

## Technical data sheet

### DIPLAST<sup>®</sup> RS

Version: November 2015

**Chemical composition** Bis (2-propylheptyl) phthalate

**CAS number** 53306-54-0

**EINECS number** 258-469-4

#### Specifications

Characteristics	Unit	Value	Test method	
Density at 20°C	g/ml	0.960 – 0.965	GM 012	ASTM D 4052-96
Refractive index n <sup>20</sup> <sub>D</sub>		1.482 – 1.485	GM 020	ASTM D 1045-95
Colour	Pt - Co	40 max.	PL02F	ASTM D 1045-95 ASTM D 1209-00
Acidity	mgKOH/g	0.07 max.	PL02C	ASTM D 1045-95
Water content	%	0.05 max.	GM 010	ASTM E 203-96
Viscosity at 20°C	mPa·s	115 - 130	GM 022	ASTM D 445-96
Ester content	%	99.5 min.	PL10C	G.C.

**DIPLAST<sup>®</sup> RS** is an oily, limpid, anhydrous liquid, with a mild characteristic odour. It is soluble in common organic solvents, insoluble in water and miscible with most of the plasticizers used in processing PVC.

Due to its nature, **DIPLAST<sup>®</sup> RS** does not have a shelf life. However it can be stored in appropriate containers at a temperature of approximately 20°C and the exclusion of humidity for at least 1 year, without losing its chemical properties.

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

#### Characteristics and applications

**DIPLAST<sup>®</sup> RS**, being Bis(2-propylheptyl) phthalate, is obtained by reacting phthalic anhydride with an alcohol (2-propylheptanol) which is a decanol's isomer. For this reason, and with particular reference to its applications, **DIPLAST<sup>®</sup> RS** must be regarded as a C<sub>10</sub> phthalate.

**DIPLAST<sup>®</sup> RS** is a plasticizer for PVC with a broad spectrum of uses.

The main application of **DIPLAST<sup>®</sup> RS** is the manufacturing of insulators for electric cables for mid-range operating temperatures, where good mechanical properties after ageing or good electrical insulation properties are required.

Other important characteristics of **DIPLAST<sup>®</sup> RS** are low volatility, low tendency to migrate, and good stability of PVC plastisol's viscosity. For these reasons **DIPLAST<sup>®</sup> RS** is also used in the production of:

- imitation leather;
- tarpaulin covers for cars;
- adhesive tapes;
- conveyor belts;
- shoe soles;
- tubing, profiles, and gaskets for a variety of applications.

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**DIPLAST® RS** is a technical grade product. Should you have more specific needs, you are invited to contact our sales offices or representative agencies.

### General properties in PVC compounds

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

Formulation	PVC K70	Plasticizer	Ca/Zn	Stearic Acid
(parts by weight )phr	100	50	1.2	0.3

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

### Results

	Test method	DIPLAST RS (DPHP)	DIPLAST NS (DINP)
<b>Shore “A” hardness</b>	ISO 868	84	82
<b>Cold flex °C (Clash &amp; Berg)</b>	ISO/R 458	-20	-26
<b>Solution Temperature °C (*)</b>	DIN 53408	141	129
<b>Extraction resistance</b>	ISO 175		
-% weight loss- (48h at 70°C)			
• Water		-0.1	-0.1
• Aqueous soap 1%		-0.1	-0.7
• Olive oil		-6.3	-6.8
• Mineral oil		-5.2	-5.5
• n-Hexane (24h at 23°C)		-28.9	-27.6
<b>Volatility (7days at 100°C)</b>	ISO 176	-5.5	-6.1
<b>Rheological properties</b>			
• Dryblending time 83°C (Mixer P-600 : 100 RPM)	Brabender Plasticorder	4'12	3' 45"
• Gel time 88°C (at max torque) (Mixer W-50 : 40 rpm; 48g )	Brabender Plasticorder	19'12"	9'20"
• Fusion Temperature (°C) (Mixer W-50, 5°C/min, 40Rpm)	Brabender Plasticorder	125.3	117

(\*) 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.

DINP = Diisononyl phthalate ; DPHP = Bis(2-propylheptyl) phthalate

## Properties in PVC compounds for cables

**DIPLAST® RS with antioxidant (DIPLAST® RS/ST)**, has been evaluated in PVC compound in comparison with **DIPLAST® NS/ST** (Diisononyl phthalate with antioxidant).

Results of these tests prove that **DIPLAST® RS/ST** can be advantageously used in the production of cable insulators, thanks to its good workability and to the excellent characteristics imparted to the PVC insulator, like the good retention of mechanical properties after thermal ageing and the good flexibility at low temperature.

Formulation	PVC K70	Plasticizer	Ca/Zn	CaCO3	Stearic Acid
(parts by weight )phr	100	47	8	15	0.5

### Results

Characteristic -Thickness 1 mm	DIPLAST RS/ST (DPHP)	DIPLAST NS/ST (DINP)
Dry-blending time at 83°C – minutes	3'58"	2'52"
Cold Flex (Clash & Berg test) - °C	-18.5	-21
<b>Mechanical properties – (original specimen)</b>		
Tensile Strength - Mpa	21	20.9
Elongation at break - %	282	284
Modulus 100%	13.1	12.3
<b>Mechanical properties after 10 days at 100°C in air</b>		
Tensile Strength - Mpa	20.4	20.5
Elongation at break - %	278	274
Modulus 100%	14.1	13.9
<b>% Variation on original specimen</b>		
Tensile Strength -	-2.9	-1.9
Elongation at break -	-1.4	-3.5
Modulus 100% -	+7.6	+13

*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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