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 Turpentine

Hydrocarbon Resins

Braskem Unilene®

Solvents

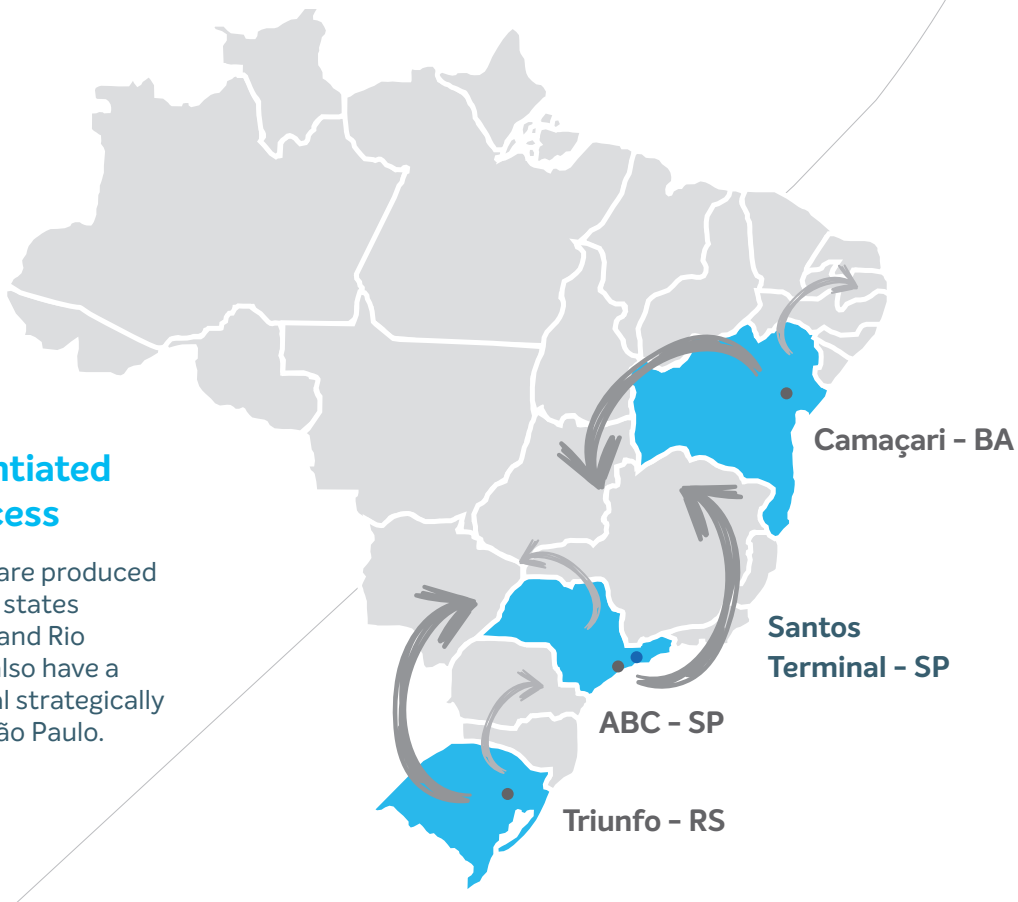
Solvents are indispensable for making paints, since they dissolve resins and keep pigments and additives in homogeneous suspension. Our solvents facilitate paint application by adjusting the viscosity and evaporation rate, which results in superior-quality films free of defects. Braskem's Chemicals Business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

Light solvents

6/7 Braskem Ezolem™

7/9 Braskem Ezolem™

6/13 Braskem Ezolem™

6/15 Braskem Ezolem™

6/17 Braskem Ezolem™

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 di erent markets
- Optimal balance between cost and performanceo

Medium solvents

13/15 Braskem Sensitis™

17/21 Braskem Sensitis™

22/25 Braskem Sensitis™

Toluene

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

9 Braskem Pluract™

10+ Braskem Pluract™

12+ Braskem Pluract™

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

Table of Properties

Discover the properties of Braskem's complete solvent portfolio.

Product	Density (20/4 °C)	PIE (°C)	PFE (°C)	Flash de Point (°C)	Aniline Point (°C)	Mixed Aniline Point (°C)	Evaporation Rate (butyl acetate = 100)	Benzene Concentration (%)	Color (Pt/Co)
AROMATICS									
TOLUENE	0.87	110	-	4	-	10	209	< 0.1	< 20
XYLENE	0.86	136	143	17	-	12	73	< 0.02	< 20
9 Braskem Pluract™	0.88	156	170	40	-	14	23	< 0.01	< 20
10+ Braskem Pluract™	0.86	180	230	60	-	27	3	< 0.01	< 20
12+ Braskem Pluract™	0.89	200	350	80	-	33	0.2	< 0.01	< 5 (*)
HS-100 Braskem	0.86	152	-	39	-	14	45	< 0.01	< 10
ALIPHATICS									
6/7 Braskem Ezolem™	0.70	58	72	< 10	55	-	790	< 0.1	< 10
7/9 Braskem Ezolem™	0.72	70	95	< 10	48	-	655	< 0.1	< 20
6/13 Braskem Ezolem™	0.69	60	135	< 20	69	-	447	< 0.05	< 30
6/15 Braskem Ezolem™	0.72	50	200	< 20	51	-	442	< 0.1	< 30
6/17 Braskem Ezolem™	0.72	60	170	< 20	62	-	473	< 0.1	< 20
Braskem White Spirit	0.76	135	235	≥ 28	57	-	39	< 0.01	< 30
HYDROGENATED									
CYCLOHEXANE	0.78	78	82	-20	32	-	425	< 0.1	< 5
3/16 Braskem Sensitis™	0.71	35	160	< 10	75	-	122	< 0.01	< 5
13/15 Braskem Sensitis™	0.72	130	150	20	76	-	94	< 0.01	< 5
17/21 Braskem Sensitis™	0.75	170	210	52	83	-	8	< 0.002	< 5
22/25 Braskem Sensitis™	0.78	218	255	90	89	-	0.5	< 0.002	< 5

(*) 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 characteristic 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**

*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.

**Compatibility

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

Key applications

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

Hydrocarbon Resins

Table of properties

Braskem Unilene

Properties		Softening Point	Gardner Color	Acid Number
Unilene® C9 Aromatic resin		ASTM D-6496	ASTM D-6166	ASTM D-974
Series A	A-80	75-86	max. of 7	< 0.10
	A-90	87-95	max. of 7	< 0.10
	A-100	96-105	6-max.	< 0.10
Series B	B-100	95-105	6-max.	< 0.10
	B-110	106-115	6-max.	< 0.10
	B-120	116-125	6-max.	< 0.10
Series BS	BS-130	126-135	max. of 5	< 0.10
	BS-140	136-145	max. of 5	< 0.10

Unilene® T 100 C5 Aliphatic resin	ASTM Method	Units	Values
Softening point	D 6493	°C	95-98
Gardner color (50% resin solids in toluene)	D 6166	-	≤ 4
Acid number	D 974	mgKOH/g	< 0.1
Viscosity at 200 °C	D 3236	mPas	max. 250
Molecular weight (GPC, Mw)	GPC		1800

Unilene® XT 100 C5-C9 Modified aliphatic resin	ASTM Method	Units	Values
Softening point	D 6493	°C	89-96
Gardner color (50% resin solids in toluene)	D 6166	-	≤ 3
Acid number	D 974	mgKOH/g	< 0.1
Molecular weight (GPC, Mw)	GPC		1700

Unilene® XT 1000 C5-C9 Modified aliphatic resin	ASTM Method	Units	Values
Softening point	D 6493	°C	97-103
Gardner color (50% resin solids in toluene)	D 6166	-	≤ 1
Molecular weight (GPC, Mw)	GPC		2000

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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