

IPT ELECTRICAL INSULATION

PERFORMANCE CHARACTERISTICS

- ❖ The excellent thermal conductivity (Graph 1) of CeQUIN materials helps dissipate heat build-up in electrical equipment resulting in reduced operating temperatures, longer life, and higher energy efficiency. Dry-type transformer coils wound with CeQUIN have exhibited 10-15°C lower average winding temperature rise as compared to coils of the same design wound with competitive high temperature insulation materials. Alternatively, equipment design engineers can take advantage of the improved heat dissipation afforded by CeQUIN to design more compact coils and reduce overall costs.
- ❖ CeQUIN inorganic papers exhibit low moisture content and very little moisture absorption even under high humidity conditions, especially when compared to aramid paper, thus reducing the need for extended drying cycles prior to varnishing. CeQUIN papers are not susceptible to hydrolytic degradation as are some organic-based insulation materials.

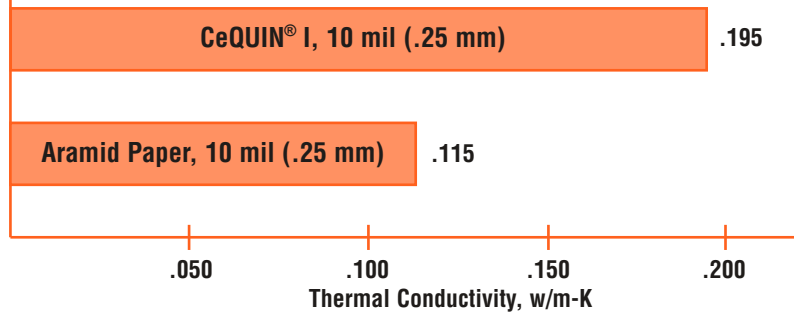
- ❖ CeQUIN papers are easily impregnated and fully compatible with standard varnishes and resins, yielding tightly bonded coils and further improving thermal conductivity.
- ❖ The high inorganic content of CeQUIN I and II equates to excellent dimensional stability, whether exposed to varying humidity conditions or long-term thermal aging.

ELECTRICAL CHARACTERISTICS

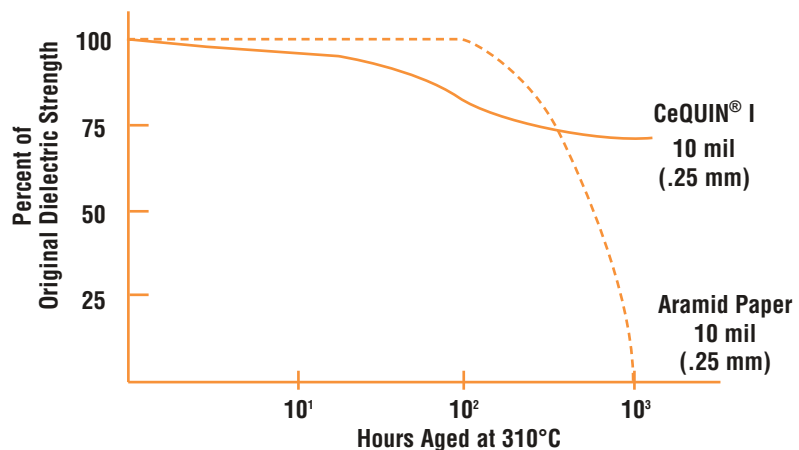
- ❖ The thermal stability of CeQUIN inorganic papers is demonstrated in their retention of dielectric strength, even after thermal aging at temperatures in excess of 300°C. Graph 2 exhibits the performance of 10 mil (.25mm) CeQUIN I vs. 10 mil (.25mm) calendered aramid paper when aged at 310°C.
- ❖ The inorganic content of CeQUIN papers reduces the effect of long-term electrical stress and partial discharge on their insulation qualities. For example, when exposed to a continuous electrical stress of 1.8kV, 10 mil CeQUIN I will typically exhibit over three times the voltage endurance of 10 mil calendered aramid paper (see Graph 3).

GRAPH 1
Thermal Conductivity

Thermal Conductivity of CeQUIN I vs. calendered aramid paper; tested at 180°C per ASTM E 1530.



GRAPH 2
Effect of Thermal Aging on Dielectric Strength



UL RECOGNITION

CeQUIN inorganic papers are designed to provide high-temperature performance in electrical insulation systems. CeQUIN products have undergone extensive thermal aging evaluation per UL 1446, “Standard for Systems of Insulating Materials – General,” and as a result are UL Recognized as suitable for use as major ground insulation in systems rated through Class 220(R).

Several UL Recognized Insulation Systems are listed under IPT File No. E65007 in the OBJS2 category for Class 130(B), Class 155(F), Class 180(H), and 220(R) applications. This open file is free for use by any electrical apparatus manufacturer by contacting the nearest UL office. This file is also recognized by UL as being in compliance with International Electrotechnical Commission (IEC) Publication 85, “Thermal Evaluation and Classification of Electrical Insulation.”

RECOMMENDED PRACTICE FOR USING CeQUIN PRODUCTS

Optimum performance of an electrical insulation system is dependent upon many factors including proper choice of materials, acceptable design criteria, and good manufacturing procedures. CeQUIN’s resistance to moisture absorption can minimize drying time required prior to varnish impregnation or encapsulation. Varnishing is recommended for construction of equipment that may be exposed to the elements. CeQUIN papers are easily saturated and will tend to assume the aging characteristics of the resin or varnish that is used.

APPLICATIONS

High Temperature Electrical insulation for:

Dry-Type Transformers

- Ground Insulation
- Phase Insulation
- Barrier Insulation
- Core Wrap
- End Fill
- Interwinding for strip-wound coils

Traction Motors, Generators

- Interwinding for form wound coils
- Slot Fill
- Phase Insulation

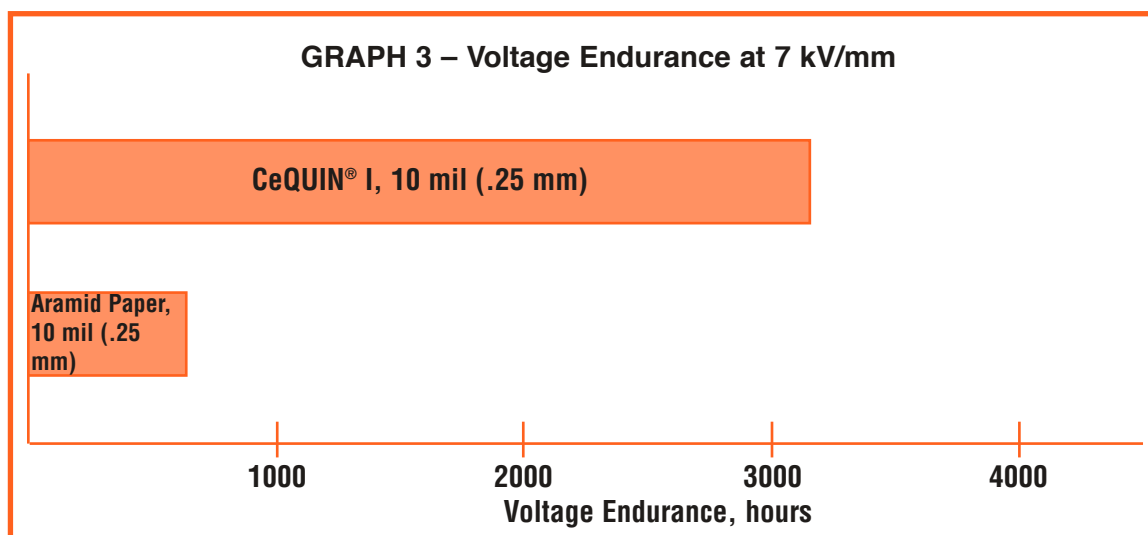
Wire and Cable Wrap

Battery Separators

Capacitor and Electromagnet Layer Insulation

Switchgear Insulation

Spiral and Convolute Tubing



Voltage endurance of CeQUIN I vs. calendared aramid paper; average of five data points for each material; materials tested concurrently on same machine at 20°C, 50% RH.



ADDITIONAL INFORMATION

The CeQUIN® family of products includes a full line of laminate and coated products, as well as a line of related semi-rigid board materials. In addition, IPT supports an active research program to develop new products and satisfy special customer requirements. Please contact your IPT Sales Manager for further information or call IPT Headquarters in Tilton, New Hampshire.

ENVIRONMENTAL SAFETY AND HEALTH

The CeQUIN® family of products meets all current OSHA requirements for health and safety with normal handling and good work practices. CeQUIN falls within the Threshold Limit Values for Chemical Substances in the Work Environment as specified by the American Conference on Governmental Industrial Hygienists. Notwithstanding this, it is incumbent upon our customer to use suitable work practices, good housekeeping and proper industrial hygiene. If necessary, protective clothing, safety glasses, face masks and a dust collection system should be used in order to provide a safe work environment. It is a prudent practice to reduce the workers' exposure to any respirable material to the lowest practical level.

A Material Safety Data Sheet is available upon request.

The particulate and fibers in CeQUIN are encapsulated in saturants and binders. This minimizes the amount of airborne dust generated during handling and fabrication. The dust from CeQUIN contains a small amount of glass fiber which sometimes will cause itchiness or a mild case of dermatitis in some individuals. This discomfort is usually temporary. Most workers become acclimated after several days of working with the material.

CeQUIN waste should be disposed of in accordance with local landfill requirements.

PRODUCT WARRANTY

IPT products are warranted free from defects in workmanship and in material. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

The sole and exclusive remedy against IPT for breach of its limited product warranty shall be, at the option of IPT, either refund of the invoice value of defective products, or repair or replacement F.O.B its plant or other shipping point.

IN NO EVENT SHALL IPT BE LIABLE TO ANY BUYER OR ANY THIRD PARTY FOR ANY SPECIAL, INCIDENTAL, AND/OR CONSEQUENTIAL DAMAGES.

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