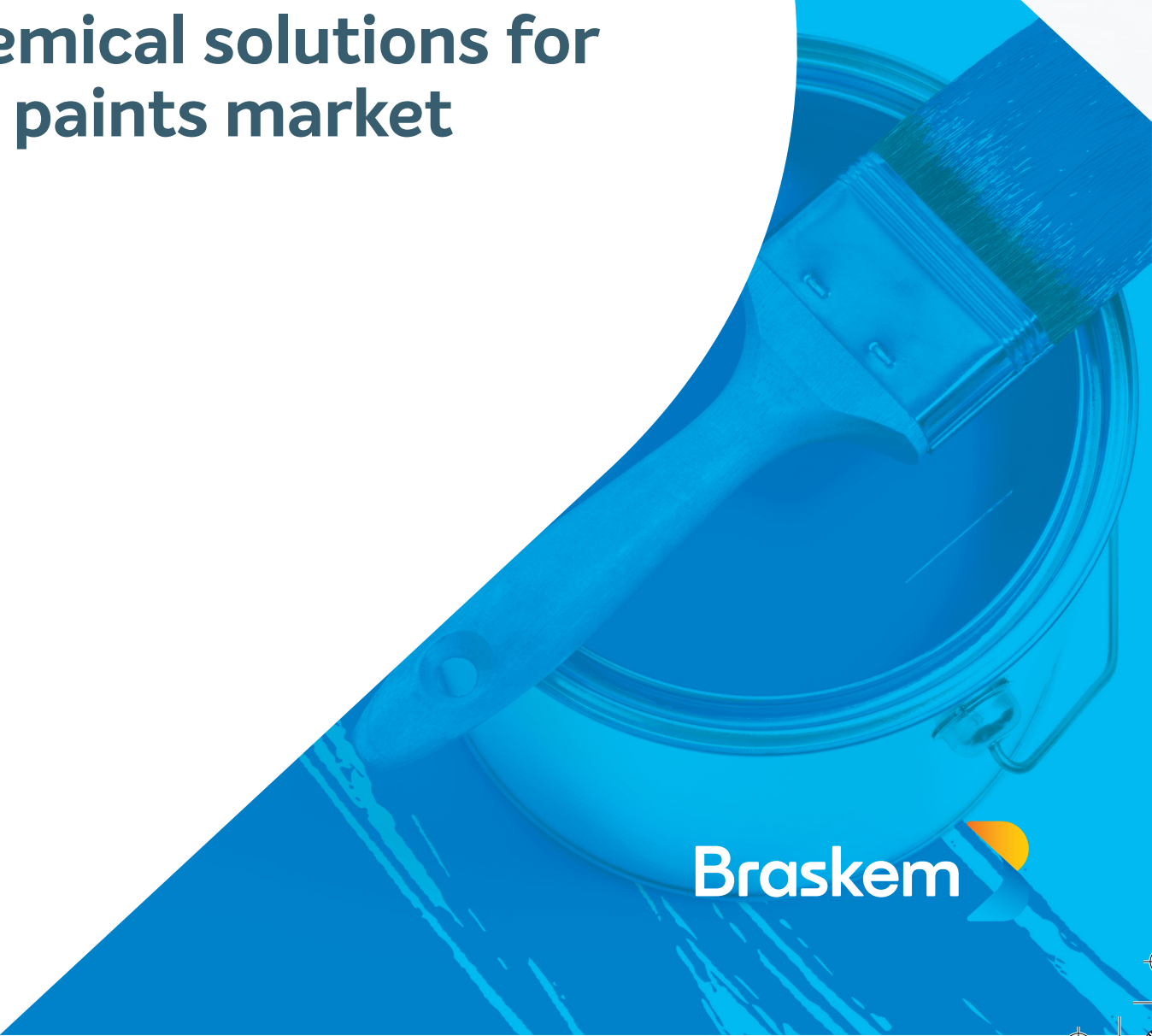




Chemical solutions for the paints market



Braskem





Braskem's chemicals business

Braskem's Chemicals Business produces a diversified portfolio of basic and performance chemicals, such as solvents and specialties. With a global, forward-looking and sustainable vision, we are constantly innovating to add value and transform markets. This translates into true partner relationships with our clients, supported by close and personalized service and by versatile products that combine high performance with reliability.

Our competitive advantages

- Broad and versatile portfolio
- High performance and reliability
- Excellent customer service
- Dedicated after-sales service
- Superior distribution process
- Focus on innovation and transforming markets
- Partnering on product development and applications



The Paints Market

In the paints industry, Braskem offers a diversified and flexible portfolio to meet a wide range of industry needs.

Discover our solutions for paint and thinner formulations:

Solvents

Braskem Ezolem®

Braskem Pluract®

Braskem Sensitis®

Cyclohexane

Braskem Toluene

Braskem Xylene

Braskem White Spirit

Circular Hexane HE-70S

Circular Sensitis 17/21

Hydrocarbon Resins

Braskem Unilene®

I'm Green™ PE Wax



Solvents

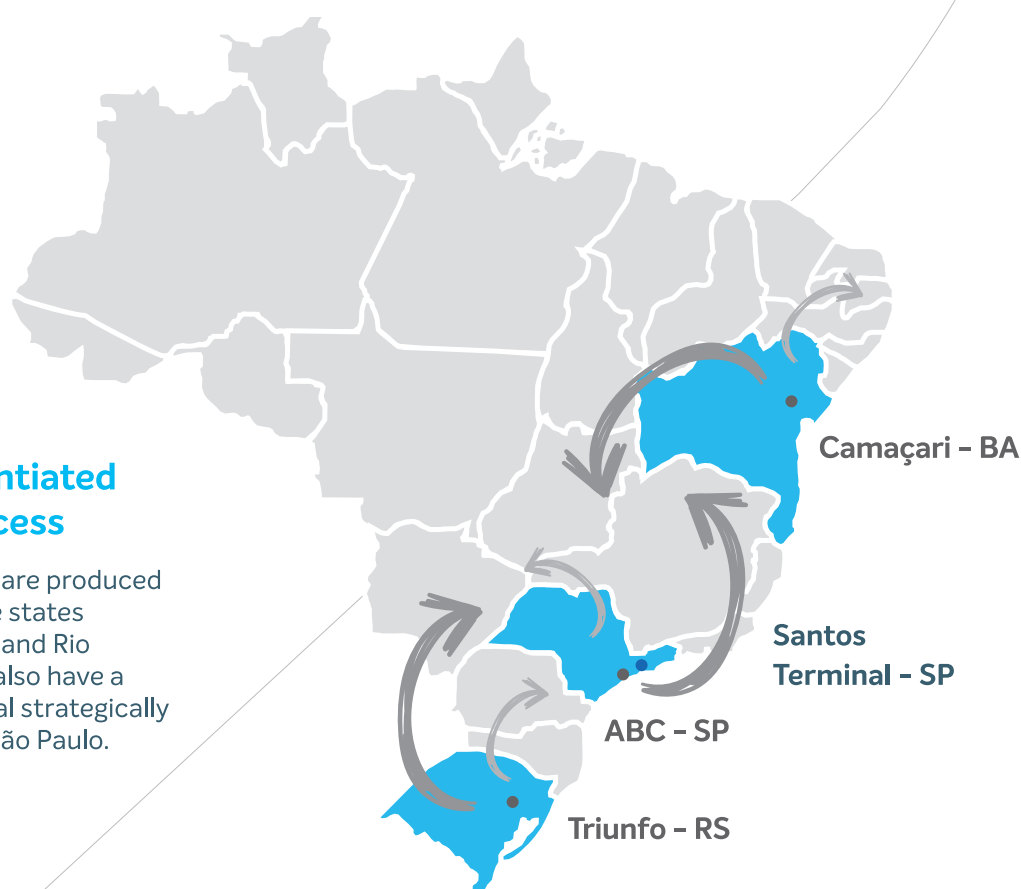
Solvents are indispensable for making paints, since they dissolve resins and keep pigments and additives in homogeneous suspension. Our solvents facilitate paint application by adjusting the viscosity and evaporation rate, which results in superior-quality films free of defects. Braskem's Chemicals Business has a series of solvents for this market that can enhance Clients' formulations.

Key applications

- Automotive paints (OEM and Repaint)
- Decorative paints
- High-performance industrial protective paints
- Thinners for dilution and cleaning
- Synthetic enamel and varnishes for wood and metal

Safe and differentiated distribution process

- Braskem's solvents are produced at three units in the states of Bahia, São Paulo and Rio Grande do Sul. We also have a distribution terminal strategically located in Santos, São Paulo.





Solvents

Products and characteristics

Braskem's solvents combine high performance and reliability to meet a wide array of paint manufacturers' applications and needs. Key advantages include excellent solvency power, compliance with the market's rigorous quality demands and an excellent cost-benefit tradeoff.

Discover our solvents and their main characteristics:

HYDROCARBON SOLVENTS

Light solvents

Braskem Ezolem® 6/7
Braskem Ezolem® 7/9
Braskem Ezolem® 6/13
Braskem Ezolem® 6/15
Braskem Ezolem® 6/17
Cyclohexane

Characteristics

- Low-odor solvents
- Adjusts viscosity to prevent runs and ensure homogenous surface coverage free of defects
- Longer durability in final applications
- Formulation flexibility for different markets
- Optimal balance between cost and performance

Medium solvents

Toluene
Mixed Xylene
Braskem White Spirit

Characteristics

- High solvency power for applications in various resin families
- Average evaporation rate supports the formation of high quality films free of defects

Heavy solvents

Braskem Pluract® 9
Braskem Pluract® 10+
Braskem Pluract® 12+
Braskem Sensitis® 13/15
Braskem Sensitis® 17/21
Braskem Sensitis® 22/25

Characteristics

- Maximum solvency action
- Acts as an evaporation retardant
- High flash point, improving handling safety
- Low evaporation rate promotes film formation with good leveling, appearance and gloss, free of defects such as blushing, blistering and air bubbles
- Excellent cost-benefit tradeoff

SUSTAINABLE SOLVENTS

Renewable Solvents

HE-70S

Characteristics

- Low Carbon footprint - renewable carbon content certified by ASTM D6866-18
- High evaporation rate
- High solvency power

Circular Hexane
Circular Sensitis 17/21

- Solvents with 100% circular content
- Quality
- Performance



Table of Properties

Discover the properties of Braskem’s complete solvent portfolio.

SOLVENTS	EVAPORATION RATE (BUTUL ACETATE = 100)	SOLUBILITY PARAMETERS (J/cm³) 1/2			FLASH POINT (°C) CLOSED VESSEL	DISTILLATION RANGE (°C)	DENSITY (20/4° C)
		dD	dP	dH			
AROMATICS							
Toluene	209	18	1,4	2	4	110–112	0,87
Mixed Xylene	72	17,8	1,2	2,1	30	136–143	860
Braskem Pluract® 9	23	17,6	1,9	2,2	40	156–170	0,88
Braskem Pluract® 10+	30	17,1	1,4	1,1	61	180–230	0,86
Braskem Pluract® 12+	0,2	16,1	0,7	0,4	80	200–350	0,89
ALIPHATICS							
Braskem Ezolem® 6/7	790	15,4	0	0,6	–22	58–72	0,7
Braskem Ezolem® 7/9	655	15,7	0	0,5	<10	70–95	0,72
Braskem Ezolem® 6/13	447	15,1	0	0,1	<20	60–135	0,69
Braskem Ezolem® 6/15	442	15,6	0	0,3	–38	50–200	0,72
Braskem Ezolem® 6/17	473	15,6	0	0,5	<20	60–170	0,72
Braskem White Spirit	39	16,2	0	0,4	28	125–235	0,76
HYDROGENATED							
Cyclohexane	425	16,8	0	0,2	–20	78–82	0,78
Braskem Sensitis® Hiflash	7,5	15,4	0	0	64	180–210	0,75
Braskem Sensitis® 17/21	8	15,4	0	0	52	170–210	0,75
Braskem Sensitis® 22/25	0,5	15,6	0	0	90	218–255	0,78
SUSTAINABLE SOLVENTS							
HE-70S	700	14,4	3,7	3,3	<10	72–73	0,74
Circular Hexane	830	14,9	0	0	–26	58–80	0,67
Circular Sensitis 17/21	8	15,4	0	0	52	170–210	0,75

(*) Scale according to ASTM D-1500





Solubility software

Close, personalized service and technical support are major competitive advantages of Braskem's solutions.

To help clients choose the product best suited to their needs, Braskem offers a tool based on Hansen solubility parameters to assess the solubility of solvents into various resins used in paint formulations.



We also have an application laboratory to support solubility assessments, optimize formulations and eNose technology.



Hydrocarbon Resins



Braskem Unilene®, Braskem's line of hydrocarbon resins, is ideal for paint and varnish formulations given its compatibility with most solvents and polymers. Key characteristics include improving gloss and drying properties and imparting technical and economic advantages due to its chemical stability and high purity. Braskem is Latin America's only producer of this type of resin and each year exports more than 5,000 tons of it to over 20 countries.

Main advantages of using Braskem Unilene® in paints

- Increases film hardness
- Highlights and helps maintain gloss*
- Reduces drying times*
- Increases adherence to surface
- Enhances moisture resistance, as well as resistance to acid and base substances
- Compatible with various solvents and bases**
- Acts as a flow aid, increasing the leveling of the film during application

*Gloss and drying

Aluminum paints made with Braskem Unilene® are used for tanks, silos, containers and cylinders. Their main function is to dissipate light and heat, resulting in shorter drying times, significantly higher gloss while maintaining reflection and stability properties.

Key applications

- Inks for printing industry
- Road-marking paint
- Aluminum-based protective paints for tubing
- Automotive paints
- Protective varnishes
- Tanks and cylinders

**Compatibility

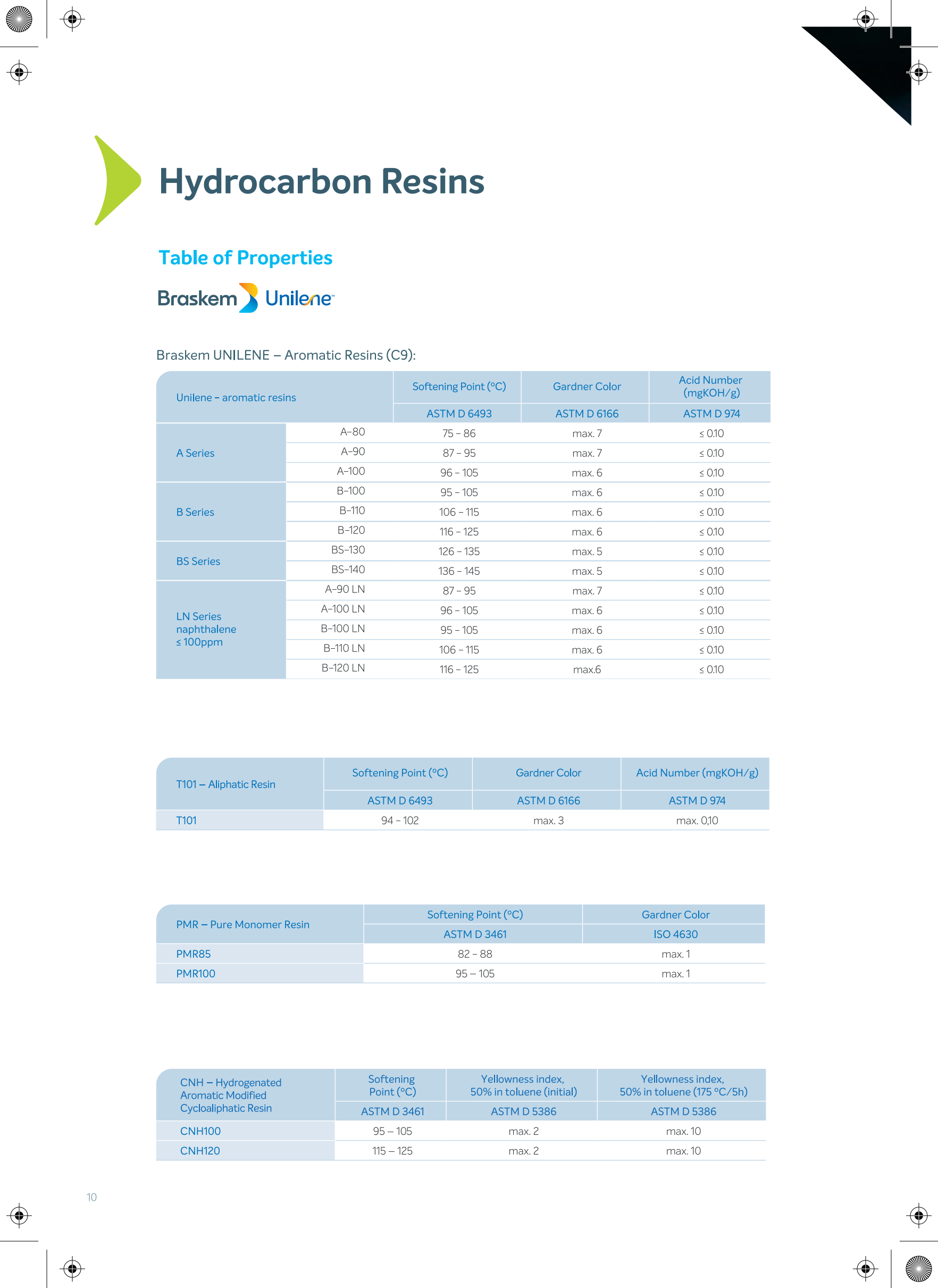
Unilene is highly compatible with other bases, such as epoxy, oil-based and alkyd resins and elastomers.

Solubility of Hydrocarbon Resins in Solvents

The Braskem Unilene hydrocarbon resins are soluble in various solvents, such as esters, ketones, aromatics, chlorinated hydrocarbons, ethers and aliphatic hydrocarbons (white spirit). The resins also have good compatibility with epoxy, polyester polymers and elastomers.

The solubility of Unilene resins allows not only an increase in the solid content, but also a reduction in viscosity, contributing to a reduction in solvent emissions.





Hydrocarbon Resins

Table of Properties



Braskem UNILENE – Aromatic Resins (C9):

Unilene - aromatic resins		Softening Point (°C)	Gardner Color	Acid Number (mgKOH/g)
		ASTM D 6493	ASTM D 6166	ASTM D 974
A Series	A-80	75 – 86	max. 7	≤ 0.10
	A-90	87 – 95	max. 7	≤ 0.10
	A-100	96 – 105	max. 6	≤ 0.10
B Series	B-100	95 – 105	max. 6	≤ 0.10
	B-110	106 – 115	max. 6	≤ 0.10
	B-120	116 – 125	max. 6	≤ 0.10
BS Series	BS-130	126 – 135	max. 5	≤ 0.10
	BS-140	136 – 145	max. 5	≤ 0.10
LN Series naphthalene ≤ 100ppm	A-90 LN	87 – 95	max. 7	≤ 0.10
	A-100 LN	96 – 105	max. 6	≤ 0.10
	B-100 LN	95 – 105	max. 6	≤ 0.10
	B-110 LN	106 – 115	max. 6	≤ 0.10
	B-120 LN	116 – 125	max.6	≤ 0.10

T101 – Aliphatic Resin	Softening Point (°C)	Gardner Color	Acid Number (mgKOH/g)
	ASTM D 6493	ASTM D 6166	ASTM D 974
T101	94 – 102	max. 3	max. 0.10

PMR – Pure Monomer Resin	Softening Point (°C)	Gardner Color
	ASTM D 3461	ISO 4630
PMR85	82 – 88	max. 1
PMR100	95 – 105	max. 1

CNH – Hydrogenated Aromatic Modified Cycloaliphatic Resin	Softening Point (°C)	Yellowness index, 50% in toluene (initial)	Yellowness index, 50% in toluene (175 °C/5h)
	ASTM D 3461	ASTM D 5386	ASTM D 5386
CNH100	95 – 105	max. 2	max. 10
CNH120	115 – 125	max. 2	max. 10



NH – Hydrogenated Aromatic Resin	Softening Point (°C)	Yellowness index, 50% in toluene (initial)	Yellowness index, 50% in toluene (175 °C/5h)
	ASTM D 3461	ASTM D 5386	ASTM D 5386
NH100	95 – 105	max. 1,5	max. 10
NH120	120 – 130	max. 1,5	max. 10

The grades most recommended for paint formulations have softening points between 100 °C and 120 °C (Unilene B100 and Unilene B120).



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