

# Flexing with the market – Dow SILASTIC™ Fluorosilicone Rubber for turbocharger hose

Turbocharger hoses (TCH) are well established within the automotive sector, typically consisting of a multilayer structure of textile reinforced by silicone rubber with an oil-resistant fluorinated rubber inner liner. In the last decade, the use of Dow SILASTIC™ Fluorosilicone Rubber (FSR) for the inner liner has been growing.

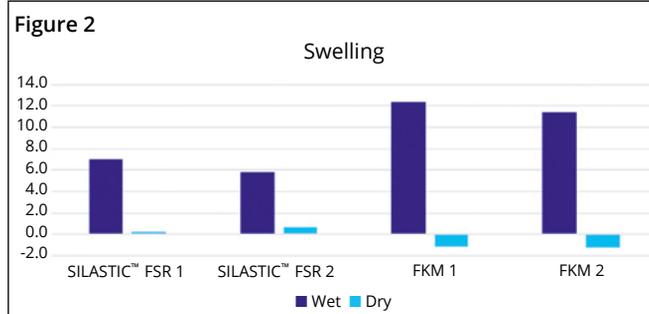
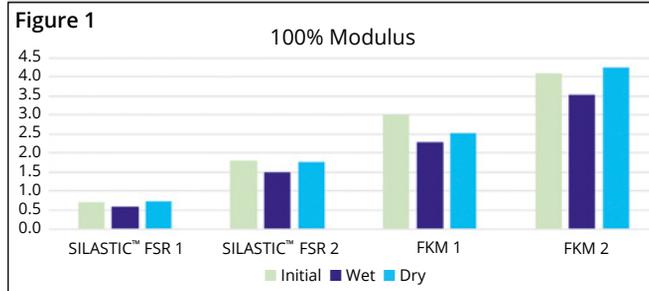
Historically, FSR material for TCH's has been perceived as having lower peak temperature resistance to alternative materials. Whilst high temperature resistance remains a key property requirement for TCHs, FSR has become more appealing following the evolution of powertrain technology and European Union regulatory requirements to reduce CO<sub>2</sub> emissions, which make acid resistance caused by exhaust gas recirculation a more important consideration.

Recent test data compares Dow SILASTIC™ FSR material performance on both **acid resistance and high temperature tear strength** with high-performance fluoroelastomer (FKM) compounds specifically designed for TCH fabrication:

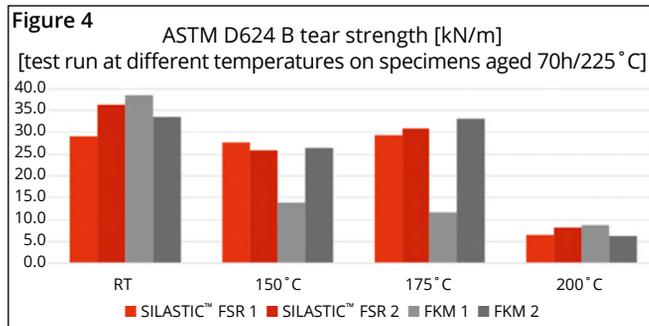
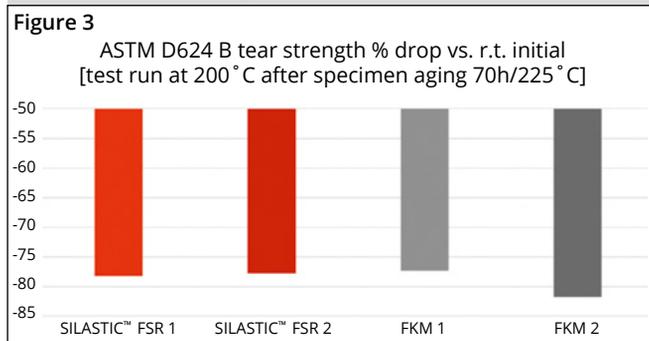
Figure 1 shows that the 100% modulus of SILASTIC™ FSR is lower than FKM. Thus, during radial expansion of an FSR TCH hose under pressure, the inner liner will be less stiff and less prone to disconnect from TCH construction and rip. Figure 2 shows that swelling of SILASTIC™ FSR is lower, whereas FKM not only shows higher swelling but is also subject to shrinkage after drying.

Figure 3 shows drop percentage of tear strength measured at 200 °C of initial vs aged specimens where both SILASTIC™ FSR and FKM materials show very compa-

## Acid solution immersion test



## Tear resistance at high temperature test



able performance. Figure 4 shows Tear Strength measured at different temperatures on specimens that were previously aged for 70 hours

at 225 °C, where FKM-1 especially shows a notable drop in tear performance at temperatures down to 150 °C. The combination of above factors

shows that SILASTIC™ FSR is a **real alternative** for TCH liner fabrication.

Whilst it's clear that the overall power train outlook remains in flux, it is important to realise that diesel engine production is still a priority in Europe. Diesel technology supports the growing light commercial vehicle and passenger vehicle markets while other more efficient technologies are being developed. In terms of emerging TCH technology, SILASTIC™ FSR is an **enabler to the petrol hybrid drive train**, where lower engine size is required to reduce weight. However, the need for increased power still exists; hence the turbo charger requirement.

As a result of our strong belief in our technology platform and growing markets, we are investing in the most effective technology for Fluorosilicone Rubber compound production at our Barry site in the United Kingdom. As mentioned above, SILASTIC™ FSR is a highly versatile material and we have **in-house capability to compound it to meet customer specific needs** such as viscosity, adhesion, fluid or heat ageing, hardness, colour and preform. In addition, we have compounds that offer the fabricator the option of utilising wrapped and continuous co-extruded hose technology. Also, thanks to the **flexible processability** of SILASTIC™ FSR – which can be extruded, calendared, injection and compression moulded – it is a very easy material for fabricators to work with, and flexible enough to react to the dynamic environment of a motor vehicle engine.

Dow remains committed to current and future automotive market trends. Learn more on [www.dow.com](http://www.dow.com)