

Marshall Technology Center

Putting tomorrow's materials and cable designs to the test

Since its inception in 1968, Marshall Technology Center (MTC) in Marshall, Texas, has been a World Class Testing and Analytical Center with the market focus of energy cable technology.

With over three decades of experience, MTC has provided extensive industry research and development programs dedicated to providing its customers, suppliers and the cable community with total quality and technical excellence. The MTC specialized team delivers a unique and comprehensive service with a staff of professional experts in the varied fields of electrical engineering, material sciences and computer sciences — each with an average of 17 years of experience. Combine this with state-of-the-art equipment, and you have our guarantee for accurate, impartial and relevant information from the largest, most sophisticated testing facility of its kind in North America.

Customer Assurance

No matter what the application, requirement or environment, every customer should have access to the latest and the most innovative wire and cable products — those which promise unmatched reliability, performance and cost effectiveness. The Marshall Technology Center has been specifically created to achieve this goal of developing and evaluating new materials and cable designs for low-, medium- and high-voltage applications.

Marshall Technology Center:

- supports a dedicated team of project managers, technologists and technicians with extensive experience and commitment.
- utilizes industry-recognized statistical software programs for all data analysis.
- provides industry specification qualification reports which guarantee confidentiality via trusted impartiality.
- differentiates itself by providing superior distinctive services.

Significant Accomplishments

In such a competitive marketplace, reducing costs while improving performance is critical to continued business success. MTC's Accelerated Cable Life Test (ACLT) laboratory is dedicated to the thorough evaluation of polymeric cable performance in wet locations. Using this technology, engineers simulate extended aging in real life situations, qualifying generation after generation of product evolution in medium-voltage insulation and conductor shield cable materials for timely commercialization since 1980. A distinguished list of key industry-recognized materials are as follows:

- HFDE 4201 NT EC
- HFDA 4202 NT EC
- HFDB 4202 NT EC
- HFDA 0802
- HFDA 0800
- AT320TR
- LE 4212
- LE 0594
- LE 0504

For over 24 years, MTC has been commissioned by the **Electric Power Research Institute (EPRI)** to manage scientific research programs of technology development providing the energy industry community with knowledge, tools and cost-effective environmental solutions.

Two prime examples of our contributions are:

Aging of Distribution Cables in Controlled Temperature Tank Tests

EPRI Project 2713-02 (report TR-108405-V2). For this 11-year project MTC developed a cable life model for XLPE cables, which is often referenced/cited in industry forums and technical papers.

Estimation of Life Expectancy of XLPE-Insulated Cables: Aging of In-Situ Tested Cables

EPRI project WO-6306-01 (report 1001892). EPRI commissioned MTC to evaluate the ability of two (2) field testing diagnostic techniques (partial discharge and low frequency dissipation factor testing) to correlate with (and estimate) the remaining life of service-installed cables.

MTC has also provided statistical analysis of industry data in support of the Underground Power Cable Standards Technical Advisory Committee (UPCSTAC), and in support of revisions to Insulated Cable Engineers Association (ICEA) standards and Association of Edison Illuminating Companies (AEIC) cable specifications. AEIC Qualification testing is yet another significant service provided by MTC to the utility cable manufacturers within the industry.

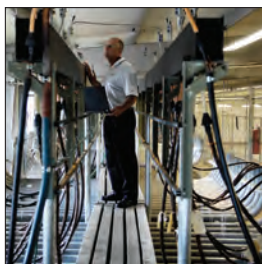
MTC, a recognized leader in their field, regularly authors technical papers in industry journals, as well as reports and technical presentations for EPRI, ICC (Insulated Conductors Committee), ICEA, IEEE (Institute of Electrical & Electronics Engineers) and UPCSTAC.



Specializing in a Full Spectrum of Products and Services

Our team of professional project managers, technologists and technicians are committed to the development, implementation and confidential results of the following industry-recognized testing products and services:

- Accelerated Cable Life Testing (ACLT)
- Weibull Statistical Analysis
- AEIC Cable Qualification Testing
- Low- and Medium-Voltage Cable Product Testing: 600V-46kV
- Field-Failure Root Cause Analysis of Utility Cables
- Cable Field Performance and Reliability Evaluation
- In-Plant Electrical Test Failure Analysis
- High-Voltage Cable Product Testing: 69kV-138kV
- EPRI Research Project Performance Reports



MTC Testing Protocols

Our testing protocols follow industry-specified and/or industry-accepted standards, such as ASTM, to assess the short- and long-term performance of low-, medium- and high-voltage cable products.

- ACLT Materials Evaluation
 - Time-to-Failure (Life Estimate Comparisons)
 - Fixed-Time Aging – including Non-Destructive and Destructive Diagnostics
- AEIC Qualification Testing
 - Dimensional Analysis
 - Hot Oil Exams
 - Semi-Conductive Shield Protrusion Testing
 - Shield Volume Resistivity Testing
 - Shield Strippability Testing
 - Treeing Examination per CS8-00
 - Void and Contaminant Determinations
- Cable Field Failure Analysis
- Connectability Testing
- Failure Reliability Analysis
- Longitudinal Water Penetration Resistance Testing
- MV-105 Testing per UL and ICEA
- HV Cable Qualification Testing per AEIC, ICEA and IEC



4 Tesseneer Drive • Highland Heights, KY 41076
 800.237.2726 • 859.572.8000 • 859.572.8072 fax
www.generalcable.com

GENERAL CABLE is a trademark of General Cable Technologies Corporation.
 ©2010. General Cable Technologies Corporation.
 Highland Heights, KY 41076
 All rights reserved.
 Form No. UTY-0024-R0410

MTC Test Equipment

MTC features state-of-the-art equipment in a totally dedicated 49,000 square feet testing facility.

- Biddle Conventional 200 kV, 50 kVA, ac Test Set
- Hipotronics Series Resonant 400 kV, 1200 kVA, ac Test Set
- Hipotronics Series Resonant 600 kV, 1200 kVA, ac Test Set
- 500 Hz ac Test Set
- Haefely 1800 kV, 135 kJoules, Impulse Generator
- 65 Water-Filled ACLT Tanks
- 162 Water-Filled AEIC AWTT Pipes
- Tettex Direct Reading Dissipation Factor Bridges
- Biddle and Lemke Partial Discharge Detectors
- 2-140x Stereo Microscopes with Digital Camera Attachments
- Instron Tensile Testing Machine
- Nikon Optical Comparator

A Sampling of Key Customer Partnerships

At MTC, we have worked with customers, both past and present, to provide solutions, improve processes, and enhance quality, safety and service, while reducing total system costs.

Utility Companies:

- Florida Power & Light Company
- TXU (Oncor)
- Xcel Energy

Independent Industry Research Agencies:

- Canadian Electrical Association (CEA)
- Electric Power Research Institute (EPRI)

Material Suppliers:

- AT Plastics Corporation
- Borealis Compounds, Inc.
- BP Performance Polymers, Inc.
- Dow Chemical Company
- E.I. DuPont Nemours, Inc.
- Equistar Chemicals Company
- Exxon Chemicals Americas
- DuPont Dow Elastomers, Inc.
- Union Carbide Corporation
- USI Chemicals Company

Cable Manufacturers:

- The Southwire Company
- Aetna Wire & Cable Company
- General Cable BICC®



Marshall Technology Center

9975 US 80 East
 Scottsville, TX 75688
 Phone (903) 935-8265
 Fax (903) 935-8525