

**KOPEL®**

Thermoplastic Polyester  
Elastomer





## KOLON ENP at a glance

KOLON ENP is dedicated to making the world a better place by drawing on the DNA of KOLON Group, 'LifeStyle Innovator.' As a leading engineering plastics manufacturing company in Korea, it has developed a diverse product portfolio, which includes POM, PA, PBT, TPEE, and supplies these products to over 90 countries worldwide.

KOLON ENP is committed to providing unique value to its customers, through continuous research and development and by improving the competitiveness of its products.

KOLON ENP has gained market recognition and the trust of its customers. In the future, We will continue to grow as a company that garners attention in the market and earns the trust of its customers by providing even greater value to them.



**ESTABLISHMENT**  
March 15, 1996



**HEAD OFFICE**  
Korea



**SALES**  
350 mil. USD (2023)



**PRODUCTS**  
8 Brands, 400 Grades

# KOPEL®

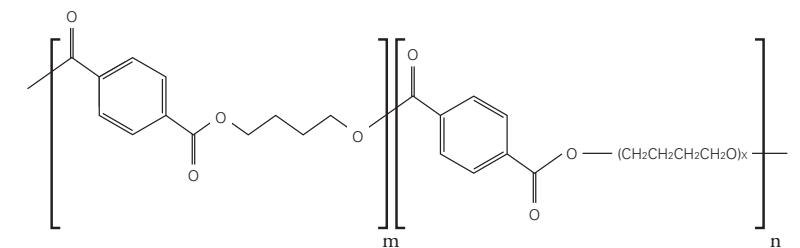
Thermoplastic Polyester Elastomer

## KOPEL® (TPC-ET)

KOPEL® is the first national TPEE produced by KOLON ENP.

Thermoplastic Polyester elastomer, which is a TPE based engineering plastic, has rubber-like properties with greater properties, thermal stability, chemical resistance and UV stability.

KOPEL® consists of hard segmented and soft segmented block copolymer. Hard segment is crystalline polymer Polybutylene terephthalate (PBT), and soft segment is amorphous polyether. Due to these structures, KOPEL® has the same properties and stability of engineering plastic, along with rubber-like flexibility.



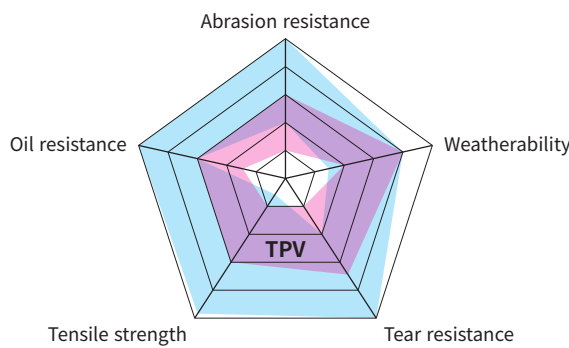
[ KOPEL® Molecular Formula ]

CHARACTERISTIC OF KOPEL®

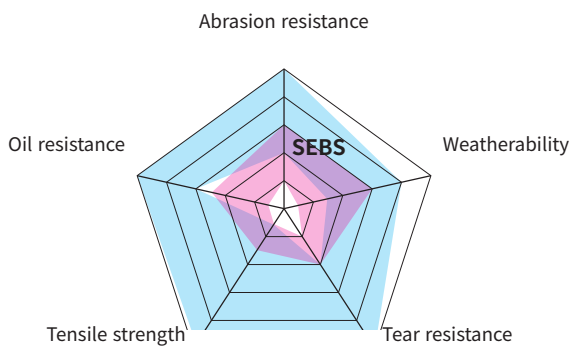
KOPEL® has the following strengths.

- Machinability and reusability
- Low-temperature flexibility
- High heat stability
- Chemical resistance
- Fatigue resistance
- Wear resistance
- Unpoisonous

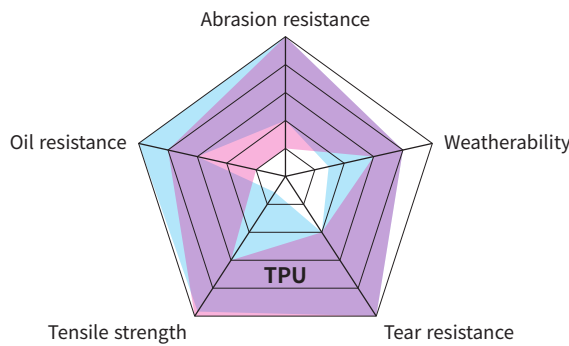
TPEE vs TPV



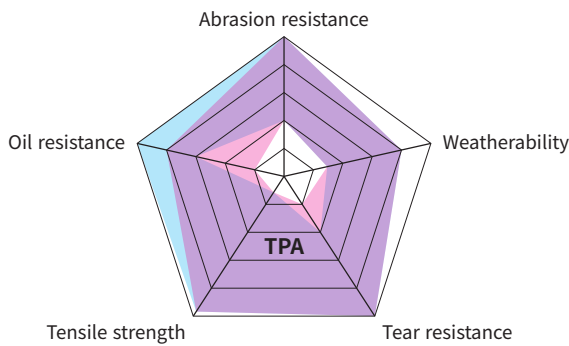
TPEE vs SEBS



TPEE vs TPU



TPEE vs TPA



[ Comparing general & engineering properties of TPE and TPEE ]

APPLICATIONS

CVJ BOOTS

KP3942BM

- ▶ Long-term durability
- ▶ Heat resistance
- ▶ Excellent repeat fatigue resistance



SIDE AIRBAG GUIDE

KP3855FB, KP3855FBBL

- ▶ Long-term durability



AIRBAG COVER

KP3855FB, KP3855FBBL

- ▶ Long-term durability



CABLES

KP3363, KP3768EX, KP3372

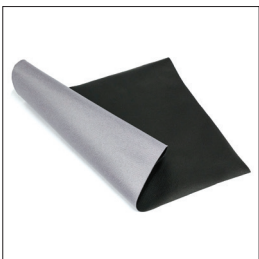
- ▶ Excellent repetitive fatigue characteristic



ARTIFICIAL LEATHER

KP3226, KP3328

- ▶ Wear resistance
- ▶ Fatigue resistance
- ▶ Great emotional touch



RAILROAD PAD

KP3345RPBL

- ▶ High Strength to Fatigue
- ▶ Durability



BED SPRING

KP3340HR, KP3363HR

- ▶ High Resilience
- ▶ Durability



DOOR LATCH CATCHER

KP3355, KP3363

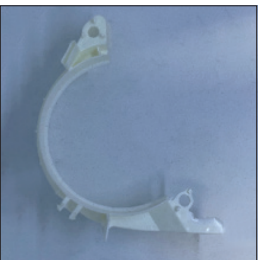
- ▶ Wear Resistance



TRANSMISSION BAFFLE

KP3769HR

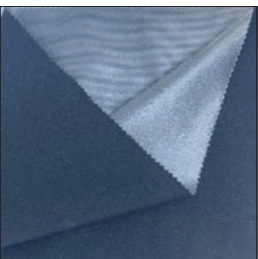
- ▶ Oil Resistance
- ▶ High Durability



WATERPROOF & BREATHABLE FILM

KP3346MP

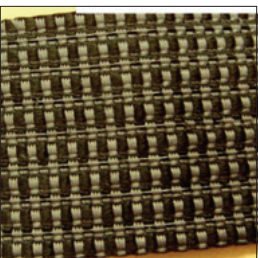
- ▶ Moisture breathing & Waterproof
- ▶ Weather Resistance



MONOFILAMENT

KP3355MF, KP3363

- ▶ High Resilience
- ▶ Wear Resistance





OVERVIEW

PRODUCT PORTFOLIO

LOW HARDNESS

GRADE NAME	APPLICATION
KP3226	Artificial Leather
KP3328	Artificial Leather
	Air Ventilation for Backpack
	Golf Ball(Core)
KP3339UM	House Roofing Membrane
	Elastic Fabric / Non-Woven
	Conveyor Belt with Various Profile
	Brush / Broom
	Cable Inner Liner(Charge/Data)
	Air Ventilation for Backpack
	Damper Coupling
	Golf Ball(Skin)
	Rail Road Pad (Um)
KP3339UMHR	Conveyor Belt with Various Profile
	House Roofing Membrane
	Elastic Fabric / Non-Woven
	Brush / Broom
	Cable Inner Liner(Charge/Data)
	Air Ventilation for Backpack
	Damper Coupling
	Golf Ball(Skin)
	Rail Road Pad (Um)
KP3339UMFC	Toy
	Toilet parts

MIDDLE HARDNESS

GRADE NAME	APPLICATION
KP3340	Conveyor Belt with Various Profile
	Low Noise Gear
	Rail Road Pad (General)
KP3340RA	Monofilament, Foaming, Conveyor belt
KP3340HR	Conveyor Belt with Various Profile
	Bed Spring / Support Equipment
	Elastic Fabric / Non-Woven
	Brush / Broom
	Damper Coupling
	Golf Ball(Core)
KP3942BM	Blow Molding Components
KP3355	Automatic Gear Lever Slider
	Conveyor Belt with Various Profile
	Roller for Semi Conduct or Process Line
	Brush / Broom
	Door Latch Catch
	Low Noise Gear
	Grommet / Plug
KP3355HR	Conveyor Belt with Various Profile
	Roller for Semi Conduct or Process Line
	Bed Spring / Support Equipment
	Elastic Fabric / Non-Woven
	Draft Gear
	Coolant Hose for Airconditioner
	Mesh Chair / Slim Seat (General)
	Golf Ball (Skin)
	Car Sheet Monofilament (General)
KP3355HS	Coolant Hose for Air-Conditioner
KP3355MF (UV-stabilized)	Car Sheet Monofilament
	Mesh Chair / Slim Seat
KP3355UM	Grommet / Plug
KP3355W (UV-stabilized)	Automatic Gear Lever Slider
	Car Sheet Monofilament
	Mesh Chair / Slim Seat
KP3855FB	Airbag Cover
KP3855FBBL	Airbag Cover
KP3956BM	Blow Molding Components
KP3359UM	Grommet / Plug
KP3345RPBL	Rail Road Pad

HIGH HARDNESS

GRADE NAME	APPLICATION
KP3363	Automatic Gear Lever Slider
	Conveyor Belt With Various Profile
	Ski/Snowboard Equipment
	Draft Gear
	Brush / Broom
	Door Latch Catch
	Parts For Cosmetic Container
	Low Noise Gear
	Cable Inner Liner(Charge/Data)
	Grommet / Plug
KP3363HR	Snow Chain Parts
	Cable/Tubing for Robot System
	Rail Roda Pad (General)
	Conveyor Belt with Various Profile
	Bed Spring / Support Equipment
	Elastic Fabric / Non-Woven
	Draft Gear
KP3372	Snow Chain Parts
	Cable/Tubing for Robot System
KP3768	Toothbrush
KP3768EX	Cable Inner Liner(Charge/Data)
	Flexible Optical Fiber (General)
KP3372	Ski/Snowboard Equipment
	Parts for Cosmetic Container
	Low Noise Gear
	Cable Inner Liner(Charge/Data)
KP3769HR	Toothbrush
	Transmission Baffle





NOMENCLATURE

The name of KOPEL® commercial products generally follows the scheme below:

RESIN			PROCESS	HARDNESS		COLOR/ CHARACTERISTICS	
K	P	3	4	4	0	H	R

RESIN	
KP3	
PROCESS	
2	Alloy
3	Injection
6	Flame retardant
7	Extrusion
8	Airbag cover
9	Blow molding
HARDNESS	
(Shore D)	

COLOR/CHARACTERISTIC	
BL	Black
GR	Gray
GN	Green
HR	High resilience
HS	Heat stabilized
UM	Upper molecular weight
FB, PB, LV	Airbag cover
BM	Blow molding
MF	Monofilament
EX	Extrusion
RA	Low melting point
MP	Moisture permeable
W	Weather resistant



THE PROPERTIES OF KOPEL®

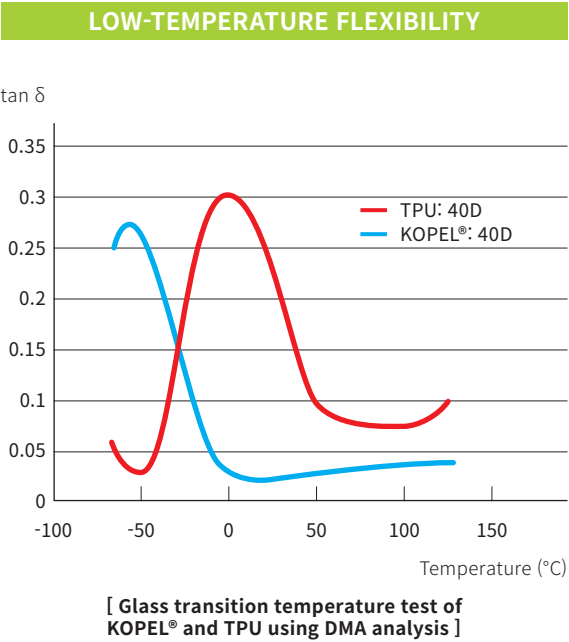
KOPEL® FOR AIRBAG COVER

Air Bag Module cover made of KOPEL® boasts superior deployment stability and sensitivity quality.

Due to the vehicle crash caused by a collision, it does not cause any debris that may endanger the safety of the occupants, protecting the customer's safety from a wide range of temperatures range from 40°C to 120°C.

And we achieved the top durability among product lines that withstand persisting period of the car. In addition, KOPEL® for airbag cover features the aesthetic surface quality, providing the highest sensitivity quality for passengers to drive in comfort.

As shown in the right figure, the KOPEL® glass transition temperature is shown to be at -50°C where TPU shows 0°C. These low glass transition temperatures maintain high resiliency at low temperatures, allowing applications to such as ski boots.



KOPEL® FOR BLOW MOLDING

KOPEL® blow molded products are used in applications such as CVJ boots or bellows, which are used under harsh environments due to their high melt viscosity and excellent durability.

Superior bending resistance and hinge fatigue properties show excellent material retention even when the blow molded moldings are deformed by torsion.

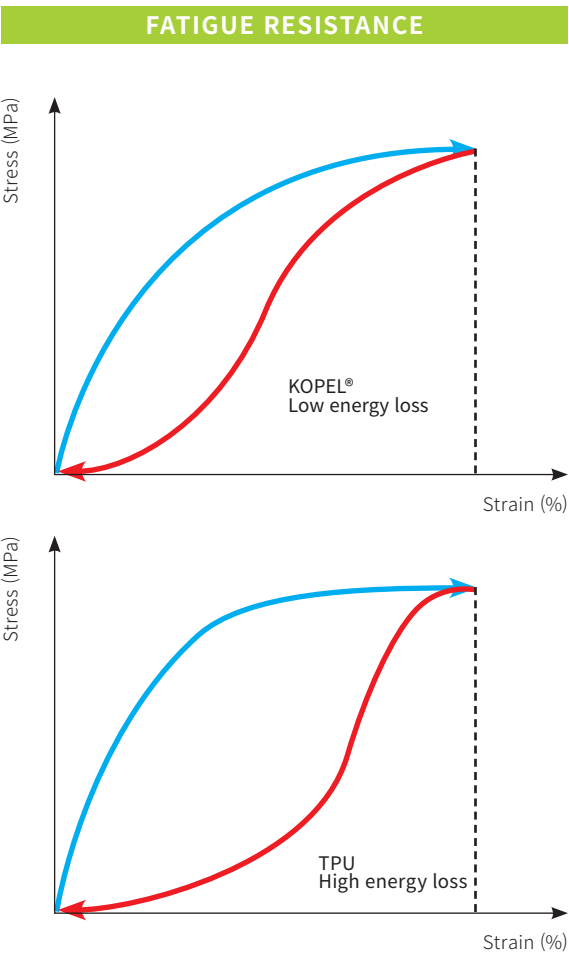
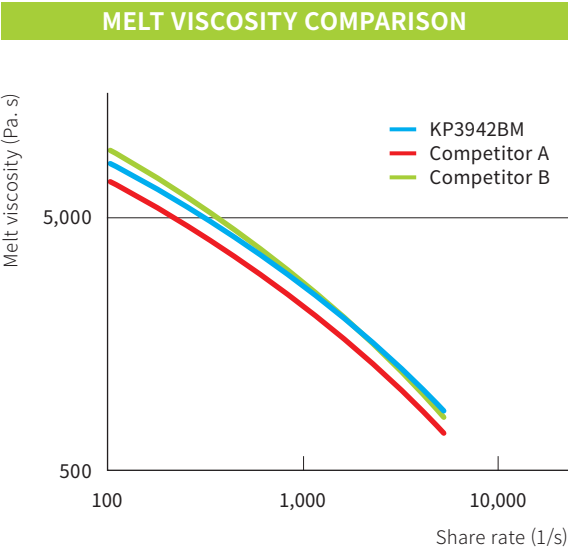
It is also excellent in heat resistance and chemical resistance, so it can be used even when used with various types of grease and oils.

KOPEL® FOR DAMPING APPLICATION

Vibration absorbing, fatigue resistance and impact resistance are key properties for damping applications.

As shown in the right figure, the energy loss factor was measured by hysteresis analysis. Compared with TPU, KOPEL® shows lower energy loss.

Low energy loss can be an advantage for applications such as shoe soles, rail pad and draft gear.



[ Fatigue resistance Comparison Data (KOPEL® vs. TPU) ]



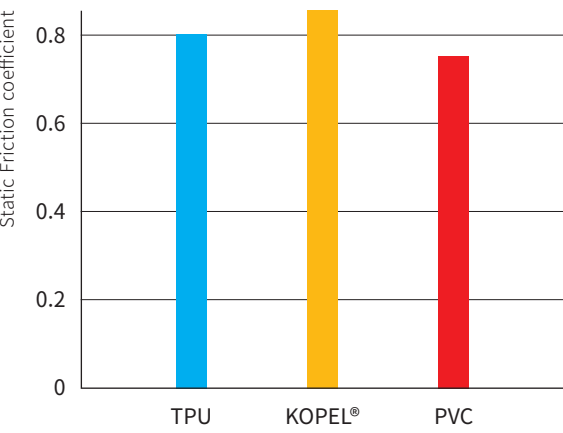
THE PROPERTIES OF KOPEL®

KOPEL® FOR  
AUTOMATIC GEAR LEVER SLIDER

Gear lever slider which is always held while driving, made of KOPEL® enhances handling which helps better pleasant driving.

Automatic gear lever slider made from KOPEL® makes it possible to maintain consistent, continuous gear operation with wear resistant and durability.

FRICITION COEFFICIENT COMPARED WITH TPE



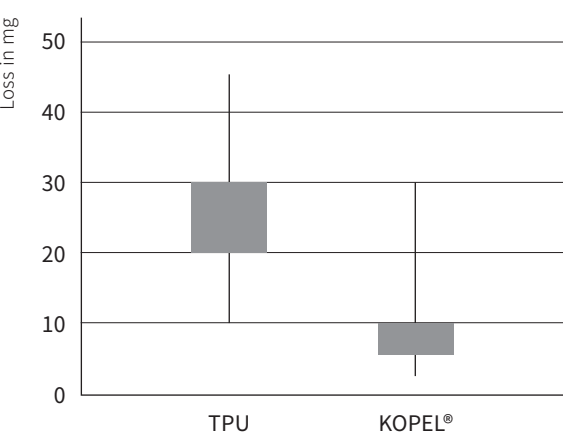
TYPE OF KOPEL®	KOPEL® on SUS ASTM D1894	
	STATIC	DYNAMIC
KP3339UM	0.86	0.769
KP3340HR	0.648	0.61
KP3340	0.486	0.442
KP3355	0.374	0.292
KP3363	0.461	0.258
KP3372	0.369	0.185

[ KOPEL® Test Result ]

The KOPEL® material is extremely resistant to abrasion and has an abrasion resistance greater than twice the durability of TPU.

※ Condition: ASTM D1004, @1000rev, CS-17  
- TPU: 10~50mg  
- KOPEL®: 3~20mg

WEAR RESISTANCE COMPARED WITH TPU



KOPEL® FOR LIVING & LEISURE

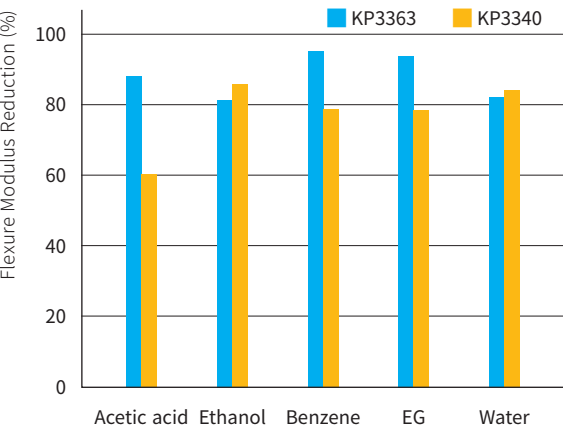
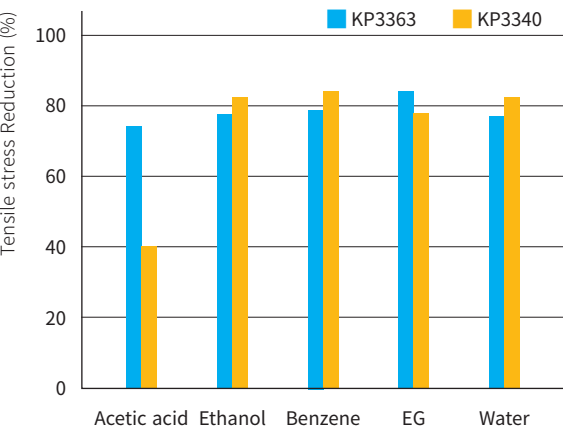
KOPEL® is applied to various life products.

It has excellent overmolding, eco-friendliness and soft feeling quality, so it offers differentiated value from other materials.

It also contributes to the enjoyment of skiing and snowboarding more safely and comfortably.

Excellent mechanical properties and low temperature stability are applied to ski straps for ski/snowboards and high backs for snowboards, enabling skiers and skiers to enjoy snowy conditions with confidence.

CHEMICAL RESISTANCE TEST  
UNDER VARIOUS SOLVENTS



KOPEL® material owns excellent adhesive characteristic with PC, PVC, ABS, PS and other polyester based products.

This characteristic is due to hard segment PBT. Because of this it is possible to apply to different materials such as grips and other applied areas.

As shown in the right figure, it shows excellent adhesive intensity on PBT, PC like ester group high molecules. And also certain levels of adhesive intensity on PA, PP like high molecules.

Sample		Material B			
		PA	PBT	PP	PC
Material A	KP3328 (28D)	0.53	3.24	1.64	6.3
	KP3355 (55D)	0.29	10.51	0.33	19.52

[ KOPEL® Test Result ]



**Note:** KOLON ENP has prepared this report based on the data obtained up to the time of writing. The figures in all tables are representative values, not quality assurance values. The figures in the table can not be used as basic data for semi-finished products and finished product designs. As product quality improves, figures in the table may change without notice.

KOPEL® is an engineering elastomer, which has similar performance to rubber, while the processing conditions for product molding are similar to those of ordinary crystalline thermoplastic resins, making it easy to process with the usual injection molding aids used for molding crystalline resins.

CONDITIONS OF INJECTION MOLDING

INJECTION MOLDING PARAMETERS		KP3328	KP3340	KP3355	KP3363	KP3372
Shore D		28	40	55	63	72
Recommended Moisture Contents (%)		≤ 0.04				
Melting Temperature (°C)		180 ± 5	180 ± 5	200 ± 5	210 ± 5	220 ± 5
Cylinder Temperature (°C)	Nozzle	185 ~ 200	185 ~ 200	210 ~ 220	220 ~ 235	230 ~ 240
	Front	180 ~ 200	180 ~ 200	210 ~ 220	220 ~ 235	225 ~ 240
	Middle	170 ~ 190	170 ~ 190	200 ~ 220	220 ~ 230	225 ~ 235
	Rear	160 ~ 170	160 ~ 170	180 ~ 190	200 ~ 210	200 ~ 210
Mold Temperature (°C)		20 ~ 40				
Holding Pressure (%)		35%~65% of maximum injection pressure				
Cushion (mm)		5 ~ 10				



For more detailed information regarding injection molding conditions, please contact the technical support representative at KOLON ENP.

PRECAUTIONS IN MOLDING PROCESS

- 1-1 Injection speed can vary greatly depending on the form of the product, but KOPEL® has a relatively high rubber property even in the molten state compared to the polycrystalline resin. When the injection speed is set high, the melt absorbs the injection pressure It is advantageous to set it lower than other resins because the state of the melt is excited and can act as a disadvantage to the product design and condition setting. In addition, in case of thin product, the cooling rate in CAVITY The injection speed should be relatively fast. In case of a thick product, if the injection speed is fast, surface defects such as flow marks and jetting may cause the product to be a critical defect.
- 1-2 When using a screen filter for mixing or other purposes in a barrel during extrusion, 60 or 120 mesh is suitable.
- 1-3 In order to prevent deterioration during processing of KOPEL®, moisture content should be kept below 0.1wt%.  
Usually, after about 2 hours from the opening of the bag, the moisture content becomes more than 0.1wt% After drying for 2~4 hours at 110°C, you can get good quality products.
- 1-4 KOPEL® has a very low melting point compared to other thermoplastic resins, which can cause defects on the product surface when mixed with other resins. In order to prevent this, we need clean management of the expectation, pre-work FEEDER and BARREL, and occasionally screen washing. Also, using SCREEN FILTER between DIE and BARREL is effective for eliminating unmelted material and impurities. POLYMER MELT It is also advantageous in terms of flow uniformity. However, in this case, care must be taken to avoid excessive pressure build-up within BARREL.



## GLOBAL SALES NETWORK

### KOREA

[kenp\\_korea@kolon.com](mailto:kenp_korea@kolon.com)

### EUROPE

[kenp\\_europe@kolon.com](mailto:kenp_europe@kolon.com)

### CHINA

[kenp\\_china@kolon.com](mailto:kenp_china@kolon.com)

### INDIA

[kenp\\_india@kolon.com](mailto:kenp_india@kolon.com)

### AMERICAS

[kenp\\_usa@kolon.com](mailto:kenp_usa@kolon.com)