I'm green™

Sustainable solutions for a Circular Economy

Braskem

Building a CIRCULAR FUTURE

A new way of thinking about poduction and consumption, this is how Braskem can support the transition to a Circurlar Economy. The evolution of the I'm green™ sustainable portfolio, which now has products form renewable and recycled souces, is helping a wide range of products and partners achieve their sustainability goals and close the loop.

I'm green™ represents a revolution in sustainable sourcing, the result of our commitment and investment into innovation and research to find the best life-cycle solutions that combine natural resouces and post-consumer waste, bringing benefits to planet and society.

I'm green™
BIO-BASED

I'm made from

SUGAR-CANE

I'M RENEWABLE

- I'm HDPE, LDPE, LLDPE and EVA
- I'm blow-molded, injection molded, extruded
- I may be in **contact with food**
- I'm **capturing CO_2** from the environment
- I'm tackling **climate change**

I'm green™
RECYCLED

I'm made of

RECOVERED PLASTIC

I'M RECYCLED

- I'm rHDPE, rLPDE and PP
- I'm blow-molded, injection molded, extruded
- I'm **closing the loop**
- I'm being recovered avoiding waste
- I'm tackling **climate change**

I'm green™
BIO-BASED & RECYCLED

I´m creating a positive

IMPACT ON ENVIRONMENT

I'M BIO-BASED & RECYCLED

- I'm rHDPE, rLDPE and PP
- I'm blow-molded, injection molded and extruded
- I'm **closing the loop**
- I can be a **carbon neutral solution**
- I'm a combination of **recycled & bio-based**
- I'm tackling **climate change**

I'm green™ 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

BIO-BASED ETHYLENE

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

2010

INAUGURATION OF THE BIO-BASED ETHYLENE PLANT

Southern Brazil

Braskem becomes a world leader in the production of biopolymers by installing a bio-based ethylene and polyethylene production on an industrial scale.

I'm green™ BIO-BASED

Launch of the I'm green™ to identify Braskem's bio-based source products.

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 the I'm green™.

FAST COMPANY 50 MOST INNOVATIVE COMPANIES 2014

2015

I'm green™ RECYCLED

Launch of the first post-consumer recycled resins.

REVERSE LOGISTICS FOR PP PLASTIC CUPS PROGRAM

The program seeks to guide and encourage companies in Brazil to adopt better logistics procedures for the proper destination of plastic cups after their use, cooperating with the entire value chain to promote plastic reuse and recycling. The cups are collected, recycled and transformed into new products, such as caps for cosmetic and household items packaging.

2018

BIO-BASED EVA

The new resin is made from sugarcane, and is used in the footwear, automotive, transportation, among other sectors.

EXTENSION OF THE RECYCLED RESIN PORTFOLIO

Expansion of the post-consumer resin portfolio.

RECYCLED SOLVENT

Braskem develops a hydrocarbon solvent from renewable sources that can be used in the rubber, adhesive and other markets.

2019

ALLIANCE TO END PLASTIC WASTE

(AEPW - Industry commitment and engagement)

- Braskem becomes a founding member of the Alliance to End Plastic Waste, an organization that aims to develop solutions to eliminate plastic waste in the environment.
- $ 1.5 billion has been destined for the next 5 years and will finance projects worldwide, especially for cleaning on Asia and technological development on Europe.
- More than 45 global companies in the entire value chain contribute: plastic producers and processors, brand owners and recyclers.

2020...

EXPANSION OF THE PRODUCTION CAPACITY OF BIO-BASED AND RECYCLED PRODUCTS.

JOIN THIS JOURNEY!

OUR RESINS MADE **FROM SUGARCANE**

With the I'm green™ bio-based portfolio, whose raw material is sustainably-sourced sugarcane ehtanol, Braskem's partners can offer their customers a range of unique products that contribute significantly to the redution of greenhouse gaz emissions along the chain.

Bio-based products are drop-in solutions that can replace their conventional version without the need to invest in new plastic processing machinery.
You're ready to go.

I'm green™
BIO-BASED

Recyclable
Use of the same recycling chains developed for conventional resins

Drop-in solutions
Replace conventional resin with no investment in new plastic transformation machinery

CO_2 capture
Sugarcane helps to fight the greenhouse effect by capturing CO_2 from the atmosphere

Renewable source
Made from sugarcane, a renewable raw material

LIFE CYCLE ANALYSIS

To deal with the growing demand from society for more sustainable solutions and the pressing concorns of citizens about climate change, "Life Cycle Thinking" is one of the major challenges for industries and governments when creating products and proposing new regulations.
In order to better understand the impacts associated with the production of I'm green™ bio-based Polyethylene, Braskem conducts LCT, Water Footprint and Land Use studies for the product.

PE
I'm green™ bio-based

Applications

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

The support of Braskem technical teams during the development of the products guarantees a shorter approval time for Customers and a range of high renewable content in the final products.

Main applications

I'm green™ bio-based polyethylene is the renewable alternative to 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 40 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 is proven by biogenic carbon content, verified according to the ASTMD6866 standard. There are numerous certifying bodies in Europe, USA and Asia that offer labels for the renewable content of a material or product based on the ASTMD6866 standard.

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

Merely 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 or contact Braskem for specific regulatory information.

PE I'm green™ bio-based

Injection molding

Typical Properties		Fluidity 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, housewares; cosmetics and pharmaceutical products packaging.		
	SHC7260	7.2	0.959	94
		Industrial containers; safety helmets; toilet seats; housewares, toys, lids; pallets; boxes for beverage bottle; boxes for fish and vegetables; cosmetics and pharmaceutical products packaging.		
	SGE7252NS	2.0	0.952	96
		Beverage bottle lids.		
LDPE	SPB208	22	0.923 [a]	95
		Masterbatches; Injection of parts with large flat area; lids.		
	SPB608	30	0.915 [a]	95
		Masterbatches; Injection of parts with large flat area; 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		Fluidity 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 food products; compression lids; cosmetics and pharmaceutical products packaging.		
LDPE	SEB853	2.70	0.923 [a]	96
		Tubes for food and cosmetics.		
	STN7006	0.60	0.924	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.

Fiber Extrusion

Typical Properties		Fluidity 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	95	-
		Low neck-in applications; good film stability; good adhesion to porous substrates; carton packs for food products.			

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	Temperatura de Deflexão Térmica (0,45 MPa) [a]	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; fibers in general			
	SHE150	1,0	0,948	76	94
		Raschel; protection and shadow nets; strings.			

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

Extrusion of Tubular Films and Extrusion of Flat Films

Typical Properties		Fluidity 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	-	0.952	96	AF
		Retail bags; promotional bags; perforated coils; frozen food packaging.			
	SHE150	1.0	0.948	94	AF
		Cereal packaging; mixtures with LLDPE and LDPE.			
LLDPE	SLL118	1.0	0.916 [a]	87	-
		Stretch films; mixtures with LDPE and HDPE and general use packaging. Other applications: mixtures for irrigation pipes; industrial sacks; liners; cosmetics and pharmaceutical products packaging.			
	SLL118/21	1.0	0.918 [a]	87	AB, D
		Automatic packaging (FFS); mixtures with LDPE and HDPE.			
	SLH118	1.0	0.916 [a]	84	-
		Stretch films; mixtures with LDPE and HDPE and general use packaging. Other applications: mixtures for irrigation pipes; cosmetics and pharmaceutical products packaging.			
	SLH218	2.3	0.916 [a]	84	-
		Stretch films; mixtures with LDPE and HDPE and general use packaging. Other applications: mixtures for irrigation pipes; insulation of low and medium XLPE wires and cables.			
	SLH0820/30AF	0.80	0.92 [a]	84	AB, AF
		Industrial sacks; mixtures with LDPE and HDPE.			
HDPE	SBF0323HC	0.32	0.923 [a]	95	-
		Industrial sacks; agricultural films; coextruded and heat-shrinkable for palletizing; cosmetics and pharmaceutical products 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 pastes products for hygiene and cleaning; cosmetics and pharmaceutical products packaging.			
	STS7006	0.60	0.925	95	AB, D
		High clarity films for coextrusion food products 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 mixtures with LLDPE and HDPE.			
	SEB853/72	2.7	0.923 [a]	95	AB, D
		Lamination film and general uses; automatic packaging of solid products (FFS); automatic packaging for various products; high transparency films.			
	SPB681	3.8	0.922 [a]	95	-
		Extrusion of Blow and Flat Films; Injection Molding; Mixtures with LDPE and HDPE; cosmetics and pharmaceutical products packaging.			
	SPB681/59	3.8	0.922 [a]	95	AB, D
		Lamination films and general uses; automatic packaging for solid products.			

Test specimens prepared from compression molding, according to ASTM D 4703.. Additives: AB = anti-blocking, S = sliding, FA = flow aid. a) Value obtained by the ASTM D1505 method.

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EVA
I'm green™ bio-based

I'm green™ bio-based EVA, made 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

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

The support of Braskem's technical teams during the development of the products guarantees a shorter approval time for Customers and a range of high renewable content in the final products.

Main applications

Shoes

Tatami mats

Sport items

Brassiere

Ball

Toys and educational games

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Expansion Resins

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 expanded and reticulated plates and soles (unisola and mid-sole) 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		Índice de Fluidez (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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OUR RESIN SOLUTIONS WITH **RECYCLED CONTENT**

I'm green™ RECYCLED

The portfolio of resins with recycled content is a Braskem innovation reflecting our commitment to turn the Circular Economy from concept to reality. The goal is to promote businesses and initiatives to create value for post-consumer plastic waste and the recycling chain, through partnerships with customers, recyclers, cooperatives and brand owners.

Main applications

Lids

Home appliances

Furniture

Packaging

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RIGID

About 34.7% of the global plastic market is made up of rigid packaging and technical parts. These packaging and artifacts have incorporated the concept of circular economy, both in the packaging proposal and in the manufacturing process. Braskem develops post-consumer resin solutions to combine sustainability with the high technical requirements of applications. The I'm green™ recycled portfolio was developed to meet sustainable projects that demand quality, traceability and, above all, compliance.

PE - Polyethylene

Family	Commerce	Grade	MFI (190 °C / 2,16 kg)	Density	Color	Process-ability	Rigidity	Fall-proof	Chemical resistance	Weldability	Tear resistance
Units			g/10 min	g/cm³							
HDPE		RPR 5A3 BK	0.30	0.950	Black	●●●	●	●●	●●	-	-
		RGR 7A2 WE	0.35	0.955	White	●●	●●	●●	●●	-	-
		DA065A	0.20	0.960	White	●●	●●●	●●●	●●●	-	-
		DA065B	0.20	0.960	Black	●●	●●●	●●●	●●●	-	-
		RPR 3A1 NL	0.30	0.955	Natural	●●●	●●●	●●●	●●●	-	-
		RPR 5A1 WE	0.30	0.955	Natural	●●●	●●	●●	●●●	-	-

PP - Polipropileno

Family	Commerce	Grade	MFI (230 °C / 2,16 kg)	Color	Process-ability	Rigidity	Fall-proof	Dimensional stability
Units			g/10 min					
PP Heco/ Copo		DP237C	8	Black	●	●●	●●●	●
		DP237F	8	White	●	●●	●●●	●
PP Copo		DP237A	18	Black	●●●	●	●●	●
		DP237D	18	White	●●●	●	●●	●
PP Homo		DP237B	10	Black	●●	●●●	●	●●
		DP237E	10	White	●●	●●●	●	●●
		RPH 0J7 WE	10	White	●●	●●●	●	●●
		RPH 0J2 GY	10	Gray	●●	●●●	●	●●
		RPC 0L7 BK	14	Black	●●●	●●	●●	●●
		RPH 9H2 BK	6.5	Black	-	-	-	-

● Good ●● Great ●●● Excellent

FLEXIBLE

Flexible packaging represents 65.3% of the global plastic sector. The transition to a circular economy, which is currently being consolidated in the world, is bringing a new concept of packaging development and brand communication with the consumer.

This transformation comprises the understanding of new packaging materials and concepts and is extended to the correct handling and proper disposal, supported by the principle of enhancing sustainability.

Main applications

Bags

Sacks

Pad packaging

Toilet paper packaging

Trash bags

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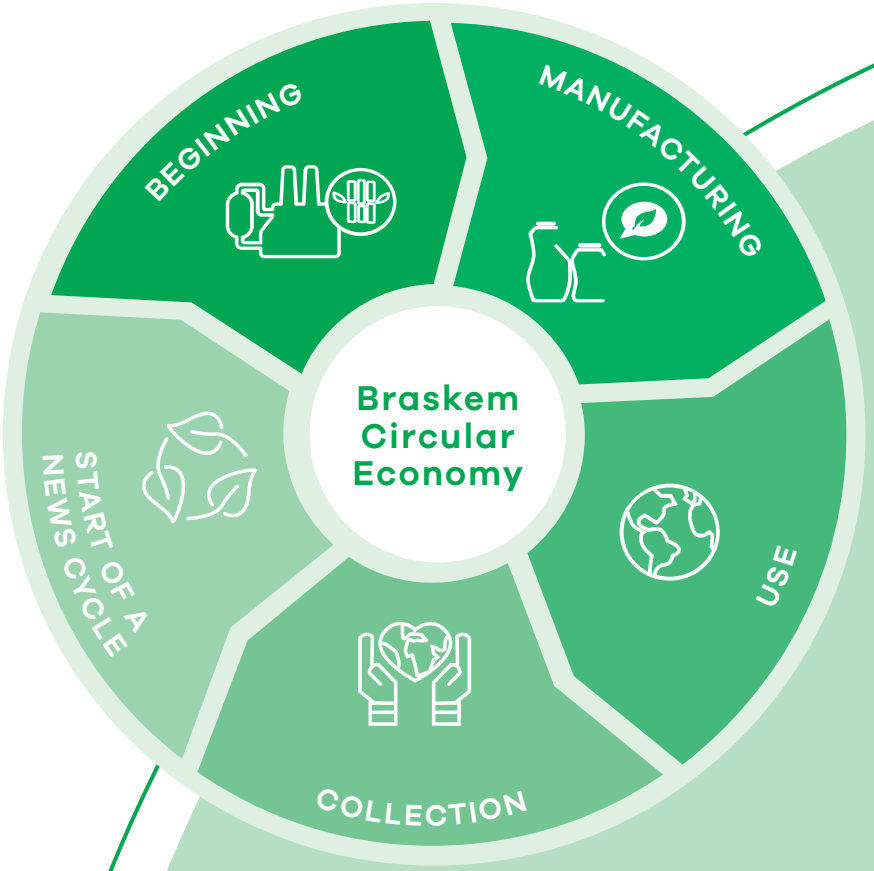
PE - Polyethylene

Family	Commerce	Grade	MFI (190 °C / 2,16 kg)	Density	Color	Processability	Rigidity	Fall-proof	Chemical resistance	Weldability	Tear resistance
Units			g/10 min	g/cm³							
LLDPE		RPL 0C1 WE	0.50	0.925	White	●●	-	-	-	●●●	●●
		RPL 0C1 BR	0.50	0.925	Translucent	●●	-	-	-	●●●	●●
		PRL 5C1 LB	1.80	0.921	Brown light	●●	-	●●	-	-	-
		PRL 5C1 NL	1.85	0.921	Multicol	-	-	-	-	-	-

● Good ●● Great ●●● Excellent



Braskem: **global presence**

With a global vision of the future, aimed at the human being, Braskem strives every day to improve people's lives by creating sustainable solutions for chemistry and plastic.

Braskem is the largest producer of thermoplastic resins in the Americas and the main producer of biopolymers in the world.

Our products are exported to, approximately, 100 countries and we have 40 industrial units, located in Brazil, the United States, Germany and Mexico, the latter in partnership with the Mexican company Idesa.

For more information, please visit www.braskem.com.

+20 MM TONS/YEAR
production of thermoplastic resins and other chemicals

Export to customers in about **100** COUNTRIES

8,000
members

40 industrial units:
28 plants in Brazil
6 plants in the USA
2 plants in Germany
4 plants in Mexico

Braskem