Water Injection Technology

A large range of polyamide dedicated to Water Injection Technology

Rhodia

Engineering Plastics

CHALLENGING BOUNDARIES

A complete Technyl Star™ range for design and structural parts

TECHNYL STAR™ S 218 V35
TECHNYL STAR™ S 218L1 V30
TECHNYL STAR™ SX 218L1 V50
TECHNYL STAR™ S 218 MT40

A perfect fit with Water Injection Technology

- High fluidity of the melt for a large processing window
- Great design freedom
- Fit to all type of section and angle fluctuation

Excellent outer surface aspect

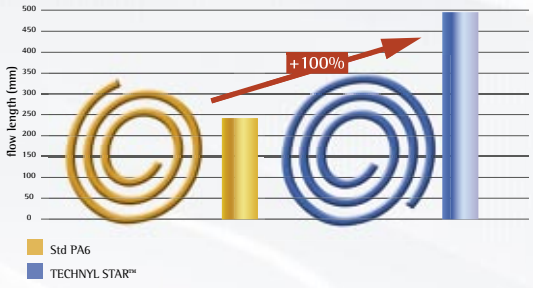
- Superior filler covering
- No sink mark

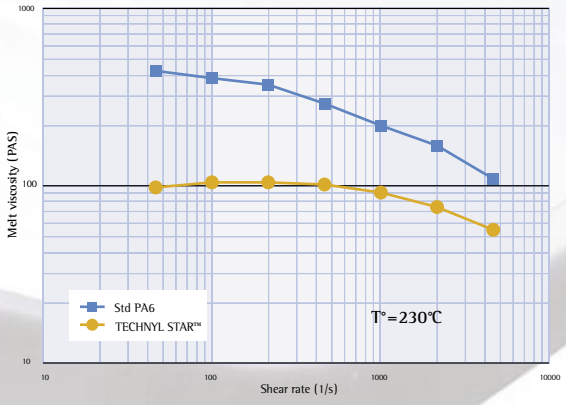
Significant productivity gains

- Lower cycle time vs std PA 6
- Melt temperature reduction vs std PA 6

High fluidity for enhanced design freedom

Spiral flow length melt temperature 250°C vs PA Standard





2 new Technyl® grades dedicated to cooling tubes

TECHNYL® A 338Wit1 V30
TECHNYL® A 338Wit2 V30

Specifically designed for Water Injection Technology

- High viscosity grades for excellent processability
- Optimised cristallisation kinetics

Excellent inner and outer surface

- Excellent fibre covering
- Constant wall thickness without water inclusion

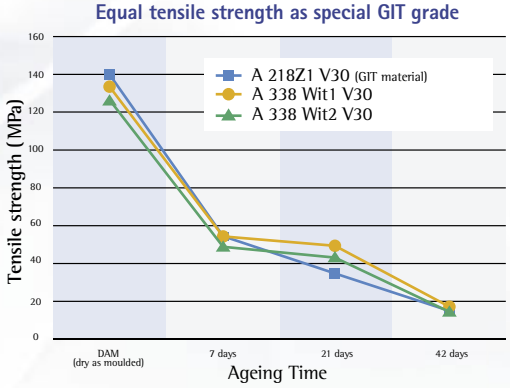
Outstanding glycol coolant resistance

Results after 1000h ageing at 130°C under 2.4 bar on long life coolant/water :

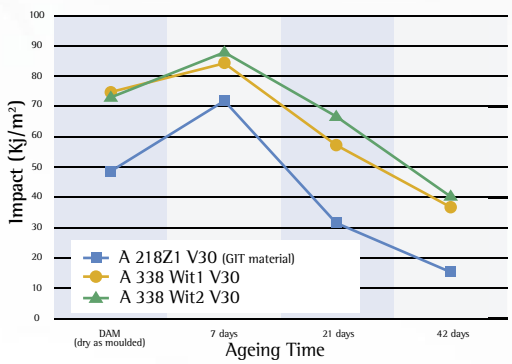
- High properties retention
- No crack, no break on the parts
- Glass fibers well bounded to the matrix

High mechanical properties

Equal tensile strength as special GIT grade



Superior impact resistance vs special GIT grade



With Std PA 6.6

With new TECHNYL® Wit grades

2 new Technyl® grades dedicated to cooling tubes

TECHNYL® A 338Wit1 V30
TECHNYL® A 338Wit2 V30

To fulfil pipes requirements

- Rigidity and high fatigue resistance
- Both internal and external surface quality
- High glycol resistance
- Low pressure loss

In terms of glycol resistance, these 2 new PA 6.6 glass fiber filled grades equal or even outperform the actual Technyl® GIT product A 218Z1 V30 used in mass production for numerous cooling pipes. For example, following a life test (1000h at 130°C in a mix of water and long life coolant), the tensile strength at break of Technyl® A 338Wit1 V30 is as good as the GIT grade, when this level is increased by 15% with Technyl® A 338Wit2 V30. Other retained properties such as impact resistance are improved about 80% with a Technyl® A 338Wit1 V30 and doubled with Technyl® A 338Wit2 V30, when compared to the GIT material.

However, the primary benefit of Technyl® Wit1 and Wit2 grades is their ability to create high quality inner surfaces, thanks to even glass fibre coverage by the polymer, along with a constant wall thickness free of water inclusion. In cooling pipe applications, the end benefits include greatly reduced pressure loss in the cooling circuit, along with reduced water pump size, and a reduced risk of cooling fluid pollution by glass fibres during engine life time.

				GLASS REINFORCED AND GLYCOL-WATER RESISTANCE IMPROVED PA 6.6	
PROPERTIES		STANDARDS	UNIT	TECHNYL® A 338Wit1 V30 Black 36N	TECHNYL® A 338Wit2 V30 Black 36N
PHYSICAL					
Density		ISO 1183-A	g/cm3	1.37	1.37
Water absorption (24h at 23°C)		ISO 62	%	0.8	0.8
Melting Temperature		ISO 11357	°C	263	263
Coefficient of linear thermal expansion parallel (23°C to 85°C)		ISO 11359	E-5/°C	2	2
Heat deflection temperature under load 1,8 MPa		ISO 75/Af	°C	225	230
MECHANICAL					
TENSILE	Strength at break	ISO 527 type 1 A	MPa	130 / -	140 / -
	Elongation at break	ISO 527 type 1 A	%	4 / -	3 -
	Tensile Modulus	ISO 527 type 1 A	MPa	7400 / -	9000 / -
FLEXURAL	Stress at break	ISO 178	MPa	200 / -	210 / -
	Flexural Modulus	ISO 178	MPa	6300 / -	7900 / -
IMPACT	Izod notched	ISO 180/1A	kJ/m²	55 / -	
	Charpy notched	ISO 179/1eA	kJ/m²	12 / -	13 / -
	Charpy unnotched	ISO 179/1eU	kJ/m²	75 / -	80 / -

*d.a.m = dry as moulded / cond. = conditioned according ISO 1110

Expertise and c

RHODIA ENGINEERING PLASTICS: T
AND IMPROVE THE USE O

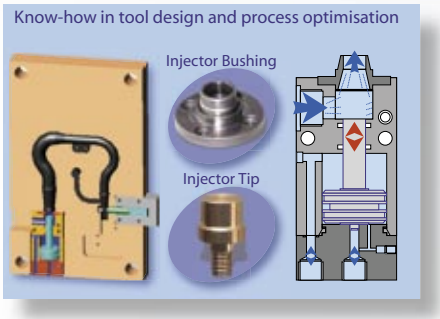
WIT process:

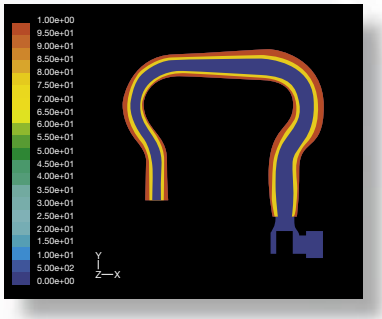
Polyamide
Water

Beyond our materials capability, Rhodia Engineering Plastics offers full technology expertise to support our customers' evolution towards WIT.

A complete range of tools and expertise for part design, simulation and trials

- In-house portable Water Injection Technology device and mould
- Specific expertise in calculation methods to simulate the WIT process
- Full expertise in injector design
- A complete range of bench tests:
  - Pulsation tests for glycol resistance
  - Fatigue and resistance tests





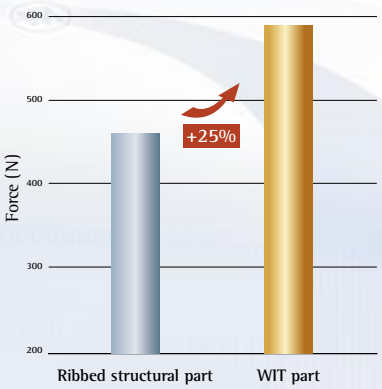
customer support

TECHNOLOGICAL SUPPORT TO IMPLEMENT
F WATER INJECTION TECHNOLOGY

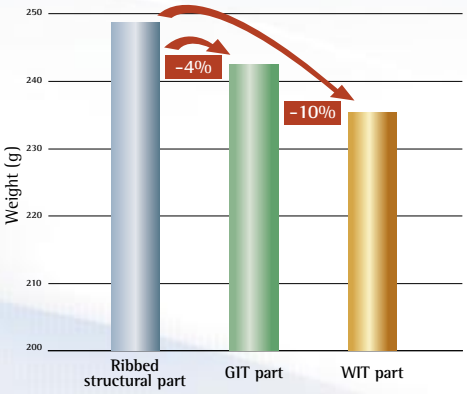
WIT benefits:

Water Injection Technology opens new possibilities for increased stiffness, weight reduction and productivity gains. It is also a perfect technology for function integration and design freedom.

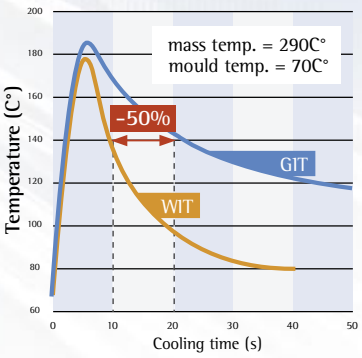
- **High stiffness and strength**



- **Weight reduction at iso size**

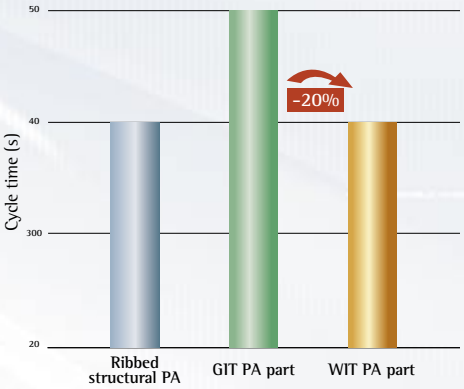


- **Cooling time reduction**



Thanks to the high calorific capacity of the water running through the part.

- **Cycle time reduction vs GIT technology**



- **Large function integration capability**
  - Fluids, air, cables, etc... can be integrated in the water channel
  - Adapted plastic design can replace pluri-material solutions including metal

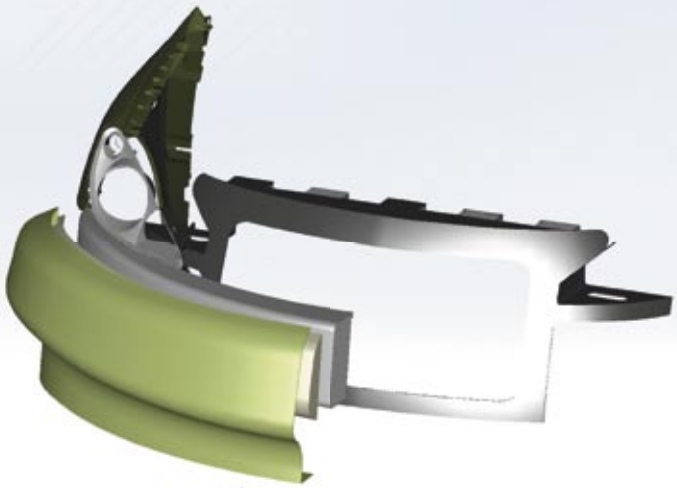
- **Recycling advantage**

Mono-material part in one shot for easy recycling

A complete Technyl Star™ range for design and structural parts

TECHNYL STAR™ S 218 V35
TECHNYL STAR™ S 218L1 V30
TECHNYL STAR™ SX 218L1 V50
TECHNYL STAR™ S 218 MT40

TECHNYL STAR™, the high flow polyamide from Rhodia Engineering Plastics, reaches beyond traditional polyamide properties to deliver major processing gains for improved productivity, new application flexibility and improved surface finish.



To fulfil structural and design parts requirements

Design parts
Door handle
Roof bar

- External surface finish
- UV resistance
- Stiffness and strength
- Paintability
- Colourability
- Chrome-platability

Structural parts
Front end
Pedals and pedal box
Handbrake lever

- Stiffness
- Impact behaviour
- Fatigue behaviour
- Weight reduction
- External surface aspect

				HIGH FLOW PA			HIGH FLOW HIGH STIFFNESS PA
PROPERTIES		STANDARDS	UNIT	TECHNYL STAR™ S 218 V35 Black 31N	TECHNYL STAR™ S 218L1 V30 Black 1N	TECHNYL STAR™ S 218 MT40 Nat.	TECHNYL STAR™ SX 218L1 V50 Black 1N
PHYSICAL							
Density		ISO 1183-A	g/cm3	1.41	1.34	1.45	1.55
Water absorption (24h at 23°C)		ISO 62	%	0.9	0.95	0.72	0.72
Melting Temperature		ISO 11357	°C	222	222	222	222
Heat deflection temperature under load 1,8 MPa		ISO 75/Af	°C	210	205	90	210
Mould shrinkage	Direction //	RHODIA-EP	%	0.3	0.3	1.0	
	Direction T	RHODIA-EP	%	0.6	0.6	1.1	
MECHANICAL							
TENSILE	Strength at break	ISO 527 type 1 A	MPa	195 / 115	180 / 110	86 / 50	230 / 162
	Elongation at break	ISO 527 type 1 A	%	3 / 4.5	3.2 / 5	7 / 25	2. 6 / 4
	Tensile Modulus	ISO 527 type 1 A	MPa	11700 / 7400	10500 / 6200	6000 / 2400	17000 / 11600
FLEXURAL	Stress at break	ISO 178	MPa	295 / 195	260 / 170	150 / 65	320 / 255
	Flexural Modulus	ISO 178	MPa	10000 / 6200	9500 / 5200	5500 / 1850	15500 / 10000
IMPACT	Izod notched	ISO 180/1A	kJ/m²	13 / 16	10 / 12	5 / 7	15 / 22
	Charpy notched	ISO 179/1eA	kJ/m²	13 / 19	10 / 12	5 / 6	15 / 20
	Charpy unnotched	ISO 179/1eU	kJ/m²	72 / 80	50 / 65	45 / 220	85 / 95

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The information contained in this document is supplied in good faith. It is based on:

- the extent of our knowledge of the products as listed,
- the tests and experiments carried out in our laboratories.

It is to be used only as an indication and shall not be construed in any way as a formal commitment or warranty on our part. Compliance of our products with your conditions of application or use can only be determined pursuant to your own prior appropriate test.

Edited by:

Rhodia Engineering Plastics S.A.S
Avenue Ramboz BP 64
F-69192 Saint-Fons Cedex
Tel.: (33) 4 72 89 27 00
Fax: (33) 4 72 89 27 01
Société par Actions Simplifiée
au capital de 1 500 000 €
393 335 104 RCS Lyon
repinfo@eu.rhodia.com
www.rhodia-ep.com

Rhodia

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