



Engineering Plastics for hybrid and electrical cars

Lower fuel consumption reduces environmental impact

In the Automotive Industry, the main emphasis today is directed towards lower fuel consumption and thus to lower CO₂ emission levels and also more sustainability via improved Eco and carbon footprints.

Lower emission levels can be achieved in various ways: through weight reduction, friction reduction and/or electrification. Weight reduction can be achieved mainly through downsizing of engines, which requires more turbo systems, and through as many as possible metal-to-plastic conversion for various applications. Friction reduction can be achieved through smart designs of certain powertrain applications and/or the use of smart materials such as Stanyl® PA46.

Increasingly electrification is also seriously considered as a solution by the Automotive OEMs, the basic drivers again being emission legislation, with CO₂ emission allowance levels being reduced to 95 g/km by 2020, coupled with finite fossil fuel supplies. This electrification trend results in electrical subsystems as electrical pumps (water, oil pumps) and in electrification of the entire drive train; the latter leading to Hybrid Cars and Electrical Vehicles.

Although it will still take several years before Hybrid Cars and Electrical Vehicles will be produced in substantial numbers, today DSM is already cooperating with various customers in the automotive industry in order to find the best

solutions for various applications including:

- start/stop components (such as starter gears and solenoids and alternator bearings, covers and bobbins in Stanyl PA46)
- coil insulation for electromotors (in Stanyl PA46)
- High Voltage cables (in Arnitel®TPC)
- High Voltage connectors (in Arnite® PBT) or High Voltage charging plugs (in Akulon® PA6)
- Structural parts and body panels (in thermoplastics or thermosets)

Some of these solutions are described below in more details.

Stanyl PA46 for Start/Stop systems

Start/Stop systems can lead to a 5-10% fuel consumption reduction. These new start/stop systems must however be able to withstand more than 300.000 start/stops, whilst the conventional systems are designed for only 60.000 starts.

For more information, please turn page.

Eco+ solution

Hybrid and electrical vehicles will help to reduce our dependency on finite resources and create more efficient modes of transport.

By using Stanyl and other DSM Performance Materials in various components of these vehicles, a significant contribution to long-term sustainability can be achieved.

The use of materials such as Stanyl PA46 for starter gears and alternator bearing cages almost mandatory, since Stanyl PA46 offers extremely good wear and abrasion resistance in combination with excellent high temperature and fatigue resistance. Other applications for Stanyl PA46 are to be found in various (insulation) components of the starters and alternators, including starter solenoid endcaps and bobbins, alternator bobbins, alternator covers, stator insulators, rotor overmouldings, and diode carriers.

Stanyl PA46 for Coil Insulation of E-Motors

Due to the high temperatures in the E-motors, the coil insulation requires the use of high temperature resistant materials such as PA46, PPA or PPS. Stanyl PA46 offers excellent part performance and the lowest potential system costs thanks to a potential wall thickness reduction of 20-40% - which will also lead to lower induction voltage peaks, as well as easier processing compared to PPS and PPA. This has already been demonstrated for coil insulations in electrical water pumps and oil pumps, where Stanyl PA46 has become the material of choice.

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