

CELANESE ZYTEL® HTN HELPS ENABLE SAFE, LONG-LIFE SERVICE FOR OUTDOOR MV ELECTRICAL SWITCH EQUIPMENT



PROJECT

Medium-voltage (MV) electrical switchgear that ensures safe and reliable operation of electrical equipment that serves homes and businesses, is an essential part of the overall electric grid. Schneider Electric, a global leader in digital transformation of energy management and automation, has been driving toward safer, more efficient and longer life electrical switchgear components. Long-time supplier, Celanese, has helped Schneider Electric toward this goal by designing a solution that replaces metal in the switchgear mechanisms with composite materials and eliminates SF6 insulating gas.

CHALLENGES

ENVIRONMENTAL IMPLICATIONS

Historically, SF6 (sulfur hexafluoride – the most potent greenhouse gas) has been used as the electrical insulator in MV switchgear components. Schneider Electric has been actively driving toward SF6-free solutions to help reduce global warming potential (GWP) elements from their products.

LONG-SERVICE LIFE

Switchgear mechanisms made of metal can sustain approximately 1,000 maneuvers during their life cycle. A more robust material was needed to increase the number of switch maneuvers over the lifetime of the equipment.

SAFETY

Electrical equipment must operate in harsh environments. The ability of the mechanism to work consistently to operate switches is essential. A material was needed that worked well in extreme temperatures and high humidity.

SMART FEATURES

The finished component needed to be adaptable for smartgrid remote monitoring and control all configured in a plug and play module to reduce maintenance downtime.

SOLUTION

Zytel® HTN coupled with Celanese design and technical support, provided Schneider Electric with a robust solution for safe, reliable, long-life switchgear actuators. This represented the first time a composite material was used for a high performance MV mechanism.

FULL-SERVICE SUPPORT

Replacing metal with composite material was not only about selecting the right material. It was about selecting the right partner with design, testing and processing expertise. Starting with CAE and working through processing parameters and testing, Celanese and Schneider Electric collaborated at every step to validate the material specification and end-product performance.

SAFETY AND ENVIRONMENTAL SOLUTIONS

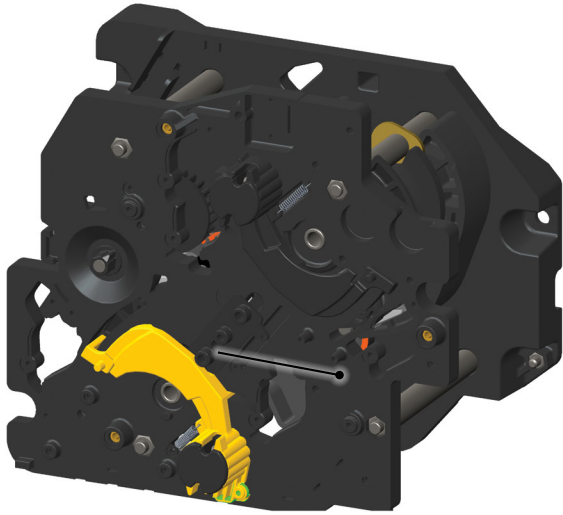
Celanese Zytel® HTN exhibits high wide temperature variation tolerance that is a key factor in replacing metal parts while retaining safe, reliable performance in harsh environments.

LONGER SERVICE LIFE

Temperature and accelerated aging tests performed jointly by Celanese and Schneider Electric at their in-house facilities and other testing institutes, demonstrated that parts made with Zytel® HTN will support 10,000 switch maneuvers – 10 times more than the metal part. A component lifetime of more than 80 years is anticipated. Mechanism parts made with Zytel® HTN also meet mandatory global requirements including IEC and UL standards.

MODULARIZATION

The composite material for mechanism frames and cams enabled lightweighting.



Compodrive unit utilizing Zytel® HTN

ZYTEL® HTN GRADES ARE IDEAL FOR USE IN DEMANDING APPLICATIONS

Zytel® HTN can withstand high temperature tolerances while reducing weight.

Key attributes include:

- Stiffness
- High strength
- Excellent creep resistance
- Broad temperature toleration
- Versatile and easy to process
- Fatigue resistant

Zytel® HTN high performance polyamide resins feature high retention of properties upon exposure to elevated temperatures, high moisture and harsh chemical environments. They are tailored to optimize performance as well as processability. Typical applications include automotive, electrical and electronics, appliances and construction.

Celanese Zytel® HTN features mechanical and physical properties such as high mechanical strength, excellent balance of stiffness and toughness, high temperature performance, good electrical and flammability attributes as well as abrasion and chemical resistance. Zytel® HTN is typically used in demanding applications for automotive, furniture, appliances, sporting goods and construction.

Life Is On

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