Naphthalene-Based Polyester Polyol

Developed product

GX-1536-100(F) • GX-1544-100(F) • GX-1558-100(F) • GX-1559-100(F)

- Polyester polyol with **naphthalene rings.**
- Solubility: **Soluble in MEK and DMF** upon heating.
- **Refractive index: 1.59–1.61** — Suitable for high-refractive-index applications.
- Benefits: **Improves solvent resistance, abrasion resistance, and PET adhesion in polyurethane resins.**

General properties

General properties	GX-1536-100	GX-1544-100	GX-1558-100	GX-1559-100
Refractive index (r.t.・632.8nm)	1.595	1.596	1.611	1.597
Tg	61℃	62℃	77℃	72℃
OH value (mgKOH/g)	37	75	75	75
Acid value (mgKOH/g)	<1.0	<1.0	<1.0	<1.0
Molecular weight (Mn) ※1	3,000	1,500	1,500	1,500
Hydroxyl functionality	2	2	2	2
Appearance	Colorless to yellow transparent solid (Flake)			
Soluble solvent※2	MEK, EtOAc, THF, DMF, PGMAc, CA			
Solution stability (r.t.) ※3	Unstable			Stable

※1 Molecular weight (Mn): Calculated from OH value. ※2 Stirring at 60℃, Solid content: 50%.
※3 After dissolving under condition ※2, cool to room temperature. Judge based on the solution's appearance after two days.

Polyurethane polymerization properties / Polyurethane resin properties

Polymerization conditions: Polymerization using TDI(1.1eq) in DMF at 80° C for 6 hours (No catalyst).

Polyol			GX-1536-100	GX-1544-100	GX-1558-100	GX-1559-100	PPG※	PTMG※
Polyurethane polymerization properties		Mw	21,000	37,000	22,000	20,000	22,000	159,000
		Mn	12,000	15,000	12,000	10,000	11,000	80,000
		Mw/Mn	1.8	2.5	1.8	2.0	2.0	2.0
Properties of the PU film	Solvent resistance	Ethanol	○	○	○	○	×	×
		Acetone	△	△	△	×	×	×
		EtOAc	△	△	△	×	×	×
		Toluene	○	○	○	△	×	×
		Hexane	○	○	○	○	○	○
	Pencil hardness		2H	F	2H	H	<6B	<6B
	Abrasion resistance		5	4	5	4	1	1
	PET adhesion		○	○	○	○	×	△

※PPG: Polypropylene Glycol 1000 (Diol Type, CAS No.: 25322-69-4)
※PTMG: Poly(tetramethylene ether) Glycol 1000 (CAS No.: 25190-06-1)
・Coating condition (base material: PET film): drying condition 120℃×5 min, dry thickness about 3μm.
・Solvent resistance: Appearance change after rubbing (5 round trips) with a cotton swab, soaked in solvents.
○: No change △: Whitening ×: Dissolution
・Pencil hardness: Evaluate the surface of the coating film based on the JIS K5600 scratch hardness (pencil method).
・Abrasion resistance: Using a Gakushin-type friction tester, visually inspect the appearance of the coating film after rubbing the surface with copy paper under a load of 500 g for 5 cycles.
5: Little to no change observed. 4: Some scratches are observed. 3: Significant scratches are observed.
2: Significant scratches are observed, with partial delamination of the coating film.
1: The majority of the surface of the coating film is delaminated.
・PET adhesion: Apply Nichiban's self-adhesive cellulose tape to the surface of the coating film, then peel it off sharply and visually inspect the appearance of the coating film.
○: No peeling observed. △: Peeling is observed in some parts, or partial transfer of the coating film is observed.
×: Peeling is observed on the majority of the coating film, or significant transfer of the coating film is observed.