

Automotive Connector

Non Toxic
High Efficiency

EARTH



FRIENDLY

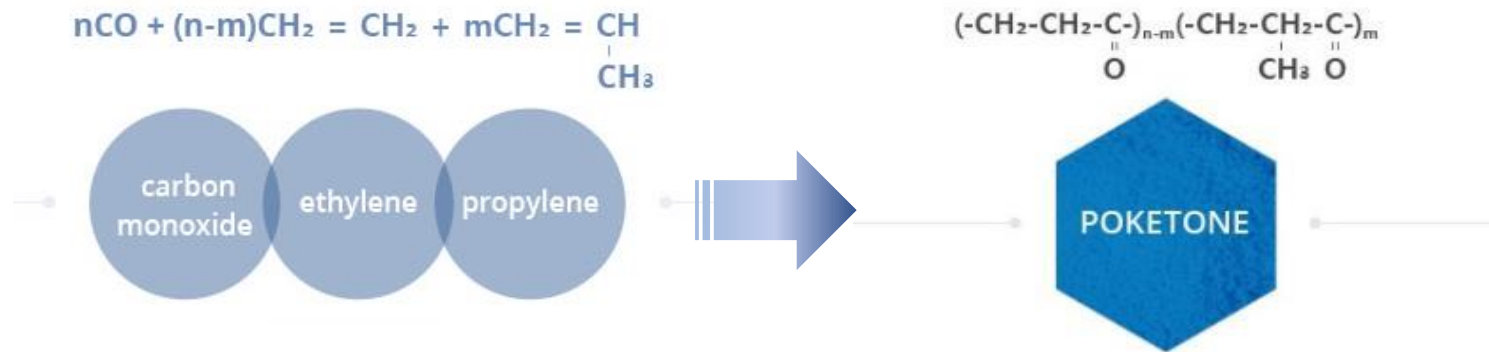
Acrylate Free
Melamine Free
Bisphenol A Free
Formaldehyde Free
Lead/ Chrome/ Free
Phthalate Free

Global Warming Potential

* PA6	6.70	
* PA66	6.40	
* PC	3.40	
* POM	3.20	
* ABS	3.10	
** PK	3.08	(kg CO ₂ eq)

* Other ETP data is based upon the Eco-profiles data from www.plasticseurope.org

** PK Data is based upon Korea LCI database and Ecoinvent database.



- ❑ Excellent Chemical Resistance for Fuel parts vs PA6, PA66, PBT
- ❑ Better NVH(Noise, Vibration, Harshness) Performance vs PA6, PA66, PBT
- ❑ Low VOCs, Low Odor for Interior Parts vs ABS, POM
- ❑ Better Scratch/Wear resistance for Interior Parts vs ABS, POM
- ❑ Better Dimensional Stability at various Environmental Conditions vs PA6, PA66, POM
- ❑ Excellent impact performance vs PA6, PA66, PBT, POM
- ❑ Superior Hydrocarbon Barrier for Fuel Tube vs PA12

✓ *Development Background*

- In the cold weather environment, connector parts were broken in process of handling and delivery
- Needed a new material for connectors which has better impact strength at low temperature

✓ *PK Characteristics*

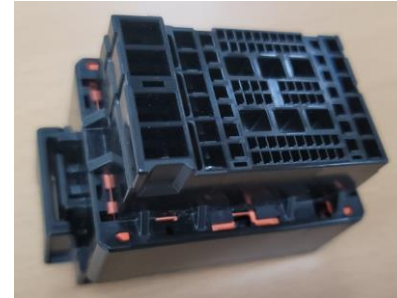
- Better impact strength at -30°C to solve breakage of connector at low temperature
- Higher MFI gives better Thin-wall processability
 - PK can be a solution for thin-wall and small size connector development for Electric Vehicle
- Light weight compare to PBT with less specific gravity (1.24 vs 1.31)

✓ *Current Status*

- Approved by Hyundai and Kia motors for Non-waterproof type (Commercialized)
- Applied for BYD Connectors for Electric Vehicle
- Material Improvement (140°C, Long-term heat stability) is in process for waterproof type connector

Project Information

- Application : Connector
- Current material : PBT
- Product : PK compound
- Customer : Hyundai motors
- Part weight : 0.1kg



Customer Requirements

- Excellent flowability
- Impact Resistance
- Dimensional stability
- Electrical properties
- Meet Insertion/Extraction force,
Terminal holding force

Value In Use

- Better impact resistance at low temperature (-30°C)
- Better processability for thin wall
- Weight Reduction: "6%" lighter than PBT
- Less deformation by heat
- Shorter cycle time

1. Mechanical property : Better impact resistance at low temperature (-30°C)

Item		Unit	Method	PK	PBT
Charpy Notched Impact strength	23°C	KJ/m ²	ISO 179/1eA	18.5	3.0
	-30°C			4.5	0

* Drop Impact Test (-30°C)



<PK>



<PBT type 1>



<PBT Type 2>

2. Flowability : Better processability for thin wall

Item	unit	Method	PK (240°C, 2.16kg)	PBT (250°C, 2.16kg)
Melt Flow Index	g/10min	ASTM D1238	60	28

* Spiral flow



<PK>

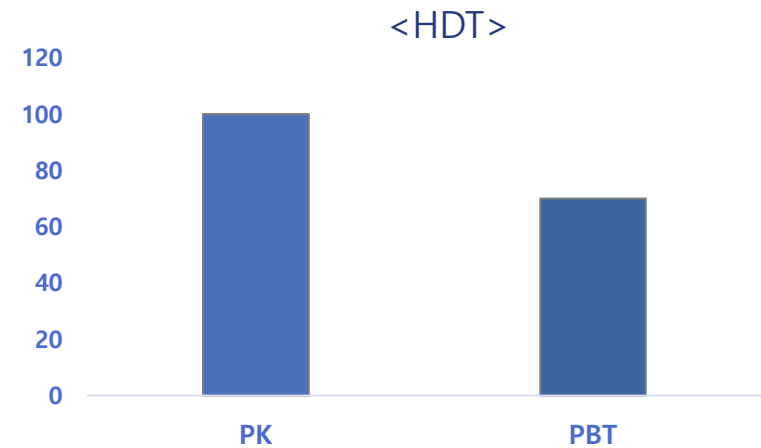
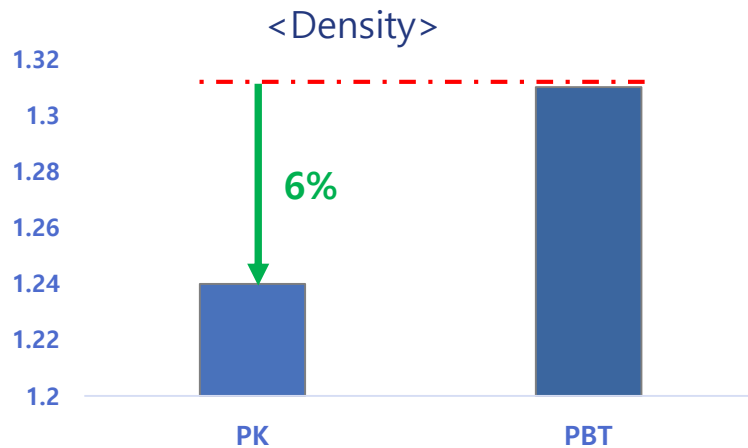


<PBT>

3. Weight reduction : "6%" lighter than PBT

4. Good Thermal property : Less deformation by heat

Item	unit	Method	PK	PBT
Density	g/cm ³	ASTM D792	1.24	1.31
Heat Deflection Temperature (1.82MPa)	°C	ASTM D648	100	70



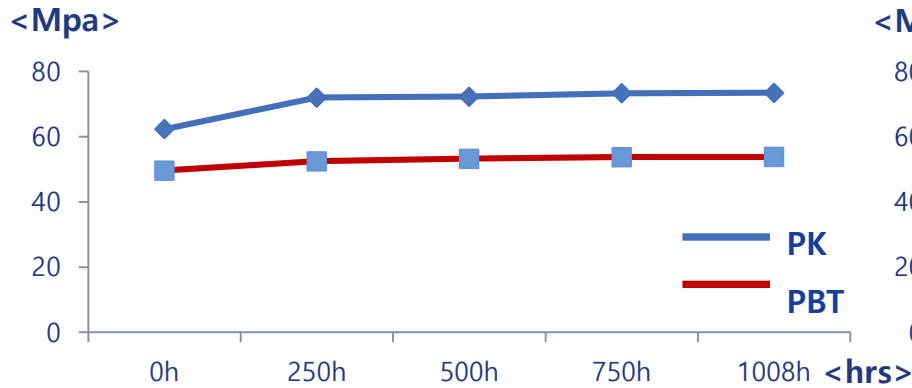
5. Physical and Electrical Property

Item	Unit	Method	PK	PBT
Density	g/cm ³	ASTM D792	1.24	1.31
Charpy Notched Impact strength	23°C	ISO 179/1eA	~10	4~8
	-30°C			
Heat Deflection Temperature (1.82MPa)	°C	ASTM D648	100	70
Process temperature	°C	-	230~240	245~260
Melt Flow Index	g/10min	ASTM D1238	MI 60	MI 15~57

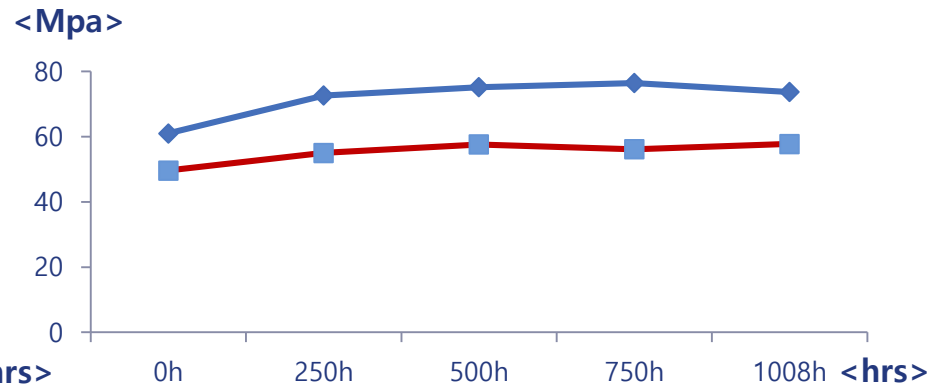
Item	Unit	Method	PK	PBT
Dielectric strength	kV/mm	IEC 60243-1:2013-03	16	18.9
Volume Resistance	Ω·cm	ASTM D 257:2007	1.27×10 ¹⁶	1.28×10 ¹⁷
Surface Resistance	Ω/sq	ASTM D 257:2007	1.8×10 ¹⁷	1.8×10 ¹⁷
Arc-Resistance	s	ASTM D 495:1999	202	130
Comparative Tracking Index	V	IEC 60112:2009-10	600	575
Glow-wire flammability test (GWFI)	°C	IEC 60695-2-12:2014-02	675	775
Glow Wire Ignitability Temperature (GWIT)	°C	IEC 60695-2-12:2014-02	700	700

6. Heat Aging Test

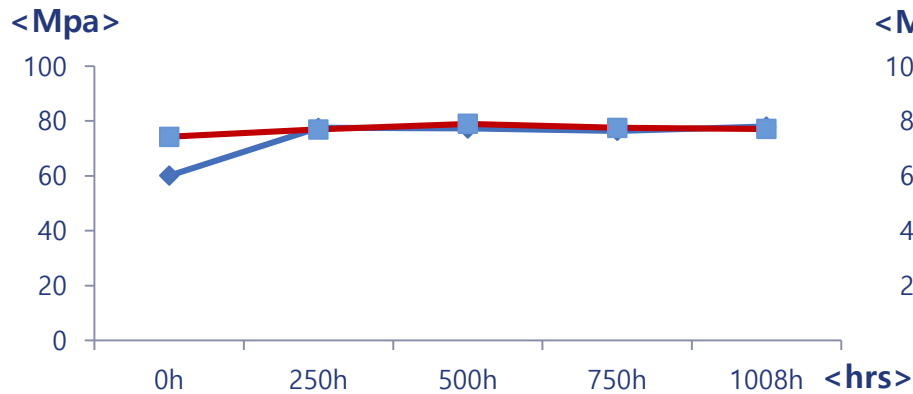
Tensile strength(80°C)



Tensile strength(120°C)



Flexible strength(80°C)



Flexible strength(120°C)

