

Lubricated high-flow injection moulding grade

POKETONE Polymer M33R3A000

POKETONE Thermoplastic Polymers are aliphatic polyketones, a revolutionary new class of semi-crystalline thermoplastics. Hyosung developed new catalyst to produce this unique polymer in 2013 and constructed commercial plant in 2015, in Ulsan, Korea.

POKETONE Polymer M33R3A000 is a lubricated high-flow injection moulding grade with mechanical properties which classify it as an engineering thermoplastic. Designed with demanding tribological applications in mind, such as gears, bearings etc., this cost efficient grade offers a high limiting pressure velocity ratio, low coefficient of friction and low wear. These benefits are achieved without sacrificing the toughness, moisture resistance and good fatigue performance which characterises the base polymer. POKETONE Polymer M33R3A000 can also withstand short-term exposure to elevated temperatures. Moreover This polymer exhibits high resistance to hydrocarbons and other chemicals.

POKETONE Polymer M33R3A000 is a high-flow, low-viscosity polymer that should be considered for mouldings with long flow paths or thin walls. This grade is very easy to process on standard injection moulding equipment. Cycle times are generally short.

Parts show good mould definition with glossy mar-resistant surfaces. POKETONE Polymer's low moisture sensitivity means that no conditioning of parts before assembly or use is necessary.

Applications for POKETONE Polymer M33R3A000 may be found in the electrical, industrial, consumer appliance and other markets.

**TABLE 1 : TYPICAL MECHANICAL PROPERTIES
OF POKETONE POLYMER M33R3A000 – Measured at 23 °C**

	Test Method & Conditions		ASTM Values	ISO Values
	ASTM	ISO	SI	SI
	Tensile strength at yield	D638	527-1	48 MPa
Tensile modulus	D638	527-1	1,400 MPa	1,300 MPa
Tensile elongation at yield	D638	527-1	25 %	25 %
Tensile elongation at break	D638	527-1	300 %	300 %
Flexural strength	D790	178	45 MPa	44 MPa
Flexural modulus	D790	178	1,250 MPa	1,050 MPa
Unnotched Izod impact strength	D256	180/U	N.B.	N.B.
Notched Izod impact strength	D256	180/A	380 J/m	21 kJ/m
Unnotched Charpy impact strength	-	179/1eU	-	N.B.
Notched Charpy impact strength	-	179/1eA	-	20 kJ/m ²

**TABLE 2: TYPICAL PHYSICAL PROPERTIES
OF POKETONE POLYMER M33R3A000 – Measured at 23°C**

	Test Method & Conditions		ASTM Values	ISO Values
	ASTM	ISO	SI	SI
	Specific gravity	D792	1183	1.23 g/cm ³
Shore D hardness	D2240	868	-	73
Hardness Rockwell	D785	-	100	-
Water absorption equilibrium at 50% RH	D570	62	0.5 %	0.5 %
Water absorption at saturation	D570	62	2.3 %	2.3 %

**TABLE 3: TYPICAL THERMAL PROPERTIES
OF POKETONE POLYMER M33R3A000**

	Test Method & Conditions		ASTM Values	ISO Values
	ASTM	ISO	SI	SI
	Melting temperature	D3418	11357	222 °C
Coefficient of linear thermal expansion, 25°C to 55°C	E831 TD MD	-	11.4*10 ⁻⁵ 11.6*10 ⁻⁵	-
Vicat softening point	D1525 5kg	306/B50 50N	174 °C	174 °C
Heat deflection temperature	D648 66psi	75 0.45 MPa	180 °C	175 °C
	264psi	1.8 MPa	85 °C	70 °C

TABLE 4: TYPICAL WEAR & ABRASION RESISTANCE
OF POKETONE POLYMER M33R3A000 – Measured at 23°C (74°F)

	Test Method & Conditions		Pin on Disk Valus	Thrust Washer Values
	Pin on Disk	Thrust Washer	SI	SI
Dynamic coefficient of Friction against self	1.3 MPa 0.06 m/sec	0.4 MPa 0.12 m/sec	0.45	0.35
Dynamic coefficient of Friction against steel	1.3 MPa 0.06 m/sec	0.4 MPa 0.12 m/sec	0.32	0.14
Wear factor against self (mm ³ /N·km)	1.3 MPa 0.06 m/sec	0.4 MPa 0.12 m/sec	0.0084	0.0094
Wear factor against steel (mm ³ /N·km)	1.3 MPa 0.06 m/sec	0.4 MPa 0.12 m/sec	0.068	0.003

TABLE 5: TYPICAL PROCESS RELATED PROPERTIES
OF POKETONE POLYMER M33R3A000

	Test Method & Conditions		ASTM Values	ISO Values
	ASTM	ISO	SI	SI
Melt flow index 240 °C /2.16kg	D1238	1133	68 g/10 min	64mℓ/10min
Mould shrinkage	D955			
	MD, 3mm		1.6%	
	TD, 3mm		1.6%	
	MD, 2mm	-	1.2%	-
	TD, 2mm		1.4%	
	MD, 1mm		1.3%	
	TD, 1mm		1.4%	

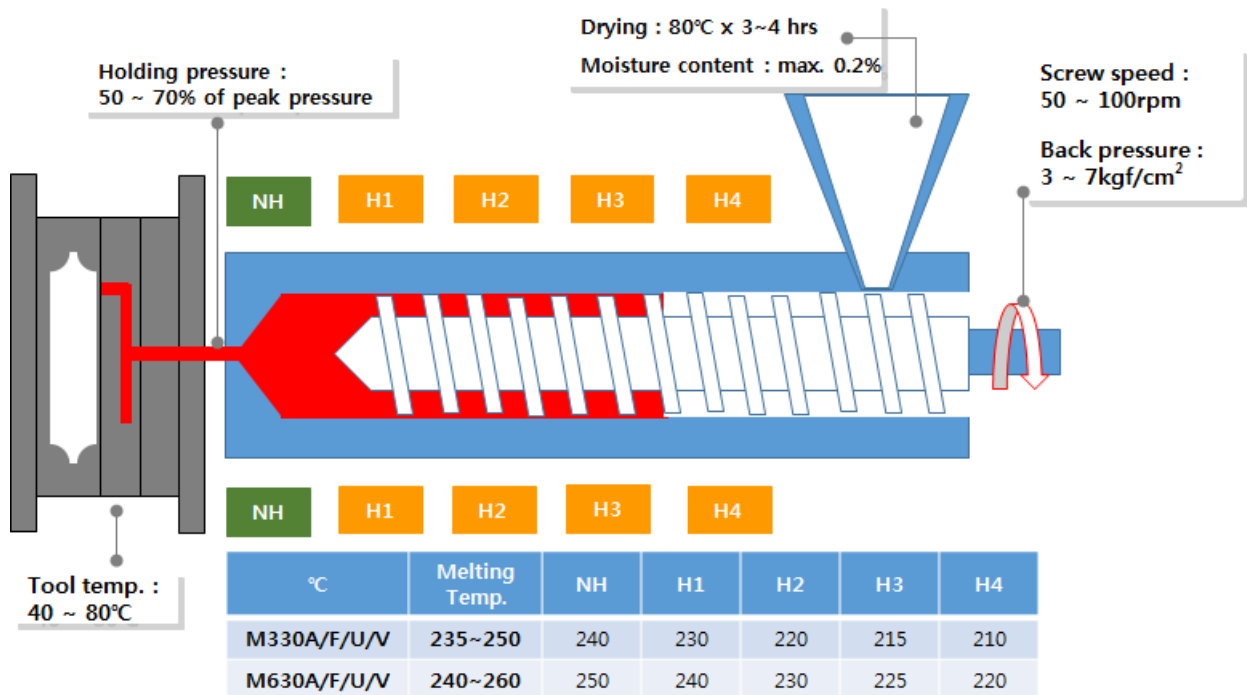
TABLE 5: TYPICAL ELECTRICAL PROPERTIES
OF POKETONE POLYMER M33R3A000

	Test Method & Conditions	ASTM Values
	ASTM	SI
Dielectric strength, Short term	D149 3 mm	17 kV/mm
Volume resistivity	D257	10 ¹⁴ ohm cm
Surface resistivity	D257	10 ¹⁶ ohm/sq.
Dielectric constant at 60Hz	D150	5.8
Dissipation factor at 60Hz	D150	0.013

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POKETONE Injection Processing Guide



Setting Temperature

- Recommended melting temperature: 235-250°C (460-490°F)
- Do not exceed 265°C (509°F). Long residence times at high end of the temperature range can cause thermal degradation & loss of physical properties.
- Mold Temperature: regarding POKETONE base grade, recommended setting temperature is at 60-80°C. In case of POKETONE glass-fiber reinforced grades, the temperature should be higher at least over 120°C for better surface quality.

Cleaning Guide

- Please immediately clean barrels thoroughly after producing POKETONE products. Recommend high viscosity HDPE, PCTG and PP (Hyosung R200P). Other commercial purging compounds are also available.

Drying

- Recommend drying POKETONE pellet at 80°C for about 3~4 hours. POKETONE should be dried by an oven or hopper drier to prevent surface problem like silver streak, drooling or voids.
- If the drying temperature is too high or the drying time is too long, it would be able to bring about discoloration of pellets.

If you need any further technical information, please contact our sales or marketing team who will be happy to assist you with any questions you may have. Feel free to visit our website. www.poly-ketone.com