QUALITY PROTECTS

Dodecylguanidine Hydrochloride (DGH)

Broadly effective biocide for water treatment

QUALITY WORKS.

LANXESS
Energizing Chemistry

OUR BIOCIDE DODECYLGUANIDINE HYDROCHLORIDE (DGH)

PROFILE

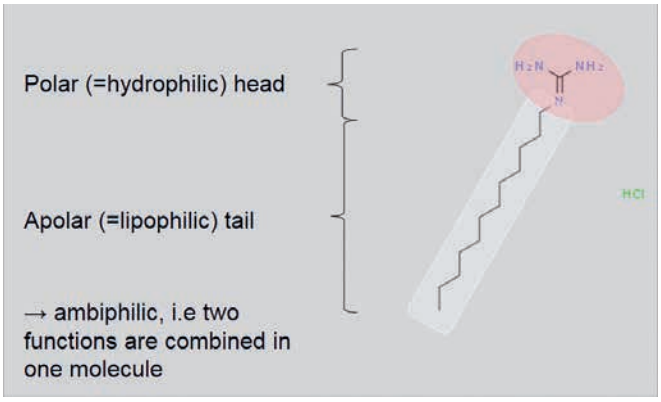
Name: Dodecylguanidine Hydrochloride (DGH)
CAS no: 13590-97-1
Molecular formula: $C_{13}H_{30}ClN_3$
Category: Bactericide, fungicide, algaecide
Appearance: Clear to slightly turbid, can vary in color

PRODUCT ADVANTAGES

- Stable at broad pH range (pH 4-12)
- Quick acting and chemically stable
- Strong against biofilm
- Strong against sulfate-reducing bacteria (SRB), fungi, algae and *Legionella** in very low concentrations
- Compatible with chlorine and typical active ingredients in water treatment
- Good combination partner for other biocides

DUAL MODE OF ACTION

DGH is a soluble, ambiphilic molecule consisting of a positively charged polar head group (guanidine) and an apolar C12 alkyl chain.



The surface activity of DGH and its cationic nature are important to control aerobic bacteria, fungi and algae, but also anaerobic bacteria (SRB) and biofilm:

1. DGH can penetrate the cell membrane and kills microorganisms by reacting with essential cell organelles and membrane disruption (dosage starts at 1 ppm).
2. As it is a surfactant, DGH breaks up and removes biofilm effectively.

* Tests carried out according to DIN EN 13623:2010 and respectively UNE-EN 13623-2011.

DGH CAN BE USED IN TWO WAYS

1) EVERYDAY BIOCIDE

Our DGH formulations can be used as regular biocide to effectively control microbial growth in water treatment, where they show a superior efficacy against biofilm, sulfate-reducing bacteria, fungi and algae. Treatment costs of DGH formulations are comparable to those of CMIT/MIT. Our DGH formulations can be combined with other biocides for an increased efficacy spectrum.

2) SPECIALTY BIOCIDE

Our DGH formulations can be used as an add-on to your regular biocidal program, e.g. for highly contaminated systems or a weekly system clean-up. Shock or intermittent dosages in defined intervals will prevent the build-up of biofilm and control aerobic as well as anaerobic (SRB) bacteria.

ENHANCED EFFICACY, SPEED AND SURFACE-ACTIVE PROPERTIES COMBINED

Biocide	Efficacy				Dosage (ppm)	Surface active properties	Speed of action	Foam production	pH Stability	Process stability in °C
	Leg.	B	F	A						
DGH (35%)	✓✓✓*	✓✓	✓✓	✓✓	**25 – 100**	**High**	**Fast**	**Moderate**	**4 – 12**	**Excellent**
Quats (50%)	✓	✓✓	✓✓	✓✓✓	5 – 50	High	Fast	Strong	2 – 12	Good
Glutaraldehyde (50%)	✓✓✓	✓✓✓	✓	-	40 – 200	Low	Moderate	None	3 – 9	Medium
CMIT/MIT 3:1 ratio (1.5 %)	✓✓	✓✓	✓✓	✓✓	100 – 1000	Low	Slow to Moderate	None	2 – 9	Medium
DBNPA (20 %)	✓✓	✓✓✓	-	✓	25 – 120	Moderate	Fast	None	4 – 8	Medium
Bronopol (15%)	✓✓	✓✓✓	-	-	50 – 300	Low	Slow	None	< 9	Medium
THPS	✓✓	✓✓	✓	✓✓	30 – 100	Low	Moderate	None	< 9	Good

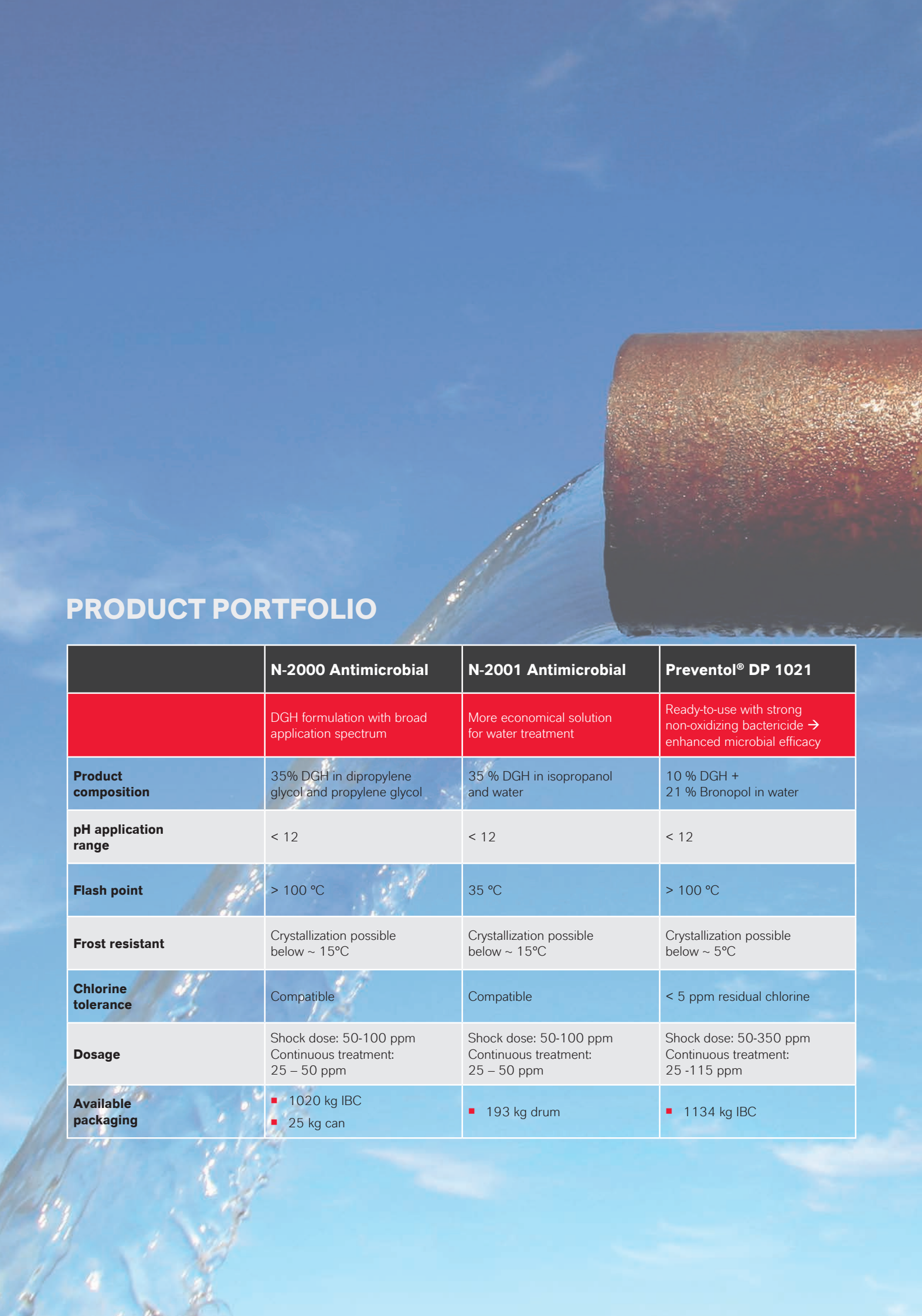
Table 1: DGH in comparison to other active ingredients

* Tests carried out according to DIN EN 13623:2010 and respectively UNE-EN 13623-2011.

WHILE BEING A STABLE BIOCIDE, DGH CAN BE DEACTIVATED EASILY

A deactivation can be easily done with bentonite, anionic chemicals such as Sodium lauryl ether sulfate (SLES) or Oxone™ (Potassium peroxymonosulfate or KMPS) from LANXESS.

Our technical team is happy to support you in finding the right deactivation chemical for your plant.



PRODUCT PORTFOLIO

	N-2000 Antimicrobial	N-2001 Antimicrobial	Preventol® DP 1021
	DGH formulation with broad application spectrum	More economical solution for water treatment	Ready-to-use with strong non-oxidizing bactericide → enhanced microbial efficacy
Product composition	35% DGH in dipropylene glycol and propylene glycol	35 % DGH in isopropanol and water	10 % DGH + 21 % Bronopol in water
pH application range	< 12	< 12	< 12
Flash point	> 100 °C	35 °C	> 100 °C
Frost resistant	Crystallization possible below ~ 15°C	Crystallization possible below ~ 15°C	Crystallization possible below ~ 5°C
Chlorine tolerance	Compatible	Compatible	< 5 ppm residual chlorine
Dosage	Shock dose: 50-100 ppm Continuous treatment: 25 – 50 ppm	Shock dose: 50-100 ppm Continuous treatment: 25 – 50 ppm	Shock dose: 50-350 ppm Continuous treatment: 25 -115 ppm
Available packaging	▪ 1020 kg IBC ▪ 25 kg can	▪ 193 kg drum	▪ 1134 kg IBC

LANXESS
Energizing Chemistry

Europe
LANXESS Deutschland GmbH
Business Unit: Material Protection Products
Kennedyplatz 1
50569 Cologne
Germany
Tel: +49 221 8885-2016
E-Mail: MPP-eBusiness@LANXESS.com
Website: www.ProtectedbyLanxess.com

North America
LANXESS Corporation
Business Unit Material Protection Products
111 RIDC Park West Drive
Pittsburgh, PA 15275-1112, USA
Phone (MPP head office): +1 412 809-1000
Fax (MPP head office): +1 412 809-1082
E-Mail: MPP-info@LANXESS.com
Website: www.mpp.us.lanxess.com

South America
IPEL - Itibanyl Produtos Especiais Ltda.
A Company of the LANXESS Group
Rod. Edgard Máximo Zambotto Km 72,5
13240-000 Jarinu
SP Caixa Postal 049
Brazil
Phone: + 55 11 4016-8000
Website: www.ProtectedbyLanxess.com.br

Asia, Australia and New Zealand
LANXESS Pte Ltd
Business Unit MPP
APAC Region
16, Joo Koon Crescent
Singapore 629018
Tel: +65 6725 5875
Fax: +65 6725 4753
E-Mail: MPP-eBusiness@LANXESS.com
Website: www.ProtectedbyLanxess.com

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