



# **VAE** Emulsion Products

Vinyl Acetate Ethylene Emulsion

## Introduction of EVA Business Unit

When Dairen Chemical Corporation (DCC) started to manufacture vinyl acetate in 1983, she has researched and developed the derivatives of vinyl acetate. Therefore DCC succeeded in manufacturing VAE Emulsion in 1985 and became only VAE Emulsion manufacturer in Asia besides Japan. Endeavoring in continuous R&D and quality improvement, DCC has enjoyed a strong brand recognition in the market. Nowadays, the production capacity has reached 330,000 MTY. DCC has become the largest VAE Emulsion manufacturer in Asia and the third in the world.

In 1994, DCC commenced to manufacture VAE Powder, a white free-flowing Vinyl Acetate-Ethylene copolymer base powder, is easily redispersible in water to form stable emulsion. The production capacity has reached 52,000 MTY in 2009. As well, DCC has become the largest VAE Powder manufacturer in Asia and the third in the world.

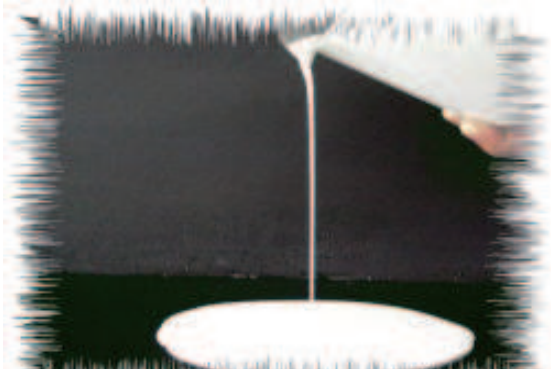
In 2004, DCC started to manufacture EVACL & EVCL emulsion and was the only EVACL & EVCL emulsion manufacturer in Asia.

DCC was divided into two business units. One of them is EVA business unit and there are three manufacture sites situate at Taiwan (Kaohsiung Ta-She), Malaysia (Johor) and China (Yizheng) which manufacture VAE emulsion, VAE powder and EVACL/EVCL emulsion. Our customers are from all over the world, including China, Japan, Korea, India, Southeast Asia, Australia, America, Europe, etc. With the global market and manufacture, we will dedicate to provide more competitive and high quality products to meet the diverse needs of our customers.

### Manufacture Base of EVA Business Unit

Product	Kaohsiung Factory	Jiangsu Factory	Malaysia Factory	Production Capacity(2011)
VAE Emulsion	✓	✓	✓	330,000 MTY
VAE Powder	✓	✓		52,000 MTY
EVACL Emulsion			✓	11,000 MTY

VAE Emulsion is a milky white Vinyl Acetate-Ethylene copolymer emulsion without any plasticizer. Because of its ethylene content to make a much more flexible film and show increased affinity to non polar substrates, totally without external plasticization are preferred raw materials for formulating adhesives, construction, paint, paper coatings and nonwovens uses. which also offers the following special characteristics:



1. Initial Adhesive Strength
2. Good Creep Resistance
3. Water Resistance
4. Alkali Resistance
5. Good Thickening Response
6. Operation Safety

## Main Application of VAE Emulsion



Substrate	Coated paper	OPP film	PE film	PVC film	Nylon fabric	Polyester fabric	Cotton fabric	Wood fabric	Aluminium foil	Zinc Plate	Tin Plate	Synthetic foam	Concrete Cement
Paper	⊙	⊙	○	○	⊙	○	○	○	⊙	⊙	⊙	○	⊙
Coated paper	△	△	△	△	△	△	⊙	⊙	△	△	×	×	⊙
OPP film		×	×	×	×	×	○	○	○	○	×	×	○
PE film			×	×	×	×	○	○	○	○	×	×	○
PVC film				×	×	×	⊙	⊙	△	△	×	×	○
Nylon fabric					△	△	⊙	⊙	○	○	×	○	○
Polyester fabric						△	⊙	⊙	△	△	×	○	○
Cotton fabric							⊙	⊙	○	○	△	⊙	⊙
Wood fabric								⊙	⊙	⊙	○	⊙	⊙
Aluminium foil									△	△	×	△	△
Zinc Plate										△	×	△	○
Tin Plate											×	△	△
Synthetic foam												△	⊙
Concrete Cement													⊙



## Grade List

Emulsion Product		Application					Typical Property			
Grade	Polymer Type	Adhesive	PSA	Construction	Textile & Paper	Paint	Solid Content* (wt%)	Viscosity* (cP) (25°C, 60rpm)	pH*	Free Monomer* (wt%)
DA-100L	VAE	●		●	○	○	54.5min	500~1000	4.5~6.5	0.5max
DA-100	VAE	●		●	○	○	54~56	1100~1600	4.5~6.5	0.5max
DA-101	VAE	●		●	○	○	55min	1500~2500	4.5~6.5	0.5max
DA-102	VAE	●		●	○	○	55min	2500~3700	4.5~6.5	0.5max
DA-102H	VAE	●		●	○	○	55min	3500~4500	4.5~6.5	0.5max
DA-103	VAE	●		●	○	○	60min	1500~2500	4.5~6.5	0.5max
DA-103H	VAE	●		●	○	○	60min	3200~4200	4.5~6.5	0.5max
DA-104	VAE	●		●			55min	2000~3000	4.5~6.5	0.5max
DA-107	VAE	●		●	○	○	65min	1000~2500	4.5~6.5	1.0max
DA-111	VAE	●		●	○	○	55min	1500~2500	4.5~6.5	0.5max
DA-117	VAE	●		●	●		65min	500~1500	4.5~6.5	0.1max
DA-125	VAE	●		●			55min	2500~3500	4.5~6.5	0.5max
DA-128	VAE	●		●			59~61	5000~7500	4.5~6.5	0.5max
DA-141	VAE	●		●	○	○	55min	1500~2500	4.5~6.5	0.1max
DA-179	VAE	○		●			54min	500~1000	4.5~6.5	0.1max
DA-180L	VAE	●		●	○	○	54.5min	500~1000	4.5~6.5	0.5max
DA-183	VAE	●		●	○	○	55min	1500~2500	4.5~6.5	0.5max
DA-265	VAE+Acrylate	●	●				65min	1000~2000	4.5~6.5	1.0max
DA-265H	VAE+Acrylate	●	●				65min	2000~3000	4.5~6.5	1.0max
DA-310	Carboxylated VAE	●					60min	1000~2000	3.5~5.5	1.0max
DA-371	VAE	○	○	○	○	●	54~56	500~1000	4.5~6.5	0.05max
DA-502	VAE	●					54.5min	3000~4000	4.5~6.5	0.5max
DA-511	VAE	●					55min	1500~2500	4.5~6.5	0.1max
DA-524	VAE	●					55min	1500~2500	4.5~6.5	0.3max
DA-652	VAE	●		○		○	54~57	15000~20000	4.0~7.0 <sup>Δ1</sup>	0.5max
DA-691	VAE	○	○	○	●	○	55min	100~500	6.0~7.5	0.5max

● Typically use      ○ usable      Δ1 25°C.30rpm

\* Marked items are ex-work delivery specification. All other figures are typical physical properties for reference only.

Protective Colloid	Ionic Type	Tg (onset, °C)	Special Feature	Grade	
PVA	nonionic	0	DA series is a vinyl acetate-ethylene copolymer emulsion, the ethylene component provides internal plasticization. DA series have excellent plasticizer /solvent thickening response , good adhesion and creep resistance, good water and alkali resistance etc. , also is suitable for bonding variety of materials including PVC, plastic film, synthetic foam, paper, wood, cotton cloth, nylon/polyester fabric, textile and carpet backing etc.Uses in construction field as primer,tile adhesives and grouts, latex-modified concrete/mortar ( polymer modified concrete/mortar).	DA-100L	
PVA	nonionic	0		DA-100	
PVA	nonionic	0		DA-101	
PVA	nonionic	0		DA-102	
PVA	nonionic	0		DA-102H	
PVA	nonionic	0		DA-103	
PVA	nonionic	0		DA-103H	
PVA	nonionic	-15		Low Tg type, flexible adhesive special for low temperature packaging	DA-104
PVA	nonionic	0		High solid type, general adhesive and construction application	DA-107
PVA	nonionic	14	High Tg type, general adhesive and construction application	DA-111	
Cellulose	anionic	0	Suitable for joint compounds and decorative coatings	DA-117	
PVA	nonionic	-8	Low Tg type, special for low temperature packaging	DA-125	
PVA	nonionic	-13	Low Tg type, special for low temperature packaging	DA-128	
PVA	nonionic	0	Similar as DA-101, low free monomer type	DA-141	
PVA	nonionic	0	Excellent compatibility for cement application	DA-179	
PVA	nonionic	0	Excellent compatibility for cement application	DA-180L	
PVA	nonionic	0	Excellent compatibility for cement application	DA-183	
Cellulose	anionic	-25	Suitable for PSA (base,or modifier), plastics lamination adhesive	DA-265	
Cellulose	anionic	-25	Suitable for PSA (base or modifier), plastics lamination adhesive	DA-265H	
PVA	anionic	0	Suitable for packaging, laminating metal bonding especially foil lamination	DA-310	
PVA	anionic	10	Suitable for Low VOC paint application with good scrub-resistance	DA-371	
PVA	nonionic	0	Suitable for packaging, good heat and water resistance	DA-502	
PVA	nonionic	15	Suitable for packaging, good heat and water resistance	DA-511	
PVA	nonionic	20	Suitable for packaging, good heat and water resistance	DA-524	
PVA	nonionic	0	High viscosity type, suitable for no solvent condition	DA-652	
PVA	nonionic	0	Good heat and water-resistance for wood adhesion	DA-691	

**Package of VAE Emulsion**

Packaging Material	Capacity	20" Container Load	Photo
50 kg OPEN TOP HDPE DRUM	( 50 kg / drum )	360 drums (18mt)	
100 kg (820M/M) OPEN TOP IRON DRUM	( 120 kg / drum )	130 drums (15.6mt)	
220 kg ISO OPEN TOP IRON DRUM	( 220 kg / drum )	80 drums (17.6mt)	
220 kg OPEN TOP IRON DRUM BLUE	( 220 kg / drum )	78 drums (17.16mt)	
1MT IBC PAPER CONTAINER	( 1,000 kg / piece )	20 cases (20mt)	
1MT IBC PE CONTAINER	( 1,000~1,100 kg / piece )	18 cases (18~19.8mt)	
PE FLEXIBLE BAG	( 20,000 kg / piece )	1 container (20mt)	



### Main Products of DCC

PRODUCTS	SUPPLY	PRODUCTS	SUPPLY
Vinyl Acetate	■	1,4-Butanediol	■ ■ ■
VAE Emulsion	■ ■ ■	2-Methyl-1,3-Propanediol	■ ■ ■
Nitrogen	■ ■ ■	n-Propanol	■ ■ ■
VAE Powder	■ ■	Iso-Butanol	■ ■ ■
Allyl Alcohol	■ ■ ■	Polyteramethylene-Ether-Glycol	■ ■ ■
Liquified Carbon Dioxide	■	Tetrahydrofuran	■ ■ ■

■ KTS, Kaohsiung Ta-She Factory, Taiwan    
 ■ KTF, Kaohsiung Ta-Fa Factory, Taiwan    
 ■ YML, Yunlin Mai-Liao Factory, Taiwan  
■ DCM, Johor Factory, Malaysia    
 ■ DCJ, Jiangsu Factory, China



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