

Best-in-class heat performance for flexible air ducts

As engine designers are challenged to create smaller, lighter and more powerful systems, DSM is innovating the materials to make it possible. DSM's portfolio of high-performance plastics provides efficient solutions for every duct in air induction systems.

For blow molded flexible ducts, OEM's and T1's are searching for high performance materials with excellent mechanical performance after heat aging combined with high chemical resistance.

DSM offers Arnitel® thermoplastic copolyester (TPC), the most reliable and cost efficient solution compared to metal and rubber. The heat aging performance of Arnitel, in combination with the best proven chemical resistance minimizes the risk of failure. Arnitel has proven performance for clean air ducts, cold charge air ducts, and in the near future also in hot charge air ducts.

Our portfolio for flexible airducts:

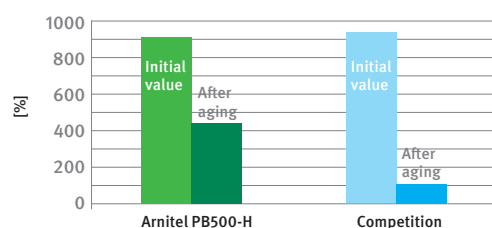
	Arnitel PB500-H	Arnitel PB582-H	Arnitel HT	Next best TPC
Chemical resistance	+	+	++	-
Heat aging	+	++	+++	-
Welding	+	+	+	0

Clean air ducts

Rubber and TPEs are commonly used for clean air ducts. Clean air ducts made from DSM's Arnitel offer reduced weight and wall thicknesses up to 50% compared to rubber, resulting in a significant cost advance and an improved environmental profile.

Arnitel outperforms competitive materials with elongation retention after heat aging that is up to four times better than other TPC materials.

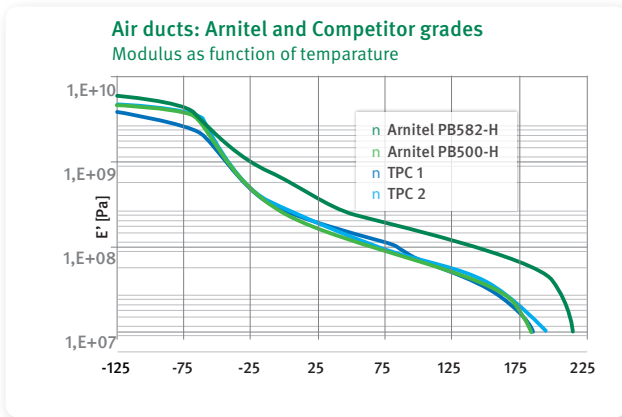
Elongation at break after aging at 150°C for 300 h



The Arnitel PB500-H and PB582-H have a proven track record in air ducts with superior heat aging performance versus competitive TPC materials confirmed by multiple OEMs.

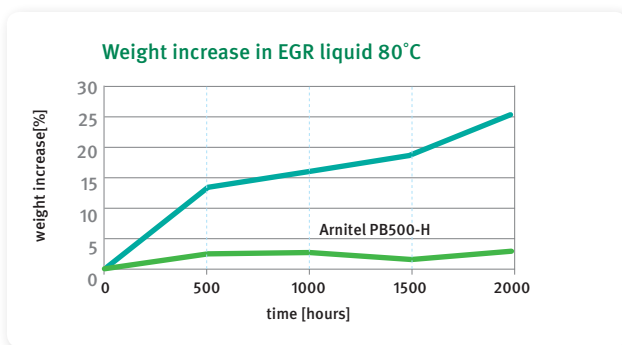
With high-performance grades that can operate at prolonged temperatures up to 150°C it offers robust elongation retention, as well as superior strength, flexibility, weldability performance and chemical resistance.

Used with 3D blow molding techniques, Arnitel offers the freedom to incorporate multiple components into one complex part design. In addition, it's easy to recycle during processing to ensure minimal waste and substantially reduce material costs.

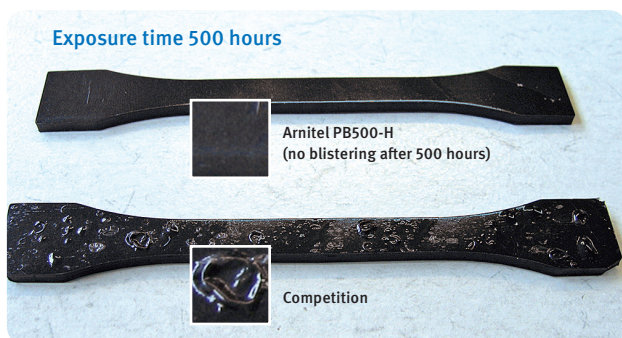


For peak temperatures up to 170- 175°C, Arnitel PB582-H is an ideal material candidate. The PB582-H material delivers higher stiffness at 175°C as compared to rubber and competitive TPC materials, while rubber and competitive TPC materials reach this stiffness at temperatures up to 110-140°C. This higher stiffness can be used to reduce wall thickness or ensure higher mechanical performance for a given design.

Best-in-class: Lowest weight increase in EGR liquid



With low pressure exhaust gas recirculation (EGR) systems and increased EGR rates, stable mechanical performance in clean air ducts has grown even more important. After exposure to EGR condensate, Arnitel shows low weight increase and very little drop in elongation at break after 2000 hours. Competitive TPC materials experience a significant weight increase, a compromised appearance, and an associated drop in mechanical properties as a result of the same exposure.



Case: Blow molding grade for Fiat's clean air ducts

Working together with Fiat Group Automobiles and leading Tier 1 systems supplier Mecaplast, DSM developed the Arnitel® PB500-H, for use in clean air ducts at a continuous use temperature of 130°C. The material is used in the 1.3 JTD engines for the Fiat Minicargo and Lancia Ypsilon (Euro V), as well as the award-winning engine for the New Ypsilon, which achieves the lowest CO2 emissions in the segment at 97 g/km.

“This grade meets Fiat’s technical requirements while also offering a cost advantage over current solutions,” says Marco Foresti, who is responsible for Engineering Material Application for Fiat Group Automobiles. “The material’s hardness offers new design freedom and a range of material properties that facilitate easy assembly and higher tolerances on the final design layout.”

“Arnitel PB500-H offers good and stable processing while achieving very complex shapes,” says Ludovic Poix, Fiat Project Manager at Mecaplast. “The material is very flexible across its entire temperature range of -40 to 150°C, while delivering a superior smooth inner surface and good weld strength with PBT/Arnitel fittings and couplings.”



Cold charge air ducts

DSM offers Arnitel for cold charge air ducts with operating temperatures up to 150°C (in this case under the hood temperature) and high pressure loads. Traditionally designed in stainless steel or aluminum, cold charge air ducts made from these materials enable metal to plastic conversion using both blow molding and injection molding techniques. The materials enable reductions in part count, weight, and processing costs while delivering the necessary durability for demanding under-the-hood applications. Arnitel leaves no residual deposit on machine heads, in contrast to competitive materials, resulting in an increase in productivity up to 5%.



Hot charge air ducts

In hot charge air ducts you see the request for a single material solution, replacing the combined metal ducts with rubber ends. A single material solution has clear advantages in cost effectiveness and weight reduction.

To meet the future requirements, DSM has developed Arnitel HT, the flexible material for hot charge air ducts up to 180°C for 3000 hours. With its excellent combination of heat performance, chemical resistance and mechanical properties, Arnitel HT is an extension to its Arnitel portfolio for ducts.

25 years' experience in air induction systems

DSM, inventor of Diablo technology, has more than 25 years of experience supplying material for air induction systems. Combining our application development expertise with the extensive knowledge base of our fundamental research team, we help to determine which material properties are needed for air induction applications. Contact us today to discuss how DSM can help redesign your air induction ducts to create lighter and more efficient air induction systems.

Contacts:

Europe:	Christian.Kilgus@dsm.com
US:	Russell.Bloomfield@dsm.com
China:	Bian.Cheng@dsm.com
Japan:	Yosuke.Umeda@dsm.com
South Korea:	Eli.Jang@dsm.com
India:	Prasanna.Godbole@dsm.com

DSM Engineering Plastics

For further information, please see:

www.dsm.com/automotive
info.automotive@dsm.com

 @dsmautomotive

Europe

tel +31 46 47 73796
info-europe.dep@dsm.com

Americas

tel +1 866-255-0855
info-america.dep@dsm.com

Asia Pacific

tel +86 21 6141 8188
info-asia.dep@dsm.com

©DSM 2015

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 and its associated companies deliver annual net sales of about €10 billion with approximately 25,000 employees. The company is listed on Euronext Amsterdam. More information can be found at www.dsm.com.