

WE'VE GOT OXA ACIDS DOWN TO AN EXACT SCIENCE

OXA ACIDS

Oxa acids are uniquely structured high-tech materials with several advantages that make them most effective in a series of applications in pharmaceuticals, nanotechnology, cosmetics and chemistry. Their properties can be exactly tailored for a given application. Due to their biodegradability Oxa acids are a new generation of environmentally friendly products.

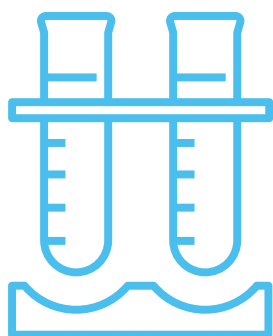
UNIQUE PROPERTIES FOR HIGH-TECH APPLICATIONS

Oxa acids may be used in the design of pro-drugs with tailored bioavailability, as unique reagents, or as speciality products in cosmetics, nanotechnology and other high-tech applications. Customers may choose from a portfolio of Oxa acids with one or two acid functions and a wide variety of different chain lengths for exactly tailored properties.

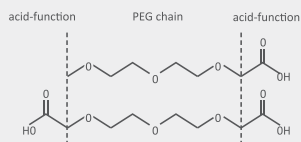
The most remarkable characteristics of Oxa acids are:

- Very broad liquid range due to low melting and high boiling points
- Unique combination of lipophilic and hydrophilic functions
- Water soluble
- Biologically degradable
- Excellent heat stability
- Outstanding complexing properties

The unique combination of lipophilic and hydrophilic functions makes these waterclear substances "multi combatants" with many strengths in various chemical and physical applications.



Finetuning of properties



Complex Science. Expert Solutions.

North America • Europe • Asia | 1.518.512.2000 | www.amriglobal.com

HIGH-TECH APPLICATIONS

- Nanotechnology
- Dispersion agents for solids
- Scale inhibition (complexing of alkaline earth metals)
- Lubricants with a wide temperature range
- High temperature cooling agents

Due to their extremely small particle size, nanotechnological products often have a high tendency to agglomerate, which may result in instability of dispersions and/or process constraints.

As a result, production processes usually need agglomeration inhibitors. Oxa acids stabilize particles by steric and electronic repulsion and therefore guarantee an excellent long-term stability of dispersions at low concentrations.

As described above, their properties can be tailored for each given application to control the effective particle size. Oxa acids can be used in water and solvent based dispersions. Again, their environmentally friendly properties are an additional benefit.

CHEMICAL APPLICATIONS

- Complexing agent in organometallic chemistry (extremely water soluble complexes)
- Phase transfer catalysis (“open crown ethers”)
- Polar high boiling solvents and distillation additives
- Galvanotechnics

SERVICES ON OXA ACIDS

AMRI is able to deliver Oxa acids in commercial multiton quantities from our DIN ISO 9001:2008 certified production facilities in Frankfurt. On request we can provide laboratory samples of certain Oxa acids for your in-house testing (TODS, TUDS and DOODS available ex stock).

Our know-how and our laboratory and small scale equipment enables us to provide all kinds of customized developments.

| | 3,6 - DIOXAHEPTANOIC ACID | 3,6, 9 - TRIOXADECANOIC ACID | DIGLYCOLIC ACID 35% SOLUTION IN WATER | 3,6, 9 - TRIOXAUNDECANEDIOIC ACID | PLYGLYCOL DIACID | 3,6 - DIOXAOCANE- DIOIC ACID |
|-----------------------------|---|---|--|---|---------------------|---|
| CAS. NO. | 16024-56-9 | 16024-58-1 | 110-99-6 | 13887-98-4 | 39927-08-7 | 23243-68-7 |
| EMPIRICAL FORMULA | C ₅ H ₁₀ O ₄ | C ₇ H ₁₄ O ₅ | C ₄ H ₆ O ₅ | C ₈ H ₁₄ O ₇ | – | C ₆ H ₁₀ O ₆ |
| DENSITY AT 20°C [g/CM3] | 1.16 | 1.16 | 1.17 | 1.30 | 1.19 | – |
| VISCOSITY AT 20°C [mPas] | 35 | 73 | 4 | 8945 | 1524 | – |
| ACID NUMBER [mg KOH/g] | ca. 410 | ca. 310 | ca. 350 | ca. 440 | ca. 180 | ca. 586 |
| BIOLOGICAL DEGRADABILITY | > 95% / 22d | > 95% / 23d | > 70% / 10d | > 95% / 13d | > 95% / 13d | > 95% / 7d |