

CASE STUDY FOR NYCOTE 7-11 AND 99: **NYCOTE POLYMER NYLON EPOXY RESIN FOR FIBER-REINFORCED COMPOSITES**

Industrial materials are facing a paradigm shift now that composites are replacing many metallic and ceramic materials. Although manufacturers prefer well-known metallics, industries, such as aerospace and automotive, require lighter weight options with high material performance capabilities, increased corrosion resistance, and increased load and fatigue capacity. Considering corrosion related expense accounts for 3.5% of the global gross domestic product, innovative companies are turning to composites to solve traditional material limitations. Processing conditions for composites and polymers are much more energy-efficient and labor friendly compared to that of metallic materials. Ceramic materials are beneficial for high-temperature applications, however, they lack the flexural strength and tend to crack and dis-bond over time. Fiber reinforced composites are becoming the desired product for the transportation industry where fuel savings and environmental concerns are a priority. Composite material innovations are of critical precedence for aerospace, automotive and marine manufacturers, but they also play an important role in energy sectors, where composites are adding significant value to applications such as wind turbine blades, energy storage tanks, and restoring present pipelines.

FIBER REINFORCED COMPOSITES CAN BE CLASSIFIED INTO FOUR GROUPS ACCORDING TO THEIR MATRICES:

1. Metal matrix composites (MMCs)
2. Ceramic matrix composites (CMCs)
3. Carbon/carbon composites (C/C)
4. Polymer matrix composites (PMCs) or polymeric composites Matrix, which has the primary role of holding the reinforcement together.

In the case of polymers, PMCs, which distinguish from other types especially because they are lightweight, are further classified as thermoset, thermoplastic, and elastomeric composites. Thermosets crosslink polymer chains during the cure stage, resulting in a rigid product that hold their shape. What is most advantageous for thermosets is that they can be used at elevated temperatures as they maintain structural rigidity when heated. Typical examples for thermosetting polymer matrices are polyester, vinyl ester, epoxy, phenolic, nylon, cyanate ester, polyurethane, polyimide, and bismaleimide.

Nycote Laboratories Corporation (NLC) is a manufacturer of unique highly crosslinked clear nylon polymer resin and coating products, which are formulated to self-level and cure pinhole-free for a uniform coverage and complete encapsulation. They can be used as a resin (glue that holds fibers together and into a specific shape).

Benefits of fiber reinforced composites made with nylon polymer resins:

- Decreases the weight of equipment and structures
- Better ballistic performance
- Better corrosion, wear and abrasion resistance
- Nylon resin enhances and protects nanotechnologies
- Increases flexural strength and product longevity
- Low-cost processing & eco-friendly solution
- Reduced AOG delays - composite parts can be 3D printed **for** on-site quickly

NYCOTE 7-11 & 99 RESIN TECHNOLOGY FOR FIBER REINFORCED COMPOSITES

Nycote formulates unique clear lightweight polymer epoxy resin products that can be used to protect and encapsulate products, or be the glue that holds fibers together, as

in Fiber Reinforced Composites. As a resin additive, Nycote products add the flexibility with nylon while increasing strength with epoxy. There is no other product like it on the market today. Nycote has an impressive 60-year history in the aerospace industry as a valued collaboration partner with major OEM's, such as, Boeing, Airbus, Embraer, Honeywell, Hamilton, Sundstrand, Lockheed, Collins AS, Panasonic and many others.

Examples of products made with Nycote resins include:

- Composite fasteners
- Plastic encasements for electronic components
- Aircraft interiors
- Aircraft window reinforcement
- Aircraft cable wheels

Additional benefits of a Nylon Resin over other polymers:

- Nylon is incredibly effective at resisting chemical corrosion for parts exposed to greases/lubricants, jet fuels & hydraulic fluids
- Nylon resin provides great flexural strength without cracking or disbonding
- Nycote resins adhere to and/or bond with a large range of materials types including metals, plastics, composites, glass, fiberglass, other fibers and textiles
- Nycote resins are the perfect delivery systems for additives, such as, metal powders and taggants
- Nylon is naturally microbial resistant and can keep composites pathogen-free
- Tolerates extreme environments and temperatures
- Meets flammability requirements for aircraft
- Is Reach/IATA compliant and No SVHC
- Cost efficient

Please contact sales@nycote.com for technical or purchasing assistance

Nycote Laboratories Corporation
12750 Raymer Street, Suite A3
North Hollywood, CA 91605

P: +1 (818) 764-9498
E: sales@nycote.com
nycote.com

