ENABLING BRANDS IN THEIR SUSTAINABILITY JOURNEY

Braskem

With a strategy centered around people and sustainability, Braskem is committed to transitioning the industry to a carbon neutral circular economy.

The I'm green™ bio-based portfolio is the result of our continuous commitment and investment in innovation and research to find the best sustainable solutions to mitigate climate change. Products under the I'm green™ bio-based brand are produced from sustainably sourced sugarcane, offering a reduced carbon footprint compared to traditional alternatives, bringing benefits to the planet and society.

I'm green™ bio-based portfolio is enabling brands in their sustainability journey.

I'm green™ BIO-BASED

I'm made from
SUGAR -CANE
I'M RENEWABLE

- I'm HDPE, LDPE, LLDPE, EVA and PE WAX
- I'm blow-molded, injection molded, extruded
- I can be used for **food packaging, toys, cosmetics** and **hygiene** applications
- I'm mitigating **climate change**

I'm green™ bio-based **PORTFOLIO EVOLUTION**

2002

Braskem

CREATION OF BRASKEM

Announcement of the public commitment that identifies Braskem's principles and values, including its contribution to economic and social growth and its operation following principles of sustainable development.

2007

I'm green BIO-BASED

Launch of I'm green™ bio-based brand for Braskem's bio-based portfolio.

2010

INAUGURATION OF THE BIO-BASED ETHYLENE PLANT

Southern Brazil

Braskem becomes the market leader and pioneer in the production of biopolymers on an industrial scale by inaugurating the renewable ethylene industrial unit.

BIO-BASED ETHYLENE

Production of the first sample of renewable ethylene made from sugarcane ethanol.

2014

FAST COMPANY THE WORLD'S 50 MOST INNOVATIVE COMPANIES 2014

FAST COMPANY

Braskem is nominated as one of the 50 most innovative companies in the world by Fast Company magazine. The only Brazilian company to be listed and recognized for its research on bio-based products, such as I'm green™ bio-based.

2018

BIO-BASED EVA

A new resin made from sugarcane, used in various sectors, such as footwear, automotive, transportation, among others.

2019

RENEWABLE SOLVENT

Braskem develops an oxygenated solvent from renewable sources, the HE-70s, for the paint, adhesive and personal care segments, among others.

2020

10 YEARS

The tenth anniversary of the launch of Braskem's I'm green™ bio-based portfolio.

2021

PRODUCTION EXPANSION

Capacity expansion of the renewable ethylene industrial scale.

PE WAX

Launch of I'm gree™ bio-based polyethylene wax.

2023

Our goal is to expand portfolio from 260kt to 1MMt by 2030. We announced our joint venture with leading petrochemical SCG Chemicals, marking our steps towards additional mid-term bio-based PE production in Thailand.

OUR PATH IN DEVELOPING PRODUCTS FROM RENEWABLE SOURCES CONTINUES. JOIN US IN THIS JOURNEY!

OUR RESINS MADE **FROM SUGARCANE**

With the I'm green™ bio-based portfolio, derived from sugarcane, a sustainable and renewable source, Braskem's partners can offer their consumers a variety of unique products that contribute significantly to the reduction of greenhouse gases along the chain.

I'm green™ bio-based products are drop-in solutions, which can replace the conventional version without the need to invest in new machinery.

I'm green™
BIO-BASED

Recyclable
Recyclable in the same chains developed for conventional resins

Drop-in solutions
Replaces conventional resin with no investment in new plastic conversion machinery

CO_2 capture
Sugarcane captures CO_2 from the atmosphere, helping to mitigate climate change

Renewable source
Derived from sugarcane, a renewable material

LIFE CYCLE ASSESSMENT

I'm green™ bio-based HDPE (polyethylene)

1 kg I'm green™ bio-based polyethylene > **-2,12 kg** of CO_2 e/kg*

*Ecoinvent v.3.9.1 database, compared to global **HDPE** average.

Updated results from 2023, reviewed by KPMG.

In order to continually improve our understanding of the key environmental impacts associated with the production of I'm green™ bio-based polyethylene, Braskem has been periodically conducting LCA studies since 2010.

The carbon footprint calculation of our most recent LCA confirms that I'm green™ bio-based plastics continue to support the journey to net-zero by offering a leading and unique portfolio of low-carbon solutions with the same characteristics and technical performance as their conventional counterparts.

This is supported and strengthened by Braskem's continued commitment to sustainable practices under its Responsible Ethanol Sourcing Programme, which focuses on ensuring the highest possible levels of social responsibility, sustainability, and biodiversity in the value chain.

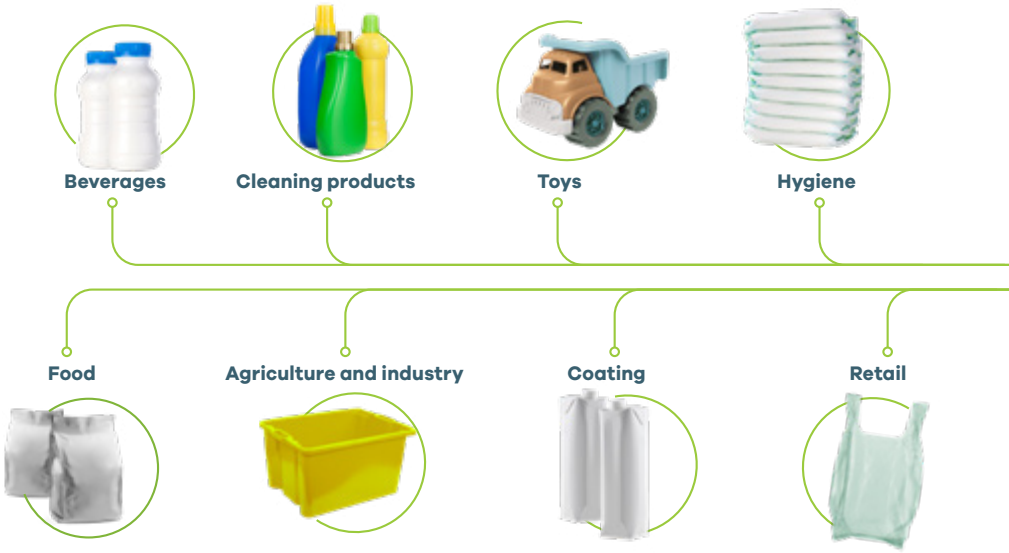
PE
I'm green™ bio-based

Applications

I'm green™ bio-based polyethylene can be used in **rigid and flexible applications** already available in the market, as well as in foamed plastics.

The support of Braskem's technical teams during the development process, increases the chances of a fast approval while maximizing the renewable content in the final products.

Main applications



I'm green™ bio-based polyethylene is the renewable alternative to fossil polyethylene, a thermoplastic resin widely used in packaging in the consumer goods sectors, such as food, beverages, hygiene and cleaning products, as well as toys, trash cans and plastic bags.

The I'm green™ bio-based polyethylene portfolio offers approximately **25 grades in the HDPE, LLDPE and LDPE families that cover a wide range of applications.** In **most grades** the renewable **carbon content ranges from 80% to 100%,** which can be **certified by measuring the biogenic carbon content, according to the ASTM D6866 standard**.

There are labs that carry out carbon dating analysis and certifying bodies in Europe, USA and Asia. The certifying bodies in Europe, USA and Asia offer labels for the renewable content of a material or product based on the standard.

At the end of its life, I'm green™ bio-based polyethylene can be recycled in the same way as conventional polyethylene.

Merely illustrative exemplary applications. The possibility of using this product for a specific purpose may change according to the country and should be analyzed by the interested party. Braskem does not guarantee the possibility of using the product with other materials for the desired application. Please check the RIS (Regulatory Information Sheet) or contact Braskem for specific regulatory information.

Injection molding

Typical Properties		Melt Index (190 °C/2.16 kg)	Density	Minimum C14 content
ASTM method		D 1238	D 792	D 6866
Units		g/10 min	g/cm³	%
HDPE	SHA7260	20	0.955	94
		Buckets and bowls, lids, toys, thin-walled parts, houseware and cosmetic packaging.		
	SHC7260	7.2	0.959	94
		Industrial containers, safety helmets, toilet seats, houseware, toys, lids, pallets, crater for beverage bottle, crater for fish and vegetables and cosmetic packaging.		
	SGE7252NS	2.0	0.952	96
		Beverage bottle caps.		
LDPE	SPB208	22	0.923 [a]	95
		Masterbatches, injection of parts with a large flat area such as snap lids.		
	SPB608	30	0.915 [a]	95
		Masterbatches, injection of parts with a large flat area such as snap lids.		

Test specimens prepared from compression molding, according to ASTM D 4703.. a) Value obtained by the ASTM D1505 method.

Tubes extrusion & blow molding

Typical Properties		Melt Index (190 °C/2.16 kg)	Density	Minimum C14 content
ASTM method		D 1238	D 792	D 6866
Units		g/10 min	g/cm³	%
HDPE	SGF4950	0.36	0.956	96
		Bottles for hygiene and cleaning products, bottles for beverages, compression molded caps and cosmetic packaging.		
	SGD4960	0.70	0.962	96
		Bottles for food and beverages, bottles for dairy products, rigid containers for lubricant oils, bottles for ethylic alcohol		
	SGF4950HS	0.21	0.951	95
		Canisters from 2L to 20L for chemical products, bottles for concentrated detergent, bottles for food, tanks for wind shild and air ducts.		
LDPE	SEB853	2.70	0.923 [a]	96
		Tubes for food and cosmetics.		
	STN7006	0.60	0.924 [a]	95
		Tubes for food and cosmetics.		
	SBF0323HC	0.32	0.923 [a]	95
		Tubes for food and cosmetics.		

Test specimens prepared from compression molding, according to ASTM D 4703. a) Value obtained by the ASTM D1505 method.

Extrusion coating

Typical Properties		Melt Index (190 °C/2.16 kg)	Density	Minimum C14 content	Additives
ASTM method		D 1238	D 792	D 6866	-
Units		g/10 min	g/cm³	%	-
LDPE	SBC818	8.30	0.918 [a]	95	-
		Low neck-in applications, good film stability, good adhesion to porous substrates, carton packs for food & beverages.			

Test specimens prepared from compression molding, according to ASTM D 4703.

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Fiber Extrusion

Typical Properties		Fluidity Index (190 °C/2.16 kg)	Density	Thermal Deflection Temperature (0.45 MPa)	Minimum C14 content
ASTM method		D 1238	D 792	D 648	D 6866
Units		g/10 min	g/cm³	°C	%
HDPE	SHA7260	20	0.955	67	94
		Two-component non-woven fabric and fibers in general.			
	SHE150	1.0	0.948	76	94
		Raschel, protection and shadow nets and strings.			

Test specimens prepared from compression molding, according to ASTM D 4703. a) Tests performed on samples of 3 mm.

Cast and Tubular films

Typical Properties		Melt Index (190 °C/2.16 kg)	Density	Minimum C14 content	Additives
ASTM method		D 1238	D 792	D 6866	-
Units		g/10 min	g/cm³	%	-
HDPE	SGM9450F	0.33 [b]	0.952	96	AF
		Retail bags, promotional bags, produce bags and frozen food packaging.			
	SHE150	1.0	0.948	94	AF
		Cereal packaging and blends with LLDPE and LDPE.			
LLDPE	SLL118	1.0	0.916 [a]	87	-
		Stretch films, blends with LDPE and HDPE and general use packaging. Other applications: blends for irrigation pipes, industrial sacks, liners and cosmetic packaging.			
	SLL118/21	1.0	0.918 [a]	87	AB, D
		Automatic packaging (FFS) and blends with LDPE and HDPE.			
	SLH118	1.0	0.916 [a]	84	-
		Stretch films, blends with LDPE and HDPE and general use packaging. Other applications: blends for irrigation pipes and cosmetic packaging.			
	SLH218	2.3	0.916 [a]	84	-
		Stretch films, blends with LDPE and HDPE and general use packaging. Other applications: blends for irrigation pipes, insulation of low and medium XLPE wires and cables.			
LDPE	SBF0323HC	0.32	0.923 [a]	95	-
		Industrial sacks, agricultural films, co-extruded and heat-shrinkable films for palletizing and cosmetic packaging.			
	STN7006	0.60	0.924	95	-
		High transparency films for food products packaging by coextrusion such as: cheese, meat, sausages, sliced ham, etc.; flat films for tablecloth, curtains and laminated fabric, flexible bottles for solids, liquids or paste products for hygiene and cleaning and cosmetic packaging.			
	STS7006	0.60	0.925 [a]	95	AB, D
		High clarity films for coextrusion food product packaging, such as: cheese, meat, sausages, sliced ham, etc.			
	SEB853	2.7	0.923 [a]	95	-
		Typical applications of blown film including diaper films and other general uses in addition to blends with LLDPE and HDPE.			
	SEB853/72	2.7	0.923 [a]	95	AB, D
		Lamination film and general use, automatic packaging of solid products (FFS), automatic packaging for various products and high transparency for tissue paper.			
	SPB681	3.8	0.922 [a]	95	-
		Extrusion of blow and flat films, injection molding, blends with LDPE, HDPE and cosmetic packaging.			
	SPB681/59	3.8	0.922 [a]	95	AB, D
		Lamination films and general uses and automatic packaging for solid products.			

Test specimens prepared from compression molding, according to ASTM D 4703. Additives AB = anti-blocking, S = slip, PPA = polymer processing aid. a) Value obtained by the ASTM D1505 method. b) Melt index measured with 5 kg.

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EVA
I'm green™ bio-based

I'm green bio-based EVA, which is partially derived from sugarcane, is the sustainable alternative for several segments that use EVA in their products.

Bio-based content ranges from **45% to 80%**, based on the ASTM D6866 standard.

At the end-of-life, I'm green™ bio-based EVA can be **recycled/reused** in the same way as conventional EVA.

Applications

I'm green™ bio-based EVA is ideal for applications such as: **shoes, adhesives**, **toys**, **wires & cables**, **tatami mats** and **foams in general**.

The support of Braskem's technical teams during the development process, increases the chances of a fast approval while maximizing the renewable content in the final products.

Main applications

Shoe souls

Tatami mats

Sport items

Brassiere

Ball

Toys and educational games

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Foamed Products

Typical Properties		Fluidity Index (190 °C/2.16 kg)	Vinyl acetate content	Minimum C14 content
ASTM method		D 1238	Braskem	D6866
Units		g/10 min	%	%
EVA	SVT2180	2.1	19	80
		Polymer used as a base for manufacturing foamed and reticulated plates and soles (unisole midsole) for shoes, toys, sporting items, etc. The resin can be processed by injection molding or compression.		

Test specimens prepared from compression molding, according to ASTM D 4703.

Braskem Evance

Typical Properties		Fluidity Index (190 °C/2.16 kg)	Vinyl acetate content	Minimum C14 content
ASTM method		D 1238	Braskem	D6866
Units		g/10 min	%	%
EVA	Evance SVT2145R	2.1	14	45
		Semi-amorphous thermoplastic resin with medium Vinyl Acetate content, easily crosslinkable and good compatibility with different thermoplastics, inorganic fillers and pigments. It has an excellent soft touch, good grip, good resistance to abrasion and resilience.		

Test specimens prepared from compression molding, according to ASTM D 4703.

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PE WAX
I'm green™ bio-based

I'm green™ bio-based polyethylene wax complements Braskem's bio-based portfolio offer for multiple markets.

Applications

I'm green™ bio-based polyethylene wax is ideal for use in applications such as: **adhesives**, **cosmetics**, **paints** and **compounds**.

Main applications

Adhesives

Cosmetics

Paints and compounds

PE Wax

Family	Grade	Dropping point	Solidification point	Melting point	Needle penetration (25°C)	Dyn. viscosity (140°C)	Densit	Acid value	Acid value	Yellowness index	Flashpoint – Clevel.	Flashpoint – Pensky M.
Method		DIN ISO 2176	DIN ISO 2207	DIN ISO 51007	DIN 51579, ASTMD 1321	DIN EN ISO 2555	DIN EN ISO 183-1	DIN EN ISO 2114	DIN EN ISO 3681	DIN EN ISO 11664	DIN EN ISO 2592	DIN EN ISO 2719
Units		°C	°C	°C	10-1mm	mPas	g/cm³	$mg_{(KOH)}/g$	$mg_{(KOH)}/g$	-	°C	°C
LPDE	GWAX 50E	108	94	105	4	138	0.88	< 1	< 2	4	> 250	> 220
HDPE	GWAX 150A	120	105	120	1	360	0.93	< 1	< 2	< 25	> 225	> 225

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Braskem: **global presence**

With a global, human-oriented vision of the future, Braskem strives every day to improve people's lives by creating sustainable solutions in chemistry and plastics.

Braskem is the largest producer of thermoplastic resins in the Americas and **a global leader in the production of biopolymers on an industrial scale**. Our products are exported to some 70 countries and we count on 40 industrial units, located in Brazil, the United States, Germany and Mexico (in partnership with Mexican company Idesa).

For more information, visit www.braskem.com.

GLOBAL LEADER in the production of **biopolymers**

6 largest producer in **PE, PP** and **PVC**

#1 producer PE, PP and PVC in the **Americas**

#1 PP producer in **North America**

#1 PE, PP and PVC producer in **Latin America**

Clients in more than **70** COUNTRIES

more **than** **8.000** team members

40 industrial units:
29 plants in Brazil
5 plants in USA
4 plants in Mexico
2 plants in Germany

01 | 2024

Braskem