

grotan[®] OK Plus

Preservative for technical products

- Bactericidal and fungicidal effect
- Broad, balanced spectrum of effect (incl. sulphate-reducing bacteria)
- Immediate effect with improved long term efficacy
- Demonstrable effective against Mycobacteria
- Good anticorrosion properties
- Contains no nitrate, nitrosing agents or organically bound chlorine (has no effect on the AOX value)
- Odour improved methylenebisoxazolidine

Active substance		
EINECS-Name:	CAS-No.:	EC-No.:
3,3'-Methylenebis[5-methyloxazolidine]	66204-44-2	266-235-8
Pyridine-2-thiol-1-oxide, Sodium salt	3811-73-2	223-296-5

Physico-chemical properties	
Colour	light yellow - pale red-brown
Form	Liquid
Odour	amine-like
Density (20 °C)	1.080 - 1.120 g/ml
Refractive index (20 °C)	1.480 - 1.492
Boiling point	> 100 °C
Flash point (ISO 2719)	> 100 °C
Flow time (DIN 53211 - 20 °C)	ca. 180 s
Water solubility (20 °C)	in all proportions
VOC-Content to Directive 2004/42/EC	92 %

Fields of application		
The optimum use level should be evaluated by means of a repeated challenge test (e.g. at schülke Technical and Microbiological dept). Use biocides safely. Always read the label and product information before use.		
	Recommended dosage	
Watermiscable metalworking fluids	1.0 - 1.5 g/kg	(0.10 - 0.15 %)
Technical emulsions	1.0 - 1.5 g/kg	(0.10 - 0.15 %)
Metalworking fluid concentrates [1.5 g/kg (0.15 %) in the end dilutions]	20 - 40 g/kg	(2.0 - 4.0 %)
System cleaner [1,0 - 1,5 g/kg (0,10 - 0,15 %) in the end dilutions]	100 - 150 g/kg	(10 - 15 %)

Indications for use	
General Information	grotan [®] OK Plus is suitable for use in water-mixed metalworking fluids, metalworking fluid concentrates and other technical emulsions.
Solubility	Fully soluble in water and in most polar organic solvents.
Recommended use pH range	8 - 11
Maximum use temperature	max. 80 °C
Additional advice	In order to avoid microbial growth and the resultant consumption of preservative from the outset, it is advisable to add grotan [®] OK Plus to the fresh mix of metalworking fluid. More can be added at weekly to fortnightly intervals depending on the discharge of the metalworking fluid. When adding grotan [®] OK Plus, it should be added at a point with good turbulence in order to ensure good distribution in the system. Before refilling the plant, system cleaning is recommended (e.g. with grotanol [®]).

Microbiological efficacy					
The efficacy of the product has been tested against the following microorganisms according to DGHM (German Society for Hygiene and Microbiology). Determination of the minimum inhibitory concentration in the serial dilution test produced the following values (MIC in % of the product):					
Bacteria (gram-negative)	MIC	Bacteria (gram-positive)	MIC	Yeasts	MIC
<i>Enterobacter gergoviae</i>	0.050	<i>Kocuria rhizophila</i>	0.100	<i>Candida albicans</i>	0.100
<i>Escherichia coli</i>	0.050	<i>Staphylococcus aureus</i>	0.050	<i>Rhodotorula mucilaginosa</i>	< 0.025
<i>Klebsiella pneumoniae</i>	0.050			<i>Saccharomyces cerevisiae</i>	0.050
<i>Mycobacterium terrae</i>	< 0.075	Sulphate-reducing bacteria	MIC	Moulds	MIC
<i>Mycobacterium chelonae</i>	< 0.075	<i>Desulfovibrio desulfuricans</i>	0.050	<i>Aspergillus niger</i>	0.100
<i>Mycobacterium immunogenum</i>	< 0.075			<i>Aspergillus oryzae</i>	0.100
<i>Proteus mirabilis</i>	0.050			<i>Alternaria alternata</i>	0.050
<i>Pseudomonas aeruginosa</i>	0.050			<i>Fusarium oxysporum</i>	0.050
<i>Pseudomonas fluorescens</i>	< 0.025			<i>Penicillium expansum</i>	0.050
<i>Pseudomonas putida</i>	0.050			<i>Penicillium funiculosum</i>	< 0.025
				<i>Trichoderma virens</i>	< 0.025

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Longterm efficacy

In the BOKO-test grotan[®] OK Plus shows up to a 50 - 75% improved long-term efficacy compared to other N-formals such as grotan[®] Forte or grotan[®] WS Plus. The inoculation was made with a standard mixed suspension containing bacteria, yeasts and fungi.

Compatibility*

	compatible	to be avoided
concentrate	stainless steel, steel, aluminium, polypropylene, polytetrafluoroethylene	brass, copper, zinc, sealants and plastics other than mentioned
aqueous dilution (0.15 %)	No significant difference to water	Water incompatible materials, otherwise see advice for the undiluted product.
Further information	On contact with non-ferrous metal or non-ferrous metal containing alloys, discolourations of the surface wetted with grotan [®] OK Plus can occur if the coolants do not contain a non-ferrous corrosion inhibitor. From the available test results, it can be concluded that the addition of grotan [®] OK Plus has virtually no influence on the medium to be preserved.	

*Compatibility has to be proved in each case

Labelling

R-phrases(s)	R21/22, R34, R52
S-phrases(s)	S26, S35, S36/37/39, S45, S61
Labelling	C (Corrosive)
	For further hazard instructions and safety advice please refer to the actual material safety data sheet.

Environmental information

At a sufficient degree of dilution, all components of grotan[®] OK Plus are completely biodegradable. Dilutions of grotan[®] OK Plus do not normally interfere with the operation of waste water treatment plants. grotan[®] OK Plus contains no organic chlorine compounds, so that there is no effect on the AOX as a result of grotan[®] OK Plus in the waste water. The canisters and drums used by schülke are made of polyethylene (HDPE) and are labelled accordingly. The 1000 kg containers are covered by a return scheme that ensures collection of the used containers free of charge and appropriate reuse all over Europe. The labels are made of PE. schülke packaging materials contain no PVC and can be recycled. For further information please ask for our detailed environmental report.

Listings and approvals of active ingredients

EINECS / ELINCS (Europe)
 TSCA (USA)
 AICS (Australia)
 ECL (Korea)
 DSL / NDSL (Canada)
 PICCS (Philippines)
 IECSC (China)
 Fullfills the requirements of the TRGS 611 (Germany)

Transport & Storage

Dangerous goods	Yes
UN-Number	2735
Packaging group	III
Package sizes	10 kg, 200 kg, 1000 kg
Shelf life	36 Months
Storage	Protect from frost, heat and direct sunlight. Store at room temperature in the original container.

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Our recommendations regarding our products are based on in-depth scientific testing in our Research Department; they are given in good faith, but no liability can be derived from them. It is the responsibility of the final product manufacturer to assure that claims made for the final product are in conformance with all applicable local laws. In other respect our Conditions of Sale and Supply apply.

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