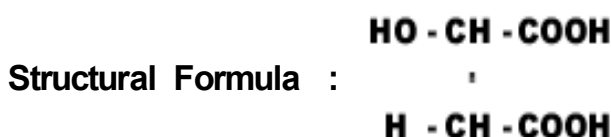


DL-Malic Acid (Food Grade)

Chemical Formula : C₄H₆O₅
 Molecular Weight : 134.09
 CAS. No : 617-48-1(6915-15-7)
 INS Number : E296



1. Specification

Item	Unit	Specification	Test Method
Appearance	-	White Crystalline Granular Powder	Visual
Assay	wt%	99.5Min	FCC
Fumaric Acid	wt%	1.0Max	USP
Maleic Acid	wt%	0.05Max	USP
Arsenic(as As ₂ O ₃)	ppm	0.5Max	FCC
Heavy Metals(as Pb)	ppm	10Max	FCC
Residue on ignition	wt%	0.05Max	FCC
Water Insoluble Matter	wt%	0.1Max	FCC
Solubility	-	Very soluble in water; freely soluble in ethanol	JECFA
Iron	ppm	5Max	Absorption Spectrophotometry (Orthophenanthroline)
Lead	ppm	2Max	FCC
Mercury	ppm	1Max	KFAC
Chloride	ppm	30Max	KFAC
Melting Point	℃	127 ~ 132	KFAC
Clarity		Clear	KFAC
Moisture	wt%	0.4Max	Karl Fischer Titrator
Test of Malate	-	Passed	KFAC

- KFAC : Korea Food Additives Code
- FCC : Food Chemicals Codex, U.S.A
- USP : U.S Pharmacopeia

2. Country of Origin

- Republic of Korea

3. Particle Size

General Grade (Typical Value)

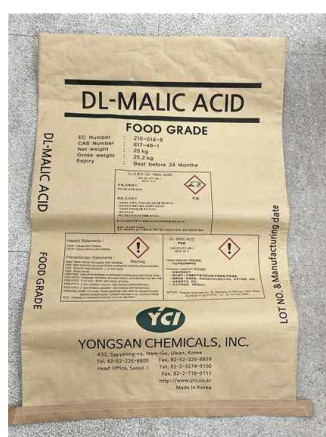
- Through 12Mesh : 99% Min
- Through 100Mesh : 15% Max

Fine Granular Grade (Typical Value)

- Through 25Mesh : 99% Min
- Through 100Mesh : 20% Max

4. Packing

- Packing type : 25kg Bag
- Material : Kraft × PP Woven with inner PE tube
- Pallet Material : Wood
- Pallet Size : 1,050±5mm(W) × 1,100±5mm(L) × 116mm(H)
- Quantity per Pallet : 1MT (25kg/bag × 5bag/layer × 8layer/Pallet)



25kg Bag



40Bag Pallet

5. Lot Code Explanation

■ K24GE 0123

K : DL-Malic Acid Product Code, 24 : Year Code

GE : Product Grade Code (GE : General Grade)

0 : Packing Bag

123 : Lot Serial Number (5MT per Lot)

6. Shelf Life

We hereby certify that the shelf life of our Malic Acid is 24 months from manufacturing date as the following conditions.

- (1) Avoid multi-stacking on top of each other.
- (2) Avoid long term storage.
- (3) Avoid direct sunlight.
- (4) Store in dry and good air ventilating place.
- (5) Refer to MSDS for other categories.

7. Stability Data

Elapsed Time (months)	Purity (wt%)	Moisture (wt%)
0	99.8	0.24
6	99.8	0.21
12	99.8	0.19
18	99.8	0.18
24	99.8	0.16
30	99.8	0.15

Storage Condition : 25kg Product Bag, 30months(2005.11.5.~2008.5.8.), Warehouse

8. Physical Properties

■ Solubility in Water

Temperature (°C)	Solubility (wt%)
5	48
25	58
75	75

Reference : Encyclopedia of Chemical Technology

■ Density of Aqueous Solution at 15°C

Concentration (g/ℓ)	Density (d15/15, g/ml)
30	1.115
40	1.151
50	1.186
60	1.220

Reference : Encyclopedia of Chemical Technology

9. Applications

- Soft Drinks
- Canned Fruits and Vegetables
- Fruit Juices
- Candies and Chewing Gum
- Gelatin Desserts