DEGAPAS

Environmentally benign scale inhibitors and dispersing agents

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DEGAPAS products are aqueous polymer solutions with excellent dispersing properties.
The product group is free of nitrogen and phosphorous. Due to their anionic nature and polymer structure they are capable of interrupting inorganic crystal growth and thus are perfect anti-scalants/dispersants. They are optimized to prevent formations of scalants based on calcium-, magnesium-, iron- and/or manganese salts. Scale formation and deposites can be detrimental to water bearing systems, heat exchanger or boiler systems resulting of poor heat transmission and subsequently bad economics. Very small amounts of DEGAPAS can prevent scaling and improve the economics significantly. DEGAPAS is idealy suited to substitute phosphorus containing products when required by legal regulations.
Customers have used the product series over decades with complete satisfaction.
This brochure is designed to offer information on the properties and various applications of DEGAPAS range and to foster the development of new uses for these products.
The group of water soluble polyacrylic acid products is classified under the abbreviated heading "DEGAPAS" and identified by the suffixes "S" for the free acid grades and "N" for the sodium salt grades. Each of these groups consists of a number of qualities with different chain lengths.

SCALE INHIBITOR IN WATER LOOPS AND OTHER INDUSTRIAL SEGMENTS

Scalings in boilers and deposits of sludge on surfaces of heat exchangers, in tubes, on walls etc. reduce the effectivity of plants. The results are:

- **Increase of heating costs**
- **Reduction of flow rate**
- **Overstress of pumps**
- **Pressure losses in pipes**
- **Increased corrosion**
- **Plugging**

In general DEGAPAS products are already very effective inhibitors in concentrations far below stoichiometric demand for crystallization of calcium carbonate, calcium sulphate and other salts of the earth alkali elements. Brown deposits of iron-salts, occurring in many fresh waters, can be prevented as well. $CaCO_3$ resp. $CaSO_4$ remain soluble in presence of few mg/l DEGAPAS and form a oversaturated, transparent solution, even when above the thermo-dynamic "solubility product".

The mode of action is explained in that way, that the growth centres of tiny $CaCO_3$ or $CaSO_4$ particles are blocked by adsorption of DEGAPAS. Subsequently further growth is supressed and agglomeration to larger structures is not possible anymore.

The inhibition of crystallization starts at a concentration of a few mg DEGAPAS per litre and depends on the kind and type of the substances present in the water. The sudden loss of effectivity by going under this "level" of concentration led to the definition of the "threshold effect".

Anti-scalants can also be used in all industrials segments when scaling can occur. The oil and gas field industry as well as the waste water treatment industry are further examples DEGAPAS can be used.

DISPERSING AGENTS

DEGAPAS is recognized as chemically stable dispersing agents - i.e. they do not undergo hydrolysis. They liquefy high-solids aqueous pigment dispersions at concentrations as low as 0.1 to 0.3 %. Kaolin slurries and titan dioxide suspensions between 50 and 60 weight percent with a significant viscosity reduction are examples for a good efficiency of DEGAPAS.

Main user is the paint and coating industry.

ADDITIVE IN WASHING AND CLEANING PROCESSES

DEGAPAS fulfils the requirements of modern detergents or cleaners for effective and environmentally benign builders

- Good lime binding capacity
- Dispersing action, in particular with fatty soil, for increasing the dirt carrying capacity of the liquor → less greying of textiles
- Synergistic activation of the active detergent substances beyond the straightforward electrolyte effect
- Stability in the presence of oxidizing agents like active oxygen compounds
- Good water solubility
- Ability to mix with liquid tensides and electrolytes
- The neutralized DEGAPAS N products, are suitable for spray drying and spray mist blending processes
- Phosphorous free

Furthermore DEGAPAS 4104 N can be used in chlorine containing cleaner formulations and does not destroy the chlorine.

PRODUCTS AND PHYSICO-CHEMICAL PROPERTIES

DEGAPAS	Active matter (%)	pH-value	Density (g/ml)	Molecular weight (g/mol)
1105 S	50	<2	1.2	5 500
3104 S	40	<2	1.1	41 000
4104 S	40	<2	1.1	70 000
1105 N	45	7-9	1.3	5 000
3104 N	40	6-8	1.3	40 000
4104 N	40	6-8	1.2	65 000

PACKAGING AND STORAGE

Common forms of packaging for DEGAPAS are:

Plastic canisters:
60 kg content

Plastic drums:
220 kg content

IBC (Intermediate Bulk Container):
- 1 100 kg, DEGAPAS S-products and DEGAPAS 1105 N
- 1 200 kg, DEGAPAS 3104 N and DEGAPAS 4104 N

DEGAPAS S products can cause irritation to the skin and mucous membranes, so that all contact with the skin or eyes must be avoided. If contact does occur, rinse with copious amounts of water. DEGAPAS N, on the other hand, call for no special safety precauions.

Due to the acidic pH value DEGAPAS S products belongs to dangerous products.

All products should be stored at normal room temperatures.

For storage tanks, metering equipment etc., stainless steel, polyethylene, polypropylene, PVC or glassfiber-reinforced plastics may be used.

If the correct storage conditions are maintained, the shelf life of DEGAPAS is guaranteed for 24 month after production. After several months, DEGAPAS solutions may acquire a more pronounced color, but this does not reduce the product's effectiveness.

It should be noted that during cold weather DEGAPAS solutions should be homogenized by stirring before usage.

Evonik Resource Efficiency GmbH
Active Oxygens, EMEA
Rodenbacher Chaussee 4
63457 Hanau-Wolfgang
Germany
http://active-oxygens.evonik.com/

Marketing, EMEA
Phone +49 6181 59-4122
Fax +49 6181 59-74122

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