ENHANCING BEAUTY WITH SUSTAINABILITY

SABIC SOLUTIONS FOR FLEXIBLE TUBES

CHEMISTRY THAT MATTERS™

SOLUTIONS FOR YOUR NEEDS

SABIC polymers for innovation, sustainability and performance benefits.

1 HIGH PURITY AND SAFETY

2 RECYCLABILITY AND CIRCULARITY

3 AESTHETICS AND EASE OF USE

TRENDS AND CHALLENGES

The packaging industry is constantly seeking advanced material solutions for tube packaging to enhance function, aesthetics, sustainability and to answer growing awareness about health and personal care.

The trends around tubes used in the packaging industry is shifting towards sustainability and reducing the potential environmental impacts of a package across its lifecycle. Companies are increasingly focusing on using post consumer recycled (PCR) materials, reducing plastic waste through end-of-life recyclability, and exploring alternative materials like bio-based materials.

Additionally, minimalist and sleek tube designs with recyclable components are becoming more prevalent to align with consumers' preferences for environmentally conscious choices.

SABIC offers tailor made solutions to meet these challenges, with a broad portfolio of polymers. SABIC's TRUCIRCLE™ portfolio offers circular polymers from the advanced recycling of mixed plastic waste, bio-renewable polymers and mechanical recycled polymers using post consumer recycled (PCR) content.

COSMETIC INDUSTRY TUBE PACKAGING TRENDS

DESIGN & CONSUMER APPEAL
- HIGH-END DESIGN & LIGHTWEIGHT
- DURABLE

FUNCTIONALITY
- EASY TO USE
- DISPENSE THE PRODUCT EFFECTIVELY

HEALTH & SAFETY
- SAFE FOR USE WITH COSMETICS TO PREVENT ANY HARMFUL REACTIONS
- REGULATORY COMPLIANCE FOR CONSUMER SAFETY

SUSTAINABILITY
- RECYCLABLE/ RECYCLED MATERIALS
- VEGAN

INDUSTRY MANUFACTURERS CHALLENGES

SUSTAINABILITY
- RECYCLED MATERIALS AND/OR DESIGN FOR RECYCLING TO REDUCE WASTE

HIGH QUALITY MATERIALS WITH EXCELLENT PROPERTIES
- COMPATIBLE WITH THE COSMETIC FORMULATION
- EFFECTIVE BARRIER PROPERTIES
- CHEMICAL RESISTANCE

COST EFFICIENCY
- LIGHT WEIGHTING
- INTEGRATION OF COMPONENTS
- TOTAL SYSTEM COST REDUCTION

GLOBAL OPERATIONS
- GLOBAL BRANDS, REGIONAL PRODUCTIONS AND BUSINESS EXPANSION

HOW TUBES ARE MADE

The tube sleeve can be made in different ways depending on the tube type:

EXTRUDED TUBES

Extruded tubes are seamless. Plastic resin is extruded into a tube form and then cut to size before being "headed" or joined with the separately molded shoulders and head.

- **Monolayer Extruded Tubes**
  Typically made of extruded polyethylene, monolayer tubes are ideal when a barrier layer is unnecessary, i.e., for most personal care products, and are more recyclable.

- **Co-extruded Tubes**
  Typically, polyethylene with an added EVOH barrier layer when needed for specific formulations, including solvents, oils, and UV sunscreens. Co-extruded tubes can have many layers.

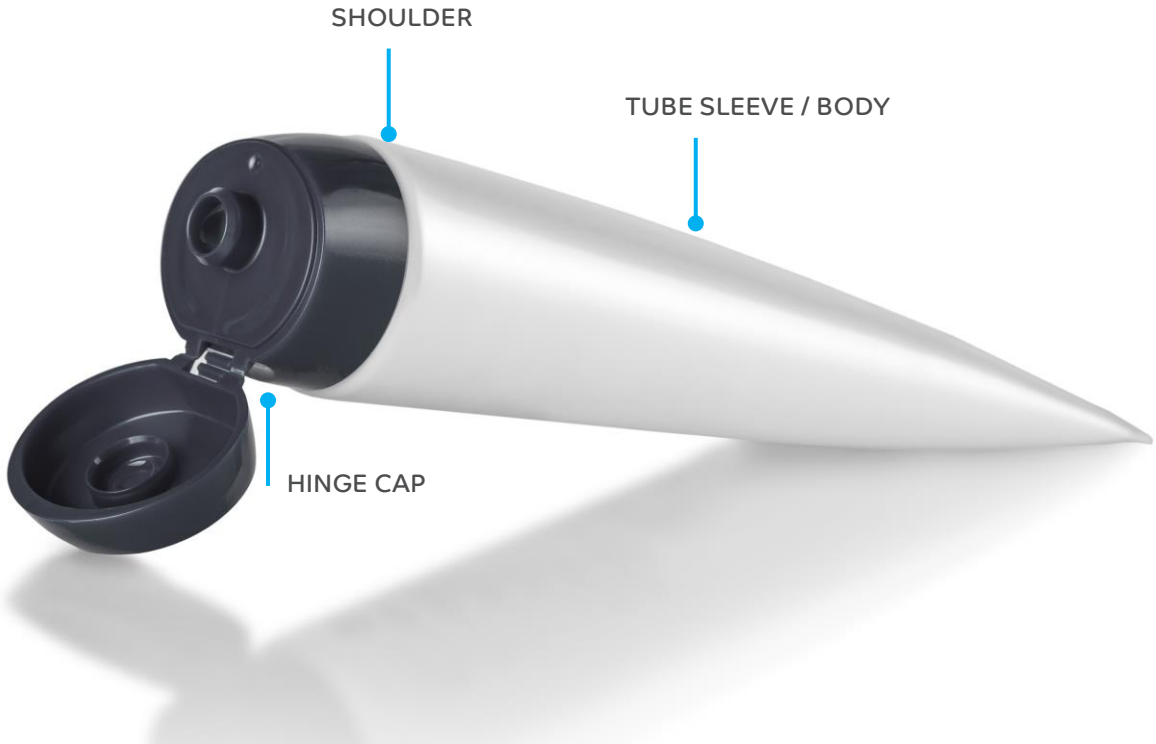
LAMINATE TUBES

Laminate tubes are composed of several layers of film that are adhered to each other with an adhesive or "Tie Layer". Once the layers are laminated, they are rolled into a tube shape and cut to size before being "headed" or joined with the separately molded head and shoulders. Laminates can be printed before or after being formed into a tube shape.

- **Plastic Laminate Tubes**
  These are composed of layers of plastic film, typically an inner layer compatible with the fill, middle barrier layer, and exterior printable layer.

INJECTION-MOLDED TUBES WITH IN-MOLD LABELLING

A printed plastic label is placed in the tool before the tube material is injection molded and bonded together with the label. Since the label and tube are of the same material, waste sorting it is not a problem.



MATERIALS USED FOR TUBES

Tube materials must meet certain requirements to ensure the safety and quality of the product, especially for cosmetic or pharmaceutical applications. They must be safe for use with content to prevent any harmful reactions or contamination and be compatible with the product formulation to avoid degradation or alteration of the product. Next to that the tube should provide an effective barrier to protect the cosmetic product from external factors such as light, oxygen, and moisture. Tube materials must adhere to regulatory guidelines set by authorities such as the FDA to ensure consumer safety. By meeting these requirements, tube materials used in cosmetics can help maintain the safety and integrity of the products they contain.

SABIC PRODUCT PORTFOLIO

SABIC offers a broad product portfolio, serving wide range of tube applications used in:

- Cosmetic (vegan)
- Pharma
- Toothpaste
- Food
- Home care
- Household / Industrial

SABIC offers a product portfolio for tube applications that are carefully developed to meet regulatory compliance requirements. Our products can be used for extrusion and laminated plastic tubes and extrusion coatings for laminated paper tubes.

SABIC offers a specific portfolio for tube applications that complies with the stringent regulations of the pharmaceutical industry:

- Our dedicated portfolio for pharma applications adheres to the European Pharmacopoeia (EP) and United States Pharmacopoeia (USP VI) regulations.
- We prioritize product consistency and stability, following a "No change" policy on product composition and formulation. Any modification to our products requires a minimum of 18 months notice before implementation.
- Our regulatory documents are readily available for download on our website, providing transparency and accessibility to our customers.
- For additional support and expertise, our Product Stewardship team is available upon request through our website contact.

TRUCIRCLE™ PORTFOLIO & SERVICES

SABIC's TRUCIRCLE™ portfolio and services includes certified circular polymers, design for recyclability, mechanically recycled products, certified renewable polymers from bio-based feedstock and closed loop initiatives to recycle plastic back into high quality applications and help prevent valuable used plastics from becoming waste.

Our TRUCIRCLE™ portfolio and service supports circularity in flexible tubes packaging:

- One-stop-shop with one of the largest polymers product portfolios for flexible tubes, including HDPE, LDPE, LLDPE, and PP materials.
- Availability of product grades from the TRUCIRCLE™ portfolio, such as certified circular and certified renewable versions, to reduce environmental impact through reducing plastic waste and CO2 emissions.
- Mono-material solutions supporting full recyclability.
- Dedicated team to provide customer support and tailored solutions and services, such as LCA information.

PRODUCT PORTFOLIO

SABIC MATERIAL GRADES	MFR @ 2.16 kg (g/10 min)	DENSITY (kg/m3)	E-MODULUS Tensile (Mpa)	PROCESSING	TRUCIRCLE™ GRADE AVAILABILITY Certified circular/Bio-renewable	APPLICATION KEY FEATURES
TUBE SLEEVE/BODY						
SABIC® HDPE POLYMERS						
F4520	0.16	945		Extrusion	√	Stiffness and moisture barrier
SABIC® LLDPE POLYMERS						
PCG61	0.9	918		Extrusion	√	Pharmacopoeia
118NE	1	918		Extrusion	√	Toughness and flexibility
318NE	2.8	918		Extrusion	√	Toughness and flexibility
SABIC® LDPE POLYMERS						
2100N0	0.33	921		Extrusion	√	Flexibility
PCG80	0.33	922		Extrusion	√	Pharmacopoeia
PCG02	1.9	921		Extrusion	√	Pharmacopoeia
2402H0	2	924		Extrusion	√	Flexibility
2404EC	3.5	924		Extrusion Coating	√	Paper based bodies
2005EC	5	920		Extrusion Coating	√	Paper based bodies
SABIC® PP POLYMERS						
620P	1.7	905	850	Extrusion	√	Improved stiffness
FLOWPACT FPC100	100	905	1600	Injection molding	√	High flow
TUBE SHOULDER						
SABIC® HDPE POLYMERS						
F4520	0.16	945		Compression moulding	√	Stiffness and moisture barrier
CC027C	0.8	953		Inj. & Compression molding		Organoleptic, Multi-modal
PCG453	4.7	953		Injection molding	√	Pharmacopoeia
CC860V	7.6	960		Inj. & Compression molding	√	Organoleptic
M1053	8	953		Injection molding	√	ESCR
PCG863	8	963		Injection molding	√	Pharmacopoeia
CC2056	20	956		Injection molding	√	Organoleptic
SABIC® LLDPE POLYMERS						
6118NSF	0.9	918		Compression molding	√	Thoughness
PCG61	0.9	918		Compression molding	√	Pharmacopoeia
M200024	20	924		Injection molding		Thoughness
M200056	50	926		Injection molding		Thoughness
SABIC® LDPE POLYMERS						
2100N0	0.33	921		Compression molding	√	Flexibility
PCG80	0.33	922		Compression molding	√	Pharmacopoeia
PCG02	1.9	921		Inj. & Compression molding	√	Pharmacopoeia
2402H0	2	924		Inj. & Compression molding	√	Flexibility
SABIC® PP QRYSTAL RANDOM COPOLYMER						
QRYSTAL QR681K	2.2	905	950	Inj. & Compression molding	√	Anti-squeeze vs. PP closures

Note: All grades mentioned in this list are food contact approved. MFR PE is measured at 190°C. MFR PP is measured at 230°C.

CAPS MADE WITH SABIC® PE

SABIC MATERIAL GRADES	MFR @ 2.16 kg (g/10 min)	DENSITY (kg/m3)	E-MODULUS Tensile (Mpa)	TRUCIRCLE™ GRADE AVAILABILITY Certified circular/Bio-renewable		APPLICATION KEY FEATURES
SABIC® HDPE POLYMERS						
M40060S	4	953				General purpose caps
CC458	4	958				General purpose caps, overcaps – high ESCR
M80064 / M80064S	8	964				General purpose caps, overcaps
M1053	10	953			√	General purpose caps, overcaps, hinged caps
CC20056 / M200056	20	956				Cosmetic overcaps
CC3054 / M300054	30	954				Cosmetic overcaps
SABIC® HDPE PCG HEALTHCARE GRADES						
PCG453	5	953			√	High impact healthcare caps & closures
PCG63	8	963			√	High stiffness healthcare caps & closures
PCG3054	30	954			√	High flow, high gloss healthcare caps & closures

CAPS MADE WITH SABIC® PP

SABIC MATERIAL GRADES	MFR @ 2.16 kg (g/10 min)	IZOD kJ/m² (+23°C)	E-MODULUS	TRUCIRCLE™ GRADE AVAILABILITY Certified circular/Bio-renewable		APPLICATION KEY FEATURES
SABIC® PP HOMOPOLYMERS						
520P	10.5	3	1700			Overcaps
576P / 576S	19	3	1800	√		General purpose (hinged caps)
5707N	24	3	1700			High Stiffness Caps
578L	25	3	1700		√	Hinged caps (low opening force & scratch resistance)
SABIC® PP RANDOM COPOLYMERS						
QRYSTAL QR672K	11	6	1050		√	Flip top caps, cosmetic caps, transparent overcaps
QRYSTAL QR673K	25	5	1050		√	Flip top caps, cosmetic caps, transparent overcaps
QRYSTAL QR674K	40	4	1150		√	Flip top caps, cosmetic caps, transparent overcaps
RA12MN40	40	4	1000		√	Flip top caps, cosmetic caps, transparent overcaps
SABIC® PP IMPACT COPOLYMERS						
56M10	6.2	7.5	1550		√	General purpose (hinged caps)
FLOWPACT FPC45	45	7	1700			Hinged caps
FLOWPACT FPC70	70	6	1700			Thin wall caps
512MN10	37	8	1300			Hinged caps
412MN40	37	8	1300			Hinged caps
PHC27	14	No break	1000		√	High impact resistant caps (child resistant)
PHC31	15	11	1300		√	High impact resistant caps (child resistant)
48M10 / 48M40	15	8	1400		√	General purpose (hinged caps)
PPA20	20	5	1550		√	High gloss, scratch resistance, low stress whitening, ABS replacement
SABIC® PP PCG HEALTHCARE GRADES						
PCGH19	19	3	1800		√	Healthcare caps and closures
PCGR40	40	4	1150		√	High flow transparent caps –Lubricated

Note: All grades mentioned in this list are food contact approved. MFR PE is measured at 190°C. MFR PP is measured at 230°C.

APPLICATION EXAMPLES

N°1 DE CHANEL
SAMPLE TUBE

CHANEL
CERTIFIED CIRCULAR SABIC® PE POLYMERS

The tube is made with certified circular polymers from SABIC's TRUCIRCLE™ portfolio. SABIC's certified circular polymers are produced via the advanced recycling of mixed and used post-consumer plastics. Through a process called pyrolysis, difficult-to-recycle used plastic is broken down into its molecular building blocks to produce pyrolysis oil. This is then used by SABIC as feedstock to create certified circular polymers which have the same properties as virgin material. The collaboration demonstrates the high added value of the recycled content in cosmetic packaging via advanced recycling solutions.

ORIGINS CLEAR IMPROVEMENT™
ACTIVE CHARCOAL MASK PACKAGING

THE ESTÉE LAUDER COMPANIES AND ALBÉA

CERTIFIED CIRCULAR SABIC® PP & PE POLYMERS

Origins is using tubes made from certified circular polyolefins manufactured by SABIC as a result of a revolutionary recycling process. The cap of the new packaging is made from certified circular Polypropylene (PP), while the tube structure is made from certified circular Polyethylene (PE). SABIC's advanced recycling technology regenerates hard-to recycle plastics, which would otherwise be destined for incineration or landfill. It breaks them down to its molecular building blocks to produce pyrolysis oil, which is then used as a feedstock to recreate high performance plastics akin to a virgin material – in this case, polyethylene and polypropylene. The use of this innovative technology and true collaboration between Origins, ELC, SABIC and ALBÉA (packaging manufacturer), are pushing the pace of development needed across the value chain to drive a circular plastic economy.

PERSONAL CARE, HOMECARE AND OTHER FOOD AND NON-FOOD PRODUCTS

SABIC
SABIC® PP QRYSTAL QR672K POLYMER

SABIC® PP QRYSTAL QR672K is the newest random copolymer material, created by using SABIC's technology expertise and the best of manufacturing processes, for transparent injection molded applications that provide improved mechanical performance without compromising on transparency and gloss.

This product offers very high clarity and high glossiness for caps & closures that are typically used for hinged caps or transparent over-caps that might be subject to both low and elevated temperatures during use by consumers or handling before use (e-commerce).

TOOTHPASTE CAP

HALEON AND SIBO
CERTIFIED CIRCULAR SABIC® PP POLYMER

A range of toothpaste caps from Sensodyne Pronamel owned by Haleon, are produced by advanced recycling of used mix post consumer plastics.

Collaboration between SABIC and Haleon resulted in a cap made from recycled plastic. This cap is created using certified circular SABIC® PP polymers from SABIC's TRUCIRCLE ™ portfolio and comes from recycled plastics from post consumer waste that would otherwise typically, be destined for incineration or landfill. SABIC's drop in solution polymers are then used by Sibo to produce the cap.

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