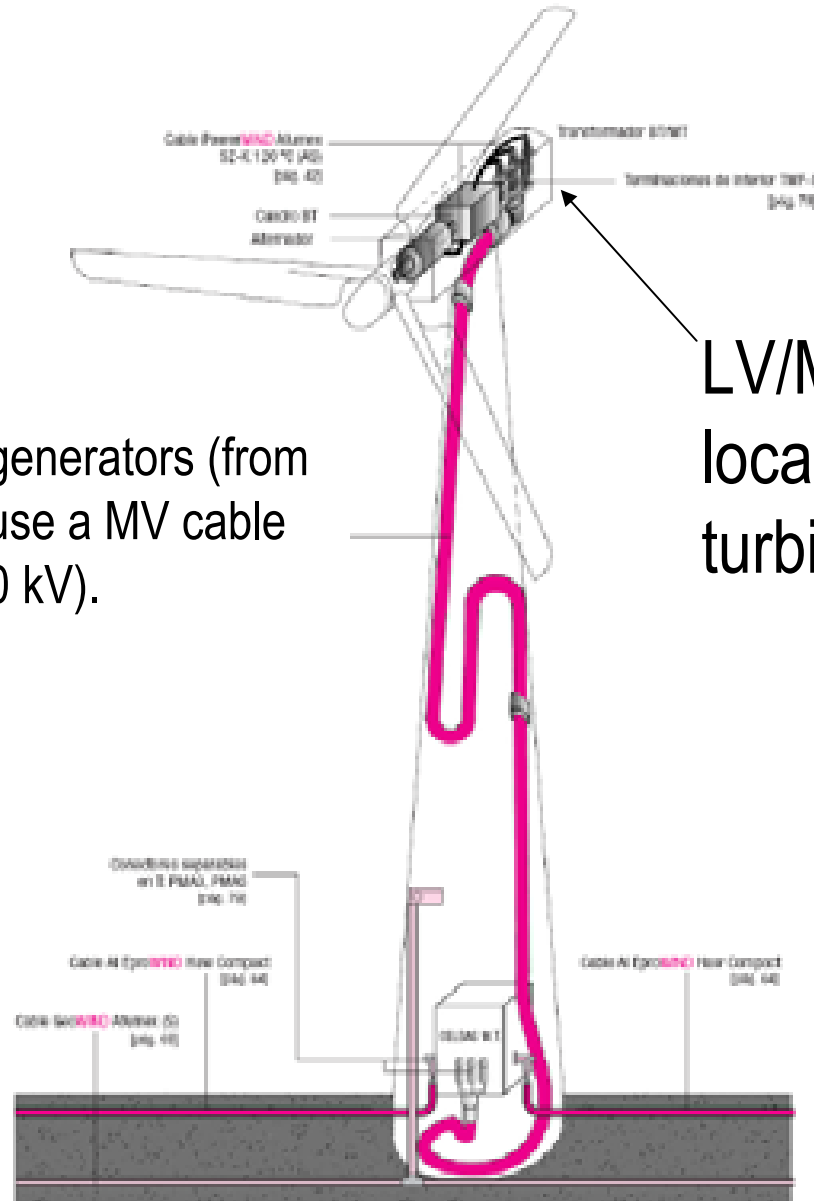
LV/MV transformer located at the base of the mill tower



# Medium Voltage Cable and Connections



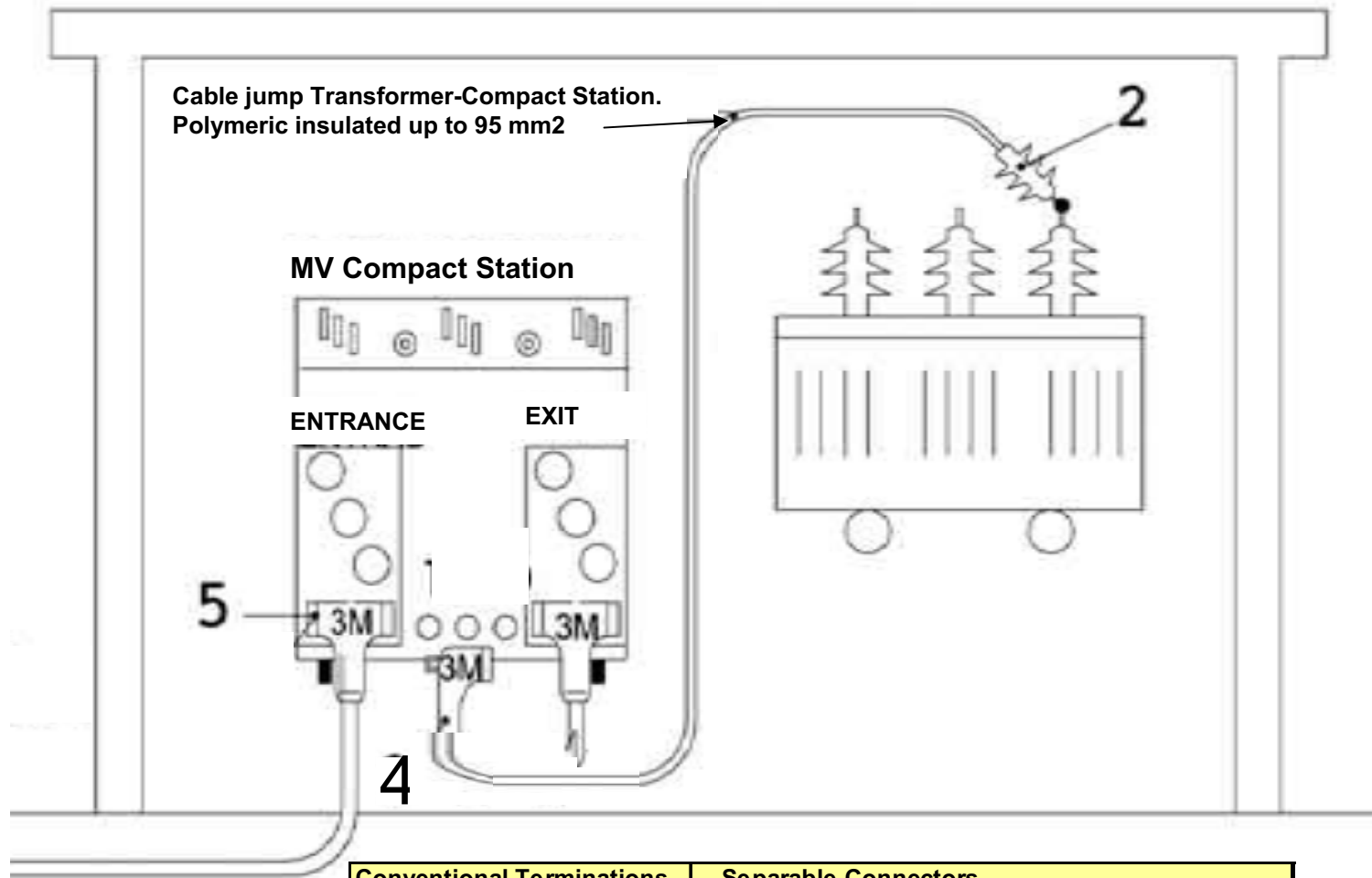
High power wind generators (from 1,5 MW approx.) use a MV cable (12/20 kV or 18/30 kV).



LV/MV transformer located at the wind turbine



# Recommended Product range for wind farms



| Conventional Terminations |                       | Separable Connectors    |  |
|---------------------------|-----------------------|-------------------------|--|
| <b>2.- Indoor</b>         | <b>4.- 250A Elbow</b> | <b>5.- 630A T</b>       |  |
| 12/20KV                   | 12/20KV               | 12/20KV                 |  |
| 25/95 QT-II J4            | 25/95 93-EE-605-2/95  | 50/95 93-EE-705-6/95    |  |
| 95/240 QT-II K4           | 150 93-EE-615-2/150   | 150/240 93-EE-705-6/240 |  |
| 240/400 QT-II L4          |                       | 400 93-EE-715-6/400     |  |



# New Brochure.



### Training where you are

Customers of 3M don't just want on-site exceptional products, they look to 3M for installation training conducted by experienced, technically trained representatives on-site, when needed. 3M also provides in-depth wind farm electrical technology training for customers at its state-of-the-art facility in Austin, Texas. From on-site training, 3M customers can count on experienced 3M technical service engineers who are on-site as the phone.



### Support from design through end of installation

3M can help you optimize your wind farm electrical system with a team of experienced professionals who can:

- Provide you with the correct details in specifications.
- Help you configure the best kits for your project to meet your electrical needs and help minimize labor and installation time.

3M's on-site representatives in the field are always prepared to provide on-site support as you need it.

Ask about the broad range of cable termination and splice kits from 3M.



### Solutions packaged for you

3M not only provides easy-to-install products, but can package products to make your inventory and installation processes more efficient.

- 3M will custom configure wind farm kits with the addition of job and project specific components.
- Product kits can be specially labeled for your project with details down to your print specifications call-outs. These kits are assembled at a 3M ISO 9001 certified plant. 3M kits can be drop-shipped directly to your job site.

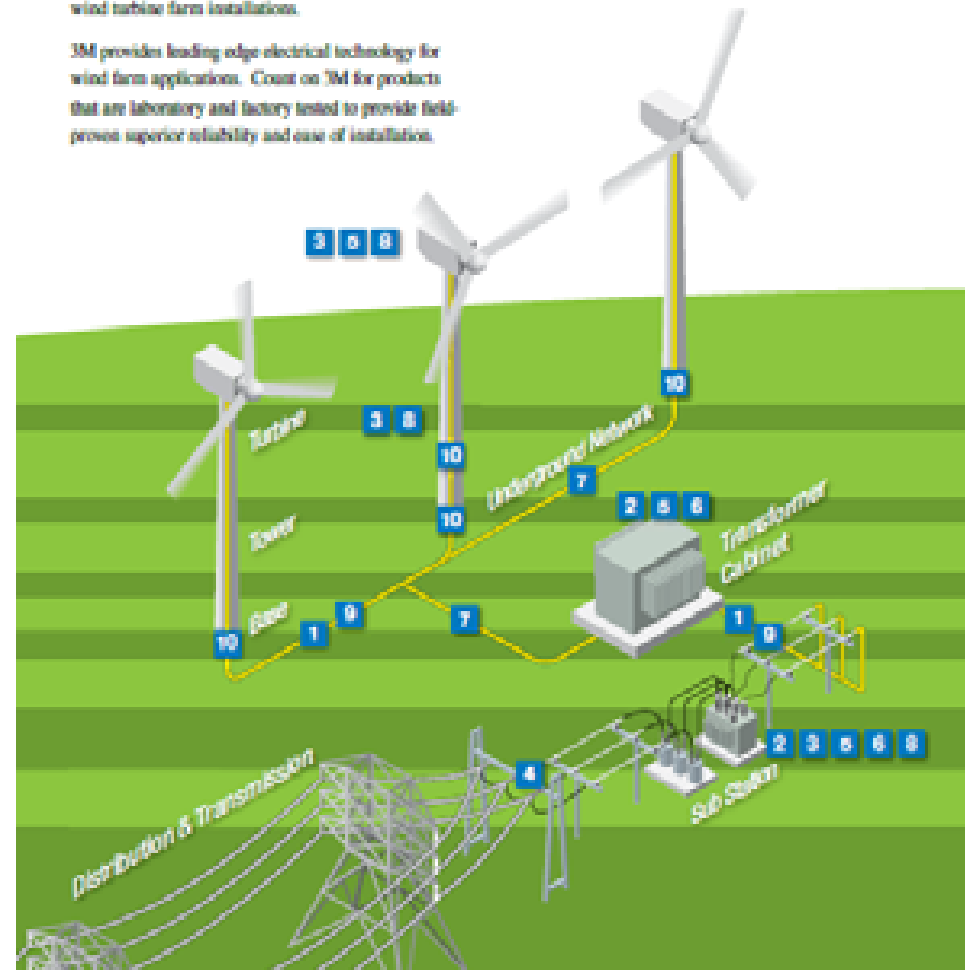


3M custom labeling helps reduce inventory demands, streamline workflow and may reduce time needed for installation.

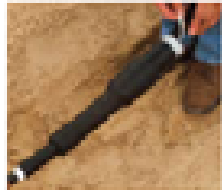
## Electrical solutions for Wind Farms

3M products help protect reliability in key places in wind turbine farm installations.

3M provides leading edge electrical technology for wind farm applications. Count on 3M for products that are laboratory and factory tested to provide field-proven superior reliability and ease of installation.



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## 1. Medium-Voltage Splices (up to 35kV)

3M makes a wide range of cold-shrink medium-voltage splices, which 3M invented, to fit a broad range of cables. Cold-shrink technology provides easy installation, effective insulation and creates a dynamic, compressive seal which has been proven reliable over 40 years of field use. 3M™ Splice Kits for wind farm applications are tested on aluminum and copper conductors to meet the stringent test requirements of IEEE Standard 404.

Cross-Bond Splices - Special kit configurations include the 3M™ Cold Shrink Cross-Bond Splice Kit (CS-8), a silicone rubber splice based on 3M cold-shrink technology.



## 2. Medium-Voltage Terminations (up to 35kV)

3M also provides a wide range of medium-voltage terminations, based on cold-shrink technology, to fit a broad range of cables. These terminations are quick and easy to install and have been field-proven reliable. 3M™ Termination Kits for wind farm applications are tested on aluminum and copper conductors to meet IEEE Standard 48.

Add Separable Connectors



## 3. Low-Voltage Splices (up to 1000V)

3M offers several solutions for splicing low-voltage cable, including the 3M Cold Shrink Connector Insulator QSLV and QSLV-M series. Both products incorporate an insulating tube with a three-core system that is designed to be installed quickly and easily and provide extra impact resistance for direct bury applications. QSLV-M insulators, with mastix rings to the tube ends, offer even broader range taking.



## 4. High-Voltage Terminations (up to 69kV)

3M offers the first cold-shrink termination for HV applications. This termination offers the same easy installation and long-term reliability as 3M's medium-voltage terminations. It meets or exceeds the requirements of IEEE 48, Class 1, for HV.

Add Splice (69kV)



## 5. Premium Electrical Tape

3M invented vinyl electrical tape and still makes the tapes counted on by electricians and contractors around the world. 3M™ and Scotch™ Premium Vinyl Electrical Tapes offer excellent conformability and widespread resistance, weather extremes, ultraviolet rays and corrosion. 3M makes a wide range of top-quality insulating and sealing tapes for most electrical applications.



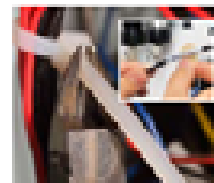
## 6. Heat Shrink for Bus Bars

3M Bus Bar Tubing HSE-A is made of a specially formulated polyolefin that is cross-linked, flame resistant, split resistant and track resistant. It handles voltage ranges from 600V to 35kV and will shrink to fit rectangular, square or round bus bars.



## 7. Cable Grounding Kits (up to 35kV)

3M Cable Grounding Kits provide a simple, reliable and secure method for grounding and encasing of the jacket of direct buried cables. These kits are available for a range of cable types and sizes, including the commonly used RCN cables ranging from 2 to 40 AWG, rated through 35kV.



## 8. Wire Management and Marking Supplies

3M offers a wide range of products for marking and managing wires. There are dozens of ways to mark wires and cables in the 3M Scotchlock™ Wire Identification Systems. 3M Cable Ties include a wide variety of sizes and styles for protected and exposed use.

## Non-electrical solutions



## 9. Locating and Marking Products

The full line of 3M locators and markers helps you quickly and accurately identify underground assets. From finding the exact path and estimated depth of underground utilities to locating buried passive markers to marking and writing information directly to the new RFID markers, 3M offers the precision tools needed to manage your assets. And now, certain 3M™ Dynaloc™ Locators interface with select CIPRO™ field mapping instruments.

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## T0. Fiber Optic Splicing System and Enclosures

3M makes a range of exceptional products for splicing fiber optic cables and enclosures for protecting it. These products include the 3M<sup>®</sup> Fiber Glass Closure and the 3M Fiberlink<sup>®</sup> Optic Splicing System, a precise, simple system for splicing fiber optic cable which includes rugged enclosures that protect fiber optic facilities in punishing environments. The 3M No Polish Connector allows for fast, on-site installation of single-mode and multi-mode fiber optic connections using a one-piece, pre-assembled design.



## T1. Blade and Tower Protection

Whether you need to gain an edge over blade repair and protection, tower maintenance, corrosion protection or worker safety, 3M Wind Energy Products provide a wide range of advantages.

Based on technology used to protect helicopter blades, 3M Wind Tape 8001 and 8021 provide effective erosion control for the leading edge of wind turbine blades. 3M ScotchBlast<sup>®</sup> High-Performance Coatings offer long-lasting, maintenance-free protection for towers and blades against corrosion, abrasion, erosion and other aggressive operating conditions.

## Meet the Challenge with 3M

The wind farm may be exposed but your project shouldn't be. Let 3M help make the electrical insulation of your wind farm go in more efficiently and operate more reliably.

Contact your 3M representative and learn how 3M has developed a track record of reliability thanks to its superior technology backed by leading edge training.

### Electrical solutions:

For information about electrical products, call 800 248 3673 or visit the 3M Electrical Markets Division Web site at [www.3m.com/electrical](http://www.3m.com/electrical)

For technical support for medium- and high-voltage electrical products, call 542 984 5055.

For technical support for tapes, wire marking and management and other low-voltage electrical products, call 542 984 5000.

### Tower and blade solutions:

For more information about products for tower and blade applications, visit [www.3m.com/wind](http://www.3m.com/wind) or call 800 3M HELPS.



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### Important Notice

Before using this product, you must evaluate it and determine if it is suitable for your intended application. The amount of time and facility associated with such use.

### Warranty, Limited Remedy, Limited Liability

3M's product warranty is stated in the 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 USE. 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 return the purchase price of the 3M product. Except where prohibited by law, 3M will not be liable for any indirect, special, incidental or consequential loss or damage arising from the 3M product, regardless of the legal theory asserted.



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