



Polyolefin for Cap Production

The Cap Market

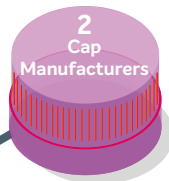
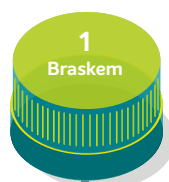
Essentially, every package requires a closing system, and although it is usually one of the last operations performed on the packaging line, it is considered an important factor in the consumer's recurring purchase decision.

The challenges in cap development are diverse, ranging from ensuring the integrity of the packaged product, providing ease of handling and disposal, to offering more sustainable packaging.

To meet all market demands, cap development—besides good design and molding process—requires choosing the right resin to ensure a perfect sealing system for the package.

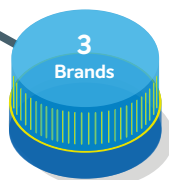
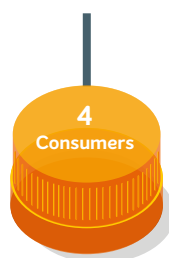
Braskem offers its customers resin solutions to meet their specific needs with a complete and high-quality portfolio.

Braskem's portfolio offers specially developed resin solutions for cap production.



Braskem's solutions, combined with its customers' processes, provide stability and productivity in cap manufacturing.

Value Chain



The perfect combination of packaging and Braskem resin ensures the integrity of the packaged product and effective brand communication with the consumer.

Our solutions aim to exceed consumer expectations during package handling and product use.



Beverages

The beverage segment is one of the largest within the cap market due to high consumption. It is a market that includes all types of beverages — from milk and soft drinks to hot-filled beverages such as teas and energy drinks — requiring great versatility from our resins designed for these applications.

POLYETHYLENE				
Grade	Family	Melt Flow Rate (g/10min) ASTM D 1238 (190 °C/2,16 kg)	Density (g/cm ³) ASTM D 792	Application
HD7255LS-L	HDPE	4,5	0,954	Caps for beverages with excellent mechanical properties
HD3401S	HDPE	4,5	0,954	Caps for beverages. Low application torque with easy opening
HC7260LSL ⁽¹⁾	HDPE	7,2	0,959	Caps for beverages with excellent mechanical properties
IA59	HDPE	7,3	0,960	Caps for dairy products, juices, teas, and isotonic drinks with excellent mechanical properties
HA7260 ⁽¹⁾	HDPE	20	0,955	Caps for beverages. Excellent processability
IA58	HDPE	22	0,957	Caps for dairy products, juices, teas, and isotonic drinks. Excellent processability

⁽¹⁾ It can be produced from a renewable source – I'm green™ bio-based.

POLYPROPYLENE							
Grade	Family	Melt Flow Rate (g/10min) ASTM D 1238 (230 °C/2,16 kg)	Density (g/cm ³) ASTM D 792A	Flexural Modulus - 1% Secant (MPa) ASTM D 790A	Notched Izod Impact Strength (23°C) (J/m) ASTM D 256A	Opacity (%) ASTM D 1003	Application
JE 6190	PP Homopolymer	2,1	0,905	1600	40	-	Caps for carbonated beverages, water, and juices
EP 445L	PP Copolymer	6	0,900	1450	80	-	Two-piece caps for carbonated beverages, water and juices
RT100N	PP Raco	10	0,902	950	55	16	Transparent injection-molded caps
Maxio® RP340R	PP Raco	25	0,902	1000	50	17	Transparent injection-molded caps



Carbonated Beverages

(CSD – Carbonated Soft Drink)

Caps intended for the carbonated beverage sector can be molded through injection or compression processes.

These caps have important requirements, such as withstanding internal pressure and maintaining the beverage's carbonation. Braskem's resins developed for the carbonated beverage market offer superior performance to meet all requirements, including the new neck finish standards that support packaging weight reduction.

POLYETHYLENE					
Grade	Family	Melt Flow Rate (g/10min) ASTM D 1238 (190 °C/2,16 kg)	Density (g/cm ³) ASTM D 792	Slip	Application
HD6401H	HDPE	0,8	0,955	Yes	One-piece caps with high mechanical performance for carbonated beverages
GE7252NS [®]	HDPE	2,0	0,952	No	One-piece caps for carbonated beverages
GE7252XP	HDPE	2,0	0,952	Yes	One-piece caps for beverages and mineral water
GE7252XS	HDPE	2,0	0,952	Yes	One-piece caps for carbonated beverages

[®] It can be produced from a renewable source – I'm green™ bio-based.

POLYPROPYLENE						
Grade	Family	Melt Flow Rate (g/10min) ASTM D 1238 (230°C/2,16 kg)	Density (g/cm ³) ASTM D 792A	Flexural Modulus -1% Secant (MPa) ASTM D 790A	Notched Izod Impact Strength (23°C) (J/m) ASTM D 256A	Application
JE6190	PP Homopolymer	2,1	0,905	1600	40	Caps for carbonated beverages (two-piece), water, and juices
EP445L	PP Homopolymer	6,0	0,900	1450	80	Caps for carbonated beverages (two-piece), water, and juices



Water

It can be produced from a renewable source – I'm green™ bio-based.

Caps intended for the water bottles sector are produced through compression or injection molding processes, and the main requirement in this market is organoleptic properties.

Braskem has developed its portfolio using advanced production technologies to ensure resin approval in the qualification processes of the most demanding customers and brands in this market.



POLYETHYLENE

Grade	Family	Melt Flow Rate (g/10min) ASTM D 1238 (190 °C/ 2,16 kg)	Density (g/cm ³) ASTM D 792	Organoleptic Properties	Application
GE7252XP	HDPE	2,0	0,952	Good	Caps for injection and compression molding processes. Low application torque and easy opening
HD3403S	HDPE	4,5	0,954	Excellent	Caps for injection and compression molding processes. Low application torque and easy opening
HC7260LSL ⁽¹⁾	HDPE	7,2	0,959	Excellent	Caps for injection molding process

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POLYPROPYLENE

Grade	Family	Melt Flow Rate (g/10min) ASTM D 1238 (230°C/ 2,16 kg)	Density (g/cm ³) ASTM D 792A	Flexural Modulus - 1% Secant (MPa) ASTM D 790A	Notched Izod Impact Strength (23°C) (J/m) ASTM D 256A	Application
JE6190	PP Homopolymer	2,1	0,905	1600	40	Caps for carbonated beverages (two-piece), water, and juices
EP445L	PP Copolymer	6,0	0,900	1450	80	Caps for carbonated beverages (two-piece), water, and juices

Food

The food segment has important organoleptic and regulatory requirements. For this sector, the injection molding process stands out for the production of plugs and various types of caps — from large flat-surface caps and integrated caps to bi-component caps assembled during the production process. In this segment, both polyethylene and polypropylene resins are used, depending on the specific requirements of the cap.



POLYETHYLENE

Grade	Family	Melt Flow Rate (g/10min) ASTM D 1238 (190 °C/2,16 kg)	Density (g/cm ³) ASTM D 792	Application
GE7252NS ⁽¹⁾	HDPE	2,0	0,952	Caps with high ESCR requirements
HD3401S	HDPE	4,5	0,954	Caps requiring low application torque – easy opening
IA58	HDPE	22	0,957	Large flat-surface caps
IB58	HDPE	35	0,958	Large flat-surface caps
ML2400N	PEBDL	20	0,926	Plugs for edible oil, vinegar, and sauce caps
IC32	PEBDL	29	0,924	Large flat-surface caps
IF33	PEBDL	48	0,931	Large flat-surface caps
IN34	PEBDL	48	0,938	Large flat-surface caps
M2520	PEBDL-m	25	0,919	Household items and large flat-surface caps

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POLYPROPYLENE							
Grade	Family	Melt Flow Rate (g/10min) ASTM D 1238 (230°C/2,16 kg)	Density (g/cm ³) ASTM D 792A	Flexural Modulus - 1% Secant (MPa) ASTM D 790A	Notched Izod Impact Strength (23°C) (J/m) ASTM D 256A	Opacity (%) ASTM D	Application
H 503	PP Homopolymer	3,5	0,905	1300	30	–	Screw caps and flip-top caps
H 301	PP Homopolymer	10	0,905	1350	25	–	Tamper-evident caps; flip-top caps and general-purpose injection-molded caps
Maxio® FT120WV	PP Homopolymer	13	0,905	1655	37	–	Flip-top caps with excellent dimensional stability
Maxio® PT400NA	PP Homopolymer	40	0,905	1600	20	24	Thin-wall caps with fast cycle
HP 648S	PP Homopolymer	40	0,905	1400	20	–	Thin-wall caps with fast cycle
H 117	PP Homopolymer	45	0,905	1700	20	–	Tampas de parede fina e alta rigidez, ciclo rápido
RT100N	PP Raco	10	0,902	950	55	16	Thin-wall caps with high rigidity and fast cycle
Maxio® RP 340R	PP Raco	25	0,902	1000	50	17	Thin-wall caps with high rigidity and fast cycle
RT400NAQ	PP Raco	40	0,902	1050	40	18	Injection-molded caps with high transparency and thin walls
Maxio® RP 340S	PP Raco	45	0,902	1050	40	18	Injection-molded caps with high transparency and thin walls
EP440L	PP Copolymer	6,0	0,895	1050	NB*	–	General-purpose injection-molded caps with high toughness
CP 141	PP Copolymer	43	0,900	1200	95	–	General-purpose injection-molded caps with thin walls and fast cycle

*NB = No Break.



Cleaning Products

Cap production for the cleaning products market is mainly carried out through the injection molding process. For this market, Braskem offers polyethylene and polypropylene resin solutions. Depending on the application and the shelf life of the packaged product, there are specific requirements — such as high chemical resistance, high dimensional stability, and ease of handling the packaging.

This market highlights flip-top, push-pull, and screw caps with or without plugs.



POLYETHYLENE

Grade	Family	Melt Flow Rate (g/10min) ASTM D 1238 (190 °C/2,16 kg)	Density (g/cm ³) ASTM D 792	Application
HD6401H	HDPE	0,8	0,955	Caps with high ESCR requirements
GE7252NS ⁽¹⁾	HDPE	2,0	0,952	Caps with high ESCR requirements
JV060U	HDPE	7,0	0,957	Screw caps
HC7260LS-L ⁽¹⁾	HDPE	7,2	0,959	Screw caps
IA59	HDPE	7,3	0,960	Screw caps
ML2400N	LLDPE	20	0,926	Caps and plugs
IC32	LLDPE	29	0,924	Caps and plugs
IF33	LLDPE	48	0,931	Caps and plugs
IN34	LLDPE	48	0,938	Caps and plugs

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POLYPROPYLENE							
Grade	Family	Melt Flow Rate (g/10min) ASTM D 1238 (230°C/2,16 kg)	Density (g/cm ³) ASTM D 792A	Flexural Modulus - 1% Secant (MPa) ASTM D 790A	Notched Izod Impact Strength (23°C) (J/m) ASTM D 256A	Opacity (%) ASTM D 1003	Application
H 503	PP Homopolymer	3,5	0,905	1300	30	-	Screw caps and flip-top caps
H 301	PP Homopolymer	10	0,905	1350	25	-	Tamper-evident caps; flip-top caps and general-purpose injection-molded caps
Maxio® FT120WV	PP Homopolymer	13	0,905	1655	37	-	Flip-top caps with excellent dimensional stability
Maxio® PT400NA	PP Homopolymer	40	0,905	1600	20	24	Thin-wall caps with fast cycle
HP 648S	PP Homopolymer	40	0,905	1400	20	-	Thin-wall caps with fast cycle
H 117	PP Homopolymer	45	0,905	1700	20	-	Thin-wall and high rigidity caps, fast cycle
RT100	PP Raco	10	0,902	950	55	16	Injection-molded caps with high transparency
Maxio® RP 340R	PP Raco	25	0,902	1000	50	17	Injection-molded caps with high transparency
RT400NAQ	PP Raco	40	0,902	1050	40	18	Injection-molded caps with high transparency and thin walls
Maxio® RP 340S	PP Raco	45	0,902	1050	40	18	Injection-molded caps with high transparency and thin walls
EP440L	PP Copolymer	6,0	0,895	1050	NB*	-	General-purpose injection-molded caps with high impact resistance
CP 141	PP Copolymer	43	0,900	1200	95	-	General-purpose injection-molded caps with thin walls and fast cycle

*NB = No Break.



Cosmetics and Personal Care

In this segment, packaging communication is a key aspect; therefore, requirements related to cap aesthetics — such as surface finish, transparency, and gloss — are often requested. Injection molding is predominant in this segment due to the wide variety of models and sizes designed for each product. Examples of caps in this market include flip-top caps with small to large flat areas, disk-top caps, and applicator caps. Polypropylene resin is predominantly used in this segment due to its ability to meet the specific requirements of these applications.



POLYPROPYLENE						
Grade	Family	Melt Flow Rate (g/10min) ASTM D 1238 (230°C/2,16 kg)	Density (g/cm³) ASTM D 792A	Flexural Modulus - 1% Secant (MPa) ASTM D 790A	Notched Izod Impact Strength (23°C) (J/m) ASTM D 256A	Application
H 503	PP Homopolymer	3,5	0,905	1300	30	Screw caps and flip-top caps
H 301	PP Homopolymer	10	0,905	1350	25	Tamper-evident caps; flip-top caps and general-purpose injection-molded caps
H 117	PP Homopolymer	45	0,905	1700	20	Thin-wall and high rigidity caps, fast cycle



POLYPROPYLENE							
Grade	Family	Melt Flow Rate (g/10min) ASTM D 1238 (230°C/2,16 kg)	Density (g/cm ³) ASTM D 792A	Flexural Modulus - 1% Secant (MPa) ASTM D 790A	Notched Izod Impact Strength (23°C) (J/m) ASTM D 256A	Opacity (%) ASTM D	Application
Maxio® FT120WV	PP Homopolymer	13	0,905	1655	37	-	Flip-top caps with excellent dimensional stability
Maxio® PT400NA	PP Homopolymer	40	0,905	1600	20	24	Thin-wall caps with fast cycle
HP 648S	PP Homopolymer	40	0,905	1400	20	-	Thin-wall caps with fast cycle
RT100N	PP Raco	10	0,902	950	55	16	Injection-molded caps with high transparency
Maxio® RP 340R	PP Raco	25	0,902	1000	50	17	Injection-molded caps with high transparency
RT400NAQ	PP Raco	40	0,902	1050	40	18	Injection-molded caps with high transparency and thin walls
Maxio® RP 340S	PP Raco	45	0,902	1050	40	18	Injection-molded caps with high transparency and thin walls
EP440L	PP Copolymer	6,0	0,895	1050	NB*	-	General-purpose injection- molded caps with high impact resistance
CP 241	PP Copolymer	20	0,900	900	150	-	Screw caps and flip-top caps
CP 141	PP Copolymer	43	0,900	1200	95	-	General-purpose injection- molded caps with screw or assembled by tapping, with thin wall and fast cycle

*NB = No Break.



Industrial

This segment mostly requires more robust caps to comply with extremely strict regulations, as they are used in packaging for transporting chemical products. Requirements such as chemical resistance and dimensional stability are also part of the cap design scope for this application, making it essential to combine mold and resin solutions to maximize cap performance.

POLYETHYLENE				
Grade	Family	Melt Flow Rate (g/10min) ASTM D 1238 (190 °C/2,16 kg)	Density (g/cm ³) ASTM D 1505/ D 792	Application
HD6401H	HDPE	0,8	0,955	Caps with high impactresistance at low temperatures and low application and opening torque
GE7252NS ⁽¹⁾	HDPE	2,0	0,952	Caps for drums and packaging of hazardous chemical products
GE7252XS	HDPE	2,0	0,952	Caps for drums and packaging of hazardous chemical products. Low application and opening torque
HD3401S	HDPE	4,5	0,954	Caps for lubricating oil
BC818 ⁽¹⁾	HDPE	8,3	0,918	Plugs for chemical product caps
PB208 ⁽¹⁾	HDPE	22	0,923	Plugs for chemical product caps
PB608 ⁽¹⁾	HDPE	30	0,915	Plugs for chemical product caps

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Grade	Family	Melt Flow Rate (g/10min) ASTM D 1238 (230°C/2,16 kg)	Density (g/cm ³) ASTM D 792A	Flexural Modulus - 1% Secant (MPa) ASTM D 790A	Notched Izod Impact Strength (23°C) (J/m) ASTM D 256A	Application
EP 445L	PP Copolymer	6,0	0,900	1450	80	Caps for chemical, agrochemical, and industrial products
CP 442XP	PP Copolymer	6,0	0,895	1100	170	Caps for chemical, agrochemical, and industrial products
CG 220NA	PP Copolymer	22	0,905	1100	180	Caps for chemical, agrochemical, and industrial products



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