

KUMHO POLYCHEM

INNOPRENE Technical Feature

- Low Specific Gravity
- Excellent Chemical Resistance & Heat Resistance
- Excellent Electrical Insulation
- Low Permanent Set & Compression Set
- Excellent Flex Fatigue Resistance
- Excellent Tear Strength
- Excellent Ozone-Resistance & Weather Resistance
- Recycling



INNOPRENE Classification

INNOPRENE is available in various grades from Shore A hardness 35 to Shore D hardness 50 and is available in the natural color and black color with the addition of dyes.

INNOPRENE 1 8 7 6 B				
1	8 7	6		B
Hardness Scale	Hardness(Shore A, Shore D)	Grade Type		Color Type
1=Shore A 2=Shore D	ex. 87=Shore A.87 55=Shore A.55	ex. 0=General Purpose 6=UV Stabilized	0=General purpose 1=Automotive 2=Extrusion 3=Blow molding 4=Medical 5=Resistance 6=UV Stabilized 9=Customized	N=Natural B=Black

INNOPRENE Application

- Automotive:** Tubing, Gaskets, Door seals, Dust covers, Impact plates, Interiors, Tubes, Front glass seals, Door belts, Glass-run channel, Bellows, Air intake hoses, Wipers & Spoilers, Bumper mud guards, In-panel skin, Airbag cover/blanket & holders, etc.
- Construction material:** Glass seal gaskets, Window frame seal gaskets and sealing, Water-proof sheets, Top/bottom layer of tracks and artificial grass, etc.
- Office supplies:** Vibration insulation part, Edge guards, Electronics slipping prevention pads, etc.
- Household electronics devices:** Door gasket and sealing, Hose connections parts, Sheets, Interior purpose external/internal materials, Hoses, Various electronics pads, etc.
- Industrial material:** Medical part gaskets and wheels, Power transmitter parts, Mine cables, Control cables, Coil chords, Power circuit cables, etc.
- Sports goods:** Underwater sporting goods devices, Fishing rod grips, Ski pole grips, Mountain hiking goods, etc.

INNOPRENE Technical Feature

- INNOPRENE is manufactured and supplied in pellet form for easy handling and storage.
- INNOPRENE may absorb significant amounts of moisture from the surrounding atmosphere. When exposed to a moist environment, INNOPRENE develops an uneven surface and undergoes a degrading of its overall physical properties. Therefore, be sure to dry INNOPRENE for 2-3 hours at 80-90°C, before processing.
- MSDS should be referred to when processing INNOPRENE.



The Best Value INNOPRENE

Eco-friendly Thermoplastic Elastomer created by the R&D of Kumho Polychem



KUMHO POLYCHEM www.polychem.co.kr

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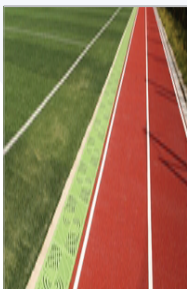
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KUMHO POLYCHEM



Thermoplastic Elastomer Of Kumho Polychem

— **INNOPRENE**



Kumho Polychem is the top manufacturer of EPDM in Korea and is significantly contributing to the stable supply of EPDM and the development of the automobile industry. We produce various products of the highest quality through continuous R&D and are standing shoulder-to-shoulder with world-class companies.

With 30 years of experience in production and R&D, we have developed and produced INNOPRENE, which has the elastic traits of thermosetting rubber and the formability of thermoplastics.

INNOPRENE can replace existing thermosetting vulcanized rubbers and PVC materials which brood environmental problems. In addition, INNOPRENE is eco-friendly and can be expected to yield carbon emissions reduction, owing to its low specific gravity and reusability.

INNOPRENE is already fully cross-linked (Thermoplastic Vulcanization). As such, no additional crosslinking process is required before its use, and the same molding methods (extrusion, injection, blow molding, calendaring) as general plastic resins can be applied. In particular, its application in extrusion molding products (automobile glass run channel, door belt, industrial gasket, etc.) is increasing.

KUMHO POLYCHEM

INNOPRENE Physical Properties of INNOPRENE GRADES

Properties	ASTM(ISO) Test Method	TEST Condition	Units	GRADE									
				1350NB	1450NB	1550NB	1640NB	1730NB	1800NB	1870NB	2400NB	2500NB	
Hardness	ISO868	25°C	Shore	38A	46A	55A	65A	74A	80A	89A	40D	45D	
Specific Gravity	D 297 (ISO183)	25°C	-	0.95 (0.95)	0.95 (0.95)	0.95 (0.95)	0.95 (0.95)	0.96 (0.96)	0.96 (0.96)	0.95 (0.95)	0.94 (0.94)	0.94 (0.94)	
Tensile Strength	D 412 (ISO37)	25°C	kg/cm ²	45 (45)	50 (50)	60 (60)	70 (70)	90 (90)	100 (100)	160 (160)	200 (200)	210 (210)	
Elongation	D 412 (ISO37)	25°C	%	670 (670)	650 (650)	620 (620)	600 (600)	530 (530)	580 (580)	570 (570)	560 (560)	550 (550)	
100% Modulus	D 412 (ISO37)	25°C	kg/cm ²	10 (10)	15 (15)	20 (20)	25 (25)	30 (30)	35 (35)	60 (60)	80 (80)	100 (100)	
Tear Strength	D 624 (ISO34-1)	25°C	kg/cm	20 (20)	25 (25)	30 (30)	35 (35)	40 (40)	50 (50)	80 (80)	85 (85)	110 (110)	
Heat aging	Hardness	ISO188	Shore	+1	+1	+1	+1	+1	+2	+2	+3	+3	
	Tensile Strength	D 412 (ISO188)	Change	-6 (-6)	-6 (-6)	-7 (-7)	-8 (-8)	-12 (-12)	-17 (-17)	-17 (-17)	-20 (-20)	-23 (-23)	
	Elongation	D 412 (ISO188)	in Property	-10 (-10)	-10 (-10)	-10 (-10)	-12 (-12)	-15 (-15)	-16 (-16)	-17 (-17)	-17 (-17)	-25 (-25)	
Low Temperature Brittleness		ISO82, Type B		°C	-62	-63	-66	-64	-64	-61	-61	-58	-58
C-set	D395-03 (ISO815 Type A)	120°C X 70hr	%	38 (38)	40 (40)	43 (43)	45 (45)	50 (50)	60 (60)	70 (70)	75 (75)	75 (75)	
		70°C X 22hr	%	30	31	23	35	39	45	55	65	70	
Fluid resistance (% weight change)	D 471	25°C X 168hr	%	+1	+1	+1	0	0	0	0	0	0	
		25°C X 168hr	%	+4	+3	+3	+2	+3	+2	+2	+1	+1	
UV resistance		SAE J1660	ΔE*	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	

* The data above is representative of INNOPRENE, and does not constitute standard specifications.

INNOPRENE Recycl

- As a thermoplastic elastomer, INNOPRENE can be reused.
- The re-use of the scrap has little impact on the physical properties of the product.
- The recycling ratio of the scrap should be kept to 10% or less to minimize processing problems.

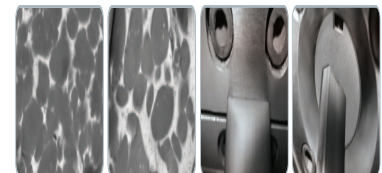
INNOPRENE Process condition

► INJECTION MOLDING CONDITIONS

- When processing the INNOPRENE Series with an injection molding machine, the molded product is easily separated from the mold, expediting the overall production process. In addition, excellent parts can be manufactured even under normal plastic injection operation conditions.

ITEMS	CONDITIONS
Drying Temperature	85°C
Drying Time	3.0 hrs
Rear Temperature	160 ~ 180°C
Middle Temperature	180 ~ 200°C
Front Temperature	200°C
Nozzle Temperature	200 ~ 220°C
Processing (Melt) Temperature	190 ~ 230°C
Mold Temperature	10 ~ 60°C
Cooling Time	20 ~ 30 sec / 100 ~ 175g
Injection Rate	FAST

INNOPRENE TEM / Extrusion



▲ INNOPRENE TEM Micrograph, SSA ▲ INNOPRENE TEM Micrograph, TSA ▼ INNOPRENE Extrusion sheet ▼ INNOPRENE Extrusion

► EXTRUSION CONDITIONS

- INNOPRENE Series can be extruded into hoses, tubes, sheets, wires and cables, etc.
- For general extrusion processing conditions, a single screw extruder with a LD (Length/Diameter) of 24:1 and a compression ratio of 3:1 is recommended.

ITEMS	CONDITIONS
Drying Temperature	85°C
Drying Time	3.0 hrs
Feed Temperature	160 ~ 170°C
Zone 1 ~ Zone 3 Temperature	180 ~ 200°C
Head Temperature	200°C
Die Temperature	180 ~ 210°C
Processing (Melt) Temperature	190 ~ 230°C
Screen Pack	20 ~ 60 mesh
Back Pressure	5.0 to 20.0 Mpa