



Polyolefins for
Caps and Closures



Caps and Closures Market

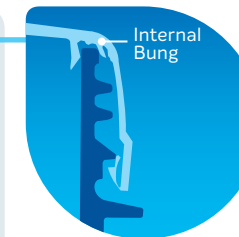
Packages that use caps as closure systems compose a market segment that evolves more and more each year in terms of innovation, aiming to improve properties and performance of the products.

The development of caps involves diverse challenges, since guaranteeing the integrity of the packed product, ease of handling and also proving more sustainable packages.

In order to comply with all the market requirements, a perfect closure system requires both correct mold design combined with the adequate resin choice.

Composed by specialists from the Innovation and Technology Center, besides technical and commercial teams, Braskem offers its clients solutions in resins through a highly qualified and complete portfolio, in order to meet their clients' specific needs.

Target markets food applications



Internal Bung
Frontal view of a left side cut drawing of the cap applied to the bottle neck

CSD Carbonated Soft Drinks

Caps for carbonated soft drinks can be molded by both compression and injection molding processes. Such caps present specific requirements.

Beverages

The segment dedicated to the development of packages for beverages is one of the largest considering the caps and closures market because of the high consumption observed for this segment. This segment involves all types of beverages – from milk and carbonated soft drinks until hot filled liquids, such as teas and energy drinks – demanding high versatility of the resins, specially designed for such applications.



Mineral Water

Caps applied for mineral water bottles can be obtained by both compression and injection molding processes. The main requirement for resins used at this application is to present excellent organoleptic properties, in order to guarantee that no alterations on the water properties regarding scent, flavor and color happen when in contact with the plastic product.

Because mineral water is considered as a universal solvent, it is odorless, tasteless and colorless at its natural conditions. This liquid is highly sensitive to any alterations on the mentioned properties. These alterations may be caused by substances, such as pigments and additives, not only used during the resin production, but also during the production of the cap.

Using advanced technologies on the production process of its resins, Braskem developed its portfolio aiming to be approved by the most critical brand owners of Mineral Water Caps market.



Food

Requirements for the food market regarding the resins applied as caps and closures are very similar to the mineral water ones. The main types of closures found in this market are large flat area, bicomponent caps, etc. Both Polyethylene and Polypropylene resins are used in this market, depending on specific requirements for the cap considering the final application.

Target markets non food applications

Home Care

The production of caps for home care applications occurs mainly by injection molding. For this market, Braskem offers solutions in Polyethylene and Polypropylene resins. Requirements such as high chemical resistance, high dimensional stability, ease of handling and use of the package vary depending on the application and shelf life of the packaged product. For this market, the main types of caps are flip-top, push pull, threaded ones (with bungs or not).



Industrial Use

Industrial applications usually require caps and closures with higher mechanical resistance in a general way, in order to comply with the critical legislations, once the packages are used to transport chemicals. For retractable closures for metallic packages, low density Polyethylene resins are used – once flexibility is required for this type of closure. Chemical resistance, dimensional stability and tightness are also important properties for this application.

Personal Care

Requirements for caps and closures applied for personal care are mainly related to aesthetic characteristics, such as surface finish, transparency and gloss. The main process to obtain such products is injection molding, able to provide a wide range of cap size and design. For this market, flip-top, disk-top, etc. caps are the most commonly demanded types. Due to the compliance of Polypropylene resins with the application requirements, they are more widely used for personal care caps and closures.



PP | Polypropylene

Grade	MFR [230 °C/2.16 kg]	Flexural Modulus [MPa]	Tensile Strength @ Yield [MPa]	Impact Charpy 23 °C [kJ/m ²]	Additives	Features and typical application
HOMO						
FT120WV	12	1850	38	-	N, AS	Flip-top caps, excellent dimensional properties for cosmetic packages
FT200WV2	20	1900	37	2.5	N, AS	Caps for general use, fast cycle injection molding, high stiffness
HSP250NA	25	1650	36	3	N, AS	Caps for general use
H7058-25R	25	1400	33	3	CR	Caps for general use, Narrow MWD
DH789.01	50	1700	37	2.5	N, AS	Thin wall caps, fast cycle
H734-52RNA2	52	1800	37	2.5	N, AS, CR	Thin wall caps, fast cycle, Narrow MWD

Grade	MFR [230 °C/2.16 kg]	Flexural Modulus [MPa]	Impact Charpy 23 °C [kJ/m ²]	Impact Charpy -20 °C [kJ/m ²]	Additives	Features and typical application
ICP						
EP445L	6	1450	7.2	3.3	N, AS, S, CR	Caps for carbonated soft drinks, water, juices
C706-21NAHP	21	1500	8	4.5	N, AS	Injection molded caps for general use, with thin wall, fast cycle and excellent stiffness
C7082-30NA	30	1300	8.5	4	N, AS	Injection molded caps for general use, with thin wall and fast cycle
C705-44NAHP	44	1500	7	4	N, AS	Injection molded caps for general use, with thin wall and fast cycle
CD700NAQ	70	1200	8	3.5	N, AS, CR	Injection molded caps for general use, with thin wall and fast cycle, large flat area thin wall, excellent dimension stability, Narrow MWD
CG700NA	70	1350	6	3.5	N, AS	Injection molded caps for general use, with thin wall and fast cycle, large flat area thin wall, excellent dimension stability
C7069-100NA	100	1500	4	2.5	N, AS	Injection molded caps for general use, with thin wall and fast cycle, large flat area thin wall, excellent dimension stability

Grade	MFR [230 °C/2.16 kg]	Flexural Modulus [MPa]	Impact Charpy 23 °C [kJ/m ²]	Haze [%] 1 mm	Additives	Features and typical application
RACO						
DR7051.01	10	1200	6	10	CA, AS	High transparency injection molded caps, flip top
DR7037.01	23	1200	6	10	CA, AS	High transparency injection molded caps, flip top
Inspire® 364	42	1050	5.5	9	CA, AS	High transparency and thin wall injection molded caps
Inspire® 382	70	1050	5	10	CA, AS	High transparency and thin wall injection molded caps
DR7032.06	100	1050	4.5	10	CA, AS, CR	High transparency and thin wall injection molded caps

N: Nucleated, CA: Clarified, AS: Antistatic, S: Slip, CR: Controlled Rheology



PE | Polyethylene

Grade	MFR [190 °C/2.16 kg]	Density [g/cm ³]	Additives	Application
HDPE				
HD6402H	0.8	0.955	-	CSD
HD6401H	0.8	0.955	Slip	CSD
HC7260	7.2	0.959	-	Still water, edible oil
Green SHC7260	7.2	0.959	-	Still water, edible oil
HDI2061	20	0.955	-	Large flat caps, spouts
Green SHA7260	20	0.955	-	Large flat caps, spouts

Type	Grade	MFR [190 °C/2.16 kg]	Density [g/cm ³]	Application
LDPE and LLDPE				
LDPE	BC818	8.3	0.918	General use, bung
	Green SBC818	8.3	0.918	General use, bung
	LDI2020	20	0.920	General use, bung
LLDPE	IF33	48	0.931	Edible oil, home and personal care, bungs

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Sustainable solutions for you

Braskem offers a huge variety of sustainable products for compounds. Our portfolio ranges from grades made of bio-based material to recycled material. The material is certified and we offer a service to provide you with a life cycle analysis.

Our commercial team will support you in finding the right sustainable material for your needs.



BIO-BASED RAW MATERIAL

- HDPE, LDPE, LLDPE and EVA
- Blow molding, injection molding & extrusion
- Can be in **contact with food***
- Measurable **bio-based content**
- **Captures CO₂** from the environment
- Tackling **climate change**



MASS BALANCE CERTIFIED BIO-ATTRIBUTED

- PP
- Blow molding, injection molding & extrusion
- Can be in **contact with food***
- **ISCC** mass balance certified bio-based
- Contributes to reduce **dependance on fossil feedstock**
- **Reduced carbon footprint**



FOSTERING THE TRANSITION TO A CIRCULAR ECONOMY



RECYCLED RESINS

- rHDPE, rLDPE, rPP
- Blow molding, injection molding & extrusion
- Made from **post-consumer recycled plastic**

MASS BALANCE CERTIFIED RECYCLED

- PE, HPP, RPP and ICP
- Blow molding, injection molding & extrusion
- Can be in **contact with food***
- **ISCC** mass balance certified recycled

LOW CARBON SOLUTIONS

- rHDPE, rPP
- Blow molding, injection molding & extrusion
- Measurable **bio-based content**

Braskem can offer all PP products with an ISCC PLUS certificate.

*These applications are merely exemplary. The possibility of using this product for a specific purpose may vary according to the jurisdiction and should be analyzed by the interested party. Braskem does not warrant the suitability of the product for the intended use when combined with other substances. Please check the RIS or contact Braskem for specific regulatory information.

Europe

Rotterdam, Netherlands
Headquarters
Start-up year: 2017

Schkopau, Leipzig Area
Capacity: 360 kT/yr
Technology: Spheripol
Start-up year: 1998

Wesseling, Cologne Area
Capacity: 265 kT/yr
Technology: Unipol
Start-up year: 1991

 **Innovation & Technology Centre**
Start-up year: 2016


Braskem in numbers

Warehouses Europe

Antwerp | Belgium
Murcia | Spain
Bologna | Italy
Rotterdam | The Netherlands

350  Team Members


2  Industrial Units:
Wesseling and Schkopau (Germany)

PRODUCTION CAPACITY OF
625 ^{KT/Y}
of **PP** 

Global presence

With a global vision of the future, oriented toward people and sustainability, Braskem is engaged in contributing to the value chain in order to strengthen the Circular Economy. Its more than 8.000 team members are dedicated to improving people's lives through sustainable solutions in chemicals and plastics. With its corporate DNA rooted in innovation, Braskem offers a comprehensive portfolio of plastic resins and chemical products for diverse industries, such as food packaging, construction, manufacturing, automotive, agribusiness, health and hygiene, and more. Braskem is globally headquartered in Brazil and EMEA head office is based in Rotterdam – NL. In total, there are more than 40 industrial units in Brazil, the United States, Mexico, and Germany, exporting its products to clients in over 80 countries.

 **8,353**
Team Members

PRODUCTION OF OVER **20** ^{MM TONS/YEAR}
of thermoplastic resins & other chemicals products 

40 industrial units:
29 plants in Brazil
5 plants in the United States
2 plants in Germany
4 plants in Mexico 



