E-Pos 976, Q-RIT 306/Q-RIT 368, Q-RIT 369
High Renewable Carbon Content Systems for the Production of Fibre Reinforced Composites

Description

QR-Polymers have developed systems with a high renewable (bio) carbon content which are suitable for the production of environmentally friendly fibre reinforced laminates. The systems are suitable for wet lay-up and various types of injection moulding. The systems are designed to cure at ambient temperature, but heat can also be used to accelerate cure rate, increase production efficiency and reach optimal final properties.

The high renewable content systems are certified under the United States Department of Agriculture's (USDA's) BioPreferred® program and carry the USDA BioPreferred® label.

Details of the scheme can be found at www.biopreferred.gov. The certified biocarbon content of the system is 29% as indicated on the label above.

E-Pos 976 is a low viscosity epoxy resin and should be mixed with either Q-RIT 306 or Q-RIT 368 or blends of the two hardeners at the recommended dose rate of 2:1 by volume (100 parts resin to 45 parts hardener by weight), in order to meet the requirements of the USDA certification. The initial mixed viscosity of the systems is very low at around 340 mPa.s.

We recommend a 50/50 mix of the two hardeners which gives an optimal balance of properties and corresponds to a 1:1 ratio of epoxy to amine groups in the system. For the convenience of our customers we offer the product Q-RIT 369 which is a ready mixed 50/50 mixture of Q-RIT 306 and Q-RIT 368. When using combinations of Q-RIT 306 and Q-RIT 368 changes can be made to the hardener ratio to fine tune the properties of the system, notably reactivity and pot life. Q-RIT 368 has a higher reactivity than Q-RIT 306.

The E-Pos 976 and Q-RIT 306/Q-RIT 368 system is suitable for use with all common reinforcing fibres such as glass, carbon and basalt. An important feature of systems containing Q-RIT 368 is the presence of two distinct Tgs, the system cures to an interpenetrating network (IPN) containing two separate domains with different Tg. This is an attractive property for composite materials which will have desirable properties from the two

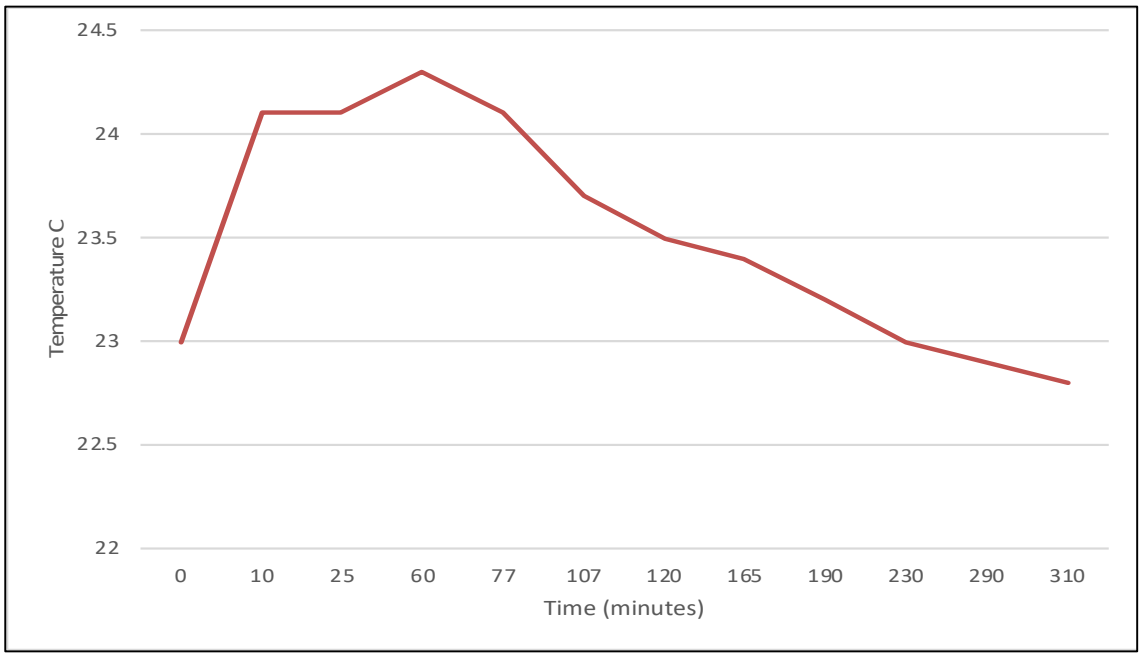
domains, a combination of high Tg and toughness. The systems are fast curing at room temperature and a post cure of 1 hour at 120°C is recommended. Care should be taken to avoid an excessive cure exotherm especially with large volumes.

System characteristics

Resin:	E-Pos 976
Hardener:	Q-RIT 369 [50/50 Q-RIT 306/Q-RIT 368]
Resin:Hardener mix ratio:	2:1 by volume
Initial mixed viscosity (23°C):	340 mPa.s
Gel time[a] @23°C:	170 minutes
Cure time[a] @23°C:	500 minutes
Tg, ambient cure:	55°C
Tg after 1h post-cure @120°C:	89 and 132°C (2 Tgs visible)
E-Modulus (100% binder):	2.6 GPa

a 20 g mass

Graph showing exotherm development in a 20 g mass at 23°C E-Pos 976 cured at 2:1 volume ratio with Q-RIT 369:



Dynamic Mechanical Analysis (DMA) graph for E-Pos 976 cured with Q-RIT 369 [50/50 mixture of Q-RIT 306 and Q-RIT 368] at stoichiometric mixing ratio, first and second run. The second graph clearly shows the presence of two distinct domains in the material with different glass transition temperature (Tg).