RAS
materials + technologies

Technical Product Data

agpure® I

Anti allergic, non toxic antibacterial and fungicidal additive for film-forming substrates like paints, sol/gel coatings, varnish, resins, polymers and other dispersions as well as for the production of monomeric resin solutions.

DESCRIPTION

agpure® I is a concentrated, liquid silver nanoparticle dispersion for the antimicrobial functionalization of surfaces and bulk materials. Due to the high surface to volume ratio of nanoparticles only low levels of metallic silver are necessary for a high and long lasting antimicrobial performance. The biocidal effect of agpure® I is based on the controlled release of silver ions.

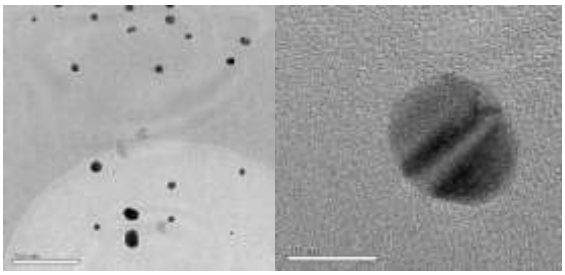

Figure: Electron microscope images of agpure® nanoparticles. (Scale: left=100 nm, right=10 nm).

agpure® I is highly recommended for solvent based, polar paint/varnish-formulations and for the antimicrobial functionalization of organic resins. This additive is characterized by reduced color effects compared to the use of W10 or W50 types. For other product forms special agpure® types are available. Please ask our experts.

TYPICAL APPLICATION AREAS

Antibacterial resins, silicones, varnishes, coatings and materials in hygienic applications in medicine, agriculture, food-processing, -transport and -handling, water treatment, air ducts, public areas, the textile industry and in the sanitary sector.

Non sensitizing, permanent active fungicidal paints, varnish, coatings.

FEATURES / BENEFITS

Products properly equipped with antimicrobial agpure® I are non-toxic to humans and animals. In contrast to other biocides agpure® I is non sensitizing and non allergic to humans in skin contact.

Due to the slow and controlled release of biocidal silver-ions from agpure® I the antimicrobial effect is persistent. Products containing agpure® I can be protected against microbial soiling for a lifetime without being toxic to humans or the environment.

agpure® I exhibits strong activity against all gram-positive and gram-negative bacteria. Its activity is unaffected by antibiotic-resistance of strains, yeast and fungi. So agpure® I is a valuable mean fighting multiresistent germs in hospitals, surgeries, agriculture and in food processing.

agpure® I itself does not induce or propagate bacterial resistance.

agpure® I silver nanoparticles exhibit a slightly gray colour. Please consider possible influences on product colour.

agpure® I is free of any inorganic fillers. It can be used for very small structures like very thin coatings.

PRODUCT FORMS

Article no.:	API003
Appearance:	gray liquid
Available container sizes:	5 kg

SPECIFICATIONS

Silver concentration	3,0 ± 0,1 %wt.

TYPICAL PROPERTIES

Gray nanoparticle	dispersion
Water content	~ 20 %
Density	1,1 kg/dm^3
Colour	gray
Mean silver particle size	15 nm
d_{99} (99% silver particles smaller as)	20 nm
Stability (dark, cool storage)	> 12 months

USE RECOMMENDATIONS

Miscibility

agpure® I is designed for the dispersion of agpure® in polar organic substrates. Nevertheless it is miscible with water at any ratio. Agglomeration will not occur with pure water. agpure® I nanoparticles tend to settle from dispersions with low viscosity with time. Settled particles easily can be redispersed by gentle shaking or stirring.

In case of addition of other solvents, salts or solids, agglomeration might occur. Preliminary tests are recommended to assess compatibilities with other components.

Dispersing agpure® I
Please keep to the following instructions to handle agpure® I properly:

- Don't use saturated or highly concentrated saline solutions.
- Dispersions will not stable at pH-values below 4.
- Mix vigorously; the use of dispersing instruments (e.g. ULTRA-TURRAX®) is recommended if the dispersion is not satisfying.

agpure® I will settle during shipping and storage. Shaking by hand or gentle stirring is usually enough to redisperse particles within the dispersion. **Shake well before use!**

Recommended dosage and antimicrobial testing
Depending on the concentration of agpure® I in the product, the wettability of the surface, potentially interfering additives and the selection of the test method for antimicrobial activity you can achieve a microbial reduction of 90% up to 99,999% (reduction value: 1 - 5 log steps). Due to this variety of influencing parameters we cannot recommend one concentration for all applications.

Typical concentrations range from 50 mg/kg to 1000 mg/kg silver in the surface layer of the product. When calculating the appropriate agpure® I dosage for your product, you have to take into account that agpure® I contains 3,0 %wt. agpure® nanosilver.

agpure® is a long-term shield against microbial growth. It is not a sterilizing agent and does not have long range effects. International research institutes typically use the listed test methods to determine the antimicrobial action of agpure® products:

Rigid surfaces:
JIS Z 2801:2000 or ISO 22196:2007
Textiles:
JIS L 1902:2002 or DIN EN ISO 20743:2007

We have a huge experience in developing and testing agpure® formulations - please ask our experts for application specific dosage recommendations and for the application appropriate test method.

HANDLING & SAFETY

agpure® I requires no special safety measures, provided the usual precautions for handling chemicals are observed.

Keep container tightly closed. Avoid release to the environment. For more detailed information please refer to the material safety data sheet and our technical information sheet.

REGISTRATION

agpure® is official OECD (NM-300 K silver) and BAM standard reference material.

CA-substance-no. 7440-22-4 "elementary silver (nanoform)"

Negotiable according to european biocidal products regulation (BPR) Nr.528/2012, listed in article 95, annex II

Applied BPR (N-73054) product types (PT)
PT 2: disinfectants and algaecides not intended for direct application to humans or animals,
PT 4: food and feed area, and
PT 9: fibre, leather, rubber and polymerised materials preservatives.

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