

# Dibasic Esters (DBE)

# **Product Description**

Dibasic esters (DBEs) are refined dimethyl esters of adipic, glutaric, and succinic acids. The primary product is designated DBE. DBE is further distilled to produce six DBE fractions for specialty applications: DBE-2, DBE-3, DBE-4, DBE-5, DBE-6, and DBE-9. DBEs are clear, colorless liquids having a mild, agreeable odor. They are readily soluble in alcohols, ketones, ethers, and many hydrocarbons, but are only slightly soluble in water and higher paraffins.

 $CH_{3}OOC(CH_{2})_{4}COOCH_{3}$  $CH_{3}OOC(CH_{2})_{3}COOCH_{3}$  $CH_{3}OOC(CH_{2})_{2}COOCH_{3}$ 

# **Applications**

#### Solvents

Industrial coatings Coil/sheet coatings Waterborne coatings Magnet wire coatings Automotive coatings Industrial cleaners Resin cleanup Paint removers Foundry core binders Printing inks Textile lubricants Magnetic memory disc coatings Urethane reaction solvents Peroxide solvents Chemical grouting/soil stabilization

### Plasticizers

Fugitive Permanent diester and polyesters

#### **Polymer Intermediates**

Polyester polyols for urethanes Wet-strength paper resins Polyester resins

#### **Specialty Chemical Intermediates**

Quinacridone pigments

## **Storage and Handling**

Dibasic esters are readily available from INVISTA in large quantities (million lb/yr) for growth applications.

Shipping Name—Dibasic ester mixture

Freight Classification—Resin solvents, NOIBN

DOT Classification—These products are not classified as hazardous materials.

#### Packages

Tank Trucks Tank Car Drums 45,000 lb net wt. 170,000 lb net wt. 523 lb gross wt. 485 lb net wt.



General Information							
Typical Compositions, wt%	DBE	DBE-2	DBE-3	DBE-4	DBE-5	DBE-6	DBE-9
Dimethyl Adipate	21	24	89	_	0.1	98.7	0.2
Dimethyl Glutarate	59	75	10	0.3	99	<0.5	66
Dimethyl Succinate	20	0.3	0.2	98.4	0.4	<0.1	33
Methanol	0.2	<0.1	<0.1	< 0.1	< 0.1	<0.1	< 0.1
Water	0.05	0.02	0.04	0.02	0.03	0.03	0.04
Physical Properties							
Molecular Weight	159 <sup>a</sup>	163ª	173ª	146	160	174	156ª
Sp. Gr. at 20/20℃ <sup>b</sup>	1.092 <sup>c</sup>	1.081 <sup>c</sup>	1.068 <sup>c</sup>	1.121	1.091	1.064	1.099 <sup>c</sup>
Density at 20 °C (lb/gal)	9.09 <sup>c</sup>	9.00 <sup>c</sup>	8.89 <sup>c</sup>	9.33	9.08	8.86	9.15 <sup>c</sup>
Distillation Range, °C	196–225	210-225	215-225	196	210-215	227-230	196–215
Vapor Pressure at 20 °C (Torr)	0.2 <sup>d</sup>	0.04 <sup>d</sup>	0.02 <sup>d</sup>	0.13	0.05	0.01	0.07 <sup>d</sup>
Solubility in Water, wt% at 20℃	5.3	4.2	2.5	7.5	4.3	2.4	~5
Water Solubility in DBEs, wt% at 20℃	3.1	2.9	2.5	3.8	3.2	2.4	~3.5
Freezing Point, °C	-20 <sup>c</sup>	-13 <sup>c</sup>	8	19	-37	10	-10 <sup>c</sup>
Flash Point, Tag Closed Cup, C (F)	100 (212)	104 (219)	102 (216)	94 (200)	107 (225)	113 (235)	94 (202)
Auto Ignition Temp., °C	370	375	360	365	365	360	365
Latent Heat of Vaporization, cal/g	81	80	79	85	81	79	82
Viscosity at 25 °C, cst.	2.4	2.5	2.5	2.5	2.5	2.5	2.4
Solvent Properties							
Solubility Parameters <sup>e</sup>							
Nonpolar	8.3	8.3	8.3	8.3	8.3	8.3	8.3
Polar	2.3	2.2	2.1	2.5	2.3	2.1	2.3
Hydrogen Bonding	4.8	4.7	4.5	5.0	4.8	4.5	4.8
Surface Tension at 20°C, dyn/cm	35.6	N/A	N/A	N/A	N/A	N/A	N/A
Electrical Resistance <sup>r</sup> at 24°C, megohms	0.5	N/A	N/A	N/A	N/A	N/A	N/A
Specifications							
Ester Content, wt% min.	99.0	99.0	99.0	98.5	99.0	99.0	99.0
Water Content, wt% max.	0.10	0.10	0.20	0.04	0.10	0.05	0.10
Acid Number, max.	0.30	1.00	1.00	0.50	0.50	1.00	0.50
Composition Range							
Dimethyl Adipate	10–25	20–28	85–95	0.1 (max.)	0.2 (max.)	98.5 (min.)	0.3 (max.)
Dimethyl Glutarate	55–65	72–78	5–15	0.4 (max.)	98.0 (min.)	1.0 (max.)	65–69
Dimethyl Succinate	15–25	1.0 (max.)	1.0 (max.)	98.0 (min.)	1.0 (max.)	0.15 (max.)	31–35
Color, APHA, max.	15	15	15	15	15	15	15
Turbidity, ppm, max.	5	5	5	5	5	5	5
<sup>a</sup> Average for mixture	<sup>d</sup> Calculated for typical composition using Antoine constants determined according to ASTM D-1719.						
<sup>b</sup> sp. gr./T = $-0.0007$ per °C over the range 20–50 °C	<sup>e</sup> Hansen Solubility Theory						
<sup>c</sup> Approximate, based on composition	<sup>†</sup> Ransberg Paint Resistance Tester Model 219CB						

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For Samples and Information:

#### INVISTA<sup>™</sup> Specialty Intermediates • (800) 231-0998

#### World Wide Web address: www.intermediates.invista.com

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