Technical Information

TI/ES 1411 e
February 1997 (DFC)

Supersedes TI/P 2670 e dated October 1989

Korantin® MAT

Low-foaming, water-soluble corrosion inhibitor for anti-rust cleaners, water treatment formulations, hydraulic fluids and metal-cutting fluids

Specialty Chemicals

BASF

Labelling

Classification according to German chemicals legislation and European Union Directive 67/548/EEC.
No labelling necessary

Chemical nature

Alkanolamine salt of a nitrogenous organic acid.

Properties

Korantin MAT is a clear, brown liquid.

Product data

Active content (determined by titration with hydrochloric acid against bromophenol blue)	ca. 100 %	
pH (1 % in water)	ca. 8.5	DIN 19268
Viscosity (23 °C)	ca. 2000 mPa · s	Brookfield
Density (20 °C)	ca. 1.12 g/cm^3	DIN 51757

The above information is correct at the time of going to press. It does not necessarily form part of the product specification. A detailed product specification is available from your local BASF representative.

Solubility

The following table shows the solubility of Korantin MAT in water and various solvents at 23 °C at a ratio of 10 parts Korantin MAT to 90 parts solvent.

Distilled water	Slightly opalescent solution
Alcohols	Clear solution
Mineral oils	Virtually insoluble
White mineral spirits	Virtually insoluble
Caustic soda	Soluble in dilute solutions (i. e., 10 % soluble in 5 % caustic soda, 5 % soluble in 13 % caustic soda)

Storage

Korantin MAT should be stored in a dry place.

Drums should be tightly resealed each time material is taken from them.

Korantin MAT should not be stored at temperatures below 20 °C, because its viscosity makes drums difficult to empty.

Liquid that has solidified or that shows signs of precipitation should be heated to 30 – 40 °C and homogenised before use. This also applies if drums are heated by external electrical elements.

Internal electrical elements should not be used because of the localised anomalies in temperature that they cause.

Shelf life

Korantin MAT has a shelf life of at least one year in its unopened, original packaging.

Applications

The main function of Korantin MAT is to protect bright iron and steel surfaces from corrosion by water or aqueous solutions in the neutral-to-alkaline pH range. Anti-rust cleaners, water treatment, hydraulic fluids and cutting fluids are important areas of application for Korantin MAT.

The following results were obtained in a test derived from DIN 51360, Part 1 (Herbert test) on mild steel and cast iron in the following media.

Distilled water	ca. 0.7 %
Potable water with a hardness of 1.8 mmol Ca ions/l (12.5° Clark)	ca. 0.7 %
Potable water with a hardness of 4.1 mmol Ca ions/l (28° Clark)	ca. 1.5 %
Artificially hardened water according to DIN 51360, 3.6 mmol Ca ions/l (25° Clark)	ca. 2 %

The corresponding figures for the test described in DIN 51360, Part 2 (cast iron-filter paper test) are as follows.

Distilled water	ca. 1 %
Potable water with a hardness of 1.8 mmol Ca ions/l (12.5° Clark)	ca. 1 – 1.5 %
Potable water with a hardness of 4.1 mmol Ca ions/l (28° Clark)	ca. 1.5 – 2 %
Artificially hardened water according to DIN 51360, 3.6 mmol Ca ions/l (25° Clark)	ca. 2 – 2.5 %

Synergistic effects with other corrosion inhibitors

Korantin MAT often acts in synergism with other corrosion inhibitors, i. e. the performance of the whole is superior to the performance of the sum of each individual component. The following mixture, which contains the triethanolamine salt of phosphoric acid, is an example.

75	Korantin MAT
2.5	Phosphoric acid (85 %)
22.5	Triethanolamine

This mixture of corrosion inhibitors is not a fully fledged formulation. Further modification is required to prevent the phosphoric acid from precipitating in hard-water and to improve the stability of the concentrate.

Synergistic effects can also be obtained with mixtures of Korantin MAT and alkanolamine salts of 2-ethylhexanoic acid, isononanoic acid (3,5,5-trimethylhexanoic acid), benzotriazole and methylbenzotriazole.

Foam formation

Dilute aqueous solutions of Korantin MAT are low-foaming, but it may be advisable to add an antifoam if air entrainment poses a problem due to mechanical action.

Behaviour in hard water

Korantin MAT contains small traces of by-products which are insoluble in water. They can precipitate and cause solutions to become opalescent, especially in hard water, but they can settle out altogether in unfavourable circumstances.

Measures have been taken to solubilize these by-products in the formulations given below, but their solubility can be improved even further by adding additional surfactants or increasing the total surfactant content. Korantin MAT has a dispersing effect on the solids responsible for turbidity in dilute aqueous solutions, and it prevents them from settling out. It needs to be added at concentrations of ca. 25 % in order to solubilize by-products in hard water.

Suggested formulations

The following BASF products are employed in the examples below.

Product	Chemical nature	Function
Lutensit® AN 50	Mixture of nonionic and anionic surfactants	Surfactant
Sokalan® CP 10	Substituted sodium polyacrylate	Dispersing agent for hardness ions
Trilon® B Liquid	Sodium ethylene-diaminetetraacetate	Chelating agent

Further details on these products are contained in the corresponding Technical Information leaflets.

All the figures below refer to mass fractions in percent.

Anti-rust cleaners

Neutral cleaners with an effective degreasing action can be formulated along the following lines. Cleaners of this type afford a high level of protection against corrosion.

65 Water
12.5 Korantin MAT
10 Triethanolamine
5 Monoethanolamine
7.5 Lutensit AN 50

Formulations of this type are usually diluted 25:1 – 35:1 with water before use.

Neutral cleaners

Suggested formulations are given in our Technical Information leaflet on "Technical cleaners" (TI/ES 1167 e).

Hydraulic fluids

The following is a typical formulation for a corrosion inhibitor to be added to water-based hydraulic fluids.

61.1 Korantin MAT
18.3 Triethanolamine
2.1 Phosphoric acid (85 %)
4.3 Methylbenzotriazole (dissolved in ethanol)
14.2 Ethanol

The above formulation reduced corrosion by 60 % in hydraulic fluids at a concentration of 100 mg/l. It was tested by leaving coupons of mild steel to stand for 16 days in soft water that contained copper and chloride ions.

Conditioning cooling water

The following is an example of a somewhat more complex formulation for a conditioning agent used to treat water circulating in open cooling circuits.

50 Water
21.8 Korantin MAT
10 Trilon B Liquid
6.6 Triethanolamine
0.7 Phosphoric acid 85 %
7 Sokalan CP 10
1.5 Methylbenzotriazole (dissolved in acetone)
2.4 Acetone

This formulation prevented fouling and afforded a very high level of protection against corrosion and when it was added at a rate of 100 mg/l to the water circulating in a laboratory-scale cooling circuit. It has the advantage of being free of chromates, nitrites and zinc.

Metalworking fluids

The following is an example of an oil-free, water-soluble fluid for use in grinding and similar operations. It is employed at a concentration of ca. 3 %.

50	Water
19	Korantin MAT
23	Triethanolamine
4	Phosphoric acid 85 %
2	2-Ethylhexanoic acid
2	Sokalan CP 10

This formulation can be used to passivate steel stock held indoors. It can also be used as an anti-corrosion cleaner, or as a non-corrosive, low-foaming penetrant. In all these applications, we would recommended diluting the concentrate down to a concentration of 1 – 3 % with water before use.

Korantin MAT can also be incorporated in emulsions that contain oil, irrespective of their oil content, but it must be borne in mind that adding Korantin MAT may impair the effectiveness of some emulsifiers.

Safety

We know of no ill effects that could have resulted from using Korantin MAT for the purpose for which it is intended and from processing it in accordance with current practice.

According to the experience we have gained over many years and other information at our disposal, Korantin MAT does not exert any harmful effects on health, provided that it is used properly, due attention is given to the precautions necessary for handling chemicals, and the information and advice given in our safety data sheets are observed.

Handling

All contact with the eyes and prolonged contact with the skin should be avoided. Safety glasses must be worn when handling this product in its undiluted form.

Ecology

Biodegradability

More than 60 % of the Korantin MAT present was removed in the static Zahn-Wellens test (OECD 302 B/ISO 9888/EEC 88/302 C), expressed as chemical oxygen demand (COD).

The surfactants (Lutensit AN types) recommended in the suggested formulations above are, on average, at least 90 % biodegradable and satisfy the requirements of German surfactants legislation of 4 June 1986.

Hazard labelling

Korantin MAT does not need to be labelled according to German and European chemicals legislation.

Note

The information submitted in this publication is based on our current knowledge and experience. In view of the many factors that may affect processing and application, these data do not relieve processors of the responsibility of carrying out their own tests and experiments; neither do they imply any legally binding assurance of certain properties or of suitability for a specific purpose. It is the responsibility of those to whom we supply our products to ensure that any proprietary rights and existing laws and legislation are observed.

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Printed in Germany