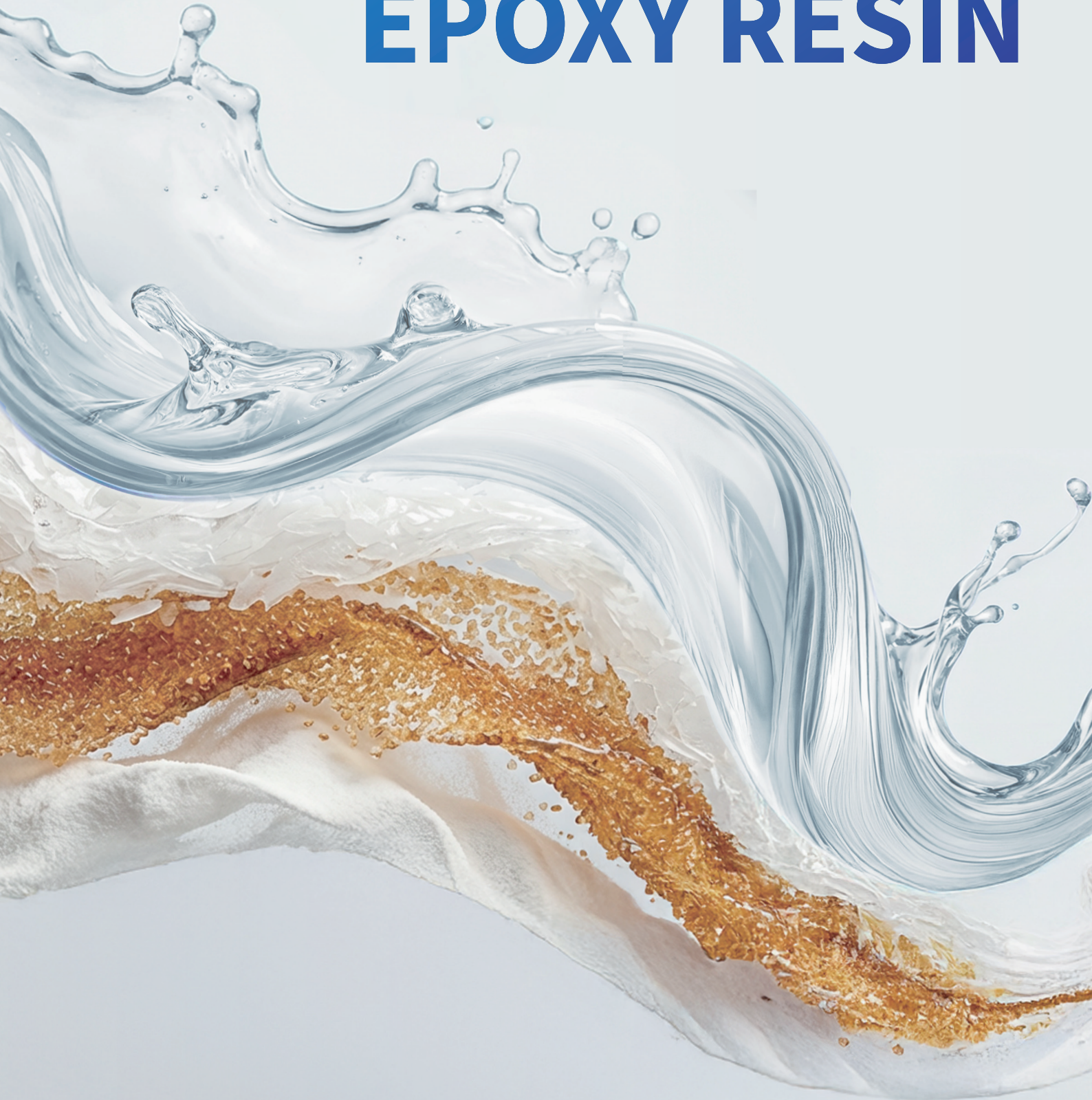




NAN YA

EPOXY RESIN



南亞塑膠工業股份有限公司
NAN YA PLASTICS CORPORATION



NANYA EPOXY RESIN

南亞公司自1988年起投入高品質環氧樹脂的生產，年產能自60,000噸逐步提升，至2015年突破461,000噸。

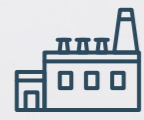
目前在台灣（樹林、麥寮）及中國昆山設有四座工廠，以滿足日益成長的市場需求。

為提供多元應用領域的客戶更完善的服務，南亞持續專注於研發與技術升級。各廠皆配備先進儀器設備，研發團隊不僅確保產品品質穩定，更與客戶保持緊密合作，協助解決各類技術挑戰，致力成為值得信賴的長期合作夥伴。

Nan Ya Epoxy started to manufacture high quality epoxy resins since 1988. Our annual capacity has expanded from 60,000 MT in 1988 to more than 461,000 MT in 2015, including two production bases in Taiwan (Shulin and Mailao) and two in China (Kunshan), to satisfy the growing market demand. To better service our customers with different applications, Nan Ya Epoxy keeps focusing on R&D and technology improvements. By using high-end instruments, our R&D departments in all four production bases are able to ensure stable product quality and always work with our customers closely for any technical issues they may encounter.



深耕經驗



年產能(噸)
461,000 ↑



研發與技術

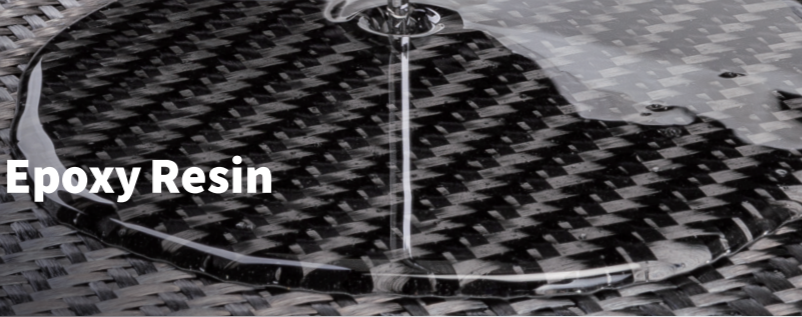


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1 Bisphenol A Type Liquid Epoxy Resin



Grade	EEW (g/eq)	Viscosity (cps/25°C)	Color (G)	Comments
NPEL-127	176~184	8000~11000	1.0 max.	Low Viscosity
NPEL-127E	176~184	8000~11000	1.0 max.	Low Hydrolyzable Chlorine
NPEL-127H	182~188	10000~12000	1.0 max.	Low Viscosity
NPEL-128	185~186.6	12000~15000	1.0 max.	Standard
NPEL-128E	185~186.6	12000~15000	1.0 max.	Low Hydrolyzable Chlorine
NPEL-128G	184~190	12000~15000	1.0 max.	Total Chlorine <1550ppm
NPEL-128R	184~194	12000~16000	1.0 max.	Non-Crystallizable
NPEL-128D	186~192	9000~14000	1.0 max.	High Alpha-glycol 10~16meq/100g
NPEL-128H	186~196	15000~20000	1.0 max.	High Viscosity
NPEL-128S	205~225	19000~24000	1.0 max.	High Viscosity
NPEL-134L	210~250	L~R*	1.0 max.	Semi-solid
NPEL-134	230~270	P~U*	1.0 max.	Semi-solid
NPEL-136	300~330	X~Z2*	1.0 max.	Semi-solid
NPEL-138	235~245	20000~40000**	1.0 max.	Semi-solid
NPEL-231	184~194	—	1.0 max.	Precatalyzed

* Gardner-Holdt method (70% N.V. in butyl carbitol solution)

**cps/45°C

1-1 Solution Type

Grade	EEW (g/eq)	Viscosity (cps/25°C)	N.V. (%)	Color (G)	Comments
NPSN-128K90	184~190	150~550	90 ± 1	1.0 max.	Solution of NPEL-128 in MEK
NPSN-128A85	185~187	200↓	85 ± 1	1.0 max.	Solution of NPEL-128 in Acetone
NPSN-134X80	230~270	900~1200	80 ± 1	1.0 max.	Solution of NPEL-134 in Xylene
NPSN-134X85	230~270	2000~5000	85 ± 1	1.0 max.	Solution of NPEL-134 in Xylene
NPSN-134X90	230~270	10000~30000	90 ± 1	1.0 max.	Solution of NPEL-134 in Xylene
NPSN-136X80	300~320	3000~7000	80 ± 1	1.0 max.	Solution of NPEL-136 in Xylene

2 Bisphenol F Type Epoxy Resin

Grade	EEW (g/eq)	Viscosity (cps/25°C)	Color (G)	Comments
NPEF-162	167~173	3500~4200	0.3 max.	BPF type, High EEW, Low Viscosity, Low Crystallizability
NPEF-170	160~180	2000~5000	1.0 max.	Standard BPF Type
NPEF-171	170~180	5000~7000	1.0 max.	High Viscosity Type

2-1 Blended Type

Grade	EEW (g/eq)	Viscosity (cps/25°C)	Color (G)	Comments
NPEF-175	160~180	2000~5000	1.0 max.	BPA/BPF Blended
NPEF-180	170~190	5000~7000	1.0 max.	BPA/BPF Blended
NPEF-185	170~190	6000~8000	1.0 max.	BPA/BPF Blended
NPEF-187	175~185	7500~9500	1.0 max.	BPA/BPF Blended
NPEF-198	180~186	10000~14000	1.0 max.	BPA/BPF Blended
NPEF-164X	185~205	700~1100	1.0 max.	BPA/BPF/Diluent Blended



3 Reactive Diluent

Grade	EEW (g/eq)	Viscosity (cps/25°C)	Hy-Cl (ppm)	Color (G)	Comments
NPEK-041	140~155	5~10	2000 max.	1.0 max.	Butyl Glycidyl Ether
NPEK-048	270~290	5~20	1000 max.	1.0 max.	C12~C14 Aliphatic Glycidyl Ether
NPEK-048A	290~310	4~15	1000 max.	1.0 max.	C12~C14 Aliphatic Glycidyl Ether
NPEK-050	120~140	10~15	1000 max.	1.0 max.	1,4 Butanediol Diglycidyl Ether
NPEK-051	139~149	10~25	2000 max.	1.0 max.	1,6 Hexanediol Diglycidyl Ether

3-1 Diluted Type

Grade	EEW (g/eq)	Viscosity (cps/25°C)	Color (G)	Comments
NPEK-114	190~210	600~1200	1.0 max.	NPEL-128 diluted with C12~C14 Aliphatic Glycidyl Ether
NPEK-114L	195~205	550~750	1.0 max.	NPEL-128 diluted with C12~C14 Aliphatic Glycidyl Ether
NPEK-115	175~195	600~1200	1.0 max.	NPEL-128 diluted with Butyl Glycidyl Ether



4 Bisphenol A Solid Type Epoxy Resin

4-1 Low/Medium Molecular Weight-Standard Type

Grade	EEW (g/eq)	Melt Viscosity (cps/150°C)**	Solution Viscosity (25°C)*	Softening Point (°C)	Color (G)	Comments
NPES-901	460~485	-	D~F	64~74	1.0 max.	For Vinyl Ester, CFRP, Paints
NPES-901H	550~570	-	I~L	76~86	1.0 max.	For Vinyl Ester, CFRP, Paints
NPES-902	610~640	-	I~M	82~92	1.0 max.	For Coatings
NPES-902H	680~710	2000~4500	K~P	90~95	1.0 max.	For Coatings
NPES-903K	670~700	2000~4000	K~P	88~95	1.0 max.	For Powder Coatings
NPES-903	720~740	3500~5000	N~R	92~97	1.0 max.	For Powder Coatings
NPES-903H	745~765	4000~6000	P~S	94~100	1.0 max.	For Powder Coatings
NPES-904	800~820	4500~8000	S~V	97~103	1.0 max.	For Powder Coatings, Epoxy Ester
NPES-904H	840~870	7000~9000	V~X	100~112	1.0 max.	For Powder Coatings, Epoxy Ester
NPES-904U	850~920	-	-	95~110	1.0 max.	For Powder Coatings, Epoxy Ester, CCL
NPES-905L	900~930	-	-	95~110	1.0 max.	For Powder Coatings, Epoxy Ester
NPES-906L	1040~1120	-	-	102~115	0.3 max.	For Pipe Coatings
NPES-906	1200~1300	-	W~Y	109~120	0.3 max.	For Reinforcement Coatings

* 40% N.V. in butyl carbitol solution

** Viscosity was measured by cone & plate viscometer at 150°C

4-2 Low/Medium Molecular Weight-High Flow Type

Grade	EEW (g/eq)	Melt Viscosity (cps/150°C)**	Solution Viscosity (25°C)*	Softening Point (°C)	Color (G)*	Comments
NPES-601L	460~480	10000~12500***	E	64~69	0-0.125	For CFRP
NPES-601	510~570	-	G~I	74~82	1.0 max.	For Paints
NPES-602	620~650	600~1800	-	75~86	1.0 max.	For Powder Coatings
NPES-602L	640~680	1200~1600	-	79~85	1.0 max.	For Powder Coatings
NPES-602H	660~720	1700~2500	-	85~95	1.0 max.	For Powder Coatings
NPES-603	720~770	1500~3500	-	85~95	1.0 max.	For Powder Coatings
NPES-604	800~850	2500~6000	-	90~100	1.0 max.	For Powder Coatings
NPES-605	900~930	3500~5500	-	96~103	1.0 max.	For Powder Coatings

* 40% N.V. in butyl carbitol solution

** Viscosity was measured by cone & plate viscometer at 150°C

*** Viscosity was measured by cone & plate viscometer at 100°C

4-3 Low/Medium Molecular Weight-Master Batch

Grade	EEW (g/eq)	Melt Viscosity (cps/150°C)*	Softening Point (°C)	Comments
NPES-902P	700~750	1800~2800	85~95	For Powder Coating, with 2.5% Flow Agent
NPES-924	720~770	2000~3500	85~97	For Powder Coating, with 10% Flow Agent

* Viscosity measured by cone & plate viscometer at 150°C

4-4 Low/Medium Molecular Weight-Modified Type

Grade	EEW (g/eq)	Melt Viscosity (cps/150°C)**	Softening Point (°C)	Color (G)*	Comments
NPES-660U	500~560	4000~8000	90~98	2.0 max.	Multifunction Resin Modified. Good Chemical Resistance and Heat Resistance.
NPES-662H	750~850	-	110~120	2.0 max.	Multifunction Resin Modified. Good Chemical Resistance and Heat Resistance.

* 40% N.V. in butyl carbitol solution

** Viscosity was measured by cone & plate viscometer at 150°C

4-5 Low/Medium Molecular Weight-Solution Type

Grade	EEW (g/eq)	Viscosity (cps/25°C)	N.V. (%)	Color (G)	Comments
NPSN-901K80	450~500	4000~13000	80 ± 1	1.0 max.	Solution of NPES-901 in MEK
NPSN-901X65	450~500	1000~1800	65 ± 1	1.0 max.	Solution of NPES-901 in Xylene
NPSN-901X70	450~500	2500~4500	70 ± 1	1.0 max.	Solution of NPES-901 in Xylene
NPSN-901X75	460~485	8000~15000	75 ± 1	1.0 max.	Solution of NPES-901 in Xylene
NPSN-902X75	610~640	40000~60000	75 ± 1	1.0 max.	Solution of NPES-902 in Xylene
NPSN-904ED60	800~820	1000-3500	60 ± 1	0-0.2	Solution in Xylene/Butanol
NPSN-904UK65	850~920	1500~2800	65 ± 1	1.0 max.	For Painting, Coating, CCL, EMC

4-6 High Molecular Weight-Standard Type

Grade	EEW (g/eq)	Softening Point (°C)	Solution Viscosity (25°C)*	Color (G)	Comments
NPES-907	1500~1800	120~130	X~Z2	1.0 max.	For Can Coatings
NPES-907F	1500~1720	120~130	Z~Z2	0-0.3	For Can Coatings, Low BPA content (BPA<3ppm)
NPES-909	1800~2400	130~150	Z2~Z5	1.0 max.	For Can Coatings, Coil Coatings
NPES-909H	2100~2500	135~150	Z3~Z5	1.0 max.	For Can Coatings, Coil Coatings

* 40% N.V. in butyl carbitol solution

4-7 High Molecular Weight-High Flow Type

Grade	EEW (g/eq)	Softening Point (°C)	Solution Viscosity (25°C)*	Color (G)	Comments
NPES-607	1650~1900	120~135	Y~Z1	1.0 max.	For Can Coatings
NPES-609	2700~3000	130~150	-	1.0 max.	For Can Coatings

* 40% N.V. in butyl carbitol solution

Grade	EEW (g/eq)	Softening Point (°C)	Ford #4 cup (sec)*	Comments
NPES-619A	2400~3000	130~150	28~36	For Can Coating, Coil Coating
NPES-619C	2400~3000	130~150	33~43	For Can Coating, Coil Coating
NPES-619D	2400~3000	135~150	39~46	For Can Coating, Coil Coating
NPES-619E	2600~3300	135~150	45~52	For Can Coating, Coil Coating
NPES-629	2400~3000	130~150	28~46	For Can Coating, Coil Coating
NPES-639	2600~3000	130~150	47~60	For Can Coating, Coil Coating, Low BPA content (BPA<5ppm)
NPES-669E	2700~3500	135~155	-	For Can Coating, Coil Coating

* 25% N.V. in PMA solution

4-8 High Molecular Weight-Solution Type

Grade	EEW (g/eq)	Viscosity (cps/25°C)	N.V. (%)	Color (G)	Comments
NPSN-608BM50	2000~2500	3000~6500	50 ± 1	1.0 max.	Solution of NPES-608 in BSC/XYL
NPSN-609BM51	2400~3000	4000~12000	51 ± 1	1.0 max.	Solution of NPES-609 in BSC/XYL
NPSN-610BM50	2500~3000	6000~7000	49 ± 1	1.0 max.	Solution of NPES-610 in BSC/XYL
NPSN-907BM50	1500~1800	2000~8000	50 ± 1	1.0 max.	Solution of NPES-907 in BSC/XYL

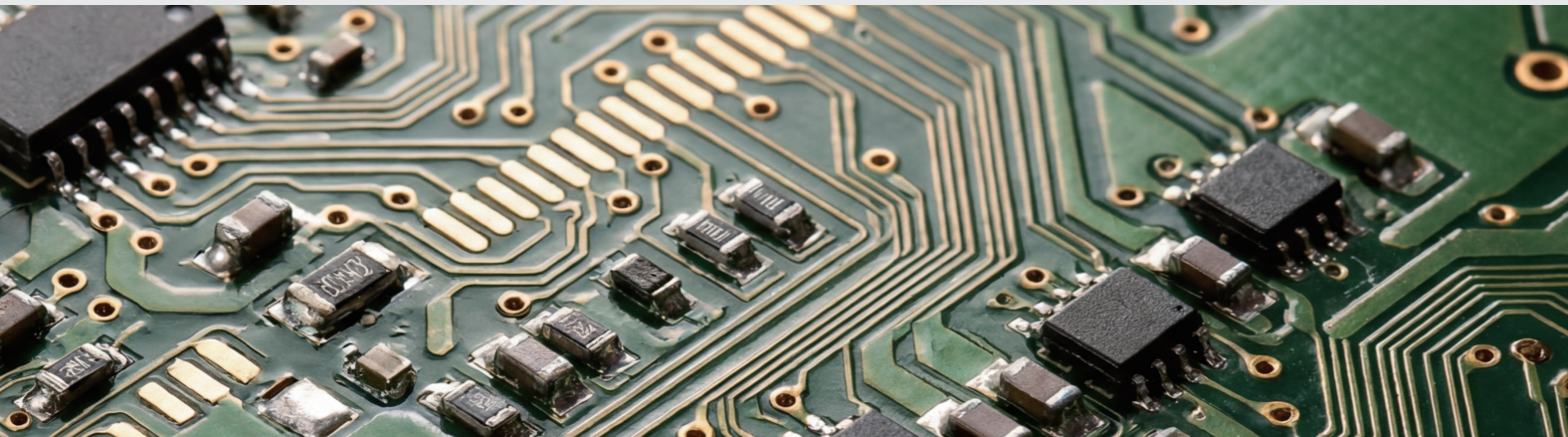
4-9 Taffy Process Bisphenol A Type Epoxy Resin

Grade	EEW (g/eq)	Solution Viscosity (25°C)*	Softening Point (°C)	Color (G)*	Comments
NPES-301	450~500	D~G	62~72	1.0 max.	For Paints
NPES-301H	530~570	-	66~78	1.0 max.	For Paints
NPES-302	600~700	G~K	75~85	1.0 max.	For Powder Coatings
NPES-303L	720~780	M~R	85~95	1.0 max.	For Powder Coatings
NPES-303	800~900	O~S	85~98	1.0 max.	For Powder Coatings
NPES-303H	850~880	-	95~105	1.0 max.	For Powder Coatings
NPES-304	900~1000	Q~U	95~115	1.0 max.	For Powder Coatings

* 40% N.V. in butyl carbitol solution

Grade	EEW (g/eq)	Viscosity (cps/25°C)	N.V. (%)	Color (G)	Comments
NPSN-301X75	450~500	6000~14000	75 ± 1	1.0 max.	Solution of NPES-301 in Xylene

5 Brominated Type Epoxy Resin



5-1 High Brominated Type

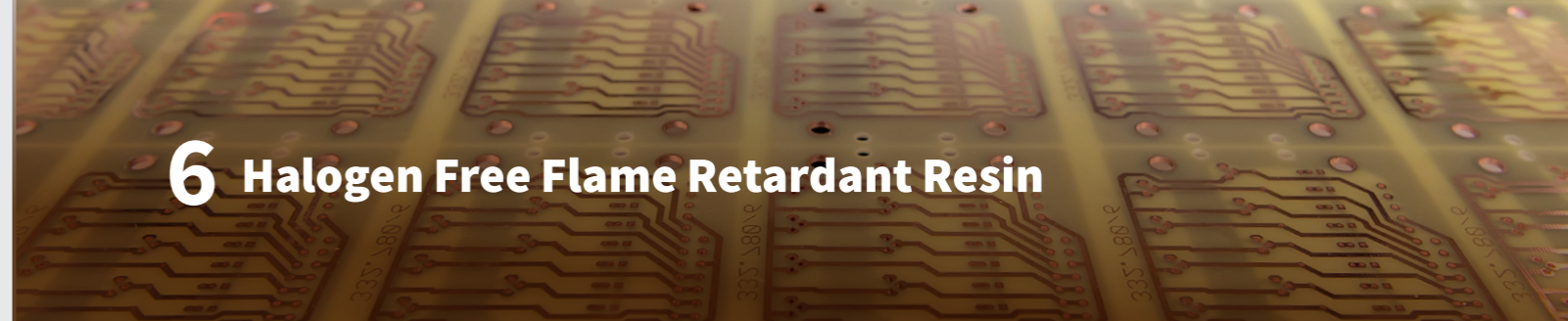
Grade	EEW (g/eq)	Softening Point (°C)	Br content (%)	Comments
NPEB-340	355~370	46~64	46~50	Low Softening Point
NPEB-400	380~410	64~74	46~50	Standard

Grade	EEW (g/eq)	Viscosity (cps/25°C)	N.V. (%)	Br content (%)	Comments
NPEB-400A65	380~410	5~17	65 ± 1	46~50	Solution of NPEB-400 in Acetone
NPEB-400T65	380~420	10~150	65 ± 1	46~50	Solution of NPEB-400 in Toluene

5-2 Low Brominated Solvent Type

Grade	EEW (g/eq)	Viscosity (cps/25°C)	N.V.(%)	Br content (%)	Comments
NPEB-450A80	415~435	800~1800	80 ± 1	18~21	Standard Brominated Epoxy Resin in Acetone. Suitable for CCL.
NPEB-452A80	425~440	800~1800	79.5 ± 1	19~21	Standard Brominated Epoxy Resin in Acetone. Suitable for CCL.
NPEB-450SK79	470~500	1000~2000	79 ± 1	21~22	Standard Brominated Epoxy Resin in Methyl Ethyl Ketone. Suitable for CCL.
NPEB-454HA80	425~455	1000~2600	80 ± 1	18~21	Modified Brominated Epoxy Resin in Acetone. Suitable for UV-Block Property.
NPEB-475K70	308~318	100~250	70 ± 1	14~16	Designing for Novolac Curing System. It provides higher Tg (150°C), along with good thermal and moisture resistance.
NPEB-479A85	242~252	400~1000	85 ± 1	18~22	It provides higher Tg, along with good thermal and moisture resistance.

6 Halogen Free Flame Retardant Resin



Grade	EEW (g/eq)	Viscosity (cps/25°C)	N.V. (%)	Comments
NPEP-200LA70	330~370	400~1400	70 ± 1	Phosphorous Cresol Novolac Epoxy Resin. Solution of NPEP-200L in Acetone. P cont. = 2.5%
NPEP-204A70	430~470	2000~4000	70 ± 1	Phosphorous Cresol Novolac Epoxy Resin. Solution of NPEP-204 in Acetone. P cont. = 4%
NPEP-210A70	310~330	100~450	70 ± 1	Phosphorous Phenol Novolac Epoxy Resin. Solution of NPEP-210 in Acetone. P cont. = 3.3%

Grade	EEW (g/eq)	Softening Point (°C)	Comments
NPEP-210	310~330	68~78	Phosphorous Phenol Novolac Epoxy. P cont. = 3.3%
NPEP-288	265-285	13000~16000*	Phosphorous Phenol Novolac Epoxy. P cont. = 4.0%

*Viscosity was measured by cone & plate viscometer at 70°C

Grade	*Phenolic-OH Equivalent (g/eq)	Viscosity (cps/25°C)	N.V. (%)	Comments
NPEP-241P57	325~375	800~2400	57 ± 1	Phosphorous Type BPA Novolac Curing Agent. P cont. = 9.0-10.0% N cont. ≤ 2% Low BPA Content
NPEP-240P60	330~370	3000~8000	60 ± 1	Phosphorous Type BPA Novolac Curing Agent. P cont. = 9.0-9.5% N cont. ≤ 2% Low BPA DOPO Residual
NPEP-250P60	340~365	1000~3000	60 ± 1	Phosphorous Type BPA Novolac Curing Agent. P cont. = 8.5-9.0 % N cont. ≤ 2%
NPEP-208JM60	-	900~2250	60 ± 1	NPEP-208JM60 is a nonreactive flame retardant resin. EEW value = 2000 g/eq Phosphorous cont = 8.2% Nitrogen cont = 4% Solvent Type PM/TOL = 1:1

*Reference Data

7 Flexible Type and Toughness Epoxy Resin

7-1 Polyurethane Modified Type

Grade	EEW (g/eq)	Viscosity (cps/25°C)	Color (G)	Comments
NPER-133M	195~240	40000~60000	1.0 max.	Standard. Suitable for Adhesion.
NPER-133L	195~240	10000~16000	1.0 max.	Diluted with C12~C14 Aliphatic Glycidyl Ether. Suitable for adhesion.

7-2 Dimer Acid Modified Type

Grade	EEW (g/eq)	Acid value (mg KOH/g)	Color (G)	Comments
NPER-171	315~345	0.3 max.	6.0 max.	Dimer Acid Modified BPA Epoxy Resin. Semi-solid.
NPER-172	600~700	0.3 max.	6.0 max.	Dimer Acid Modified BPA Epoxy Resin. Semi-solid.

Grade	EEW (g/eq)	Viscosity (cps/25°C)	N.V. (%)	Color (G)	Comments
NPER-174X90	250~265	2000~4000	90 ± 1	4.0 max.	Solution of NPER-174 in Xylene. Application for High Solid Type Coating.

7-3 Toughness by Isocyanate Modified

Grade	EEW (g/eq)	Softening Point (°C)	Color (G)*	Comments
NPEU-153	290~302	62~68	4 ± 1	Isocyanate Modified Type Epoxy Resin. Produce Tough Matrix with High Tg. Suitable for Copper Clad Laminate and CFRP.
NPEU-155	320~360	77~83	≤2	Isocyanate Modified Type Epoxy Resin. Suitable for Copper Clad Laminate and CFRP.

* 40% N.V. in THF solution

Grade	EEW (g/eq)	Viscosity (cps/25°C)	N.V. (%)	Color (G)	Comments
NPEU-153K75	280~305	500~2500	75 ± 1	6 ± 1	Isocyanate Modified Type Epoxy Resin. Produce Tough Matrix with High Tg.

7-4 Rubber Modification Type

Grade	EEW (g/eq)	Viscosity (cps/25°C)	Softening Point (°C)	Comments
NPER-450	400~500	250000~400000	-	NPER-450 is rubber modified epoxy resin with excellent toughness. Suitable for CFRP, CCL, Coating, and Adhesive.
NPER-1021	1100~1300	-	100~120	NPER-1021 is rubber modified epoxy resin with excellent toughness. Suitable for Powder Coating.

8 Multifunctional Novolac Type Epoxy Resin



8-1 Phenol Novolac Type Epoxy Resin (EPN)

Grade	EEW (g/eq)	Solution Viscosity (25°C)	Color (G)**	Comments
NPPN-630	165~178	18000~28000	2.0 max.	Low Viscosity
NPPN-631	168~178	1100~1700*	2.0 max.	Low Viscosity. Functionality is 2.5.
NPPN-638	170~190	H~K**	3.0 max.	Standard and Good Heat Resistance. Functionality is 3.6.
NPPN-638S	172~185	H~J**	1.0 max.	Standard and Narrow Viscosity Range. Phenolic OH < 1500ppm. Functionality is 3.6.

* Brookfield viscometer method cps/52°C

** 60% N.V. in butyl carbitol solution

Grade	EEW (g/eq)	Viscosity (cps/25°C)	N.V. (%)	Color (G)	Comments
NPPN-631X80	168~178	100~400	80 ± 1	3.0 max.	Solution of NPPN-631 in Xylene
NPPN-638K80	176~181	0~800	80 ± 1	2.0 max.	Solution of NPPN-638 in MEK
NPPN-638X80	172~185	1200~2000	80 ± 1	3.0 max.	Solution of NPPN-638 in Xylene
NPPN-638A85	172~182	500~1200	85 ± 1	3.0 max.	Solution of NPPN-638 in Acetone

8-2 Cresol Novolac Type Epoxy Resin (ECN)

Grade	EEW (g/eq)	Melt Viscosity (cps/150°C)**	Softening Point (°C)	Color (G)*	Comments
NPCN-701L	195~204	170-250	57-63	3.0 max.	For EMC, Ink
NPCN-701	195~204	210~330	59~66	3.0 max.	For EMC, Ink
NPCN-702	195~204	390~560	67~73	3.0 max.	For EMC, Ink
NPCN-702H	195~205	535-620	71~78	3.0 max.	For EMC, Ink, CFRP
NPCN-703	195~225	750~2000	78~85	3.0 max.	For EMC, Ink, CFRP
NPCN-704L	200~210	1300~2500	82~90	3.0 max.	For EMC, Ink, CFRP
NPCN-704	200~220	1500~4500	88~95	3.0 max.	For EMC, Ink, CFRP
NPCN-704H	200~220	3000~4500	95~100	3.0 max.	For EMC, Ink, CFRP

* 40% N.V. in butyl carbitol solution

** Viscosity was measured by cone & plate viscometer at 150°C

Grade	EEW (g/eq)	Viscosity (cps/25°C)	N.V. (%)	Color (G)	Comments
NPCN-704K80	200~220	6000~15000	80 ± 1	5.0 max.	Solution of NPCN-704 in MEK

8-3 Tetra-Functional Novolac Type Epoxy Resin

Grade	EEW (g/eq)	Softening Point (°C)	Comments
NPPN-431	200~240	82~92	Glyoxal-phenol Novolac Epoxy Resin. Excellent Heat Resistance, High Tg, Low CTE and UV Block for CCL and CFRP.

Grade	EEW (g/eq)	Viscosity (cps/25°C)	N.V. (%)	Color (G)	Comments
NPPN-431A70	200~220	100~300	70 ± 1	10.2~11.7	Solution of NPPN-431 in Acetone

8-4 Bisphenol A Novolac Type Epoxy Resin

Grade	EEW (g/eq)	Softening Point (°C)	Color (G)	Comments
NPPN-438	190~210	60~68	2.0 max.	For Ink, CFRP, CCL
NPPN-438H	190~210	68~75	2.0 max.	For Ink, CFRP, CCL
NPPN-438S	190~210	75~85	2.0 max.	For Ink, CFRP, CCL

Grade	EEW (g/eq)	Viscosity (cps/25°C)	N.V. (%)	Color (G)	Comments
NPPN-438A80	190~210	400~2000	80 ± 1	5.0 max.	Solution of NPPN-438 in Acetone
NPPN-438K80	190~210	400~2500	80 ± 1	5.0 max.	Solution of NPPN-438 in MEK
NPPN-438HA80	197~203	1000~3000	79.5-81	2.0 max.	Solution of NPPN-438H in Acetone

8-5 Tri-Functional Novolac Type Epoxy Resin

Grade	EEW (g/eq)	Softening Point (°C)	Color (G)	Comments
NPPN-442	155~175	45~55	12 max.	Phenol-Parahydroxybenzaldehyde Epoxy Resin. Excellent Heat Resistance and High Tg.
NPPN-447	165~185	45~55	10 max.	Modified Phenol-Parahydroxybenzaldehyde Epoxy Resin. Excellent Heat Resistance, High Tg, and Low Viscosity. Application for Pipe Coating.

Grade	EEW (g/eq)	Viscosity (cps/25°C)	N.V. (%)	Comments
NPPN-442K80	155~175	350~1000	80 ± 1	Solution of NPPN-442 in MEK

8-6 Speciality of Multi-Functional Novolac Type Epoxy Resin

Grade	EEW (g/eq)	Viscosity (cps/25°C)	N.V. (%)	Comments
NPPN-433A70	232~247	10~150	70 ± 1	Ben-Phenolic Novolac Epoxy Resin 70% Solid in Acetone. Reactivity is slower than other multifunctional epoxy resin, with high working window.
NPPN-436A70	205~215	10~150	70 ± 1	Benzaldehyde-Phenolic Epoxy Resin containing 70% Solid in Acetone.
NPPN-437K70	224~239	-	70 ± 1	Modified Dicyclopentadiene Novolac Epoxy Resin. 70% Solid in MEK. Low Dk/Df.

8-7 Speciality of Difunctional 2,6 DMP Type Epoxy Resin

Grade	EEW (g/eq)	Viscosity (cps/25°C)	N.V. (%)	Comments
NPPN-260A80	190~210	20~120	80 ± 1	Low Dk/Df Epoxy Resin. 80% Solid in Acetone.
NPPN-260K70	190~210	10~120	70 ± 1	Low Dk/Df Epoxy Resin. 70% solid in Methyl Ethyl Ketone. Avoiding Low Temperature Crystallization.

9 Novolac Resin

Grade	Softening Point (°C)	Color (G)	Comments
TPN1	120~150	9~11	Glyoxal-Phenol Novolac. Suitable for Curing Agent.
TPN2	120~150	10~13	Glyoxal-Phenol Novolac. Suitable for Modified Reaction.

Grade	OH equivalent (g/eq)	Viscosity (cps/25°C)	N.V. (%)	Comments
NPEH-710HA65	95~105	0~3000	65 ± 1	Phenol Novolac. 65% Solid in Acetone.
NPEH-716A65	125~135	-	65 ± 1	Phenolic Novolac Containing Benzaldehyde. 65% Solid in Acetone.
NPEH-BPNAA65	170~190	-	65 ± 1	Ben-phenolic Novolac. 65% Solid in Acetone.

10 High Performance Resin

10-1 Low Dk/Df Vinyl Polyphenylene Ether

Grade	Mw (g/mole)	Viscosity (cps/25°C)	N.V. (%)	Color (G)	Comments
NPEU-900T61	2600~3150	2500~4500	61 ± 1	8~15	High Heat Resistance. Low Water Absorption. Excellent Electrical Properties.
NPEU-910T65	1500~2500	1500~3500	65 ± 1	12~15	Higher Crosslinking Density. Higher Tg and Lower Df. Wider Working Window and Lower Working Viscosity.

10-2 Bismaleimide Resin

Grade	Mw (g/mole)	n=0 (%)	Acid Value (mgKOH/g)	Melting Point (°C)	Comments
BMI-610	330~390	≥ 99	10 max.	159~165	DDM type BMI. High Heat Resistance. High Glass Transition Temperature.
BMI-620	600~680	57~63	10 max.	67~73	Poly-DDM Type BMI. High Dimensional Stability. High Heat Resistance. High Glass Transition Temperature.
BMI-651	410~470	≥ 99	10 max.	164~170	MMEA Type BMI. Excellent Electrical Properties. High Glass Transition Temperature.

10-3 Active Ester Hardener for Low Loss High Speed CCL

Grade	Mw (g/mole)	Viscosity (cps/25°C)	N.V. (%)	Color (G)	Comments
NPEH-800T65	2150~2350	2000~6000	65 ± 1	10~13	For Low Loss Epoxy Formulation as Curing Agent. Low Water Absorption. Good Adhesion. High Glass Transition Temperature.

10-4 Phenoxy Resin

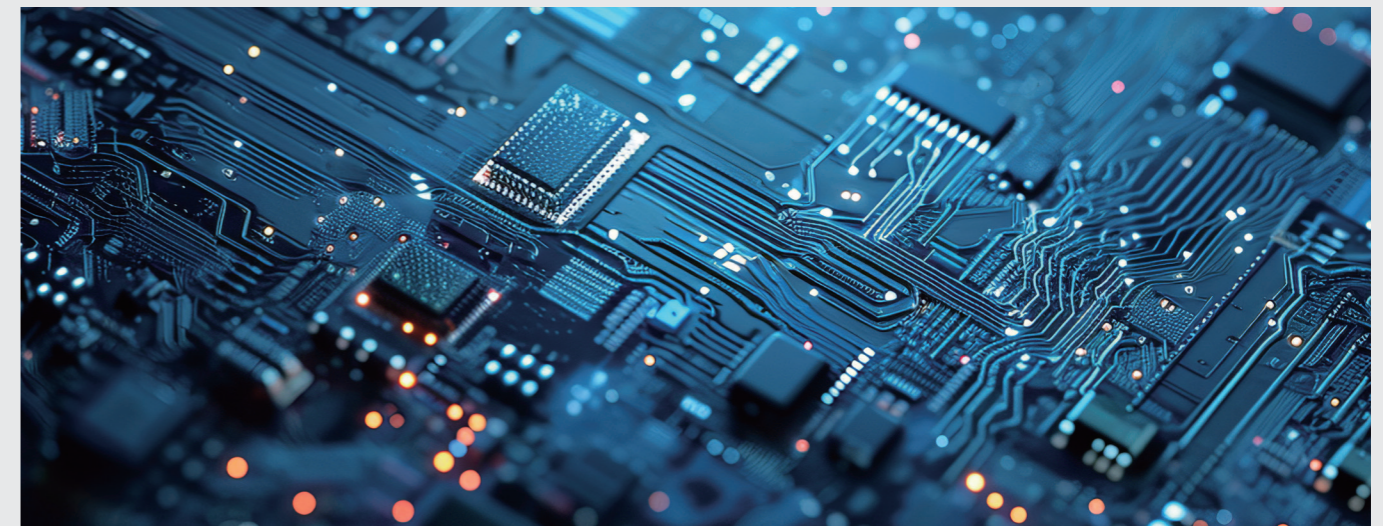
Grade	Mw (by GPC)	Viscosity (cps/25°C)	N.V. (%)	Color (G)	Comments
NPPH-500P26	55000~70000	2000~6000	26 ± 1	3.0 max.	High Molecular Weight. Good Adhesive/Flexible.

10-5 Styrene Maleic Anhydride

Grade	Mw (g/mole)	Acid value (mg KOH/g)	N.V. (%)	Comments
SMA-41	9000~13000	185~195	≥98.5	Styrene-Maleic Anhydride Copolymer. Good Electrical Properties for CCL.

10-6 High Heat Resistance Benzoxazine

Grade	Mw (g/mole)	Viscosity (cps/25°C)	N.V. (%)	Comments
NPEU-234T65	1500~2100	-	65 ± 1	DCPD Type Benzoxazine Resin. Low Dk/Df. High Tg. Tg (resin) = 170~180°C
NPEU-237LA65	1200~1700	10~150	65 ± 1	MDA type Benzoxazine Resin. High Tg. Tg (resin) = 180~190°C
NPEU-238LA65	600~800	10~150	65 ± 1	BPA Type Benzoxazine Resin. High Tg. Tg (resin) = 170~180°C



11 Waterborne Type Epoxy Resin

11-1 Waterborne Epoxy Resin

Grade	EEW (g/eq)	Viscosity (cps/25°C)	N.V. (%)	Volatile	Comments
NPEW-257	190~210	7000~11000	100	-	Pure Resin and Water-Emulsifiable. Good Chemical Resistance and Hardness. Zero VOC. For Use in Floor Paint and Concrete Coating.
NPEW-281W53	520~580	3000~10000	53 ± 2	water*	Quick-Drying. Better Toughness and Adhesion. For Use in Industrial Anti-Corrosion Coating, Primer on Plastic Substrate.
NPEW-291DW53	520~600	500~2500	53 ± 1	water*	Good Sag Resistance. Excellent Salt Spray Resistance and Waterproof. For Use in Industrial Anti-Corrosion Coating and Container paint.
NPEW-292DW53	520~580	500~3000	53 ± 2	water*	Quick-Drying. Excellent Salt Spray Resistance and Waterproof. Good Toughness and Impact Resistance. For Use in Industrial Anti-Corrosion Coating and Container Paint.
NPEW-276W25	-	11"~15"***	23 ± 1	water*	For Sizing Agent of Fiberglass Product. More Flexibility.

* Water & hydrophilic alcohol
 ** #4 Ford cup at 25°C

11-2 Waterborne Hardener

Grade	AHEW (g/eq)**	Viscosity (cps/25°C)	N.V. (%)	Volatile	Comments
NPED-512WP40	124	5000~15000	40 ± 2	water*	Polyamide Adduct Curing Agent. Quick-Drying. Better Adhesion and Toughness. Good Water Compatibility.
NPED-522P68	204	1000~4000	68 ± 2	PM	Polyamine Adduct Curing Agent. Low Viscosity. Zinc powder can be added to NPED-522P68 in advance.
NPED-525W75	86	6000~13000	75 ± 2	water*	Polyamine Adduct Curing Agent. Solvent Free. Quick-Drying. High Solid Content with Low Viscosity, Low AHEW, and Lower Hardener Dosage.

* Water & Hydrophilic Alcohol
 ** The value is calculated, which is based on the 100% solid resin

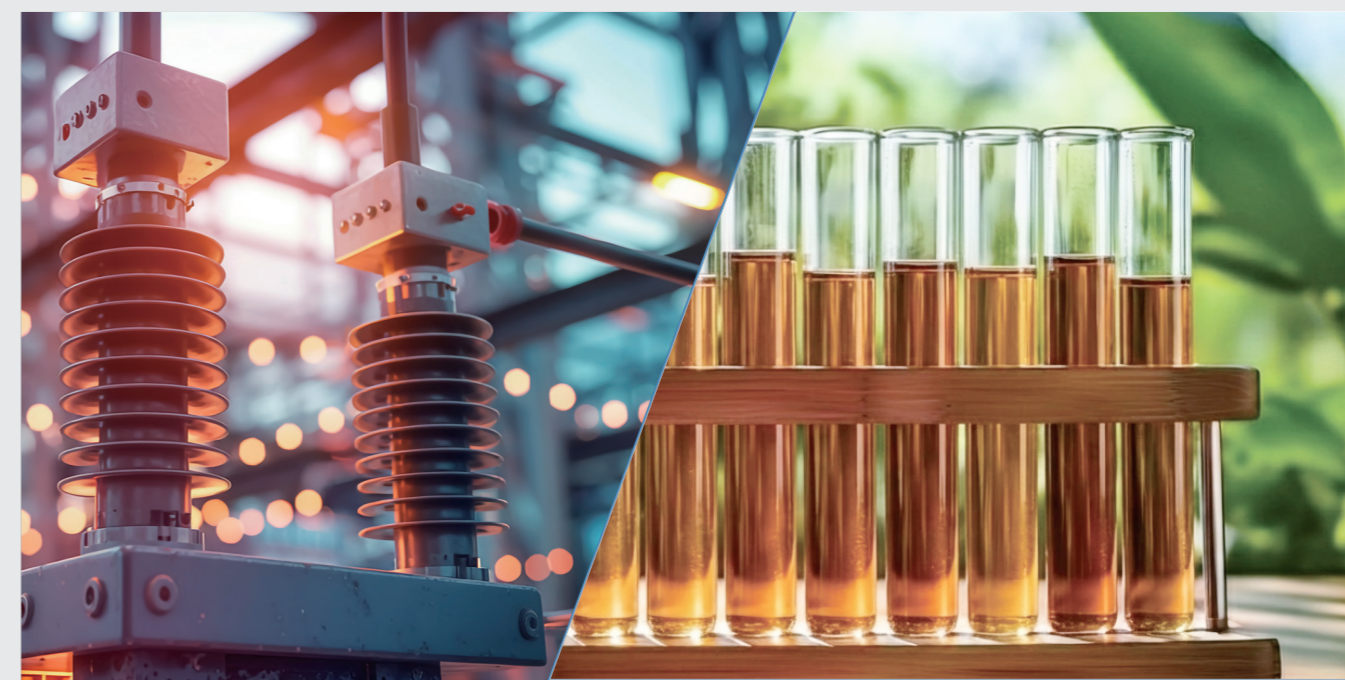
12 Insulation Epoxy System

Grade	EEW (g/eq)	Softening Point (°C)	Color (G)	Comments
NPEC-195	370~420	50~60	1.0 max.	Electronic Castings NPEC-195: NPEC-195H= 100: 30

Grade	Viscosity (cps/25°C)	Color (G)	Comments
NPEC-270	11000~15000	1.0 max.	MTR (Molding Resin Transformers System) NPEC-270A: NPEC-270B: NPEC-270C= 100: 80: 6

13 Bio-based Epoxy Resin

Grade	EEW (g/eq)	Hydrolyzable chlorine(ppm)	Viscosity (cps)	Appearance	Comments
NPEG-330	290~330	<1000	1650~3500/70°C	Dark Brown Liquid	Cardanol Novolac Epoxy Resin. Bio-based Carbon Content is 76%.
NPEG-D30	360~420	<1000	20~40/25°C	Yellow Liquid	Cardanol Glycidyl Ether. Bio-based Carbon Content is 100%.





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