



**RT507**

Excellent thermal insulation for exposure to arc, flame, or elevated heat



**MC511A**

Excellent flexural strength at high temperatures



**NP310E**

Electrically insulating; ideal for explosion-proof environments



**NP510A**

Consistent electrical properties in dry or humid conditions

The transportation industry is continually looking for ways to increase reliability while reducing component cost and weight. These objectives can be met by replacing metal or cast components with high performance thermoset composite materials. Norplex-Micarta offers a full line of these composites in sheet, tube, rod, and pre-preg forms that are certified to meet the most challenging transportation requirements. From braking systems for aircraft to electrical insulation components for subway cars, Norplex-Micarta is the preferred high performance composites manufacturer for OEMs and fabricators around the world.

Norplex-Micarta composites provide excellent mechanical strength at a relatively low weight, an important consideration for fuel efficiency. Light-weight components must exhibit excellent tensile, compressive, shear, and flexural strength to withstand operation rigors such as aircraft take-off and landing and heavy truck off-road uses. They must also withstand the initial impact force of installation, as well as the repeated stress of inspection and repair. Creep resistance is also an important performance criteria; Norplex-Micarta composites exhibit excellent creep resistance, making them a good alternative to standard thermoplastics.

High-temperature applications, such as disk brake systems in heavy trucks and landing gear in aircraft, place particular stress on composites. Norplex-Micarta materials exhibit high strength at elevated operating temperatures, and also provide insulation from heat when used to separate two components. There are even Norplex-Micarta products with thermal expansion properties similar to those of aluminum and steel, common materials used in transportation equipment.

Norplex-Micarta composites offer insulation properties when used as an electrical barrier between metal parts. They also feature low toxicity/burn characteristics critical for applications in aerospace and railroad markets. Some materials are self-extinguishing to minimize damage in the case of fire or explosion.

### Braking Systems

withstand impact force and elevated temperatures during installation, inspection, use, and repair.



**Window Frames** offer both flexural strength and light weight.



**Bearings** used in the heavy truck industry withstand high amounts of stress and weight.



**Subway and Railroad Cars** require electrical insulation from motor components and third rail electrical current.

## Braking Systems

Norplex-Micarta materials provide excellent thermal insulation for disk braking systems in aircraft and heavy truck vehicles. Disk brakes generate a great amount of heat and a thermal insulation component is required to isolate the hot disk from the tire and strut frame that leads into the aircraft or vehicle. This insulation component must also withstand extreme compressive force of up to 10,000 psi when the disk and wheel are bolted together during installation, as well as every time the braking system is inspected or repaired. The shaft of the braking system can also be insulated with a thermoset composite tube to isolate it from the tire. This tube must withstand the same high-temperature and compressive forces as disk brake components.

## Window Frames

Norplex-Micarta high performance composites are used as window frame supports for cockpit and passenger compartments in the aerospace market. The glass window mounts into the composite frame, which is then bolted to the aluminum skeleton of the aircraft. The frame must withstand the impact force of installation and provide excellent mechanical strength for the life of the aircraft. The coefficient of thermal expansion must be nearly identical to that of the aluminum skeleton and glass window to ensure that all the elements expand and contract at the same rate, thereby maintaining the integrity of the window assembly. Frames are manufactured in thicknesses matching the glass window. Those made from Norplex-Micarta materials can withstand stresses of up to 20,000 psi, greatly exceeding the expected stresses during take-off, flight, landing, and taxiing operations.

## Bearings

Norplex-Micarta thermoset composites are used to replace steel bearings in back hoes, bull dozer arms, and semi-trailers in the heavy truck industry. These connection points must withstand high amounts of stress, load, and weight, thereby requiring excellent mechanical strength and durability.

## Railroad and Subway Supports

Norplex-Micarta composites provide electrical insulation for motor mounts, generator mounts, and surrounding electrical equipment used for railroads. For subway applications, composites provide electrical insulation between the car and the electrical current running from the third rail to the motor.



665 Lybrand Street  
Postville, Iowa 52162-0977  
Phone: 800-848-4431  
Customer Service: 800-350-9490  
[info@norplex-micarta.com](mailto:info@norplex-micarta.com)  
[www.norplex-micarta.com](http://www.norplex-micarta.com)

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