DSM Engineering Plastics

Advancing the Future of Mobility with Innovative Material Solutions

DSM
BRIGHT SCIENCE. BRIGHTER LIVING.

We're Advancing Automotive Innovation

Every second of the day, our scientists and engineers are developing higher-performing plastics that our customers need to create groundbreaking products. If you're tasked with making your components lighter, working on advanced driver-assistance systems, or reinventing the powertrain, you'll find solutions engineered around advanced plastics that are at the edge of the innovation curve.

We are focused on cultivating the future and providing global innovation services to our customers. It's what drives us.

Read more about our game-changing technologies that are already solving seemingly impossible challenges. Then let us further your thinking, deepen your knowledge, or connect you with an expert.

Roeland Polet
DSM Engineering Plastics

DSM ENGINEERING PLASTICS

A QUICK LOOK AT THE NUMBERS...

8
countries with production facilities

1,100
active patents

30
more filed each year

87%
of vehicles incorporate DSM materials

75%
of business highly specified by leading global brands

4.2%
of total revenue for R&T budget

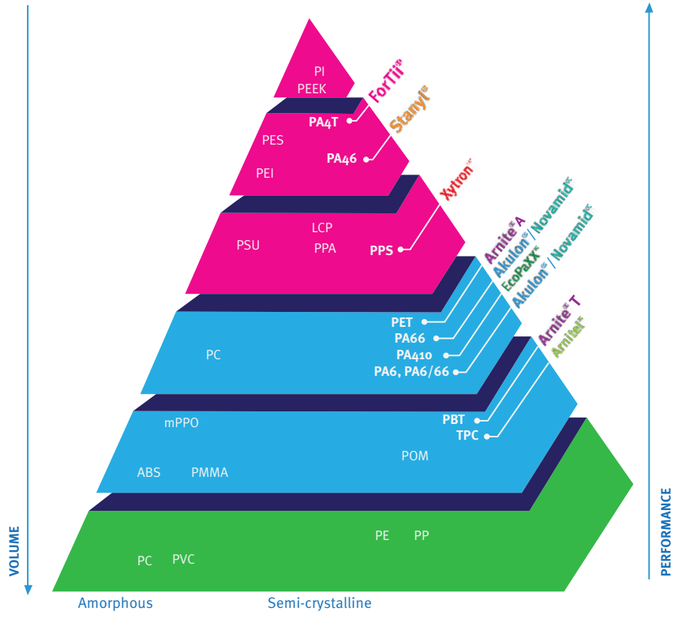
100%
of mobile devices contain DSM materials

300 MILLION
vehicles with DSM's Arnite® A (PET) for brake boosters

0 reported failures

High-Performance Automotive Materials

For over 25 years, DSM has partnered with automotive customers to design smarter, safer, lighter, and increasingly greener components. Our broad portfolio includes multiple high-performance materials.



DSM EP product		Tmelt(°C)	Main features
PA4T	ForTii®	325	reflow solderable, low CLTE, high structurals
PA46	Stanyl®	295	high stiffness retention, high abrasion resistance, low friction at elevated temperatures
PPS	Xytron™	280	extreme chemical resistance
PA66	Akulon®s	260	good hydrolysis resistance
PET	Arnite® A	255	good electricals, dimensional stable
PA410	EcoPaXX®	250	70% bio-based, carbon neutral
PBT	Arnite® T	225	good electricals, dimensional stable
PA6	Akulon® k	220	high heat aging and welding strength
PA6	Akulon® F • Novamid®	220	high oxygen barrier properties
PA6/66	Novamid®	190-200	optical properties
TPC	Arnitel®	170-210	elastomeric, high temperature resistance

Driving Fuel Economy

Stanyl® and Akulon® Diablo offer outstanding mechanical component stability over extended periods of time at elevated temperatures. The Diablo technology provides a significant improvement in long-term temperature resistance applications such as ducts, charge air cooler end caps, mixing tubes, air intake manifolds with integrated intercoolers, and resonators used in the latest car engines.

Next-Generation Metal Replacement

ForTii® Ace (PPA) provides an efficient and effective alternative for metal replacement and lightweighting. The high aromatic content of ForTii Ace – over 50% weight percentage – results in a unique set of properties which allow for high chemical resistance and linear, stable mechanical performance at up to 150°C.

	Akulon (PA6)	Akulon (PA66)	Stanyl (PA46)	Arnite (PET)	Arnite (PBT)	Arnitel (TPE)	Xytron (PPS)	ForTii (PA4T)	EcoPaXX (PA410)
Powertrain	●	●	●				●	●	●
Air and Fuel	●	●	●		●	●	●	●	●
Safety Components	●	●		●		●			
Interior	●	●				●			
Exterior	●	●			●				
Chassis and Structural Parts	●	●				●	●	●	
Auto Electronics	●	●	●		●	●	●	●	

ForTii ® Ace: The Game-Changer in Metal Replacement

If you're looking to unlock potential in automotive applications by boosting performance, cutting fuel emissions, and reducing cost of ownership, ForTii Ace was developed for you.

vs. Metal:

ForTii Ace can replace metal at just 50% of the weight over a wide range of temperatures without compromising performance. Noise, vibration, and harshness (NVH) are reduced, as is the need for secondary operations.

vs. PEEK:

PEEK has a great performance profile for metal replacement, but it faces an economic hurdle. ForTii Ace delivers similar high-heat resistance and mechanical properties at significantly lower costs, with easy and robust processing.

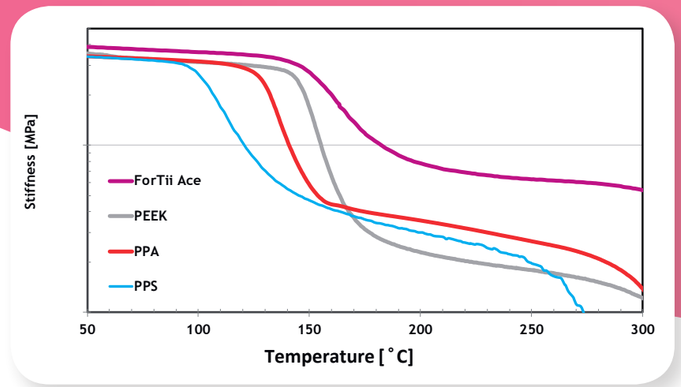
vs. PPA & PA66:

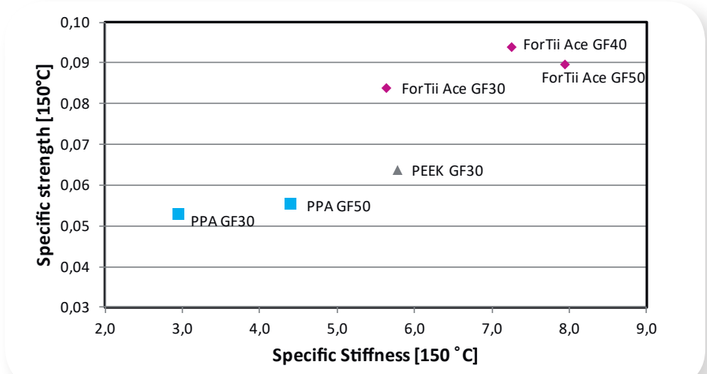
ForTii Ace has a glass transition temperature of 160ºC, enabling superior mechanical performance. It offers higher chemical resistance when exposed to EGR, water/glycol, or transmission oils. This enables engineers to actualize new designs that answer the need for lightweighting and integrated parts.

About the Technology:

ForTii Ace is available in a variety of different grades and can be tailored to your specific application needs. Our glass-filled ForTii Ace has a number of applications outside of automotive: injection molding, fibers and tubes, composite UD tapes, and so much more.

Linear performance profile that gives freedom to designers which ensures high performance in aggressive environments.





Arnitel® HT: The New Standard in High-Temperature Flexible Air Ducts

The one-part solution that allows system suppliers to produce hot charge air ducts using a single material in a one-step process.

- Best-in-class thermal stability
- Peak temperature up to 180ºC
- Flexible solution with a continuous-use temperature of 180ºC
- Suitable for different connector systems (e.g., the HENN® connector)
- Great weldability

Clean Air Ducts

- Offers up to 50% reduction in weight and wall thickness
- Elongation retention after heat aging is up to four times that of other thermoplastic copolyester elastomers
- Retains suitable stiffness at up to 180ºC

The New Heat Standard

- Improved heat aging
- Available in a wide range of Short D hardnesses
- Improved chemical resistance
- Flexibility to adapt to engine movements in a single-part solution

For Cold Charge Air Ducts

- Capable performance under high-pressure loads
- Compatible with both blow molding and injection molding techniques

Outperforms Rubber

- Weight reduction up to 40%
- Cost savings of up to 50%
- Reduced risk of leakage
- Improved environmental profile

Lowering Friction in Powertrain Systems by Tuning Tensioner Materials

Reducing friction in the engine curbs CO_2 emissions and improves engine efficiency. In current chain drive timing systems, almost 50% of friction losses are attributed to contact the chain makes with the guide and tensioner arm. Friction reduction can result in fuel savings equivalent to replacing 20 kilograms of material using “conventional” metal-to-plastic conversion.

- Reduces friction 20–40% in the boundary lubrication regime compared to PA66.
- Results in an increase of up to 1% fuel efficiency, offering a cost-effective solution for compliance with carbon emissions legislation.
- Automotive OEMs have already included Stanyl® HGR2 to improve the fuel economy of engine platforms.

Think Together

Powertrain:

Optimize fuel consumption

Applications:
chain tensioner system - bearing cages - FEAD - oil sumps

Materials:
Stanyl® (PA46)
ForTii® (PPA)
Akulon® (PA6 & PA66)

Benefits

1 gr/km

Proven lowest friction with Stanyl, resulting in up to 1 gr/km CO_2 reduction.

150° C

Due to high stiffness, up to 150°C, ForTii Ace enables next generation metal replacement.

Safety:

100% reliability

Applications:
airbag container - brake booster - braking tubes - e-brake booster

Materials:
Stanyl® (PA46)
Arnitel® (TPC)
Akulon® (PA6)
Arnite® A (PET)

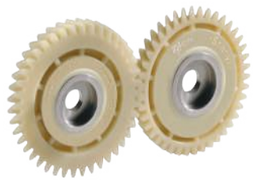
Benefits

Over 25 years in safety critical applications without a single failure.

High-dimensional stability and low-moisture uptake of Arnite A.

Gears & Actuators:

Robust perfomance with optimal cost



Applications:
motor management starter - motor gears - EGR gears - actuator housings

Materials:
Stanyl® (PA46)
ForTii® (PPA)
EcoPaXX® (PA410)
Arnite® A (PET)

Benefits

WEAR

50%

Stanyl offers best-in-class tribological behavior with up to 50% less wear than PPA.

40%

A complete gear set for a mass-balance module in Stanyl can weigh over 40% less than the steel version.

EPS:

Maximum safety, minimum weight

Applications:
housing - flex coupler - sensing cover - gears - e-motors

Materials:
Stanyl® (PA46)
Akulon® (PA6)
EcoPaXX® (PA410)
Arnite® A (PET)

Benefits

KG

50%

Weight reduction of up to 50% in metal-to-plastic conversion of EPS systems.

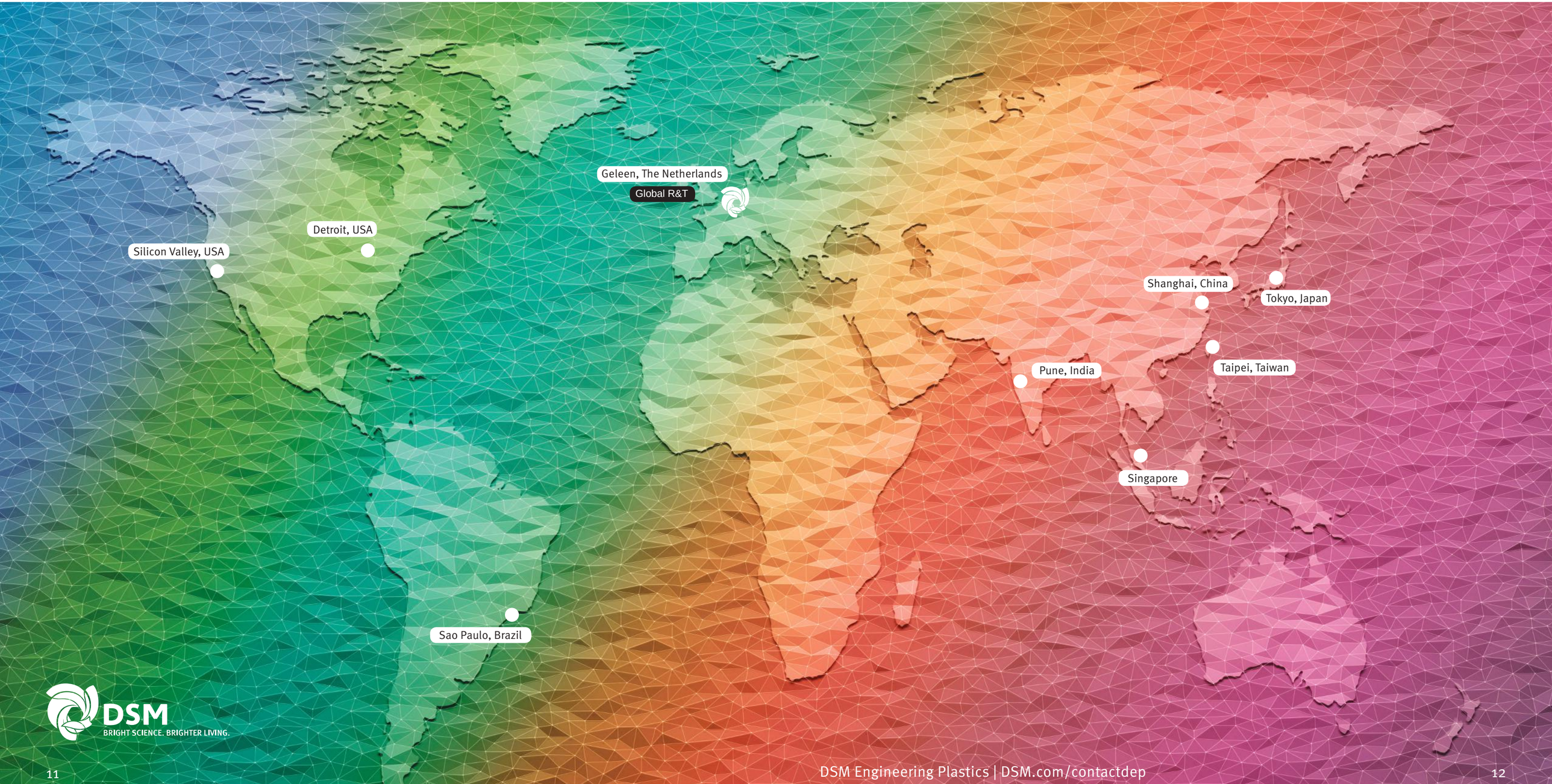
10-40%

Cost reduction of between 10-40%.

Global Partner in Automotive

Partnerships are about people. That's why our brightest minds – from scientists to sales teams – are keenly focused on customer relationships and are supported by state-of-the-art facilities, technologies, and processes.

We manufacture on three continents to guarantee a consistent supply of materials, and we have research facilities, sales teams, and marketing offices around the world. This creates a global network that includes research, technology support, and account management. Whether in the United States, Europe, or China, your project is supported by a dedicated, on-the-ground team that not only understands the automotive industry, but also the intricacies of your local market.



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