

## Technical data sheet

### DIPLAST<sup>®</sup> TM 9

Version: May 2015

#### Chemical composition

Trinonyl trimellitate

#### CAS number

35415-27-1

#### Specifications

Characteristics	Unit	Value	Test method	
Density at 20°C	g/ml	0.9670 – 0.9770	GM012	ASTM D 4052-96
Refractive index n <sup>20</sup> <sub>D</sub>		1.4800-1.4900	GM020	ASTM D 1045-95
Colour	Pt – Co	70 max	PL02F	ASTM D 1045-95 ASTM D 1209-00
Acidity	mgKOH/g	< 0.1	PL02C	ASTM D 1045-95
Water content	%	< 0.1	GM010	ASTM E 203-96
Viscosity at 20°C	mPa·s	130-170	GM022	ASTM D 445-96
Ester content	%	> 99.5%	PL10C	G.C.

**DIPLAST<sup>®</sup> TM 9** is an oily, limpid, anhydrous liquid, with a mild characteristic odour. It is soluble in common organic solvents, insoluble in water.

The product **DIPLAST<sup>®</sup> TM 9** due to its nature does not have a shelf life. However it can be stored in appropriate containers at a temperature of approximately 25°C and the exclusion of humidity for at least 1 year, without losing its chemical properties.

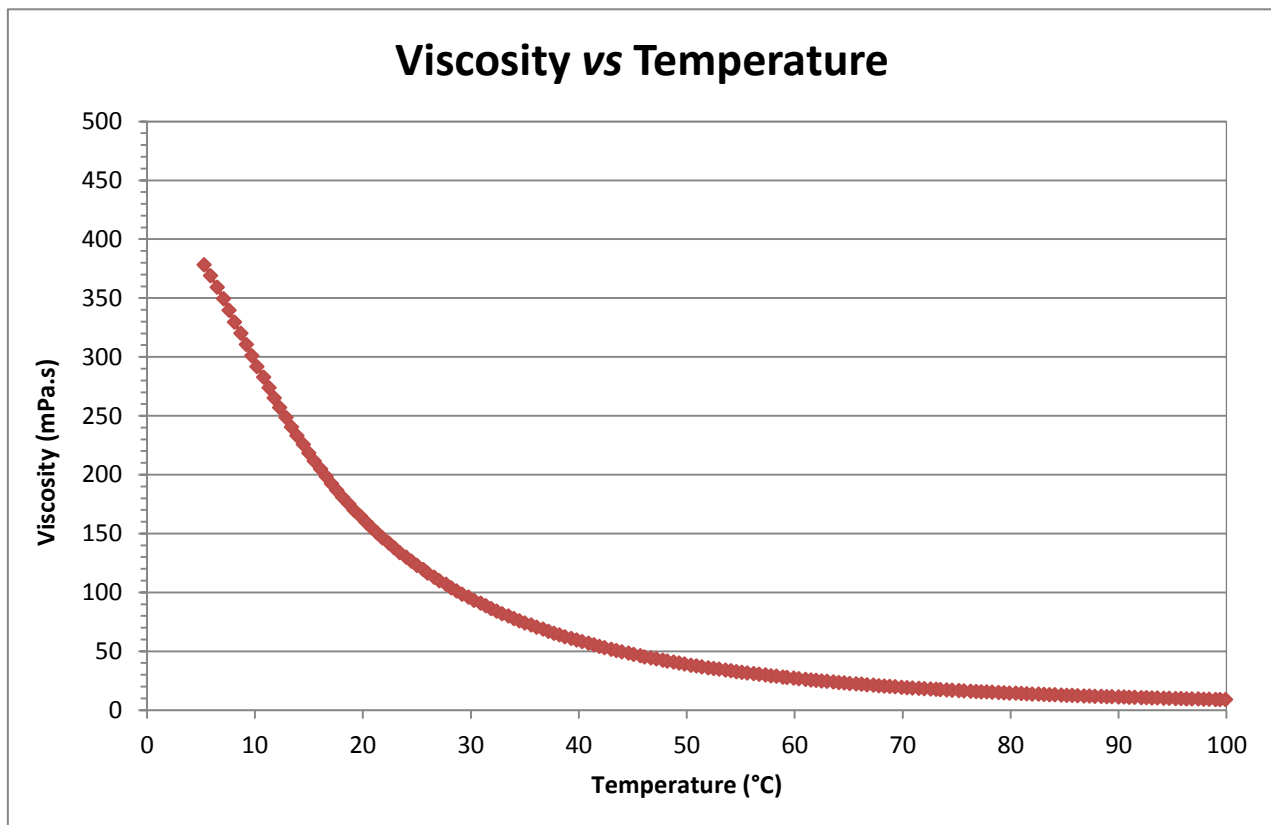
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First emission    October/18/2011

## Liquid Properties

<b>Volume resistivity</b> at 23°C (ASTM D 1169-95)	<b>5·10<sup>11</sup> Ohm·cm</b>
<b>Fogging DIN 75201</b> reflectometric (3hours at 100°C)	<b>&gt;95%</b>



The graph shows the viscosity vs. temperature curve for **DIPLAST<sup>®</sup>™ 9**.

The figures above are typical values and are not intended as specification limits.

For further information on the characteristics and properties of **DIPLAST<sup>®</sup>™ 9** in the liquid state, see the relevant EC-standard Materials Safety Data Sheet.

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## Characteristics and applications of trimellitates

PVC plasticizers based on Polynt Spa Trimellitic Anhydride (Trimellitate plasticizers) offer to users and compounders many of the performance advantages of both Polyester and Phthalate plasticizers. Trimellitate plasticizers show an unique balance of properties that can be summarized as follows:

- **Processability and efficiency**  
Comparable with those of many Phthalate plasticizers and better than most Polyester plasticizers.
- **Permanence at high temperatures and retention of mechanical properties.**  
Trimellitate plasticizers provide the same or even better performances than Polyester plasticizers.
- **Low temperature flexibility**  
Unlike Polyester plasticizers, Trimellitate plasticizers provide good flexibility at low temperatures.
- **Permanence and compatibility**  
Trimellitate plasticizers are more permanent than many other plasticizers. They are extremely resistant to extraction by aqueous soap and have an excellent compatibility under high humidity. The migration resistance in PVC compounds when in contact with a wide range of materials is much better than phthalates and other monomeric plasticizers and comparable to Polyester plasticizers.

## Characteristics and applications of DIPLAST® TM 9

**DIPLAST® TM 9**, obtained by n-nonyl alcohol, has been shown to be a product that exhibits excellent resistance to high temperatures, and at the same time an excellent cold flexibility.

Therefore **DIPLAST® TM 9** is widely used to many applications in PVC such as:

- prepare compounds for special electrical cables as it can satisfy the most severe requirements in this sector (BS 6746, VDE 0207, UL 62, CEI 20-11, and ISO 6722 with reference to automotive cables class B and C);
- production of PVC compounds, for various articles: sheets, profiles, gaskets etc.. which have to meet special requirements in terms of heat resistance, low volatility, low tendency to migrate;
- production of “anti-fogging” vinyl coatings for car interiors.

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## General properties in PVC compounds

The properties of **DIPLAST® TM 9** were evaluated using the following formulation:

Formulation	1 (parts by weight)	2 (parts by weight)
PVC K70	100	100
Plasticizer	50	47
Ca/Zn	1.2	12
CaCO <sub>3</sub>		15
Stearic acid	0.3	
Calcium stearate typo E	-	0.5

The specimens were prepared by calendaring and moulding to obtain the thickness required for the different test methods.

## Results

	Test method	TM 9 (1)	TM 9 (2)
<b>Shore “A” hardness</b>		89	-
<b>Shore “D” hardness</b>	ISO 868	-	45
<b>Cold flex °C (Clash &amp; Berg)</b>	ISO/R 458	-30	-23
<b>Solution Temperature °C (*)</b>	DIN 53408	150.5	
<b>Extraction resistance</b>			
-% weight loss-(48h at 70°C)	ISO 175		
• Water		-0.1	
• Aqueous soap 1%		-0.3	
• Olive oil		-13.0	
• Mineral oil		-5.40	
• n-Hexane (24hours at 23°C)		-29	
• <b>Volatility</b> (7days at 100°C)	ISO 176	-1.1	
<b>Rheological properties</b>			
• Dryblending time 83°C (Mixer P-600 : 100 rpm)	Brabender Plasticorder	6'28"	5'18"
• Gel time 88°C (Mixer W-50; 48g; 40rpm)	Brabender Plasticorder	54'00"	---
• Fusion Temperature (°C) (Mixer W-50, 5°C/min, 40rpm)	Brabender Plasticorder	155	--

(\*) Solution temperature determined with dispersion of resin: two grams of PVC are placed in 48 grams of plasticizer and the solution is heated at 1°C/min.

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## Properties in PVC compounds for cables

**DIPLAST® TM 9** with antioxidant enables high temperature cables to be produced.  
 As a technical information, the following results are quoted:

Test conditions	Formulation 2 specimen thickness 1mm
<b>ORIGINAL SPECIMENS:</b>	
Tensile strength MPa	20.5
Elongation at break %	287
Modulus 100%	13.1
Cold Flex °C (clash & Berg)	-23
Thermal stability at 200°C h (Min. value 120 minutes)	5
<b>SPECIMENS AGED 14 days at 140°C VDE 0207 YI8</b>	
Variation % Tensile strength (± 25% max.)	-11.7
Variation % Elong at break (± 25% max.)	-6.6
Variation % Modulus 100%	-5.3
Cold Flex °C (Clash & Berg)	-23
Variation % Cold Flex °C	-0
Weight loss (mg/cm <sup>2</sup> )	-0.89
<b>SPECIMENS AGED 10 days at 150°C</b> <b>Accelerated ageing test for class C automotive cables</b> <b>ISO 6722</b>	
Tensile strength Variation %	-10
Elong at break Variation %	-6.3
Modulus 100% Variation %	-4.6
Cold Flex °C (Clash & Berg)	-21
Cold Flex Variation %	-8.7
Weight loss (mg/cm <sup>2</sup> )	-1.28

In the tests, compounds were aged in an oven with forced ventilation

*The information contained here is correct and accurate and is based on our technical and scientific knowledge at the date of going to press.*

*Such information is, in all cases, relevant only with respect to the product as used in its pure state and only for the uses referred to in this publication.*

*Nothing stated here may be taken or construed as implying a breach of existing patents.*

*No warranty, either expressed or implicit, is given with regard to the results to be obtained from using this information.*

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