

PB 360 GS / DM 05x Green & Sprayable epoxy foam

PB 360 GS product is based on a two component formulation designed for "in situ" production of low density epoxy foam.

Advantages

Expansion at ambient temperature

DM 055 & 054: Fast curing hardeners

Sprayable with a 2 component metering machine with mixing head

Easy mixing ratio by 2 to 1 volume

Manufacturing "in situ" of a low density epoxy foam composite complex.


No handling of hollow microspheres.

Good adhesion onto many types of materials.

Homogeneous density.

Very low water absorption.

CMR free

High green carbon content 

Applications

Production of epoxy foam.

Light weight composites based on glass, carbon and natural fibers...


Low density laminate for Surfboards, sporting goods, light weight components

Casting or spraying "in situ" of epoxy cores up to 1cm thickness

Density reinforcing of foams (PVC, PET..) and honeycombs for local strengthening.

Thermal insulation.


Foaming epoxy resin PB 360 GS

Appearance / Colour		White viscous liquid
Viscosity (± 20 % m.Pas)	@ 15 °C @ 20 °C @ 25 °C @ 30 °C @ 40 °C	101 000 38 000 17 000 8 900 3 200
C green content		 26 % maximum
Density	@ 20 °C	
Pyknometer (± 0.01 g/cm ³)		1.12
Helium (± 0.001 g/cm ³)		1.166
Storage	AT 0 -25 °C	Store in cool place 12 months Keep away from sunlight

Hardeners DM 05x

		DM 055 <i>E 1652.52</i>	DM 054 <i>E 1699.4</i>
Appearance / Colour		Red - orange liquid	Black
Gardner		18 maximum	/
Reactivity type		Fast	Standard
C green content	%	60 % maximum	24 % maximum
Viscosity (+/- 20 % mPa.s)	@ 15 °C @ 20 °C @ 25 °C @ 30 °C @ 40 °C	990 640 420 290 150	1950 1140 700 450 210
Density Pyknometer (± 0.01)	@ 20 °C	0.99	1.02
Refractive index (± 0.0005)	@ 25 °C	1.5334	1.5409

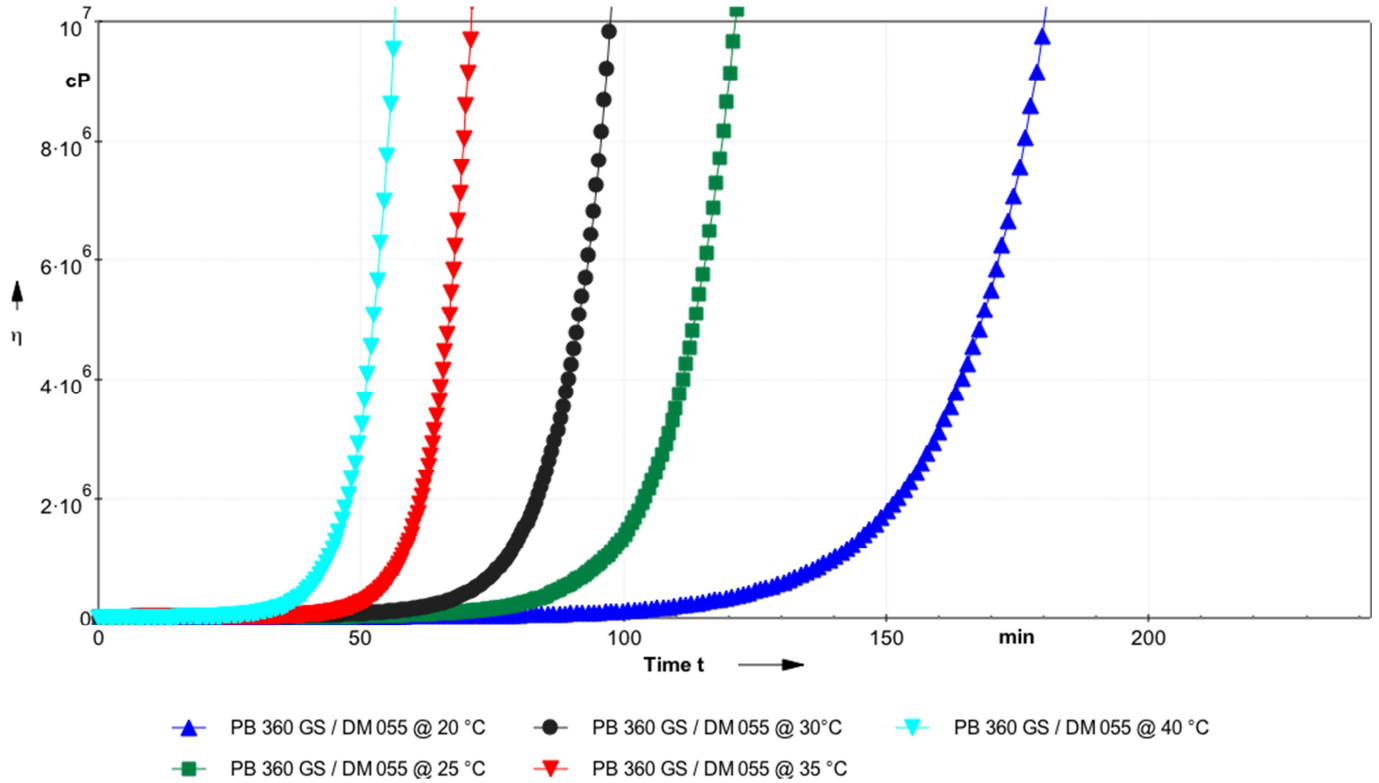
Mix properties

		PB 360 GS / DM 055	PB 360 GS / DM 054
Weight ratio		100 / 45 g	
Volume ratio		100 / 50 ml or 2 / 1	
Mix % bio-based Carbon content			
		37 %*	20 – 25 %
Viscosity initial (+/- 20 % mPa.s)			
	@ 20 °C	9 100	9100
	@ 25 °C	7 700	8 000
	@ 30 °C	3 300	3 600
	@ 35 °C	2 000	2 700
	@ 40 °C	1 400	1 700
Gel time			
	@ 20 °C	170'	200'
	@ 25 °C	110'	150'
	@ 30 °C	85'	105'
	@ 35 °C	62'	80'
	@ 40 °C	48'	60'
Density			
Free expansion	kg / m ³	320	320
Helium		360	310
Color – cure foam *		Red – orange Ral 1015	Grey Ral 7035-7038
Glass transition by DSC	°C		
Tg 1 onset maximum		79	90

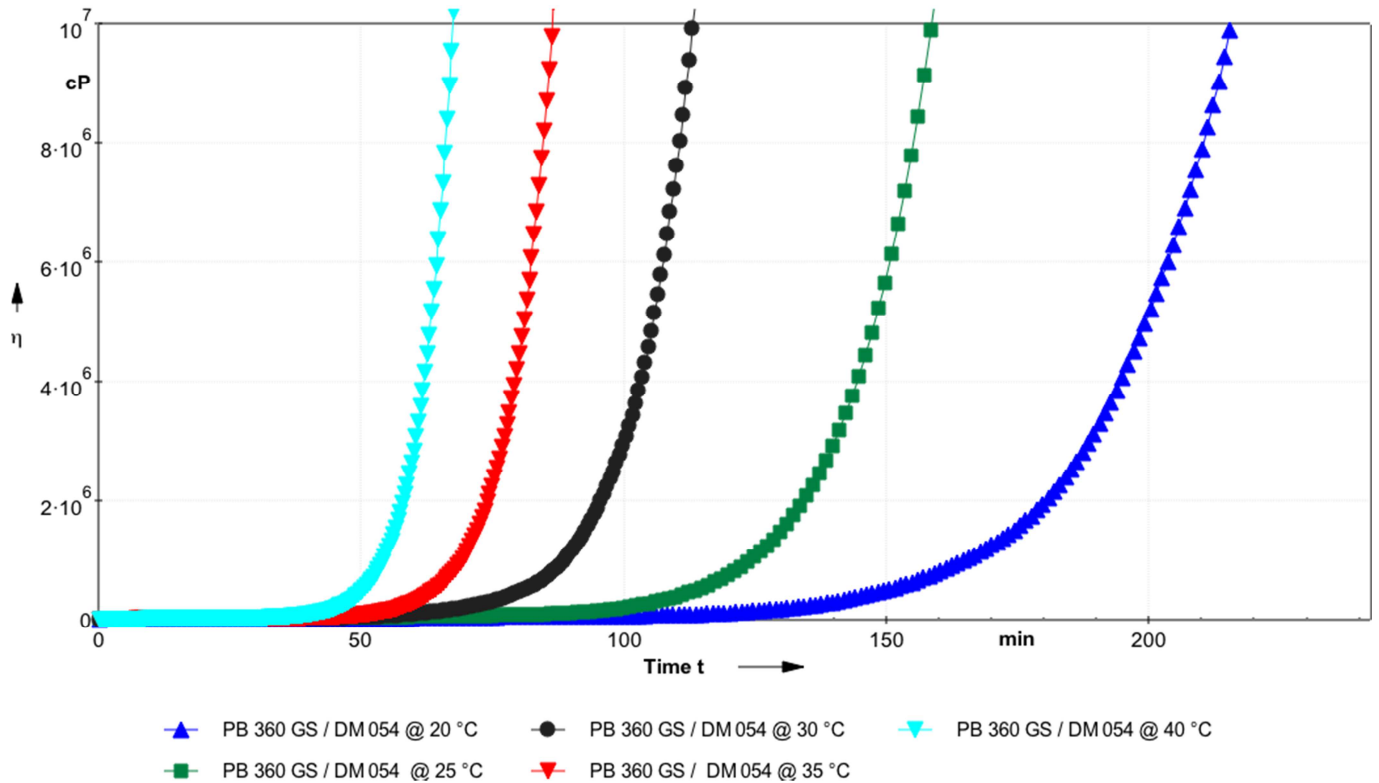
*GreenCarbon: Beta Analytic – 442218

*Color: Indicative, not for specifications

Reactivity – 1 mm film viscosity evolution with temperature
PB 360 GS / DM 055



PB 360 GS / DM 054



Exothermic parameters

Thermal conductivity of substrate.

Open or closed mould.

Temperature of components and ambient temperature.

Geometry, laminate thickness, volume and mass of the casting.

For casting onto a laminate that is curing, the heat generated by the epoxy can for a thick laminate influence the reactivity of the foaming system.

Recommendations for use

- In order to homogenize PB resins, mix thoroughly with a helicoidal agitator before quantity determination (take special care to scrape the sides and bottom of the drum).

- The expansion is much faster than the polymerization: mixing and spraying operations must be done as quick as possible.

Industrial equipment:

Best result with heatable low-pressure mix-metering systems with a static mixing head.

Feel free to ask for specific information

Foaming agent :

Immediately after mixing PB 360 GS resin and DM 05x' hardeners, a chemical reaction occurs generating the release of the foaming agent which is hydrogen.

Hydrogen is an extremely flammable gas.

Hydrogen is lighter than air: relative air density = 1 hydrogen = 0.07

Air and hydrogen combinations yield explosive mixes throughout a large scale of blends

* Explosive Limit is 4 vol% in the air

* Upper Explosive Limit is 74 vol% in the air

The hydrogen / air mixture can be ignited with very low energy ignition sources (e.g., static sparks) and burns with a hot non-luminous flame that is difficult to see.

Do not smoke while handling product.

Work far from all sources of sparks and open flames.

Ensure appropriate ventilation to prevent localized accumulation of high concentrations of hydrogen.

PB 360 GS resin reacts with acids, bases or strong oxidizers and may cause a release of hydrogen.

Ensure that the packages are properly closed after use to avoid contamination.

Hydrogen has no toxicological effect and no known ecological impact.

Mechanical properties on cast resin

Cure condition: AT + 6 hrs @ 60 °C

		PB 360 GS / DM 055	PB 360 GS / DM 054
Density	kg / m ³	320	320
Flexion			
Modulus of elasticity	N/mm ²	290	350
Maximum resistance	N/mm ²	7.5	9.1
Elongation at max.load	%	4.4	3.7
Elongation at break	%	4.4	3.7
Shear strength			
Maximum resistance	N/mm ²	3.5	4.2
Compressive			
Compressive yield strength	N/mm ²	6.3	8.0
Offset compressive yield	%	10.6	11.9
Glass Transition			
Tg1 onset	°C	61	69
Tg1 onset maximum	°C	79	90

Tests carried out on samples of pure cast resin, without prior degassing, between steel plates.
Measures undertaken according to the following norms:

Tension :	NF EN Iso 527 - 2
Flexion :	NF EN Iso 178
Charpy impact strength:	NF T 51-035
Shear Strength	ASTM D 732 – 93 punch tool
Compressive	NF EN ISO 844
Water absorption:	Internal Polymerization according to cycle, machining, weighing, time spent in distilled water at 70 °C / 48 hours, weighing 1 hour after emerging,
Glass transition DSC :	ISO 11357-2 : 1999 -5°C to 180°C under nitrogen gas Tg1 or Onset : 1st point at 20 °C/mn Tg1 maximum or Onset : second passage
Glass transition DTMA:	ISO 11357-1 - TG onset G' Temperature ramp 0°C to 180 °C @ 2°C/min ASTM D4065 - TG peak G''

Physical tests according standard ::

Gardner color:	NF EN ISO 4630 Visual method	
Refractive index :	NF ISO 280	
Viscosity:	NF EN ISO 3219	Rheometer 50 mm, shear 10s ⁻¹
Density:	NF EN ISO 2811-1	Pycnometer → liquids
Density	NF EN ISO 845	→ solids
Density	Helium	→ solids
Gel time :	Cross G' G'' / rheometer CP50 - Shear rate 10 s ⁻¹	
GreenCarbon content:	ASTM D6866 or XP CEN/TS 16640 Avril 2014	

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