

Press Release
Singapore, 30 October 2014

DSM Engineering Plastics
30 Pasir Panjang Road, Mapletree Business
City #13-31, Singapore 117440

www.dsm.com

Automobile natural gas tanks take the pressure with composites in DSM high performance thermoplastics

Royal DSM, the global Life Sciences and Materials Sciences company, says a combination of two of its most innovative thermoplastics technologies has resulted in high performance pressure vessels that are ideally suited for use as lightweight fuel tanks for automobiles running on compressed natural gas (CNG) or hydrogen. With a solution for both the inner liner and the outer tape reinforcement, DSM is able to reduce the weight of the tank by up to 70%.

Hydrogen and natural gas are claiming their place in the field of cost-effective and low carbon-footprint fuels for use in automobiles. Countries with major natural gas reserves are looking at the advantages of using CNG as an alternative fuel which reduces the CO₂ emission by 15% compared to current solutions in petrol or diesel.

A traditional steel tank of 40L weighs around 60 kg, while a composite 'Type IV' tank with Akulon® Fuel Lock liner can weigh down to 20 kg. Every 10 kg removed from a vehicle translates roughly into a reduction in CO₂ emissions from the vehicle on the road of one gram per km.

Type IV pressure vessels are based on plastics and continuous fiber reinforcements, unlike Type I, II and III pressure vessels, which contain metal components. DSM demonstrated a tank with a liner blow molded in its Akulon Fuel Lock, a polyamide 6-based engineering plastic with very high barrier to hydrocarbons, at the Fakuma plastics processing exhibition in Friedrichshafen, Germany, in mid-October. The tank can be wrapped in a tape based on thermoset or thermoplastic resins, including its EcoPaXX® polyamide 410.

Liner material for the CNG tank

Akulon Fuel Lock contains an additive formulation that further improves the already strong gas barrier of polyamide 6, and also provides it with extremely high impact resistance at low temperatures (down to -60°C). The permeation of HDPE liners is too high to allow the installation of composite Type IV tanks incorporating such liners inside a vehicle. However, Akulon Fuel Lock liner material reduces emissions by a factor of at least 150 compared to HDPE and therefore enables the use of Type IV tanks inside the car.

The Akulon Fuel Lock portfolio has been expanded with a grade that is suitable for blow molding of liners for large pressure vessels for heavy duty vehicles such as buses and trucks. It is normally difficult to make large blow moldings in polyamide 6, owing to the polymer's relatively low melt strength, but this grade has sufficient melt strength to create a stable parison for tanks beyond a length of 2m, enabling high precision in control of the wall thickness.

Tape material for CNG tank

In current Type IV pressure vessels, the tape reinforcement comprises either glass or carbon fibers in a thermosetting polymer, such as an epoxy or unsaturated polyester. DSM is cooperating in the development of next-generation Type V pressure vessels. These are made by winding a tape, developed by DSM, of continuous fiber reinforced with a thermoplastic, such as the company's EcoPaXX polyamide 410, or another grade of Akulon.

Type V pressure vessels weigh around 70% less than steel tanks and can be lighter than Type IV pressure vessels too. They are more durable than steel, they have better chemical resistance (no corrosion), and

they are also fully recyclable. EcoPaXX has the additional advantage that it has a zero carbon footprint from cradle to gate, owing to the fact that the polymer is made entirely from renewable resources.

"In the process developed by Covess for making Type V pressure vessels, you can balance weight, performance, and economics by using glass, carbon or even hybrid fibers," says Tony Vanswijgenhoven, Director of Covess, a specialist in advanced thermoplastic composite vessels for a wide range of applications, who is working closely with DSM. "Whatever choice you make, it always works out lighter than the existing comparable type IV tanks."

More information can be found at www.dsm.com/automotive, www.akulon.com and www.ecopaxx.com.

DSM - Bright Science. Brighter Living.™

Royal DSM is a global science-based company active in health, nutrition and materials. By connecting its unique competences in Life Sciences and Materials Sciences DSM is driving economic prosperity, environmental progress and social advances to create sustainable value for all stakeholders simultaneously. DSM delivers innovative solutions that nourish, protect and improve performance in global markets such as food and dietary supplements, personal care, feed, medical devices, automotive, paints, electrical and electronics, life protection, alternative energy and bio-based materials. DSM's 24,500 employees deliver annual net sales of around €10 billion. The company is listed on NYSE Euronext. More information can be found at www.dsm.com.

Or find us on:    

For more information:

Mirelle van der Kreeft
DSM Engineering Plastics
Tel.: +31 46 477 3051
Fax: +31 46 477 3959
E-mail: Mirelle.Kreeft-van-der@dsm.com

Inka Finne
EMG
Tel.: +31 164 317 019
Fax: +31 164 317 039
E-mail: ifinne@emg-pr.com

Forward-looking statements

This press release may contain forward-looking statements with respect to DSM's future (financial) performance and position. Such statements are based on current expectations, estimates and projections of DSM and information currently available to the company. DSM cautions readers that such statements involve certain risks and uncertainties that are difficult to predict and therefore it should be understood that many factors can cause actual performance and position to differ materially from these statements. DSM has no obligation to update the statements contained in this press release, unless required by law. The English language version of the press release is leading.



Automobile natural gas tanks take the pressure with composites in DSM high performance thermoplastics.
(Photo: DSM Engineering Plastics: DSMPR437)

This press release and relevant photography can be downloaded from www.PressReleaseFinder.com
Alternatively for very high resolution pictures please contact Inka Finne,
(ifinne@emg-pr.com, +31 164 317 019)

Forward-looking statements

This press release may contain forward-looking statements with respect to DSM's future (financial) performance and position. Such statements are based on current expectations, estimates and projections of DSM and information currently available to the company. DSM cautions readers that such statements involve certain risks and uncertainties that are difficult to predict and therefore it should be understood that many factors can cause actual performance and position to differ materially from these statements. DSM has no obligation to update the statements contained in this press release, unless required by law. The English language version of the press release is leading.