

EPOXY RESINS & HARDENERS

PRODUCT INFORMATION



01 KER LIQUID EPOXY RESINS

Liquid "KER" Epoxy resins are used in several major industries, notably the paint industry (high-solid and solvent-free coatings), the electrical industry (casting, potting, encapsulation), the building industry (floorings, mortars, grouts, adhesives) and in many other applications e.g. structural laminates, high performance adhesives, etc. The KER range contains resins with different reactivities, viscosities and handling characteristics, which provide a wide choice to the user.

Grade	EGC (mmol/kg)	WPE (g/eq)	Viscosity@25°C (Pa.s)	Color (Pt/Co)	Hydro-Cl (mg/kg)	Remark
KER 215	4,800-5,200	192-208	0.7-1.1	Max. 100	-	Diluted with AGE, Low viscosity
KER 215HC	4,650-5,100	196-215	1.0-3.0	Max. 100	5,000-9,000	Diluted with AGE, Non-crystallization
KER 8132	4,650-5,130	195-215	0.5-0.7	Max. 100	-	Diluted with AGE, Low viscosity
KER 815	5,100-5,600	178-196	0.7-1.1	Max. 100	-	Diluted with n-BGE, Low viscosity
KER 815HC	4,651-5,128	195-215	0.8-1.6	Max. 100	17,500-19,500	
KER 815J	5,128-5,714	175-195	0.15-0.5	Max. 100	6,000-9,000	-
KER 8240	4,545-5,000	200-220	0.7-1.1	Max. 100	< 400	Diluted with AGE, BA
KER 880	5,263-5,376	186-190	12-14	Max. 100	< 300	Standard, Low α -glycol
KER 827	5,400-5,550	180-185	8.0-10.5	Max. 100	< 400	Standard
KER 828K	5,290-5,346	187-189	11-14	Max. 100	180-250	
KER 828	5,260-5,420	184-190	12-14	Max. 100	< 400	
KER 828EL	5,260-5,420	184-190	12-14	Max. 100	< 200	
KER 828A	5,200-5,400	185-192	12-15	Max. 100	1,000-2,000	Standard, Non-crystallization
KER 828H	4,878-5,348	187-205	12-18	Max. 100	5,000-10,000	Non-crystallization, Low viscosity
KER 828S	4,444-4,878	205-225	19-24	Max. 100	18,500-22,000	
KER 828HC	4,000-5,000	200-250	20-30	Max. 100	18,000-28,000	
KER 828LV	5,340-5,500	182-187	10-12	Max. 100	< 500	Low viscosity
KER 828HLV	5,350-5,520	181-187	9-11	Max. 100	< 400	
KER 829	5,076-5,235	191-197	3.0-7.0	Max. 100	-	High reactivity
KER 834	3,800-4,250	235-263	2.1-2.3 *	Max. 100	< 300	Semi-solid, Available in Solution
KER 836	2,990-3,450	290-334	2.0-3.6 *	Max. 100	-	
KER 8828HB	4,390-4,813	208-228	1.5-2.0	Max. 100	5,400-9,000	Diluted with Benzyl alcohol, Low viscosity

• 1 Pa.s = 10 Poise

• Viscosity * = 40wt.% Solid in MEK

02 KER SOLUTION EPOXY RESINS

High viscous liquid and low molecular weight epoxy resins are available as solutions in xylene or other various solvents. Principal applications for these are the same as for the base resins. Standard KER grades currently produced by Kumho P&B Chemicals include KER 834-X-80, KER 3001-X-75. High molecular weight KER epoxy resin solutions could be made available upon request.

Grade	EGC (mmol/kg)	WPE (g/eq)	Viscosity@25°C (Pa.s)	Color (Pt/Co)	Non-volatile (wt.%)	Remark
KER 827-X-90	5,260-5,555	180-190	Q-U *	Max. 100	89-91	
KER 828-X-90	5,260-5,420	184-190	-	Max. 100	89-91	
KER 834-X-80	3,800-4,250	235-263	-	Max. 100	79-81	
KER 834-X-85	3,800-4,250	235-263	-	Max. 100	84-86	
KER 834-X-90	3,800-4,250	235-263	-	Max. 100	89-91	
KER 836-C-75	2,990-3,450	290-334	-	Max. 100	74-76	
KER 836-X-80	2,990-3,450	290-334	2.5-5.0	Max. 100	79-81	
KER 1001-HU-65	2,000-2,220	450-500	U-W *	Max. 100	64-66	
KER 1001-FX-65	2,000-2,220	450-500	0.4-1.4	Max. 100	64-66	
KER 1001-X-70	2,000-2,220	450-500	2.5-4.0	Max. 100	69-71	
KER 1001-X-75	2,000-2,220	450-500	-	Max. 100	74-76	
KER 3001-CTR-50	2000-2,220	450-500	-	Max. 100	49-51	Ambient cure coatings
KER 3012-X-75	1,887-2,000	500-530	-	Max. 100	74-76	
KER 3001MSQ-X-75	1,818-2,000	500-550	Z4-Z8 *	Max. 100	74-76	
KER 3001-X-70	2,000-2,220	450-500	2.5-4.0	Max. 100	69-71	
KER 3001-X-75	2,000-2,220	450-500	8.0-14.0	Max. 100	74-76	
KER 3001-XK-60	2,000-2,220	450-500	H-P *	Max. 100	59-61	
KER 3002-X-75	1,420-1,600	625-704	-	Max. 100	74-76	
KER 3004-C-65	1,020-1,180	847-980	2.0-8.0	Max. 100	64-66	
KER 3004N-HU-60	1,064-1,130	885-940	Z-Z2 *	Max. 100	59-61	
KER 3004N-C-75	1,010-1,125	890-990	-	Max. 100	74-76	
KER 3004-CFT-50	1,000-1,110	901-1,000	0.25-0.4	Max. 100	49-51	
KER 3007-KSH-50	435-500	2,000-2,300	0.9-1.5	Max. 100	> 50	
KER 3007K-FLX-50	440-540	1,852-2,273	1.4-2.0	Max. 100	49-52	PCM
KER 3007K-QX-50	435-500	2,000-2,300	1.0-4.0	Max. 100	49-51	
KER 1007-LX-50	540-600	1,667-1,852	W+-Z1-	Max. 100	49-51	

- EGC , WPE : Solid based data
- Viscosity : Gardner viscosity

03 KER SOLID EPOXY RESINS

Solid KER epoxy resins are mainly used in the manufacture of solvent-borne paints, air-drying epoxy esters, can coatings, PCM(coil) coatings, powder coatings, printing wiring board and moulding powders. The KER grade range contains resins of different molecular weight. All solid KER epoxy resin grades manufactured by Kumho P&B Chemicals are characterized by a low and consistent hydrolyzable(or saponifiable) chlorine contents.

Grade	EGC (mmol/kg)	WPE (g/eq)	Viscosity@25°C (mPa.s)	Color (Pt/Co)	Remark	
KER 1001MSQ	1,740-2,000	500-575	6.3-7.9	Max.100	Less sintering than 1-type resin	
KER 3001	2,000-2,220	450-500	6.3-7.9	Max.100	Ambient cure, Marine & Heavy duty coatings	
KER 3001N	2,040-2,170	461-490	5.3-6.8	Max.100		
KER 3012	1,887-2,000	500-530	200-250 ^{*5}	Max.100	Less sintering than 1-type resin	
KER 3021	1,818-1,923	520-550	500-1,000 ^{*2}	Max.100	Powder coatings	
KER 3022H	1,587-1,695	590-630	G-L ^{*5}	Max.100		
KER 3022	1,429-1,667	600-700	5,000-15,000 ^{*1}	Max.100		
KER 3002	1,420-1,600	625-704	10.5-13.5	Max.100		
KER 3002N	1,515-1,560	641-660	8.9-9.8	Max.100		
KER 3002SQIP	1,420-1,600	625-704	1,200-2,000 ^{*2}	Max.100		
KER 3032	1,379-1,538	650-725	2,000-3,500 ^{*2}	Max.100		
KER 3003	1,260-1,420	704-794	13-17	Max.100		
KER 3033	1,190-1,370	730-840	3,500-7,000 ^{*2}	Max.100		
KER 1033	1,190-1,282	780-840	2,000-5,000 ^{*2}	Max.100		
KER 3003KFL	1,260-1,380	725-794	Flowing Agent 2.43-2.97(wt.%)	-		Contain Flow control Agent
KER 3003-FCA-10	1,135-1,295	770-880	Flowing Agent 9.0-11.0(wt.%)	-		
KER 3004S	1,204-1,282	780-830	3,000-7,000 ^{*2}	Max.100	Wire coatings	
KER 3035	1,111-1,250	800-900	2,000-5,000 ^{*2}	Max.100	Powder coatings, Can coatings	
KER 1004	1,053-1,177	850-950	15-25	Max.100		
KER 3004	1,020-1,180	847-980	20-25	Max.100		
KER 3004N	1,028-1,145	873-973	14.5-17.0	Max.100		
KER 3034	1,025-1,143	875-975	1,500-4,000 ^{*3}	Max.100		
KER 3004CD	1,020-1,080	926-980	16-22	Max.100		
KER 3004K	970-1,070	935-1,031	22-27	Max.100		
KER 3005K	833-910	1,100-1,200	1,300-2,300 ^{*4}	Max.100		
KER 3006N	600-660	1,515-1,665	32-48	Max.100		
KER 3007K	460-640	1,563-2,174	50-100	Max.100		
KER 7007	513-588	1,700-1,950	30-70	Max.100	Stoved coatings, Can coatings & primer coating for pre-coated Metal	
KER 1009	260-440	2,273-3,846	100-280	Max.100		

• KER BISPHENOL-F TYPE EPOXY RESINS

Liquid "KER" Epoxy resins are used in several major industries, notably the paint industry (high-solid and solvent-free coatings), the electrical industry (casting, potting, encapsulation), the building industry (floorings, mortars, grouts, adhesives) and in many other applications e.g. structural laminates, high performance adhesives, etc. The KER range contains resins with different reactivities, viscosities and handling characteristics, which provide a wide choice to the user.

Grade	EGC (mmol/kg)	WPE (g/eq)	Viscosity@25°C (Pa.s)	Color (Gardner)	Hydro-Cl (mg/kg)	Remark
KER 862F	5,556-6,250	160-180	2.0-5.0	Max.3	< 400	Liquid Epoxy
KER 3003F	1,205-1,370	730-830	1,000-4,000* ¹	Max.3	-	Solid Epoxy
KER 3005F	833-1,000	1,000-1,200	300-3,500* ²	Max.3	-	Solid Epoxy

- Viscosity *¹: cps, melt viscosity @ 150°C
- Viscosity *²: cps, melt viscosity @ 200°C

• KER BISPHENOL-A/F TYPE EPOXY RESINS

Grade	EGC (mmol/kg)	WPE (g/eq)	Viscosity@25°C (Pa.s)	Color (Pt/Co)	Hydro-Cl (mg/kg)	Remark
KER 232	5,600-5,760	173-179	4.5-6.0	Max.200	< 2,300	Blend of BPA / BPF type Epoxy
KER 234	5,480-5,660	176-183	6.5-8.5	Max.200	-	
KER 235	5,490-5,650	177-183	6.0-8.0	Max.200	-	
KER 236	5,430-5,590	178-185	8.0-10.0	Max.200	< 2,500	
KER 237	5,400-5,700	175-186	-	Max.200	-	Diluted with n-BGE
KER 240	5,100-5,400	185-197	0.7-1.1	Max.200	-	Diluted with Aliphatic Glycidyl Ether
KER 243	5,330-5,730	174-188	0.15-0.35	Max.200	-	Diluted with o-CGE
KER 246	5,600-5,900	170-179	0.6-0.8	Max.150	-	Diluted with 1,6-HDDGE
KER 283	5,000-5,550	180-200	0.7-1.2	Max.150	-	Diluted with Aliphatic Glycidyl Ether
KER 291	4,655-4,815	207-215	12-16	Max.200	-	Blend with Urethane type Additives

- 1 Pa.s = 10 Poise

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- Viscosity : 40wt.% Solid in MEK
- Viscosity *¹: melt viscosity @ 120°C
- Viscosity *²: melt viscosity @ 150°C
- Viscosity *³: melt viscosity @ 175°C
- Viscosity *⁴: melt viscosity @ 200°C
- Viscosity *⁵: 40wt.% Solid in Butyl Carbitol

04 KER SPECIALTY EPOXY RESINS

KER specialty epoxy resins(including solution type) are consisted of products confirmed by user test and designed with the newest technology for various requirements & applications. Rubber modified & Urethane modified epoxy resins can improve the adhesion strength, impact strength and flexural strength.

• ACID RESISTANCE EPOXY RESIN

Grade	WPE (g/eq)	Viscosity@25°C (Pa.s)	Color (Pt/Co)	Remark (Application)
KER 262	186-192	9-12	Max.100	Civil & Construction anti-acidity

• RUBBER MODIFIED EPOXY RESINS

Grade	WPE (g/eq)	Viscosity@25°C (Pa.s)	Color (Gardner)	Remark (Application)
KER 792	328-377	Semi-solid	Brown	Electrics & Electronics, Adhesives
KER 793	212-232	40-60	Brown	Electrics & Electronics, Adhesives

• URETHANE MODIFIED EPOXY RESINS

Grade	WPE (g/eq)	Viscosity@25°C (Pa.s)	Color (Gardner)	Remark (Application)
KER 740	230-270	5.0-12.0	Max.3	High Flexibility, Molding
KER 741	265-280	10-40* ¹	Max.5	Elasticity, Molding

* Viscosity at 40°C *¹

- ## KER 700 SERIES

High-OH value contained epoxy resin(KER 730) can improve the adhesion of urethane top coatings. Carboxyl group modified epoxy resin(KER 750) can improve the adhesion strength and water-resistance of the cure epoxy systems. Dimer acid modified (KER 774 series) epoxy resins can improve the adhesion strength and flexibility of the cured epoxy systems.

Grade	WPE (g/eq)	Viscosity@25°C (Pa.s)	Color (Gardner)	Non-volatile (wt.%)	Remark
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- ### POLYOL MODIFIED EPOXY RESIN

KER 730	OH Value (mmol/kg)	X-Z (Gardner)	Max.1	60±1	Marine & Heavy duty coatings, Urethane top coatings
	Min.3500				

- ### ALIPHATIC MODIFIED EPOXY RESINS

KER 721-MU-50	-	X-Z ₂ (Gardner)	Max.5	50±1	Can coating
KER 722-C-50	1,650-1,900	0.5-3.0	Max.10	50±1	Plastic coating
KER 750	752-833	U--W + (Gardner)	Max.1	65±1	Marine & Heavy duty coatings
KER 760-X-90	230-270	1.0-4.0	Max.5	90±1	Marine & Heavy duty coatings
KER 774	600-700	Semi-solid	Max.12	-	Marine & Heavy duty coatings, Adhesives
KER 774-X-75	600-700	X-Z (Gardner)	-	75±1	Marine & Heavy duty coatings
KER 775	280-380	32-52	-	-	Adhesives
KER 778	182-222	1.0-5.0	Max.5	-	Filament Winding
KER 776-X-90	258-294	2.4-4.6	Max.6	90±1	Marine & Heavy duty coatings

- KER & KCA 9000 WINDTURBINE BLADE EPOXY SYSTEM SERIES**

Kumho P&B windturbine blade epoxy system, KER & KCA 9000 series, approved by the Germanischer Lloyd for windturbine blade. There are two types of epoxy system which are infusion epoxy and hand lay-up epoxy. The system is very suitable for infusion and hand lay-up process.

Epoxy Resin	Curing Agent	Mixing Ratio (part by weight)	Mixed Viscosity@25°C (cps)	Gel time at 25°C 100g (min)	Remark (Application)
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- INFUSION EPOXY SYSTEM**

KER 9100	KCA 9100	100:30	200-300	450-550	Windturbine blade, Tooling, Moulding, Ship building, etc.
	KCA 9120			350-450	
KER 9200	KCA 9210	100:31	200-500	300-400	
	KCA 9220	100:28		150-250	

- HAND LAY-UP EPOXY SYSTEM**

KER 9500	KCA 9510	100:39	900-1,300	15-35	Windturbine blade, Laminating, Adhesives, etc.
	KCA 9520	100:27		30-100	

- ADHESIVES**

KER 9900	KCA 9910	100:45	Thixotropic	80-120	Windturbine blade, Tooling, Composites, etc.
	KCA 9920			150-250	

05 KWER WATERBORNE - EPOXY RESIN & CURING AGENT

KWER(Kumho Waterborne Epoxy Resins) series are designed for use in waterborne, two-package coatings. When combined with curing agents, KWER offers the potential for high performance aqueous system.

• WATER-BORNE EPOXY RESINS

Grade	WPE (g/eq)	Viscosity@25°C (cps)	Appearance	Non-volatile (wt.%)	Remark (Application)
KWER 828S	200-220	7,000-15,000	Max. 100	100	Civil & Construction adhesives, Coating, Sizing
KWER 828-70	191-213	500-7,000	Milky	70±2	
KWER 834-60	225-269	200-7,000	Milky	60±2	
KWER 1001-47	450-550	500-5,000	Milky	47±2	
KWER 1001-50	450-550	1,000-10,000	Milky	47±2	
KWER 1001-55	476-555	100-2,000	Milky	55±2	1-Pack system, Marine & Heavy duty coatings
KWER 727-45	-	300-5,000	Milky	45±1	
KWER 728-40	-	1,000-10,000	Milky	40±1	

• WPE : Solid base

• WATERBORNE CURING AGENT

Grade	Amine Value (mgKOH/g)	Viscosity@25°C (cps)	Non-volatile (wt.%)	AHEW (g/eq)	Solvent	Remark (Application)
KCA 7701	390-450	1,000 ~ 6,000	68-72	80-100	Water	Adhesives, Putty
KCA 7702	320-370	5,000 ~ 12,000	-	95-115		Adhesives
KCA 7705	100-160	1,000 ~ 10,000	58-62	290	Water	Coating
KCA 7707	120-160	1,000 ~ 5,000	58-62	260-290	Water	
KCA 7708	220-270	5,000 ~ 10,000	78-82	140-150	Water	Metal coating
KCA 7709	180-200	5,000 ~ 10,000	50-54	180-200	Water	
KCA 7710	200-300	20,000 ~ 40,000	68-72	190-200	Water	Industrial coating, Flooring, Civil Eng
KCA 7601	120-220	10,000 ~ 25,000	58-62	195-210	Water	Civil Eng Flooring

06 CURING AGENT

Epoxy curing agents are used to cure epoxy resins by reacting with the epoxide groups or by promoting self-polymerization of the epoxy by catalytic action. Application characteristics and final physical properties can be tailored by the choice of curing agent. Kumho P&B Chemicals offers epoxy curing agents for a wide variety of coatings applications. Kumho curing agent (KCA series) are designed for paint, adhesives, heavy duty coatings, grouting, mortar, flooring, etc. Each KCA series has different properties for the various demands.

Grade	Amine Value (mgKOH/g)	Viscosity@25°C (cps)	Non-volatile (wt.%)	AHEW (g/eq)	Solvent	Remark (Application)	
• POLYAMIDE							
KCA 2100	90-100	semi-solid		450-500		Inks, Paints	
KCA 2230	200-240	50,000-70,000**		165-185		Paints, Adhesives	
KCA 2300	280-320	8,000-12,000**		120-140			
KCA 2310	280-340	2,500-4,500		100-120			
KCA 2311	280-340	2,500-4,500		90-110			
KCA 2311G	270-330	8,000-14,000		90-110			
KCA 2312	260-320	6,000-11,000		90-110			
KCA 2313	260-320	6,000-11,000		90-110			
KCA 2314	260-320	7,000-11,000		90-110			
KCA 2330	300-360	500-1,000		95-115			Paints, Adhesives for Grouting
KCA 2340	310-370	10,000-20,000		80-100			Paints, Adhesives
KCA 2341	365-395	15,000-25,000		105-115			
KCA 2400	370-430	1,500-3,000		60-80			
KCA 2483	180-220	2,700-6,400		130-135			

• Viscosity at 40°C

• POLYAMIDE SOLUTION						
KCA 2230-X-70	130-170	T-W*	68-72	165-185	Xylene	Paints, Adhesives
KCA 2300-X-70	210-250	L-P*	68-72	84-98	Xylene	
KCA 2300-X-80	225-255	X-Z1*	78-82	96-112	Xylene	
KCA 2300-T-80	225-255	L-Y*	78-82	96-112	Toluene	
KCA 2322-XB-60	90-120	1,500-4,500	58-62	370-385	Xylene, Butanol	

• POLYAMIDE ADDUCT						
KCA 3307	220-280	12,000-20,000**		190	-	Paints, Adhesives
KCA 850-X-75	120-160	3,000-7,000	73-77	260-280	Xylene	
KCA 860-XB-70	120-160	4,500-8,500	68-72	320-340	Xylene, Butanol	
KCA 3530	260-320	800-2,000		90-110	-	
KCA 3420	110-150	Z-Z3*	58-62	350-390	Xylene, Butanol	

Kumho P&B Chemicals, Inc. also offers special curing agents such as high performance modified curing agents, waterborne technology epoxy curing agents and mannich type rapid curing agents in the following chart.

Grade	Amine Value (mgKOH/g)	Viscosity@25°C (cps)	Non-volatile (wt.%)	AHEW (g/eq)	Solvent	Remark (Application)
• MODIFIED POLYAMINES						
KCA 4102	650-750	50-200		55-75		For Grouting & Resin mortars
KCA 4103	600-660	300-900		45-50		
KCA 4104	345-385	400-900		90-100		For Flooring (summer)
KCA 4106M	360-420	100-200		85-105		For Low viscosity Building stones
KCA 4110	340-390	50-150		84		Great in Anti-chemicals
KCA 4112-1	350-410	150-350		70-80		For Flooring (winter)
KCA 4115	420-480	500-2,000		75-85		Accelerating Curing Agent for other curing agent
KCA 4303	220-330	300-500		95-115		Anti-being yellow color, High Solid coatings
KCA 4304	295-335	400-800		100-120		
KCA 4305	360-420	300-900		80-100		For flooring
• MANNICH TYPE CURING AGENT						
KCA 4108H	450-500	500-4,000		70-80		For fast curing, Great in anti-chemicals
KCA 4836	340-380	200-500		73-83		Low temperature cure, Self-leveling floorings
KCA 5001	300-335	25,000-45,000		125-135		Phenalkamine type
KCA 5001-X-90	250-300	2,500-4,500	90	139-149	Xylene	Phenalkamine type
KCA 5103-XB-80	200-250	2,000-4,000	80	164	Xylene, Butanol	Phenalkamine type
KCA 5113-XI-80	160-190	2,000-4,000	80	255	Xylene, IPA	Phenalkamine type
KCA 54K	610-640	50-500				Cure accelerator

• Viscosity * : Gardner Viscosity

SEOUL OFFICE

8F, East wing, Signature Towers, #100,
Cheonggyecheon-ro, Jung-gu, Seoul, 04542, Korea

Overseas Marketing Team

·Epoxy Tel 82-2-6961-6864 / 6863

Domestic Marketing Team

·Epoxy Tel 82-2-6961-3461 / 3452

YEOSU PLANT(I)

#218, Yeosusandan 2-ro, Yeosu-si, Jeollanam-do, 59611, Korea
Tel 82-61-688-3670~3 Fax 82-61-688-3599

YEOSU PLANT(II)

#46-53, Yeosusandan 2-ro, Yeosu-si, Jeollanam-do, 59611, Korea
Tel 82-61-688-3870~2 Fax 82-61-688-3819

Kumho P&B Gimpo R&D Center

#53, Hwanggeum 4-ro, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea