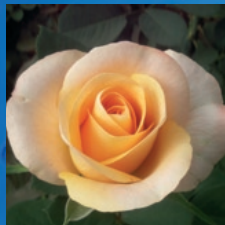
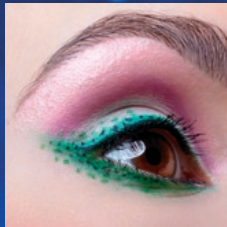


Chelates Product Guide



Agriculture
Building and Construction
Cleaning and Detergents
Industrial Cleaning
Food preservation
Metal plating and Electronics
Oil industry
Personal care
Photography
Polymer production
Pulp and Paper

Dissolvine® chelates

The versatile solution to metal ion control

Metal ions have a powerful influence on chemical processes as well as on the performance of many products. A wide range of problems associated with metal ions can be solved using Dissolvine® chelates; from improving the efficiency of pulp bleaching to cleaning dairies, from increasing crop quality and yields to preserving food quality.

2



For more info and up to date addresses please check our websites:

www.dissolvine.com
www.dissolvinegl.com
www.akzonobel.com/micronutrients
www.ferrazone.com



3

How do Dissolvine® chelates work?

Dissolvine® is the AkzoNobel brand name for products known as chelates, chemicals that control the reactivity of metal ions.

As the word 'chele' implies (it's Greek for crab's claw), chelates seize a metal ion and control it, making it very difficult for another substance to liberate it. Dissolvine® chelates form strong, water-soluble complexes that prevent undesirable precipitation, dissolve scale deposits and optimize oxidation processes. Our Dissolvine® chelate product range includes chelating agents that bind and control metal ions, as well as metal chelates

that introduce the right form of metal ions into a product or process. For example, metal cations like calcium, magnesium and barium can form low water-soluble salts with carbonates, sulfates and phosphates that precipitate out of aqueous systems. These precipitates form scales that are extremely difficult to remove and reduce the efficiency of boilers and chemical processing equipment. When Dissolvine® chelating agents are added to these systems, they complex the metal ions into a water-soluble form and dissolve the scale deposit so that it is removed in the cleaning process.



**Dissolvine®
chelates
For every
application**

Where can Dissolvine® chelates make a difference?

In virtually any industrial process which uses water, Dissolvine® chelates can add or remove metals in a controlled way.

Removing unwanted metal ions

In many applications chelates are used to remove or alter the properties of metals that are detrimental to the process, for instance, reducing water hardness or removing scales. Examples include:

Preventing precipitation, removing scale, or dissolving metals

- agricultural applications
- mining processes
- oil and gas production and processing

Controlling metal catalyzed reactions

- building applications
- food and feed products
- personal care products
- polymer production
- pulp and paper production

Reducing the toxic effects of metals

- fish hatchery processes
- pharmaceutical products

Preventing precipitation and controlling metal catalyzed reactions

- cleaners and detergents
- electronics
- industrial cleaning
- metal plating
- photography
- textile processing

Introducing metal ions

At other times you may want to introduce metal ions into an application in just the right 'form'. For instance:

Oxidizing or reduction agent

- H₂S gas sweetening
- photography
- NO_x removal

Transforming trace metals into water soluble complexes

- agriculture
- food fortification

Wherever you use a Dissolvine® chelate, it can significantly improve the efficiency and cost effectiveness of your process.

The Dissolvine® chelates product line is the most extensive there is, with chelates available for many industrial processes. The primary applications are described below, but please contact our representatives for more information related to your specific needs.

Agriculture

Every crop needs several kinds of nutrients. Dissolvine® metal chelates act as carriers for micronutrients, ensuring that plants get the trace elements they need, regardless of environmental conditions. Products can be applied on or in the soil or can be sprayed onto plants. High-purity metal chelates are available to meet the rigorous demands of soil-less culture (hydroponics). Chelates can be used to soften water in order to prevent or dissolve scale in drip irrigation. They can also be applied in combination with pesticides. A special brochure on AkzoNobel micronutrients is available from our representatives. See also www.akzonobel.com/micronutrients

Building & Construction

Rapid setting of Portland cement and gypsum can be a problem. For example, in modern gypsum board mills the proper balance of multiple admixtures is essential for optimal operation. Dissolvine® chelates are applied as synthetic retarding agents, giving more flexibility to the production process.

Cleaning and detergents

Dissolvine® chelating agents deactivate the unwanted heavy metal ions that are often introduced through raw materials in the manufacture of soap and of detergents that contain peroxides like hydrogenperoxide, percarbonates and perborates. Chelates boost the effectiveness of biocides and can be used efficiently to soften the water and act as (co-)builder in detergents.

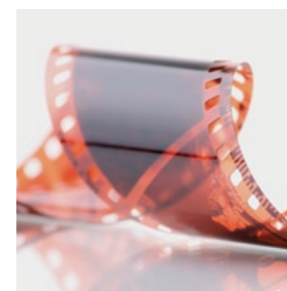
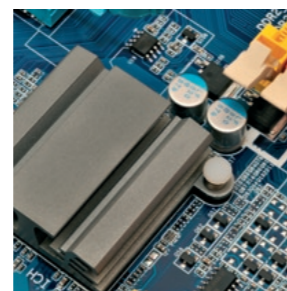
Industrial Cleaning

Metal salts can cause scaling problems in boilers, heat exchangers and other water circulation systems found in the power, brewing, sugar and dairy industries. Dissolvine® chelating agents form stable, water-soluble metal complexes with all potentially harmful metal ions, dissolving existing scale formations and preventing new scales from forming.

Feed additives

Trace metal elements are important for the health and growth of animals. According to US law, disodium EDTA (Dissolvine® NA2-P) can be used to solubilize trace minerals in aqueous solutions, which are then added to animal feeds (US: 21CFR, sec 573.360).

Dissolvine® chelates are also used as preservatives in animal feed.



Food fortification

Iron is an essential element for good health. Ferrazone® (food-grade sodium iron EDTA), is a highly effective iron source in food fortification to combat iron deficiency anemia and is produced in compliance with HACCP and FSSC 22000 regulations. Sodium iron EDTA is recommended by the World Health Organization as the preferred iron fortificant for wheat and maize flour. Furthermore Ferrazone® can be used in drinks fully free of any metallic taste and has been accepted for food use in nearly all countries worldwide. Please contact us for the current regulatory status of Ferrazone®. For more information, see: www.ferrazone.com

Food preservation

Heavy metal ions can catalyze the degradation of vegetable oils and fats that can make food and beverages rancid. Dissolvine® chelates (E-CA-10 and NA2-P) deactivate these undesirable metal ions, preserving the quality of the food and increasing shelf life. Both Dissolvine® products are produced in compliance with HACCP regulations. Please ask for our special food application brochure.

Gas sweetening

In commercially available processes, ferric ions oxidize H_2S to elemental sulfur. Dissolvine® chelating agents activate the ferric ions and prevent them from precipitating. In DeNOx processes Dissolvine® metal chelates enable nitrous oxide to dissolve in water, making it available for chemical and bacterial reduction to nitrogen.

Metal plating and electronics

Solutions containing copper ions are used in the production of printed circuit boards. Copper and nickel are used in plating of automotive parts. Dissolvine® chelates fulfill several functions: as a metal carrier, as a stabilizer of process baths and for neutralizing trace impurities.

Oil industry

Dissolvine® chelating agents are widely used in various oilfield applications like stimulation, completion, cementing and enhanced oil recovery to re-dissolve scales such as $SrSO_4$, $BaSO_4$ and $CaCO_3$. Furthermore, they can prevent iron precipitation during acidizing and fracturing processes.

Personal care

Heavy metal ions can catalyze the degradation of ingredients used in personal care products. Dissolvine® chelating agents deactivate the undesirable metal ions, maintaining quality and improving shelf life.

Pharma

Some of our products are qualified for use in the production of pharmaceuticals. Please check with our representatives for specific details.

Photography

Chelated ferric ions are used to oxidize metallic silver into soluble silver ions, which can then be washed from films. Dissolvine® chelating agents act as carriers of these ferric ions and play an essential role in accelerating and fine-tuning the reactivity of these ferric ions with metallic silver.

Polymer production

Ferric (Fe^{3+}) and ferrous (Fe^{2+}) ions play a key role in initiating emulsion polymerization processes to produce SBR and ABS. Dissolvine® chelating agents act as carriers of ferric ions. They also conserve natural rubber lattices by deactivating metal ion impurities that can catalyze decomposition.

Printing ink

Metal ions can cause the formation of insoluble resin soaps in water thinned inks. For example, in offset printing, the formation of polyvalent metal soaps may cause unwanted discoloration. Dissolvine® chelating agents are used to overcome these problems, resulting in clear and color-stable inks.

Pulp and paper

Metal ions catalyze the decomposition of bleaching agents (e.g. peroxide, ozone and hydrosulfite) and can lead to brightness reversion of pulp and paper. Dissolvine® chelating agents are used to remove and deactivate metal ions.

Textiles

During the scouring and bleaching of textile fibers, Dissolvine® chelating agents remove and deactivate metal ions that would otherwise catalyze the decomposition of the peroxide bleaching agent. They also improve the performance of dye baths, where metal ions like Ca and Mg inhibit dye penetrating the fiber.



Dissolvine® chelates The right chemistry

Dissolvine® chelating agents combine amine and carboxylic acid chemistry in one molecule. This powerful chemical combination yields aminopolycarboxylates (APCs), which form more stable complexes with metal ions compared to other chelating agents.

In fact, they are the most commonly used chelates, because of their cost effectiveness and versatility. Compared to other less effective chelating agents, the Dissolvine® chelates are stable over a wider range of temperatures and pH values, have a stronger affinity for metals and are significantly more efficient. They also have good water solubility and are inert to most chemicals. Moreover, several products in the Dissolvine® chelate range are readily biodegradable as measured using the Closed Bottle Test (OECD 301D).

Dissolvine® chelates have been designed and fine-tuned to meet the needs of our customers. Our product range is extensive, including chelating agents and metal chelates, in various salt forms, in different purities and in both liquid and solid forms. What is more, we continuously develop new products to better meet requirements in specific application areas. Thanks to our concerted research and development efforts, product quality and consistency are ensured.



The world of Dissolvine® chelates

We supply the following Dissolvine® chelates: EDTA, GLDA, DTPA, HEDTA, NTA, PDTA, EDG and Glucoheptonate. EDTA is generally the preferred choice, but specific applications may require other chelating agents. Common specific properties of these molecules:

EDTA

The most widely used, strong, cost effective and general purpose chelating agent.

GLDA

The latest, strong and green chelate in our product range. A safe and readily biodegradable chelating agent, that can be used as alternative for NTA, EDTA, phosphates and phosphonates, especially in cleaning applications. It has a high solubility over a wide pH range. The major part of the molecule originates from a natural sustainable source.

DTPA

Recommended when a stronger chelating agent is needed, such as during peroxide bleaching of pulp. It remains more effective under oxidizing conditions. It is also especially suitable for descaling in oilfield applications.

HEDTA

A chelating agent with similar efficacy to EDTA. Particularly useful when high solubility is needed at low pH and for stabilizing iron ions at high pH.

NTA

A readily biodegradable chelating agent that is not as strong as EDTA but used widely in cleaning processes and detergent applications. It has a higher temperature stability.

EDG

A readily biodegradable chelating agent, effective when a relatively weak chelating agent can be used.

PDTA

A chelating agent especially developed for the photo-finishing process. It is very effective in the bleaching of photographic films and paper, due to the favorable redox-potentials it imparts to iron.

Glucoheptonate

A biodegradable chelating agent based on a carbohydrate. It is generally weaker than the aminopolycarboxylates (APCs) mentioned above. However, it exhibits an exceptional chelating ability for iron and other transition metal ions at high pH. As with GLDA, the major part of the molecule originates from a natural sustainable source.

Choosing the right Dissolvine® chelate

Dissolvine® chelates can be used directly in chemical processes or formulated as water-soluble products. We can discuss your process to establish which product should be used. The type and quantity of metal ions as well as the anions involved in the process need to be considered. An important factor is the strength of the complex formed between the metal ion and the chelating agent. This determines whether the complex will be formed in the presence of competing anions. The stability or equilibrium constant (K), expressed as log K, has been determined for many metals and chelating agents. The higher the log K values, the more tightly the metal ion will be bound to the chelating agent and the more likely that the complex will be formed.

Stability constants (log K values)¹

Metal ion	EDTA	GLDA	DTPA	HEDTA	NTA	EDG	PDTA
Al ³⁺	16.4	12.2*	18.6	14.4	11.4	7.7	16.3
Ba ²⁺	7.9	3.5	8.7	6.2	4.8	3.4	3.9
Ca ²⁺	10.7	5.9	10.8	8.1	6.4	4.7	7.2
Cd ²⁺	16.5	9.1*	19.0	13.7	9.8	7.4	13.8
Co ²⁺	16.5	10.0*	18.8	14.5	10.4	8.0	15.5
Cu ²⁺	18.8	13.1	21.2	17.4	13.0	11.8	18.8
Fe ²⁺	14.3	8.7*	16.2	12.2	8.9	6.8	13.4
Fe ³⁺	25.1	11.7*	28.0	19.7	15.9	11.6	21.6
Hg ²⁺	21.5	14.3	26.4	20.1	14.3	5.5	19.8
Mg ²⁺	8.8	5.2	9.3	7.0	5.5	3.4	6.2
Mn ²⁺	13.9	7.6*	15.2	11.1	7.5	5.5	10.0
Ni ²⁺	18.4	10.9*	20.1	17.1	11.5	9.3	18.2
Pb ²⁺	18.0	10.5*	18.8	15.6	11.5	9.4	13.6
Sr ²⁺	8.7	4.1	9.8	6.8	5.0	3.8	5.2
Zn ²⁺	16.5	10.0*	18.2	14.6	10.7	8.4	15.2

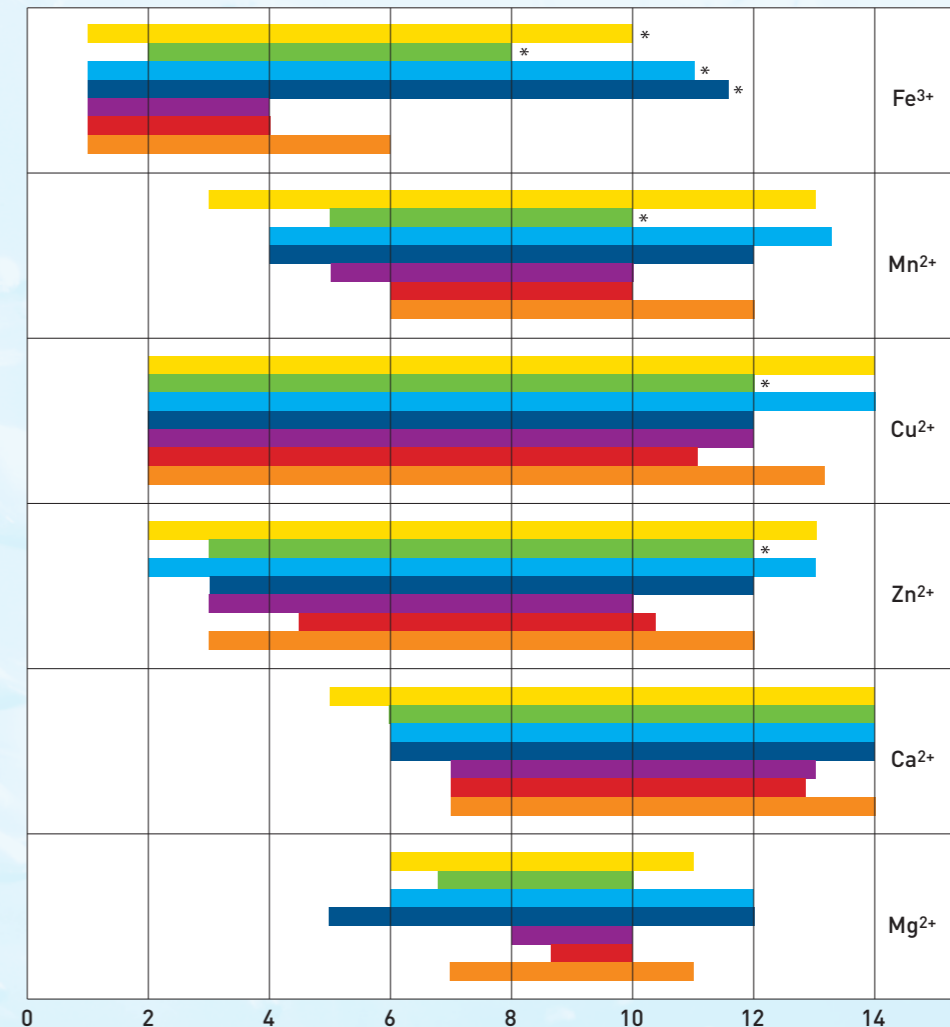
¹A.E. Martell, R.M. Smith, NIST Critically selected stability constants of metal complexes (NIST standard reference database 46, Version 7.0, 2003)

* As determined by AkzoNobel

Stability Constants: as determined at an ionic strength of 0.1M and at a temperature of 25°C, or if not available at 20°C.

Active pH range

The pH of the system and the oxidizing nature of the environment can affect the stability and effectiveness of the chelating system. For each metal complex there is an optimum pH and an active pH range in which the metal complex is stable.



● EDTA ● GLDA ● DTPA ● HEDTA ● NTA ● EDG ● PDTA

Calculated for a hydroxide environment in demineralized water at 0.1 mol / L.

Lower pH limit: the conditional stability constant logK' ≥ 3. Upper pH limit is based on the precipitation of the metal hydroxide.

At upper pH limit; fraction chelated ≥ 95%. For the Fe chelates deviations are possible in the calculation of the upper pH limit.

*= determined by measurement

The quantity of chelating agent needed depends on the concentration of metal ion to be chelated and the type of chelating agent used. Dissolvine® chelating agents form a complex with a metal ion generally on an equimolecular basis (which means the higher the molecular weight of the chelating agent, the higher the quantity of chelating agent required to chelate the metal ion). See chelation equivalents in the product overview table.

EDTA chelating agents

More products are available. Please contact your local sales office.

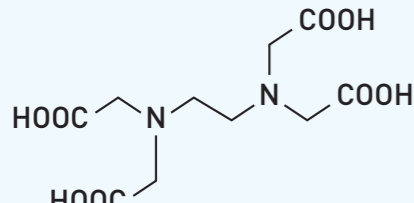
¹ poured bulk density for solids, note: 1000 kg / m³ = 8.35 lb / gal (for liquids) and 62.43 lb / ft³ (for solids)

² as 1% solution or saturated solution if solubility is < 1%

Choosing the right chelate for your application

Metals to control	High acidity	Low acidity	Low alkalinity	High alkalinity
Divalent metals	EDTA, GLDA, DTPA, HEDTA			
Water hardness	No chelating agent applicable	GLDA, HEDTA	EDTA, GLDA, DTPA, NTA, EDG, HEDTA	
Iron control	EDTA, GLDA, DTPA, PDTA		HEDTA	Glucosheptonate

12

STRUCTURE AND CHEMICAL NAME	DIS-SOLVINE®	CHEMICAL FORMULA	CAS REGISTRY NUMBER	PHYSICAL FORM	MOLECULAR MASS	DENSITY ¹ (approx.)		TYPICAL pH VALUE ²	CHELATION EQUIVALENTS Calculated weight of product needed for one weight part of metal					SPECIFIC PROPERTIES
						kg/m ³	lb/gallon lb/ft ³		Ca	Cu	Fe	Mg	Mn	
 <p>Ethylenediaminetetraacetic acid EDTA-H₄</p>	E-39	EDTA-Na ₄	64-02-8	Liquid (39%)	380.2	1300	10.9	11.5	24	15	18	40	18	Most widely used liquid chelating agent
	100-S			Liquid (38%)		1270	10.6		25	16	18	41	18	High purity (NTA free)
	NA			Micro-granular		600	37		11	7.0	7.9	18	8.0	Most widely used solid chelating agent
	NA-X	EDTA-Na ₄ Tetrahydrate		Crystalline	452.2	900	56	11.5	12	7.2	8.2	19	8.3	High purity (Low NTA)
	220-S					750	47		12	7.2	8.2	19	8.3	High purity (NTA free)
	NA3-36	EDTA-Na ₃ H	150-38-9	Liquid (36%)	358.2	1240	10.4	9.5	25	16	18	41	18	High purity (NTA free) Lower pH without inorganic salt
	NA2	EDTA-Na ₂ H ₂ Dihydrate	6381-92-6 Anhydrous: 139-33-3	Crystalline	372.2	600	37	4.5	9.4	5.9	6.7	16	6.8	Slightly acidic without inorganic salt
	NA2-S					550	34							Food / Pharma quality (USP/FCC/EP/JP/ACS)
	NA2-P													
	E-CA-10	EDTA-Na ₂ Ca Dihydrate	23411-34-9 Anhydrous: 62-33-9	Micro-granular	410.3	700	44	7	-	6.5	7.4	-	7.5	High purity (NTA free) High purity: Food (E385) and Pharma quality (USP/FCC/EP/96-77-EC)
	AM4-50	EDTA-(NH ₄) ₄	22473-78-5	Liquid (50%)	360.4	1180	9.9	9	18	11	13	30	13	Sodium free
	AM3-40	EDTA-(NH ₄) ₃ H	15934-01-7	Liquid (40%)	343.3	1150	9.6	7	21	14	15	35	16	
	AM2-45	EDTA-(NH ₄) ₂ H ₂	20824-56-0	Liquid (45%)	326.3	1200	10.0	5	18	11	13	30	13	
	K4-50	EDTA-K ₄	5964-35-2	Liquid (50%)	444.6	1300	10.9	11.5	22	14	16	37	16	Sodium free High purity
	K4-100-S			Liquid (45%)		1270	10.6		25	16	18	41	18	
K3-123-S	EDTA-K ₃ H	17572-97-3	Liquid (50%)	406.5	1310	10.9	8	20	13	15	33	15		
Z	EDTA-H ₄	60-00-4	Crystalline	292.2	700	44	2.5	7.4	4.6	5.3	12	5.4	High purity	
Z-S													High purity (NTA free)	

13

Other chelating agents

More products are available. Please contact your local sales office.

¹ poured bulk density for solids, note: 1000 kg / m³ = 8.35 lb / gal (for liquids) and 62.43 lb / ft³ (for solids)

² as 1% solution or saturated solution if solubility is < 1%

Choosing the right chelate for your application

Metals to control	High acidity	Low acidity	Low alkalinity	High alkalinity
Divalent metals	EDTA, GLDA, DTPA, HEDTA			
Water hardness	No chelating agent applicable	GLDA, HEDTA	EDTA, GLDA, DTPA, NTA, EDG, HEDTA	
Iron control	EDTA, GLDA, DTPA, PDTA		HEDTA	Glucoheptonate

14

STRUCTURE AND CHEMICAL NAME	DIS-SOLVINE®	CHEMICAL FORMULA	CAS REGISTRY NUMBER	PHYSICAL FORM	MOLECULAR MASS	DENSITY ¹ (approx.)		TYPICAL pH VALUE ²	CHELATION EQUIVALENTS Calculated weight of product needed for one weight part of metal					SPECIFIC PROPERTIES
						kg/m ³	lb/gallon lb/ft ³		Ca	Cu	Fe	Mg	Mn	
<p>Glutamic acid, N,N-diacetic acid GLDA-H₄</p>	GL-38	GLDA-Na ₄	51981-21-6	Liquid (38%)	351.1	1360	11.4	11.5	23	15	17	38	17	Readily biodegradable & highly soluble. Main part originates from natural sustainable source GL-47-S, GL-NA-40-S and GL-PD-S are high purity products. GL-47-S and GL-NA-40-S are NTA free.
	GL-47-S			Liquid (47%)		1400	11.7		19	12	13	31	14	
	GL-NA-40-S	GLDA-Na ₄ GLDA-H ₄		Liquid (40%)		1260	10.5	3-4	18	11	13	29	13	
	GL-PD-S	GLDA-Na ₄		Micro-granular		400	25	11.5	11	6.9	7.9	18	8.0	
<p>Diethylenetriaminepentaacetic acid DTPA-H₅</p>	D-40	DTPA-Na ₅	140-01-2	Liquid (40%)	503.3	1280	10.7	11.5	31	20	23	52	23	Regular DTPA
	D-50		Liquid (50%)	1370		11.4	25		16	18	41	18		
	D-88		Micro-granular	700		44	14		9.0	10	24	10		
	D-K5-40	DTPA-K ₅	7216-95-7	Liquid (40%)	583.3	1280	10.6	36	23	26	60	27	Sodium free. High purity	
	DZ	DTPA-H ₅	67-43-6	Crystalline	393.4	600	37	2	10	6.3	7.2	17	7.3	High purity Also available in version meeting the USP test requirements.
<p>Hydroxyethylethylenediaminetriacetic acid HEDTA-H₃</p>	H-40	HEDTA-Na ₃	139-89-9	Liquid (43%)	344.2	1280	10.7	11.5	20	13	15	33	15	Chelating agent for iron at low alkalinity
	H-50-GS	HEDTA-Na ₃ / HEDTA-H ₃	-	Liquid (50%)	-	1320	11.0	5-9	17	11	13	28	13	
	H-88-X	HEDTA-Na ₃ 2.5 hydrate	Anhydrous: 139-89-9	Crystalline	389.2	600	37	11.5	9.8	6.2	7.0	16	7.2	
<p>Nitrilotriacetic acid NTA-H₃</p>	A-150-S	NTA-Na ₃	5064-31-3	Liquid (40%)	257.1	1300	10.9	11.5	16	10	12	27	12	Readily biodegradable High temperature stable

15

Other chelating agents

More products are available. Please contact your local sales office.

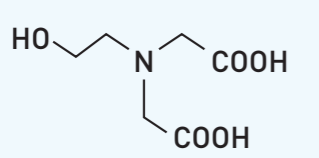
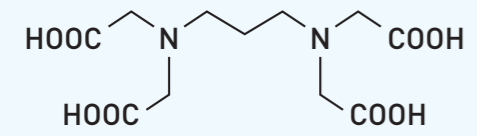
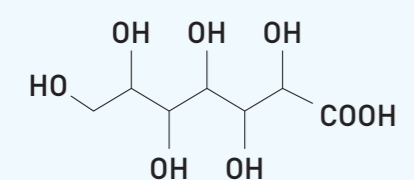
¹ poured bulk density for solids, note: 1000 kg / m³ = 8.35 lb / gal (for liquids) and 62.43 lb / ft³ (for solids)

² as 1% solution or saturated solution if solubility is < 1%

Choosing the right chelate for your application

Metals to control	High acidity	Low acidity	Low alkalinity	High alkalinity
Divalent metals	EDTA, GLDA, DTPA, HEDTA			
Water hardness	No chelating agent applicable	GLDA, HEDTA	EDTA, GLDA, DTPA, NTA, EDG, HEDTA	
Iron control	EDTA, GLDA, DTPA, PDTA		HEDTA	Glucoheptonate

16

STRUCTURE AND CHEMICAL NAME	DIS-SOLVINE®	CHEMICAL FORMULA	CAS REGISTRY NUMBER	PHYSICAL FORM	MOLECULAR MASS	DENSITY ¹ (approx.)		TYPICAL pH VALUE ²	CHELATION EQUIVALENTS Calculated weight of product needed for one weight part of metal					SPECIFIC PROPERTIES
						kg/m ³	lb/gallon lb/ft ³		Ca	Cu	Fe	Mg	Mn	
 <p>Ethanediglycine acid; EDG-H₂</p>	EDG	EDG-Na ₂	135-37-5	Liquid (27.5%)	221.1	1180	9.9	11.5	20	13	14	33	15	Readily biodegradable Also referred to as HEIDA
 <p>1,3-Propylenediaminetetraacetic acid; PDTA-H₄</p>	PDZ	PDTA-H ₄	1939-36-2	Crystalline	306.3	700	44	2	7.8	4.9	5.6	13	5.7	High purity chelate for photo bleaching Imparts favorable redox- potential to iron
 <p>Glucoheptonic acid</p>	CSA	Sodium glucoheptonate	31138-65-5 Also 13007-85-7	Liquid (30%)	248.2	1180	9.9	8.5	More metals can be chelated by one molecule of this chelating agent, depending on the pH					Readily biodegradable chelating agent for application at high alkalinity Main part originates from natural sustainable source

17

Metal Chelates

More products are available. Please contact your local sales office.

¹ poured bulk density for solids, note: 1000 kg / m³ = 8.35 lb / gal
(for liquids) and 62.43 lb / ft³ (for solids)

² as 1% solution or saturated solution if solubility is < 1%

Choosing the right chelate for your application

Metals to control	High acidity	Low acidity	Low alkalinity	High alkalinity
Divalent metals	EDTA, GLDA, DTPA, HEDTA			
Water hardness	No chelating agent applicable	GLDA, HEDTA	EDTA, GLDA, DTPA, NTA, EDG, HEDTA	
Iron control	EDTA, GLDA, DTPA, PDTA		HEDTA	Glucosheptonate

DISSOLVINE®	CHEMICAL FORMULA	CAS REGISTRY NUMBER	PHYSICAL FORM	MOLECULAR MASS	DENSITY ¹ (approx.)		APPLICATION (other than agriculture)
					kg/m ³	lb/gallon lb/ft ³	
E-CA-3	[EDTA.Ca] Na ₂	Anhydrous: 62-33-9 +2 aq: 23411-34-9	Liquid	374.3	1190	9.9	Peroxide bleaching
E-CA-10	[EDTA.Ca] Na ₂ .2H ₂ O		Micro-granular	410.3	700	44	Food & Pharma
E-CU-8	[EDTA.Cu] (NH ₄) ₂	67989-88-2	Liquid	387.8	1250	10.4	Electroplating
E-CU-9					1330	11.1	
E-CU-15	[EDTA.Cu] Na ₂	14025-15-1	Micro-granular	397.7	700	44	Cosmetics, Electroplating
E-MG-3	[EDTA.Mg] Na ₂	14402-88-1	Liquid	358.5	1240	10.4	Peroxide bleaching
E-MG-6			Micro-granular		700	44	
E-MN-6	[EDTA.Mn] K ₂	68015-77-0	Liquid	421.4	1330	11.1	-
E-MN-13	[EDTA.Mn] Na ₂	15375-84-5	Micro-granular	389.1	700	44	-
E-FE-6	[EDTA.Fe] K	54959-35-2	Liquid	383.2	1350	11.3	DeNOx, Gas sweetening
E-FE-13	[EDTA.Fe] Na.3H ₂ O	15708-41-5	Crystalline	421.1	900	56	Polymer processing, Gas sweetening
E-ZN-9	[EDTA.Zn] (NH ₄) ₂	67859-51-2	Liquid	389.7	1320	11.0	-
E-ZN-15	[EDTA.Zn] Na ₂	14025-21-9	Micro-granular	399.6	800	50	-
AMFE-50	[EDTA.Fe] NH ₄ .NH ₄ OH	68413-60-5	Liquid	397.2	1300	10.9	Photography Gas sweetening
AMFE-52					1300	10.9	
AMFE-54					1320	11.0	
D-FE-3	[DTPA.Fe] Na ₂	100208-96-6 19529-38-5	Liquid	490.2	1280	10.7	-
D-FE-6	[DTPA.Fe] (NH ₄) ₂	85959-68-8			1300	10.9	-
D-FE-11	[DTPA.Fe] H Na	12389-75-2	Crystalline	468.2	700	44	-
H-FE-4.5	[HEDTA.Fe]	17084-02-5	Liquid	331.1	1280	10.7	Gas sweetening
H-FE-5.5-GS			1360		11.4		
H-FE-13			Micro-granular		500	31	
MP	[PDTA.Fe] K	124268-99-1	Liquid	397.2	1210	10.1	Photography

Recommendation for product use

Chelating agent product range and applications

* = also available in version meeting the USP test requirements.

Dissolvine®	Building & Construction	Cleaning & Detergents	Industrial cleaning	Feed additives	Food & Pharma	Gas sweetening	Metal plating & Electronics	Oil industry	Personal care	Photography	Polymer production	Printing ink	Pulp & Paper	Textiles
E-39	●	●	●			●	●	●	●	●	●	●	●	●
100-S	●	●	●			●	●	●	●	●	●	●	●	●
NA	●	●	●			●	●	●	●	●	●	●	●	●
NA-X	●	●					●		●	●	●	●	●	●
220-S	●						●		●	●				
NA3-36							●		●	●				
NA2							●		●	●				
NA2-S							●		●	●				
NA2-P				●	●				●					
E-CA-10					●									
AM4-50			●					●						
AM3-40			●					●						
AM2-45			●					●						
K4-50		●	●					●						
K4-100-S		●	●					●						
K3-123-S		●	●					●						
Z		●	●						●	●				
Z-S		●	●						●					
GL-38		●	●			●	●	●	●		●	●	●	●
GL-47-S		●	●			●	●	●	●		●	●	●	●
GL-NA-40-S		●	●			●	●	●	●		●	●	●	●
GL-PD-S		●	●			●	●	●	●		●	●	●	●
D-40	●	●	●			●	●	●	●	●	●	●	●	●
D-50	●	●	●			●	●	●	●	●	●	●	●	●
D-88		●	●			●	●	●	●	●	●	●	●	●
D-K5-40								●						
DZ		●	●		●			●	●					
H-40		●	●		●	●	●	●	●	●	●	●	●	●
H-50-GS					●	●								
H-88-X							●		●					
A-150-S		●	●			●	●	●			●	●	●	●
EDG		●												
PDZ										●				
CSA	●		●											●

Metal chelate product range and applications

Functions

- Stopping undesirable precipitation or removing scale / re-dissolving salts
- Controlling metal catalyzed reactions
- A combination of preventing precipitation and controlling metal catalyzed reactions
- Intermediate for metal chelate

Dissolvine®	Agriculture	Food & Pharma	Gas sweetening	Metal plating & Electronics	Personal care	Peroxide bleaching	Photography	Polymer production
E-CA-3	●				●	●		
E-CA-10	●	●			●			
E-CU-8	●			●				
E-CU-9	●			●				
E-CU-15	●			●	●			
E-MG-3	●					●		
E-MG-6	●					●		
E-MN-6	●							
E-MN-13	●							
E-FE-6	●		●				●	
E-FE-13	●		●				●	●
E-ZN-9	●							
E-ZN-15	●							
AMFE-50	●		●				●	
AMFE-52	●		●				●	
AMFE-54	●		●				●	
D-FE-3	●							
D-FE-6	●							
D-FE-11	●							
H-FE-4.5	●		●					
H-FE-5.5-GS	●		●					
H-FE-13	●		●					
MP							●	

AkzoNobel

Quality first

AkzoNobel is proud to be one of the world's leading industrial companies. Headquartered in Amsterdam, the Netherlands, we are a Global Fortune 500 company and are consistently ranked as one of the leaders on the Dow Jones Sustainability Indexes. We are the largest global paints and coatings company. As a major producer of specialty chemicals we supply industries and consumers worldwide with quality ingredients for life's essentials. We think about the future, but act in the present. We're passionate about introducing new ideas and developing sustainable answers for our customers. That's why our 55,000 employees - who are based in more than 80 countries - are committed to excellence and delivering Tomorrow's Answers Today™. For more information please visit: www.akzonobel.com.

Our Dissolvine® chelates contribute to a broad range of applications that are crucial to modern society. Dissolvine® chelates are marketed through regional centers in China, The Netherlands, Singapore and the U.S.A. With production locations in Herkenbosch (The Netherlands), in Lima, Ohio (the U.S.A), in Kvarntorp (Sweden) and Ningbo (China), we are committed to supplying our customers around the globe.

Dissolvine® chelates and the environment

The convenience and economic advantages of using Dissolvine® chelates are coupled with their mild environmental profile. Dissolvine® chelates have been used for many years and extensively studied. Almost all of them have a very low toxicity to plants, animals and humans.

Several of our Dissolvine® chelates are readily biodegradable, with the remaining being inherently biodegradable. Additionally two of our products are mainly based on natural and sustainable resources. The biodegradation of the slower degrading ones can be accelerated when biotreated under slightly alkaline conditions. It has also been found that the metal complexes formed in natural environment are degraded photo-chemically. As with all chemicals, chelating agents should always be used responsibly, meeting the technical needs of the application without unnecessarily affecting the environment.

Contact us

If you would like further details, please get in touch with us at one of our regional offices

Asia Pacific

Akzo Nobel Functional Chemicals Pte Ltd.
41 Science Park Road
#03-04 The Gemini Singapore Science Park II
Singapore 117610
T: +65 6773 8488
E: AP@Dissolvine.com

China

Akzo Nobel Chemicals (Ningbo) Co., Ltd.
5F, The Exchange
No. 299 Tong Ren Road
Shanghai 200040
China
T: +86 21 2216 3600
E: AP@Dissolvine.com

Europe & Rest of the World

Akzo Nobel Functional Chemicals BV
Stationsstraat 77
P.O. Box 247
3800 AE Amersfoort
The Netherlands
T: +31 33 4676341
E: EUR@Dissolvine.com

North and South America

Akzo Nobel Functional Chemicals LLC
525 W. van Buren Street
Chicago, Illinois 60607
U.S.A.
Inside U.S.A. Tel: +1 800 906 7979
Outside U.S.A. Tel: +1 312 544 7000
E-mail: NAM@Dissolvine.com

Please also visit our website: www.dissolvine.com



The information presented herein is true and accurate to the best of our knowledge, but without any guarantee unless explicitly given. Since the conditions of use are beyond our control, we disclaim any liability, including patent infringement, incurred in connection with the use of these product data or suggestions.

© AkzoNobel
® Dissolvine and the AkzoNobel device are trademarks of the AkzoNobel group of companies
Issue: September 2010