Propylene Glycol USP Grade

Technical Documentation.

Actualized February 2017

Carpemar

SUC. DE CARMELO PEREZ MARTINEZ S.L.
Ctra Castellón Km 3,700, Pol. La Unión Nave 3
ES-50013 Zaragoza (Spain)
Phone:+34 976 42 18 50
Fax:+34 976 59 19 71
Mail: carpemar@carpemar.com
www.carpemar.com

Carpemar

Typical values as Propylene Glycol USP:

Appearance	Transparent Liquid	Visual
Boiling Point	188ºC	ASTM D 1120
Freezing Point	< -50ºC	ASTM D 1177
Density (20ºC)	1,036 g/ml	ASTM D 1122
Viscosity (20ºC)	52 mPas	ASTM D 445
pH mixed 50% v/v with distilled water	6,5-7,5	ASTM D 1287
Water content	max. 0,05%	ASTM D 1123
Cubic Expansion Coefficient	0,00062 1/K	
Alkaline Reserve	0 ml HCl 0,1N	ASTM D 1121

Specifications	
Test	**Limits**
Mono-propylene glycol % min.	99,7
Di-propylene glycol, % max.	0,1
Acidity, mg KOH/g max.	0,01
Organic Volatile Impurities	Pass
Water % Weigh max.	0,1
Residue on Ignition, ppm max.	70
Chloride ppm max.	1
Sulfates, ppm max.	60
Heavy Metals, ppm max.	5
Arsenic, ppm max.	3
Oxidiz Subst as ml thiosulfate	Pass
Reducing Substances	Pass
Iron, ppm max.	0,3
Lead, ppm max.	1
Color ALPHA, max.	10
Distillation Range IBP @760 mmHg, ºC	185,0 - 189,0
Transparency a 25ºC, NTU max.	3
Specific weigh to 25ºC/25ºC	1,0350 - 1,0370
Refraccion Index nD20	1,43100 - 1,43300
Acidity (as acetic acid), % Peso max.	0,005

1,2-Propylene glycol complies the purity requirements of the valid monographs: USP and European pharmacopoeia.

SUC. DE CARMELO PEREZ MARTINEZ S.L.
Ctra Castellón Km 3,700, Pol. La Unión Nave 3
ES-50013 Zaragoza (Spain)
Phone:+34 976 42 18 50
Fax:+34 976 59 19 71
Mail: carpemar@carpemar.com
www.carpemar.com

Carpemar

Material Compatibility with Propylene Glycol USP:

Selection of the proper material of installations including gaskets and elastomers is important in designing installation for proper working and preventing spills to the environment.

Material compatibility information, appearing in the following table was obtained from proprietary tests and published literature. Conditions of exposure and the presence of other chemicals and trace impurities should always be considered when choosing a construction material.

Glycols are likely to leak past improperly assembled or defective fittings, seals and block valves.

Material	Maximum operation Temperature	
	(ºF)	(ºC)
ABS	80	26,7
CPVC	50	10,0
Epoxy	200	93,3
Fluorocarbons FEP	400	204,4
Fluorocarbons TFE	470	243,3
Furfuryl Alcohol	250	121,1
Chlorinated Polyesters	100	37,8
Polyethylene	140	60,0
Polypropylene	140	60,0
Vinyl Ester	210	98,9
Viton A	90	32,2
Neoprene GR-M (CR)	80	26,7
Nitrile Bruna N (NBR)	80	26,7

SUC. DE CARMELO PEREZ MARTINEZ S.L.
Ctra Castellón Km 3,700, Pol. La Unión Nave 3
ES-50013 Zaragoza (Spain)
Phone:+34 976 42 18 50
Fax:+34 976 59 19 71
Mail: carpemar@carpemar.com
www.carpemar.com

Carpemar

In the following tables additional general guidance for corrosion resistance is shown for various metals and plastics **for pure Propylene Glycol USP**.

Material	Temperature (ºF)	Temperature (ºC)	Ranting
Aluminium	60-170	15,6 - 76,7	2
Brass	60-90	15,6 - 32,2	3
Bronze	60-210	15,6 - 98,9	3
Carbon Steel	60-210	15,6 - 98,9	2
Copper	60-90	15,6 - 32,2	3
Hastelloy B	60-90	15,6 - 32,2	2
Inconel	60-90	15,6 - 32,2	3
Monel	60-90	15,6 - 32,2	3
Nickel	60-90	15,6 - 32,2	3
304 SS	60-90	15,6 - 32,2	2
316 SS	60-210	15,6 - 98,9	2
Titanium	60-90	15,6 - 32,2	1

Ranting Code:
1 ≤2 mils/year
2 ≤ 20 mils/year
3 ≤ 20 mils/year NOT recommended

Zinc is not compatible with propylene glycol or their mixtures with water, avoid zinc or galvanized reservoirs.

Corrosion Table for Propylene Glycol – Water Mixtures:

Mixtures of propylene glycol and water are more corrosive than pure water so additives should be used in order to ensure the integrity of the circuit.

The following table shows the corrosion values of mixtures Propylene Glycol – Water according to ASTM D 1384. For a comparative porpoise results for water alone are presented.

Material	Propilenglicol (50% v/v)	Water
Steel	-1,2	-1,0
Aluminium	-136	-11
Cooper	-2,5	-1,0
Cast Iron	-225	-76
Brass	-92	-192
Solder	-68	-32

SUC. DE CARMELO PEREZ MARTINEZ S.L.
Ctra Castellón Km 3,700, Pol. La Unión Nave 3
ES-50013 Zaragoza (Spain)
Phone:+34 976 42 18 50
Fax:+34 976 59 19 71
Mail: carpemar@carpemar.com
www.carpemar.com

The results above are an average change in weight of coupons in mg. A positive number indicates an increase in weight due to the formation of a stable protective layer on the metal's surface.

Test description:

ASTM D 1384:

In this test method, specimens of metals typical of those present in engine cooling systems are totally immersed in aerated engine coolant solutions with corrosive water for 336 h at 88°C (190°F). The corrosion inhibitive properties of the test solution are evaluated on the basis of the weight changes incurred by the specimens. Each test is run in triplicate, and the average weight change is determined for each metal.

Compatibility table for Propylene Glycol–Water Mixtures:

The next table shows plastics, sealants and elastomers compatible with water dilutions of propylene glycol. Data has been gathered in specific bibliography and proprietary tests.

Name	Abbreviation
Butyl rubber	IIR
Cloropropene	CR
Ethylene-propylene-diene rubber	EPDM
Fluorocarbon elastomers	FPM
Natural rubber up to 80ºC	NR
Nitrile Rubber	NBR
Polyacetal	POM
Polyamide up to 115ºC	PA
Polybutene	PB
Polyethylene high/low density	PE-LD/PE-HD
Polyethylene cross linked	VPE
Polypropylene	PP
Poly (tetrafluoroethylene)	PTFE
Polyvinyl chloride, rigid	PVC h
Silicone Rubber	Si
Styrene-butadiene rubber up to 100ºC	SBR
Unsaturated polyester resins	UP

SUC. DE CARMELO PEREZ MARTINEZ S.L.
Ctra Castellón Km 3,700, Pol. La Unión Nave 3
ES-50013 Zaragoza (Spain)
Phone:+34 976 42 18 50
Fax:+34 976 59 19 71
Mail: carpemar@carpemar.com
www.carpemar.com

Carpemar

Presentation:

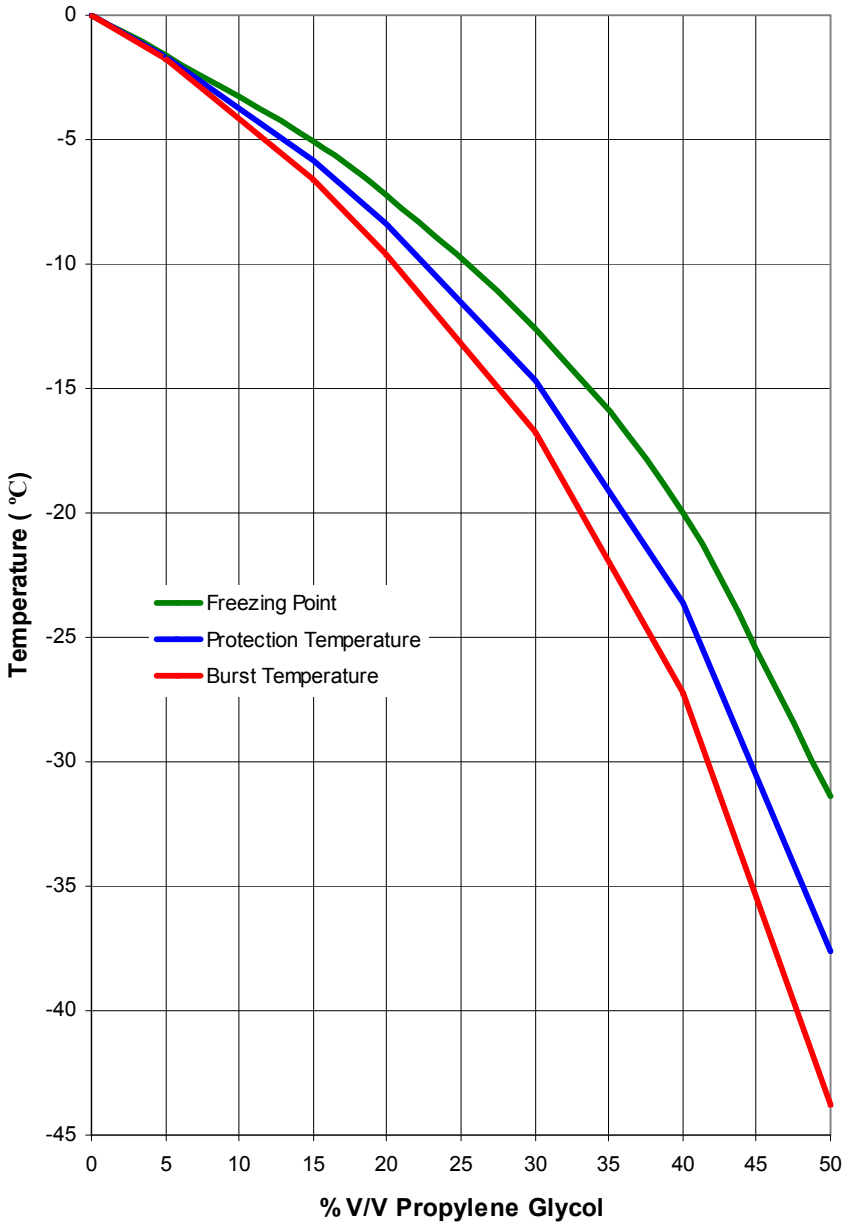
Propylene glycol is supplied in 1.000 liters. IBC containers, 210 liters non-returnable plastic drums, and in 25 and 10 liters non-returnable plastics drums.

Other volumes are available upon request.

SUC. DE CARMELO PEREZ MARTINEZ S.L.
Ctra Castellón Km 3,700, Pol. La Unión Nave 3
ES-50013 Zaragoza (Spain)
Phone:+34 976 42 18 50
Fax:+34 976 59 19 71
Mail: carpemar@carpemar.com
www.carpemar.com

Carpemar

Frost Protection .vs. %V/V Propylene Glycol



Freezing point according to ASTM D 1177 is the temperature for the first ice crystal formation.

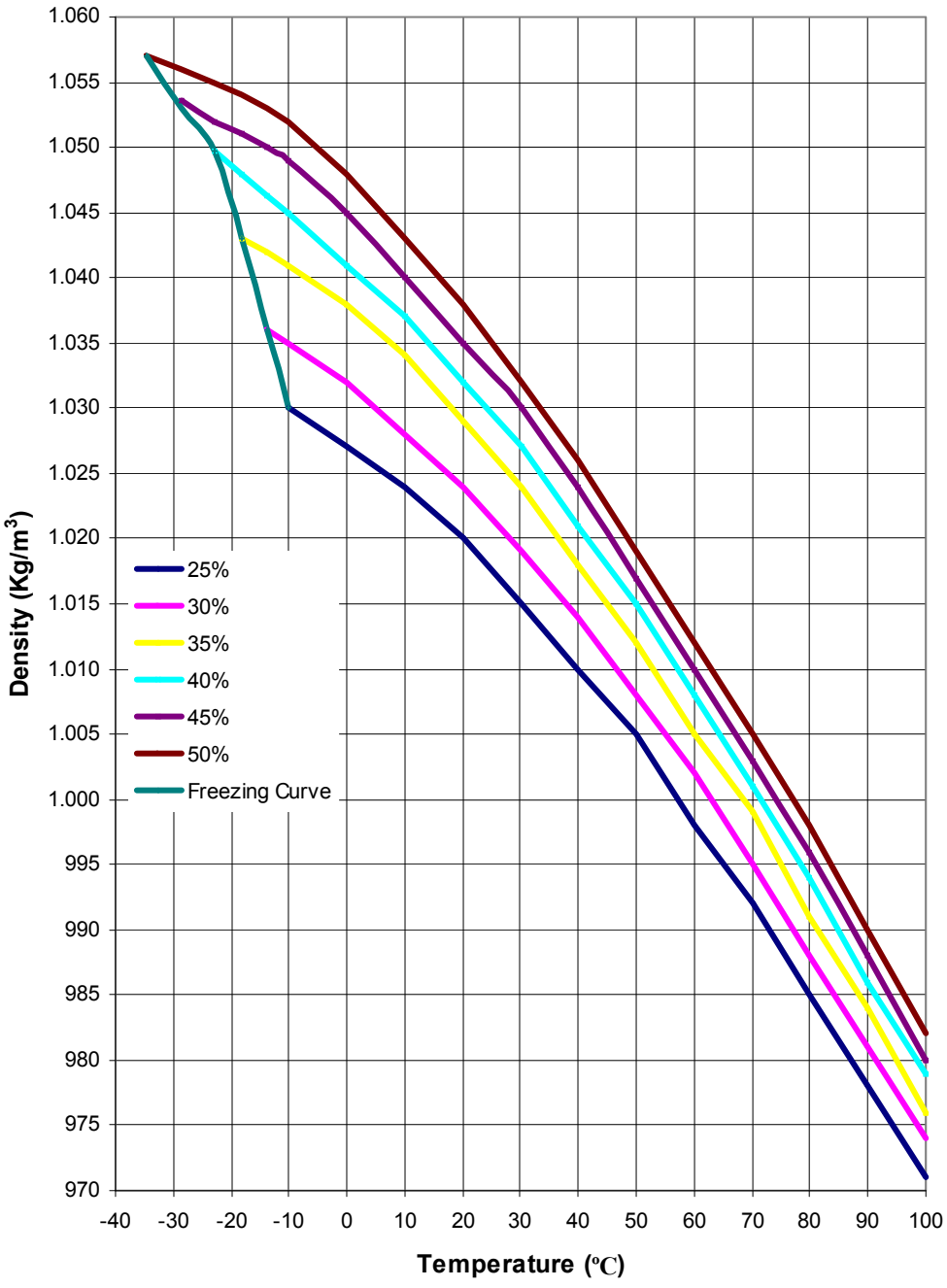
DIN 51583 normative establishes the temperature from the product does not flow and there is danger for the circuit integrity.

Between both temperatures exists a mixture of ice crystals and not-frozen fluid that flows without volume increase, thus, without bursting problems.

SUC. DE CARMELO PEREZ MARTINEZ S.L.
Ctra Castellón Km 3,700, Pol. La Unión Nave 3
ES-50013 Zaragoza (Spain)
Phone:+34 976 42 18 50
Fax:+34 976 59 19 71
Mail: carpemar@carpemar.com
www.carpemar.com

Carpemar

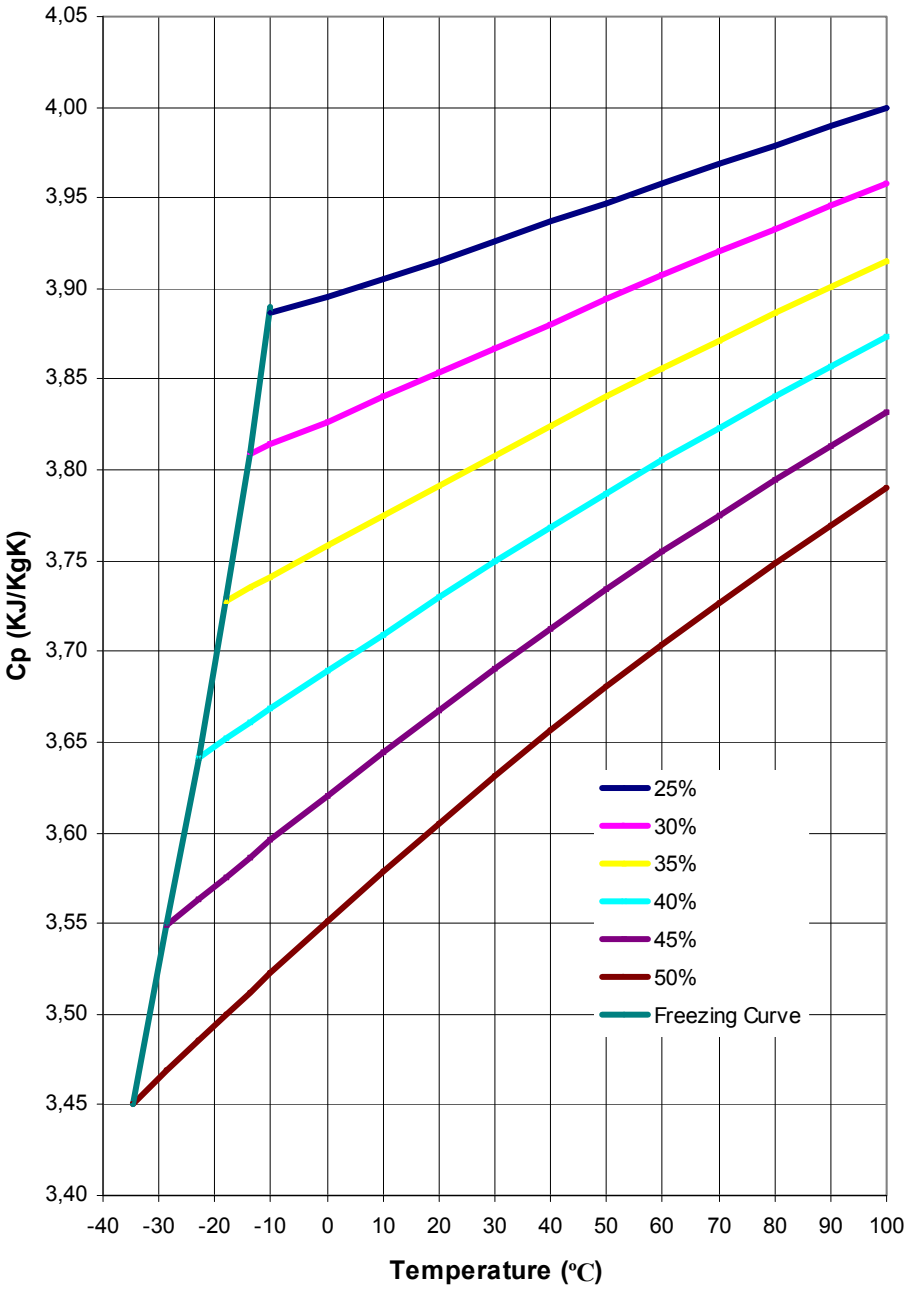
Density .vs. %V/V Propylene Glycol



SUC. DE CARMELO PEREZ MARTINEZ S.L.
Ctra Castellón Km 3,700, Pol. La Unión Nave 3
ES-50013 Zaragoza (Spain)
Phone:+34 976 42 18 50
Fax:+34 976 59 19 71
Mail: carpemar@carpemar.com
www.carpemar.com

Carpemar

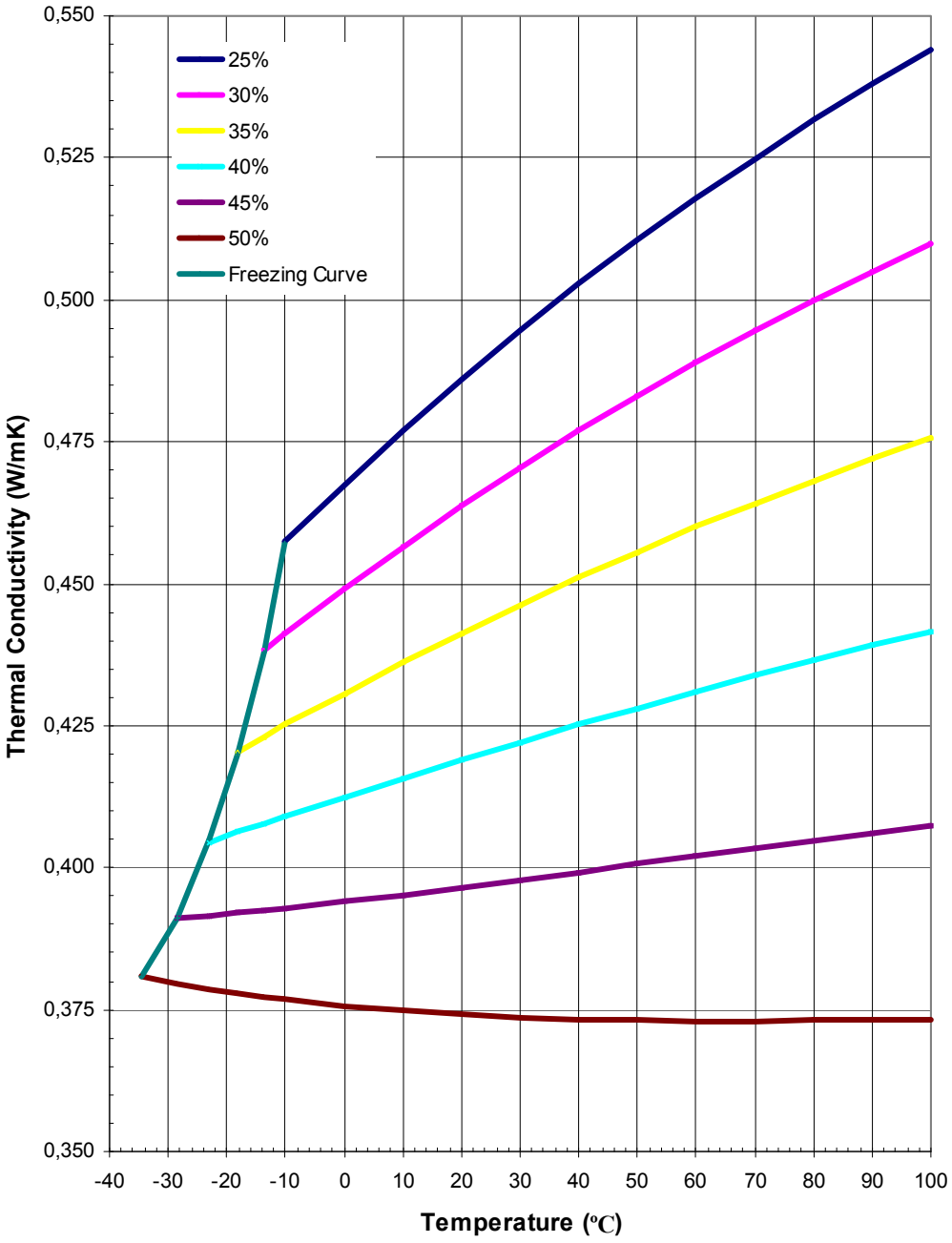
Specific Heat Capacity .vs. %V/V Propylene Glycol



SUC. DE CARMELO PEREZ MARTINEZ S.L.
Ctra Castellón Km 3,700, Pol. La Unión Nave 3
ES-50013 Zaragoza (Spain)
Phone:+34 976 42 18 50
Fax:+34 976 59 19 71
Mail: carpemar@carpemar.com
www.carpemar.com

Carpemar

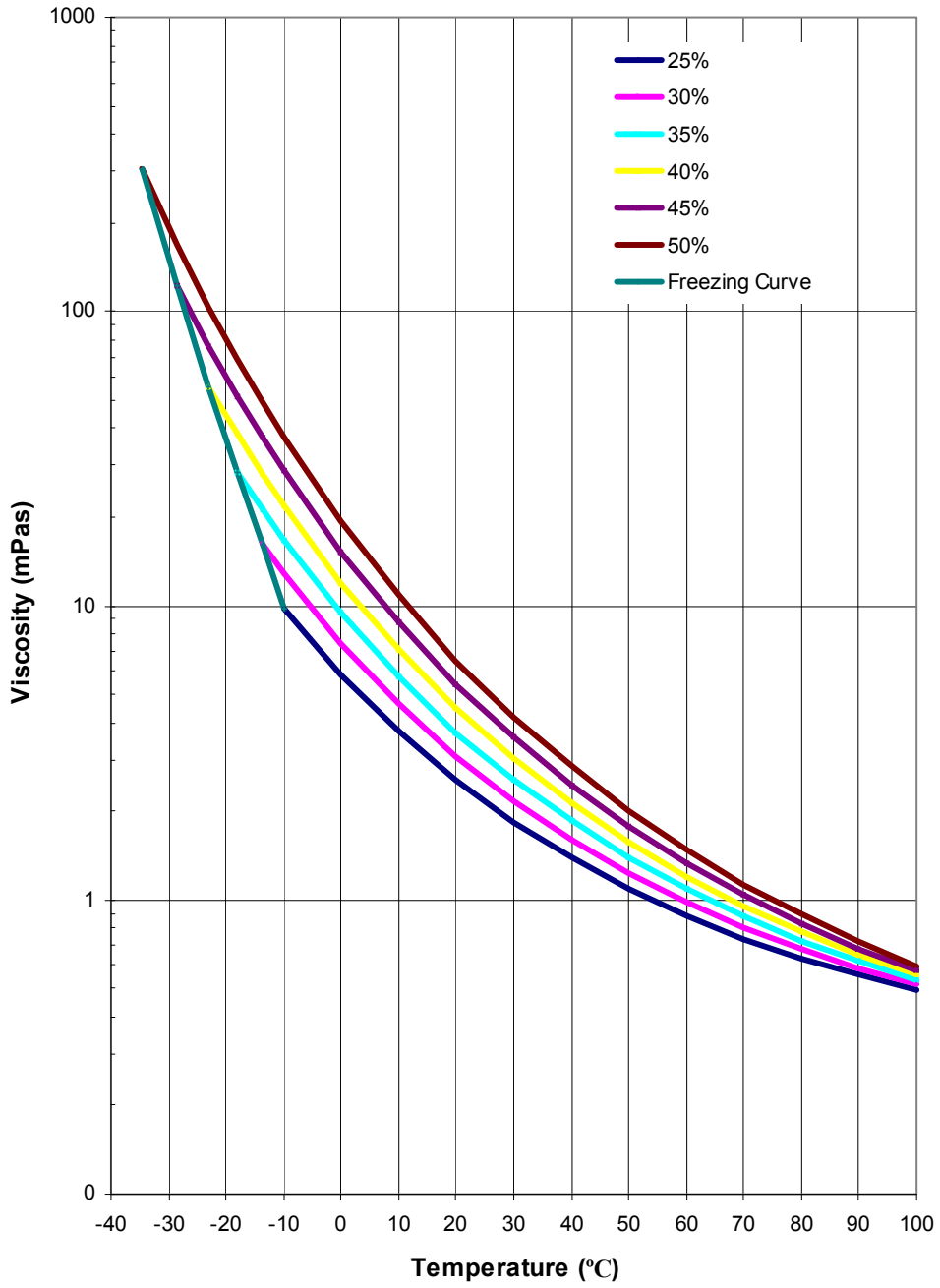
Thermal Conductivity .vs. %V/V Propylene Glycol



SUC. DE CARMELO PEREZ MARTINEZ S.L.
Ctra Castellón Km 3,700, Pol. La Unión Nave 3
ES-50013 Zaragoza (Spain)
Phone:+34 976 42 18 50
Fax:+34 976 59 19 71
Mail: carpemar@carpemar.com
www.carpemar.com

Carpemar

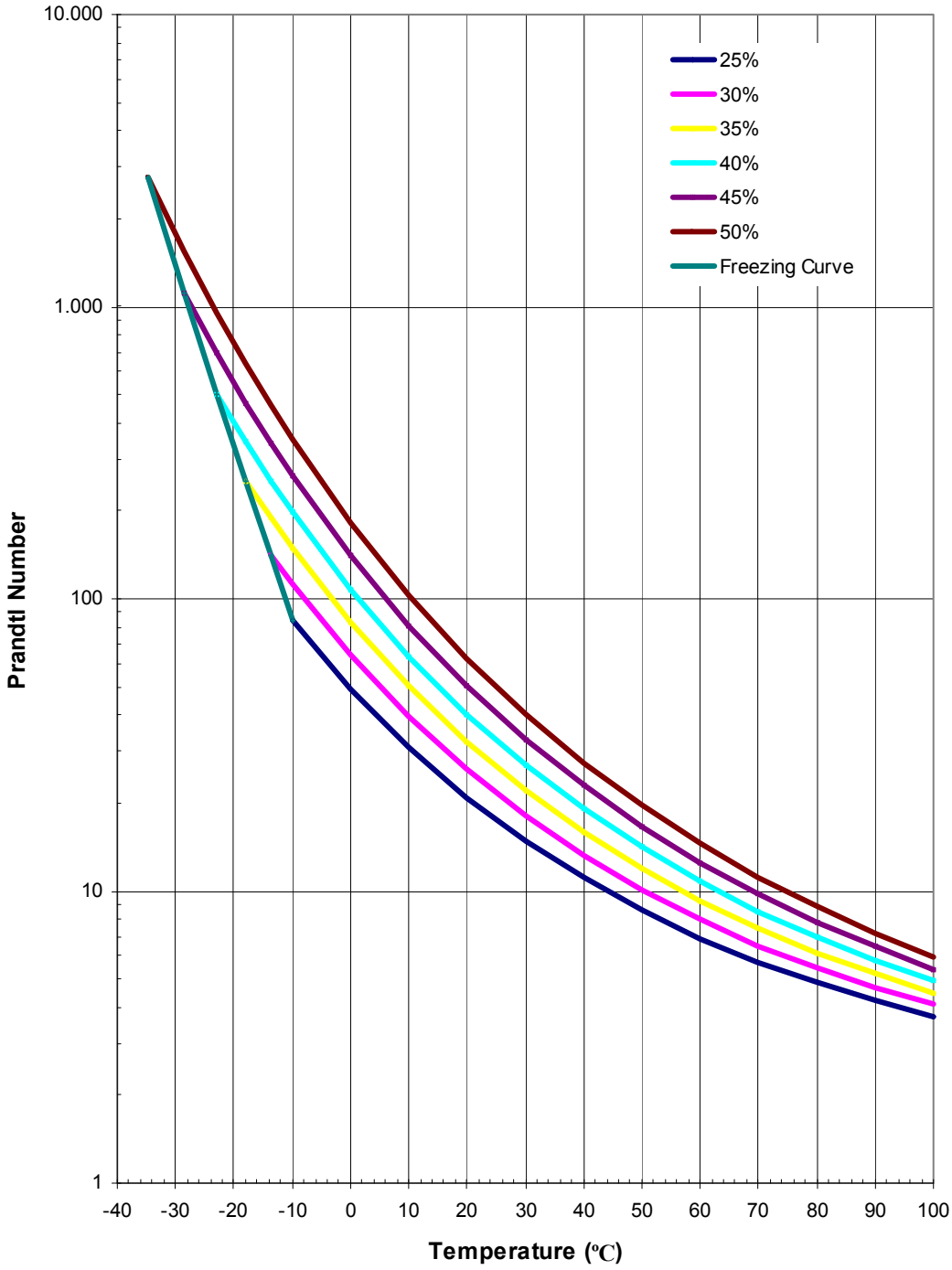
Dynamic Viscosity vs %V/V Propylene Glycol



SUC. DE CARMELO PEREZ MARTINEZ S.L.
Ctra Castellón Km 3,700, Pol. La Unión Nave 3
ES-50013 Zaragoza (Spain)
Phone:+34 976 42 18 50
Fax:+34 976 59 19 71
Mail: carpemar@carpemar.com
www.carpemar.com

Carpemar

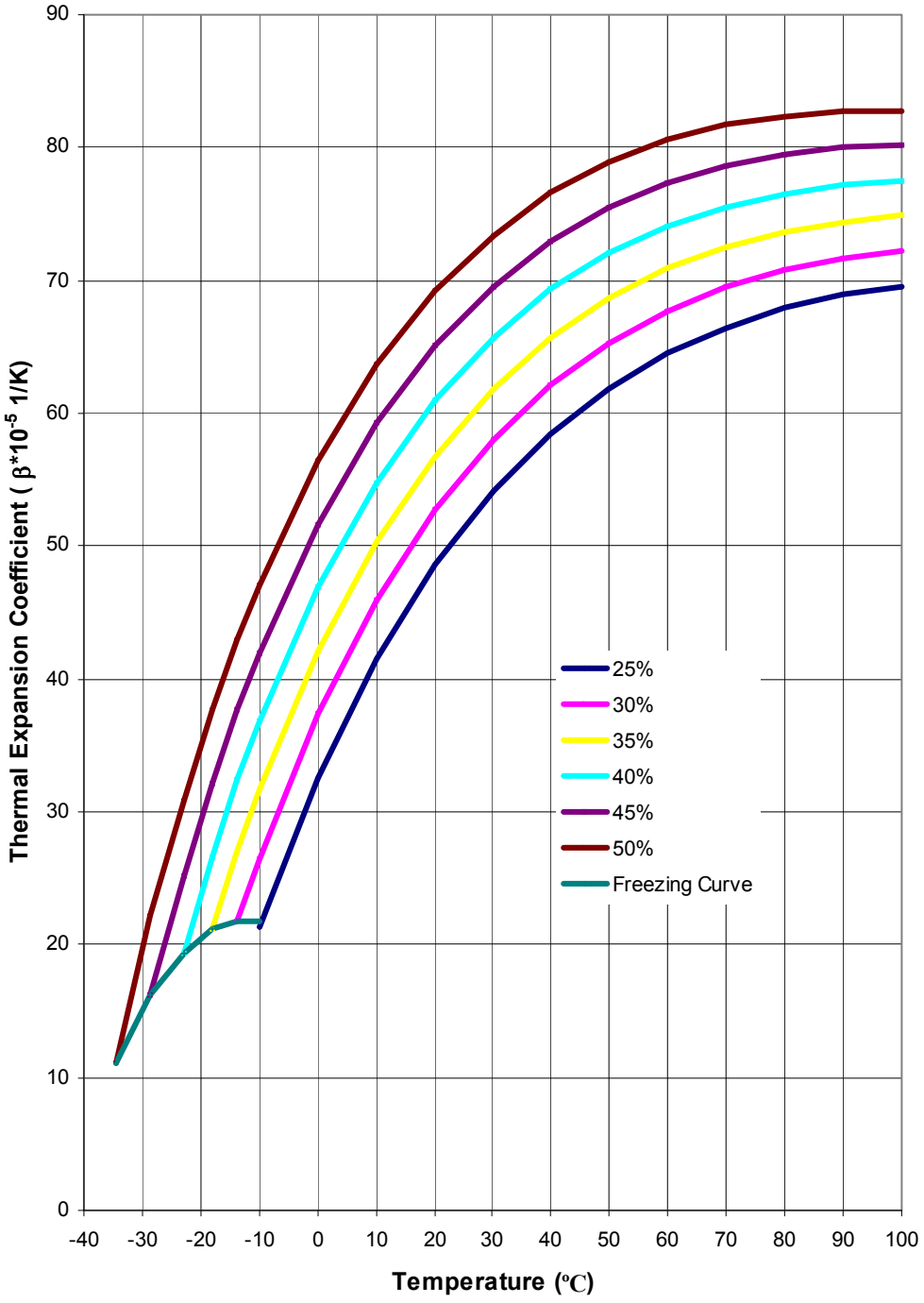
Prandtl Number .vs. %V/V Propilene Glycol



SUC. DE CARMELO PEREZ MARTINEZ S.L.
Ctra Castellón Km 3,700, Pol. La Unión Nave 3
ES-50013 Zaragoza (Spain)
Phone:+34 976 42 18 50
Fax:+34 976 59 19 71
Mail: carpemar@carpemar.com
www.carpemar.com

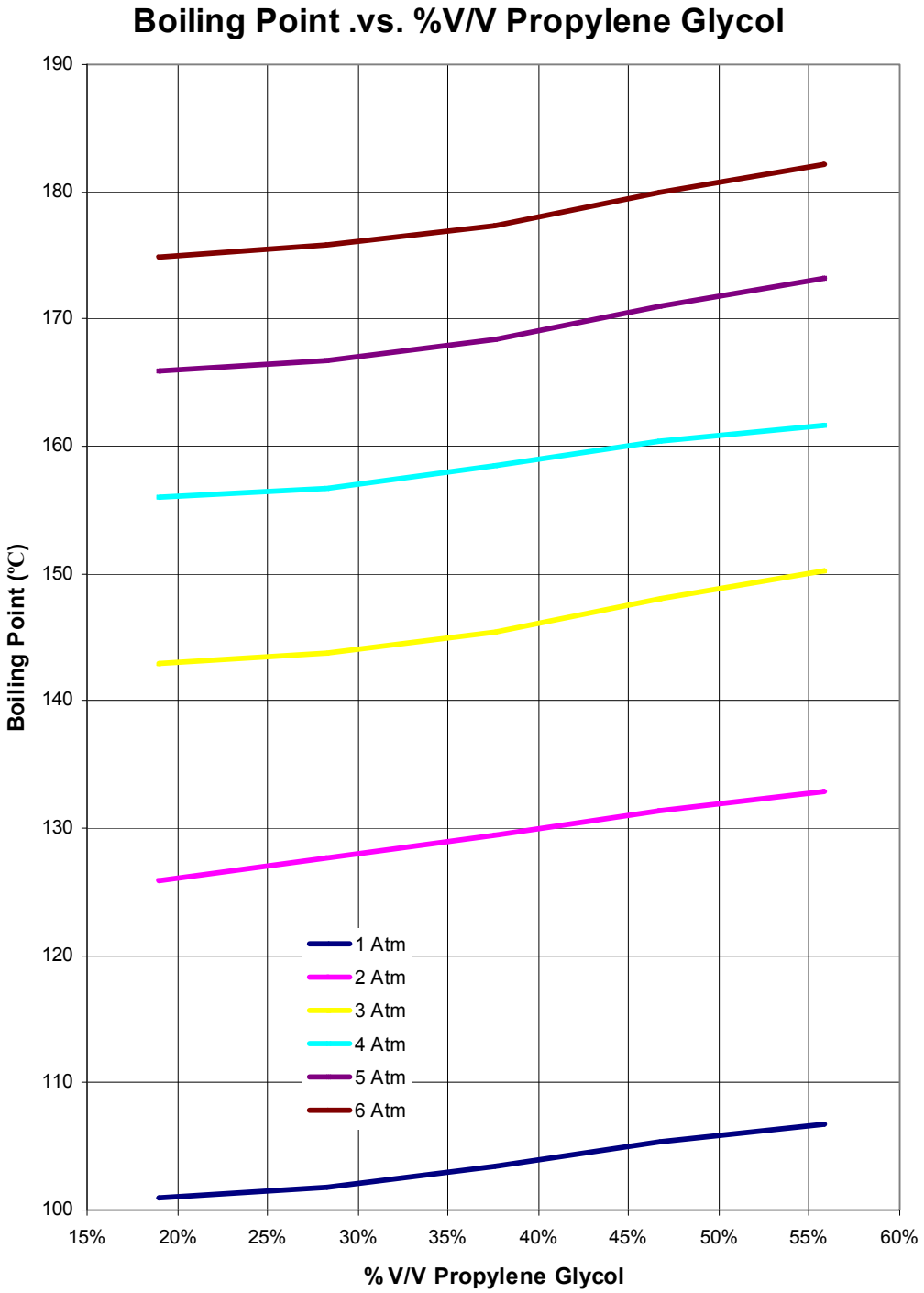
Carpemar

Thermal Expansion Coefficient



SUC. DE CARMELO PEREZ MARTINEZ S.L.
Ctra Castellón Km 3,700, Pol. La Unión Nave 3
ES-50013 Zaragoza (Spain)
Phone:+34 976 42 18 50
Fax:+34 976 59 19 71
Mail: carpemar@carpemar.com
www.carpemar.com

Carpemar



The information contained in this document is based on our current knowledge and experience. This information is presented for good use of the products and it is not part, necessarily, of the technical specifications.

It is the responsibility of those to whom we supply our products to ensure that any proprietary rights and existing laws and legislation are observed.