POKETONE™
HYOSUNG POLYKETONE

POKETONE™

Filament Performance in Brushes

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.

Non Toxic High Efficiency

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

HYOSUNG CHEMICAL

POKETONE™
The new choice for brush filaments

POKETONE Polymers are a new class of engineering plastics- semi-crystalline aliphatic polyketones(PK). The resulting molecular chains are linear, perfectly alternating carbon monoxide and alpha olefin structures that possess a unique balance of strength, chemical resistance an barrier properties, making POKETONE Polymers well-suited for a broad range of applications. POKETONE filament offers excellent wet performance and good recovery performance. It also offers excellent chemical and abrasion resistance.

Its low moisture absorption makes it an excellent filament for wet applications. Typical applications include toothbrush, paintbrush, cosmetic, hairbrush, and industrial applications.

A UNIQUE BALANCE OF PERFORMANCE PROPERTIES

- Chemical resistance
- Abrasion resistance
- Bend recovery
- Balance of strength and toughness
- Dimensional stability

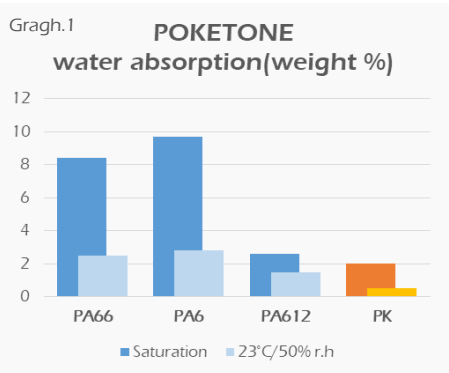
Table 1. POKETONE Polymer Properties

Property	Test method	Unit	M410F	M330A
Density	D792	g/cm^3	1.22	1.24
Melting Temp.	D3418	°C	197	222
HDT (0.45 Mpa)	D648	°C	190	200
Tensile strength	D638	Mpa	45	60
Elongation at break	D638	%	>200	>300
Flexural Strength	D790	MPa	45	57
Flexural Modulus	D790	MPa	1,000	1,500
Impact Strength	D256	J/m	100	95

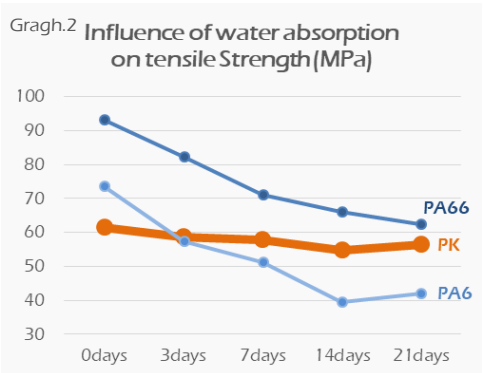
Water resistance & hydrolytic stability

Moisture absorption of polymers has always been an extremely important issue due to the repercussions that this phenomenon has on properties of these materials. All Polyamides tend to absorb moisture due to the amide chemical group.
Moisture acts as a plasticizer on Polyamides thus reducing mechanical properties like tensile modulus and its performance. POKETONE Polymers' low moisture absorption and stability makes it better choice than PA.

Gragh.1



Gragh.2



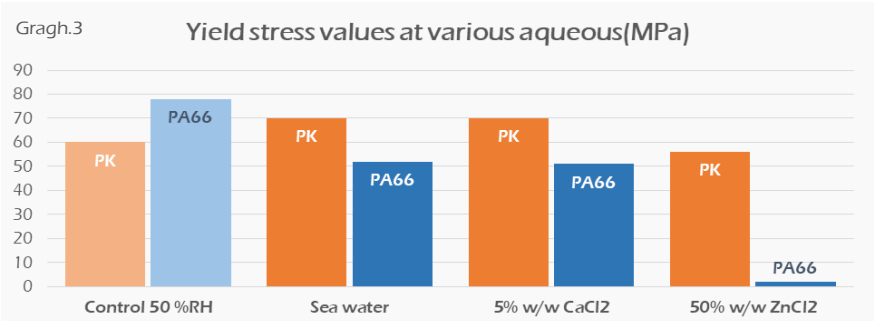
Chemical resistance

Due to their di-polar nature and semi-crystalline morphology, POKETONE Polymers resist dissolution in, and severe plasticization by, many common chemical environments and are therefore well suited for use in a broad range of applications. As no engineering thermoplastic is totally insusceptible to all solvent environments, designers should always satisfy themselves that POKETONE Polymers are suitable for a particular application.
POKETONE Polymers are particularly insensitive to plasticization in most aqueous environments.

In Gragh 3, the tensile yield stress values for POKETONE Polymer are shown after being exposed to various aqueous solutions at 80°C for 25 days. For the purposes of comparison, data for polyamide are also included in the table.

After exposure to aqueous environments, the yield stress of POKETONE Polymer is approximately 80 percent greater than that of polyamide 66 under similar conditions. POKETONE Polymer exhibits superior resistance to plasticization in aqueous environments.

Gragh.3



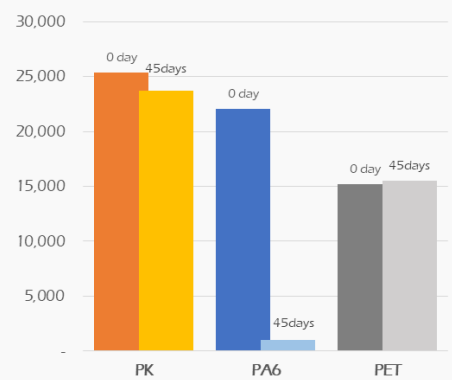
Abrasion resistance at wet condition

POKETONE polymers exhibit exceptionally high abrasion resistance with minimal wear and tear and very good tribological properties.
The combination of mechanical performance, chemical and hydrolytic stability, toughness and long-term durability enable POKETONE Polymers to out-perform other thermoplastics in a broad range of industrial applications.

The chemical and hydrolytic stability of POKETONE Polymers enables them to continue to perform their function in many hostile environments. Gragh 4 shows the relative abrasion resistance of POKETONE filament with PA6 and PET at 45°C in water

Test Method:
Running the filament on the rotating ceramic drum to the point of failure. This procedure avrades the filament until the contact area get worn to the point of failure. Ceramic/ 200rpm/ 200g

Gragh.4 Relative Abrasion Resistance
(no. of Rotation at Failure at 45°C for 45 days)

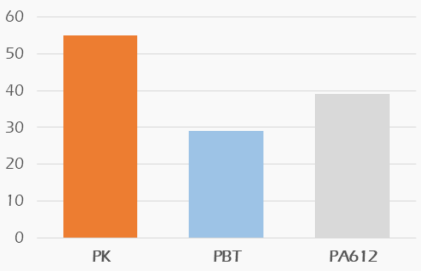


Bend recovery and Durability

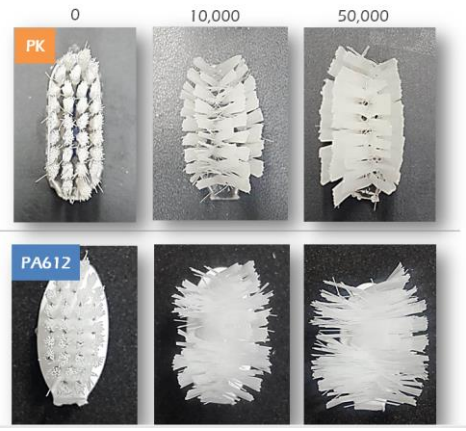
A desirable property in brush applications is good bend recovery. Bend recovery of a material is partly an inherent property of that material and partly influenced by the manufacturing process. High bend recovery is an outstanding property of POKETONE filaments.
Pic5 shows free recovery angle of single filament after folding the filament. Figure 1 shows durability of POKETONE tooth brushs at water under brushing cycle emvironment.

Test Method: Measure free recovery angle of single filament after folding

Gragh.5 Bend Recovery %

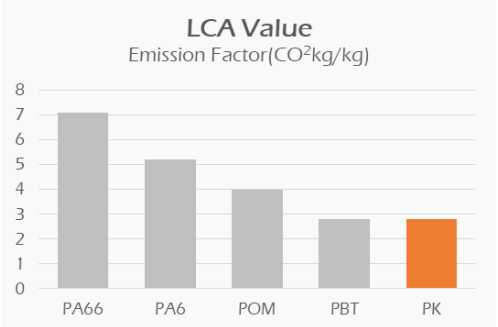


No. of Brushing cycle ▷ Figure.1



Environmental footprint

To improve POKETONE polymers' environmental performance, we use a standardized method: Life-Cycle Assessment. A Lifecycle Assessment is a complex technique used to assess the environmental impacts with all stages of a product's life. We manage the entire life of a product is analysed – from the raw materials extraction through to materials processing, manufacture, distribution, use, repair and maintenance and disposal.



+Source : LCI DB on 2015 & WECOS Simulated on 2016. PK capacity is based on 50k MT/Year

Safety & Certificate

POKETONE polymers for food contact and medical applications are thoroughly tested for toxicity and biocompatibility. For all the base grades, POKETONE polymers are filed with the FDA and used in the development of food contact and medical devices

FDA APPROVED
NSF
ATTESTATION DE CONFORMITÉ SANITAIRE ACS
RoHS COMPLIANT
European Commission Food Contact
USP Class VI
DVGW Zertifizierungsstelle
PAHS

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