

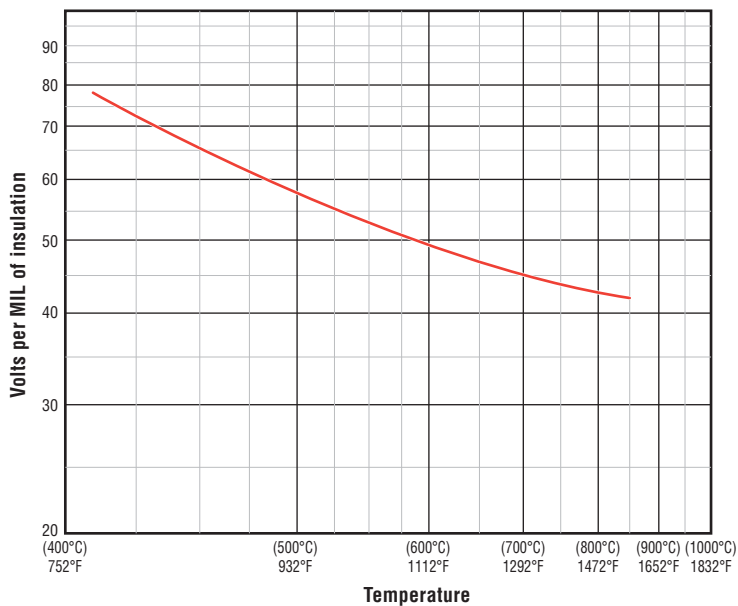
Appendix M: Magnesium Oxide Insulation Characteristics

Moisture Penetration

Magnesium oxide is hygroscopic, resulting in the uptake and retention of moisture under certain humidity and temperature conditions. When MI cable is not properly sealed and is subjected to these conditions, moisture penetrates several inches into the insulation, thereby reducing the insulation resistance. Tyco Thermal Controls' tests confirm that the moisture will not penetrate further into the cable and can be removed by applying heat to the cable to force the moisture out the open end. The insulation resistance will be restored once the cable has been dried and sealed.

Dielectric Strength

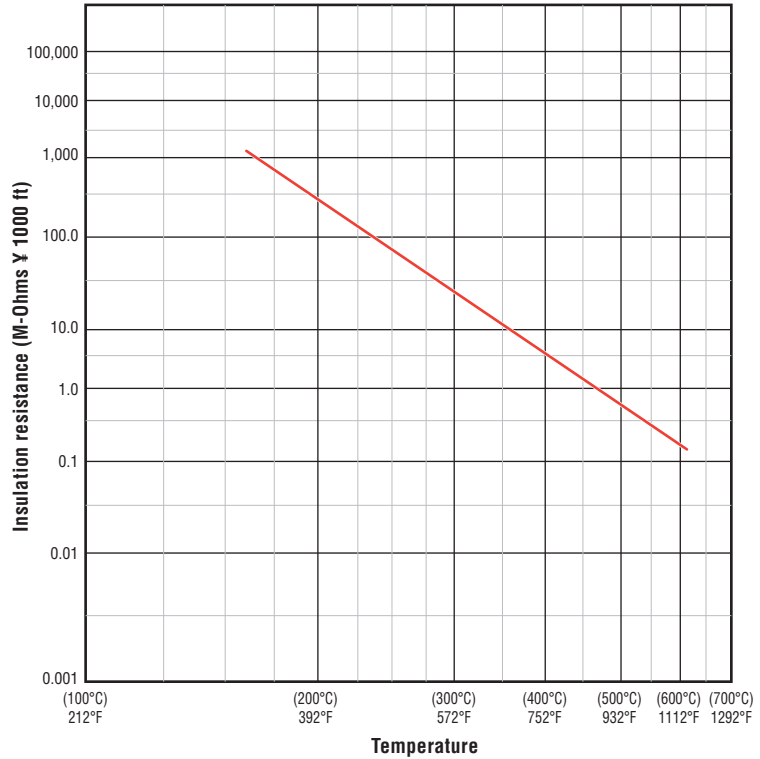
Although the dielectric strength of magnesium oxide insulation decreases with temperature, because of the way MI cables are constructed this decrease has no detrimental effect on cable functionality.



Graph M.1 Dielectric strength of MI cable as a function of temperature

Insulation Resistance

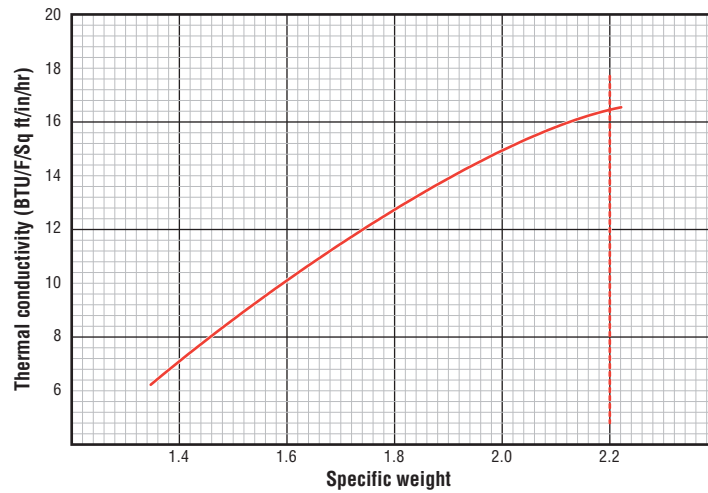
The insulation resistance of magnesium oxide decreases with increasing temperatures as shown. This decrease is unimportant at temperatures up to 250°C (482°F), the maximum continuous operating temperature of MI cable.



Graph M.2 Insulation resistance of MI cable as a function of temperature

Thermal Conductivity

Unlike most electrical insulations, magnesium oxide has a relatively high thermal conductivity. This enables the heat to be quickly conducted from the outside sheath and dissipated to the surrounding air. This conductivity increases when magnesium oxide is compacted. The manufacturing process produces a specific weight of approximately 2.2 and a thermal conductivity of 16.4 BTU/°F/sq ft/in/hr.



Graph M.3 Thermal conductivity of magnesium oxide at different levels of compaction

Power Factor

The power factor of magnesium oxide insulation is very low compared to that of most electrical cable insulations. When measured at room temperature, 60 Hz and 40 volts per mil, it is approximately 0.1%. This value increases with temperature to approximately 1.0% at 250°C (482°F).

Dielectric Constant

The dielectric constant is approximately 4 over a range from 60 Hz to 400 MHz and is relatively constant up to 300°C (572°F).

**Worldwide Headquarters
Tyco Thermal Controls**
307 Constitution Drive
Menlo Park, CA 94025-1164
USA
Tel: (800) 545-6258
Tel: (650) 216-1526
Fax: (800) 527-5703
Fax: (650) 474-7711
info@tycothermal.com
www.tycothermal.com

**Canada
Tyco Thermal Controls**
250 West St.
Trenton, Ontario
Canada K8V 5S2
Tel: (800) 545-6258
Fax: (800) 527-5703

**Latin America
Tyco Thermal Controls**
7433 Harwin Drive
Houston, TX 77036
United States
Tel: (713) 868-4800
Tel: (713) 735-8645
Fax: (713) 868-2333

**Europe, Middle East, Africa (EMEA)
Tyco Thermal Controls**
Romeinse Straat 14
3001 Leuven
België / Belgique
Tel: +32 16 213 511
Fax: +32 16 213 603

**Asia Pacific
Tyco Thermal Controls**
20F, Innovation Building,
1009 Yi Shan Rd,
Shanghai 200233,
P.R.China
Tel: +86 21 2412 1688
Fax: +86 21 5426 2937 / 5426 3167

Tyco and other trademarks are the property of Tyco Thermal Controls or its affiliates

tyco

Thermal Controls

Important: All information, including illustrations, is believed to be reliable. Users, however, should independently evaluate the suitability of each product for their particular application. Tyco Thermal Controls makes no warranties as to the accuracy or completeness of the information, and disclaims any liability regarding its use. Tyco Thermal Controls' only obligations are those in the Tyco Thermal Controls Standard Terms and Conditions of Sale for this product, and in no case will Tyco Thermal Controls or its distributors be liable for any incidental, indirect, or consequential damages arising from the sale, resale, use, or misuse of the product. Specifications are subject to change without notice. In addition, Tyco Thermal Controls reserves the right to make changes—without notification to Buyer—to processing or materials that do not affect compliance with any applicable specification.