Gear tooth strength

The test results of gear tooth strength of KEPITAL H100 are shown in 〈Table 2〉. The polyacetal homopolymer, KEPITAL H100, exhibits superior gear tooth strength values compared to polyacetal copolymers, with the same tendency as the general mechanical properties of polyacetal homopolymers and polyacetal copolymers.

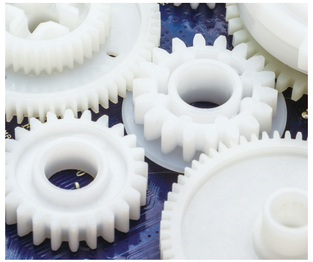

Table 2. Gear tooth strength of KEPITAL H100

Table	KEPITAL H100[1]	KEPITAL F10-02[2]
kgf·cm	131	120

1| Polyacetal homopolymer
2| Polyacetal copolymer

Standard

- Gear type : Spur gear
- Number of gear teeth : 48EA
- Pressure angle of gear : 15°
- Gear module : 0.9

Standard molding conditions

To obtain high quality molded products utilizing KEPITAL H100, we recommend the following standard injection molding processing conditions.

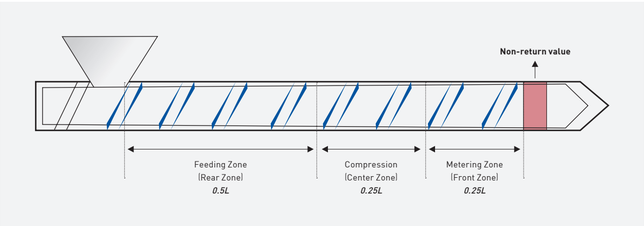

Table 3. Standard molding conditions of KEPITAL H100

Classification		KEPITAL H100	Remark
Pre-drying		80 ℃ ~ 100 ℃ (176 ℉ ~ 212 ℉), 3 h ~ 4 h	
Cylinder temperature	Feeding part	180 ℃ ~ 190 ℃ (356 ℉ ~ 374 ℉)	
	Compression part	190 ℃ ~ 200 ℃ (374 ℉ ~ 392 ℉)	
	Metering part	200 ℃ ~ 210 ℃ (392 ℉ ~ 410 ℉)	
	Nozzle part	190 ℃ ~ 220 ℃ (374 ℉ ~ 428 ℉)	
Mold temperature		60 ℃ ~ 90 ℃ (140 ℉ ~ 194 ℉)	

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General Information

Korea Engineering Plastics(KEP) has recently expanded its robust line of technical polymers with the introduction of KEPITAL H100, a new polyacetal homopolymer.

Already among the leading producers of polyacetal(POM) copolymers, KEP continues to innovate in the homopolymer category.

This innovation positions KEP as a global provider of both copolymer and homopolymer POM solutions, creating a "one-stop-shop" for customers in need of polyacetals for a variety of consumer and automotive applications.

KEP's mission is to provide solutions for a better future. This innovation is a key component of this mission.

A high viscosity, unfilled polyacetal (POM) homopolymer, KEPITAL H100 is made using state-of-the-art, patented technology.

KEPITAL H100 is setting new standards within the polyacetal family. With the development of KEPITAL H100, a highly viscous homopolymer type, we have introduced a homopolymer with enhanced features based on state of the art process technology. Its excellent processability and good mechanical properties opens up entirely new options for our customers to manufacture sophisticated technical components out of KEPITAL.

KEPITAL H100 is a highly crystalline engineering plastic with excellent mechanical properties under load. It can be used for various applications including gears, automotive door systems, bushings, housings, rollers and conveyor belts.

In particular, KEPITAL H100 is superior in mechanical strength, stiffness, creep resistance and impact resistance compared with polyacetal copolymer, allowing for thinner and lighter part design, shorter molding cycles and the potential for cost reductions.

Characteristics

- High viscosity and unfilled polyacetal homopolymer
- High mechanical strength and stiffness without the need for filler reinforcements, or modifications
- Toughness, high impact strength, and high elongation without the need for impact modifiers
- Wider processing window for excellent injection molding
- Excellent resistance to moisture, gasoline, solvents and various other neutral chemicals
- Excellent dimensional stability
- Excellent self-lubricating

General properties

The general properties of KEPITAL H100 are shown in 〈Table 1〉. The polyacetal homopolymer, KEPITAL H100, has excellent mechanical properties compared to polyacetal copolymer.

Table 1. Typical properties of KEPITAL H100

Properties	Unit	Test method	KEPITAL H100[1]	KEPITAL F10-02[2]
Physical properties				
Density	g/cm^3	ISO 1183	1.42	1.41
Melt Flow Index(MFI 190℃, 2.16kg)	g/10 min	ISO 1133	2.2	3.0
Water absorption at 23℃ to 50% relative humidity	%	ISO 62	0.2	0.2
Mechanical properties, measured under standard conditions(23 ℃, 50 % R.H.)				
Yield stress	MPa	ISO 527	70	63
Elongation at yield	%	ISO 527	20	10
Elongation at break	%	ISO 527	45	40
Tensile modulus	MPa	ISO 527	2,950	2,450
Flexural modulus	MPa	ISO 178	2,650	2,400
Rockwell hardness (M scale)	-	ISO 2039-1	87	85
Notched charpy impact strength (at 23℃)	kJ/m^2	ISO 179	11	7
Notched charpy impact strength (at -30℃)	kJ/m^2	ISO 179	8	6
Thermal properties				
Heat deflection temperature HDT/A (1.8 MPa)	℃	ISO 75	95.0	95.0
Melting point DSC, 10℃/10min	℃	ISO 3146	176	165
Coefficient of linear thermal expansion (temperature range 23 ℃ to 55 ℃)	X10^{-5}/℃	ISO 11359	9.1	12.0

1) Polyacetal homopolymer
2) Polyacetal copolymer

Stress-strain curve(S-S curve)

The tensile stress-strain curve of KEPITAL H100 is shown in 〈Figure 1〉. Maximum stress is referred to as tensile strength and strain at break is referred to as tensile elongation on the S-S curve.

The polyacetal homopolymer, KEPITAL H100, has excellent tensile properties compared to polyacetal copolymer.

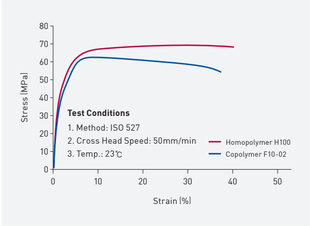

Figure 1. Tensile stress-strain curve(S-S curve) of KEPITAL H100

Thermal properties

Melting point

The melting point is a basic characteristic of distinction between polyacetal homopolymer and polyacetal copolymer. Generally, the melting point of a polyacetal homopolymer is between 175 and 177 ° C and the melting point of a polyacetal copolymer is 165 ° C.

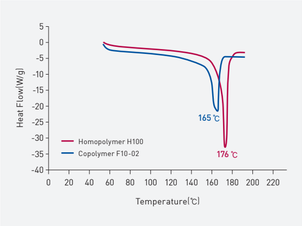

Figure 2. DSC Curve of KEPITAL H100

Heat resistance

The heat resistance of KEPITAL H100 is shown in 〈Figure 3, 4〉. KEPITAL H100 has excellent properties in terms of tensile strength and elongation compared to other polyacetal homopolymer. KEPITAL H100 also shows the consistent tensile strength and elongation at high temperature(120°C) as other polyacetal copolymer.

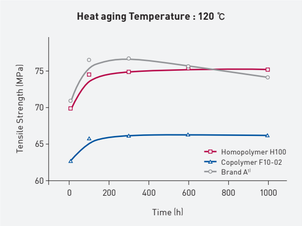

Figure 3. Tensile strength change of KEPITAL H100 at 120℃ (Test machine : UL Spec. Oven)

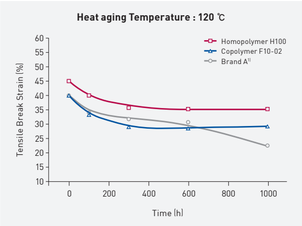

Figure 4. Tensile elongation change of KEPITAL H100 at 120℃ (Test machine : UL Spec. Oven)

> "Through continuous innovation and new value creation, KEP will be the global chemical company providing humanity with solutions for a better future."

1) Brand A is other polyacetal homopolymer made by different company.