SUSTAINABLE SOLUTIONS

that promote a

CIRCULAR ECONOMY

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Braskem Idesa

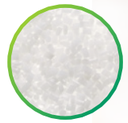
Building a **circular future**

Based on a Circular Economy model, at **Braskem Idesa** we produce and deliver a solution to the market: mixtures of recycled materials and virgin resins which will be produced and supplied in collaboration with local recyclers.

For this reason, we continue to innovating the processes that allow us to develop chemical and plastic solutions that will help build a circular future and generate a better impact on the environment and society.

This new solution is composed of:

Recycled material **(HDPE or LDPE)**



Virgin material **(HDPE or LDPE)**

It reinforces our values, beliefs and commitment to the sustainable development of the country.

In addition, this important development positions us as the first Mexican company to offer a high-quality solution that contributes to the Circular Economy, which is part of the portfolio of

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I'm green™ BIO-BASED & RECYCLED

The history of **Braskem Idesa**

Created in 2010, it's an association in which Braskem participates, the biggest producer of thermoplastic resins and leader in America, and Grupo Idesa, one of the main Mexican business groups. Together the companies lead the **Braskem Idesa** complex, which focuses on the development and implementation of a petrochemical complex for the production of polyethylene in **Nanchital, Veracruz.**

Investment

US$5,200 millions

Annual production:
1 million 50 thousand TONS
of High and Low Density Polyethylene

3 plants
2 of High Density and
1 of Low Density

COMPETITIVENESS

- **ETHANE IN GAS AS RAW MATERIAL**
  Best features vs. liquid
- **WORLD SCALE**
  Cracker of 1 million tons/year and Plants from 300 to 450 thousand tons/year
- **IDEAL INFRASTRUCTURE**
  Ports, railways, roads, railways
- **CUTTING EDGE TECHNOLOGY**

Main benefits of our *PCR resin vs. Recycling*

- Allows the use in **high performance** applications
- Lot-to-lot **quality**
- **Traceability** throughout the process
- Reduction of carbon footprint and **energy consumption**

Also **our PCR resins** are solutions with social and environmental impact (circularity of plastic).

Process diagram

Compilation of HDPE in collection centers and purchase from gatherers, who separate it before coming into contact with household garbage.

Material **verification**.

1 COLLECTION

CONSUMERS

Elimination of containers **NOT made** with **natural HDPE.**

Pressing, bale formation and transport to the **Alcamare** plant.

2 CLASSIFICATION

The process starts with:

- **1st Separation** of containers and spin to remove: lids, ring and labels.
- **2nd Separation** by different material and color (FTIR Technology).
- Separation of non-ferrous materials.
- Packaging grinding.

Alcamare International Recycling Group

Elimination of organic residues with a detergent that is subsequently eliminated.

Separation of materials of different density.

3 WASH

Rinse and remove detergent residue and moisture.

Storage.

RECYCLING

Extrusion of the processed material and the **HDPE** virgin resin, ensuring that their proportions are correct.

Elimination of possible residues, fine pellets and agglomerates.

Packaged in 1-ton **super sacks** approx.

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Shipping to distribution centers

Product packaging by the logistics provider according to customer needs.

TRANSFORMERS

RPR 3A1 NL
This resin allows a weight reduction in the final product.

RESINS
Applications

RPL 5C1 LB

RPR 5A1 WE

RPL 5C1 NL

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PE - Polyethylene

		Control properties		Typical properties[1]						
		Melt flow rate (190°/2.16kg)	Density	Tensile strength at yield	Elongation at break	Tensile modulus of elasticity, secant 1% method	Flexural modulus, secant 1% method	Izod impact strength	ESCR[2] (IGEPAL 10%)	ESCR[2] (IGEPAL 100%)
ASTM method		D1238	D792	D638	D638	D638	D790	D256	D1693	D1693
Units		g/10 min	g/cm³	MPa	%	MPa	MPa	J/m	h	h
HDPE	RPR 3A1 NL	0.3	0.955	29	>400	1300	1300	135	84	1000
		This resin is a High Density Polyethylene Copolymer that contains 30% of post-consumed recycled HDPE resin (PCR).								
		Applications: Containers, small bottles, blow molding of containers up to 20 L for chemicals, domestic and oils.								
HDPE	RPR 5A1 WE	0.3	0.955	29	>380	1200	1200	135	22	120
		This resin is a High Density Polyethylene Copolymer that contains 50% of post-consumed recycled HDPE resin (PCR).								
		Applications: Containers, small bottles, blow molding of containers up to 20 L for chemicals, domestic and oils.								

1. Test specimens from compression molded plaque according to ASTM D4703.
2. B Condition.

		Control properties		Typical properties[1]					
		Melt flow rate (190°/2.16kg)	Density	Tensile strength at break (MD/TD)	Elongation strength at break (MD/TD)	Tensile modulus, secant 1% (MD/TD)	Elmendorf tear strength (TD)	Dart drop impact	Haze
ASTM method		D1238	D792	D882	D882	D882	D1922	D1709	-
Units		g/10 min	g/cm³	MPa	%	MPa	gF	gF	%
LDPE	RPL 5C1 NL	1.85	0.921	17 / 15	408 / 659	153 / 163	848	98	7.6
		This resin is a Low Density Polyethylene that contains 50% of post-industrial recycled LDPE resin.							
		Applications: Flexible packaging, bags and sacks.							
LDPE	RPL 5C1 LB	1.8	0.921	15 / 13	395 / 620	140 / 155	790	88	8
		This resin is a Low Density Polyethylene that contains 50% post-consumer recycled LDPE (PCR).							
		Applications: Flexible packaging, bags and sacks.							

1. Film properties tested with a monolayer 50 µm thickness blown film, blow up ratio: 2.5, die gap: 1.8 mm. MD= Machine direction, TD= Transversal direction. The optimum processing conditions will vary according to the type of equipment used and cannot be considered as performance guarantee.

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www.braskemidesa.com.mx