

PRODUCT ENVIRONMENTAL DATA SHEET

SOLBERG VERSAGARD AS-100 FOAM CONCENTRATE (3% on Hydrocarbon Fuels and 3% on Polar Solvents)

CHEMICAL FAMILY: Fluorine-Free Fire Fighting foam/control agent

APPEARANCE: Water miscible, white coloured liquid

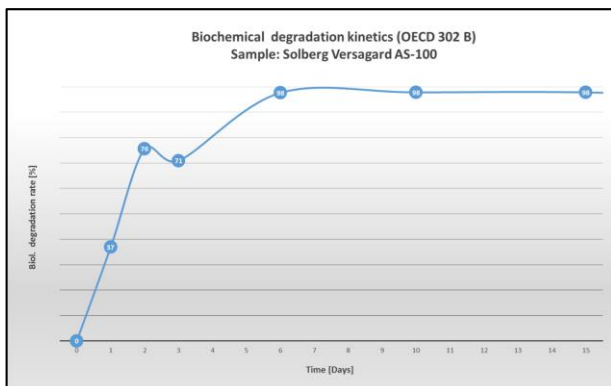
USAGE:

Foams containing Solberg VERSAGARD AS-100 cover, and thus extinguish, hydrocarbon and polar solvent liquid-based fires. For more detailed usage information, see your technical service representative.

BIODEGRADATION:

The aerobic biodegradability of Solberg VERSAGARD AS-100 Foam Concentrate has been examined according to OECD Method No. 302B: 1992-07 (Zahn-Wellens/EMPA Test). This method uses Fresh activated sludge from a municipal sewage treatment plant as inoculum. The organic carbon (TOC) contained in the sample according to DIN EN 1484: 1997-08 (H 3) was used to describe the elimination of the degradable components.

After 15 days, an inherent biodegradability of 98 % can be determined for the sample "Solberg Versagard AS-100".



Time (days)	DOC Sample Solberg Versagard AS-100 (Dilution 1:1000) minus blank value (inoculum) mg/l	TOC Elimination %
0	164	-
1	104	37
2	40	76
3	48	71
6	4	98
10	4	98
15	4	98

In addition, the biodegradability of Solberg VERSAGARD AS-100 Foam Concentrate was established using manometry to determine the biochemical oxygen demand (BOD) based on OECD Method No. 301F: 1992-07 (Manometric Respirometry Test). This method does not only state a measurement for the microbiological-oxidative degradation of organic ingredients, but also allows for assessments regarding the kinetics of the degradation on the basis of the relevant curve progression.

Assessing the Chemical Oxygen Demand of the undiluted extinguishing agent Solberg VERSAGARD AS-100 Foam Concentrate, 543,330 mg O₂/l is the necessary amount of oxygen for the 100% degradation. The biochemical degradation, expressed as BOD, amounts to 283,333 mg O₂/l = 52.1% after a period of five days. As can be seen in the Chart below, after a period of



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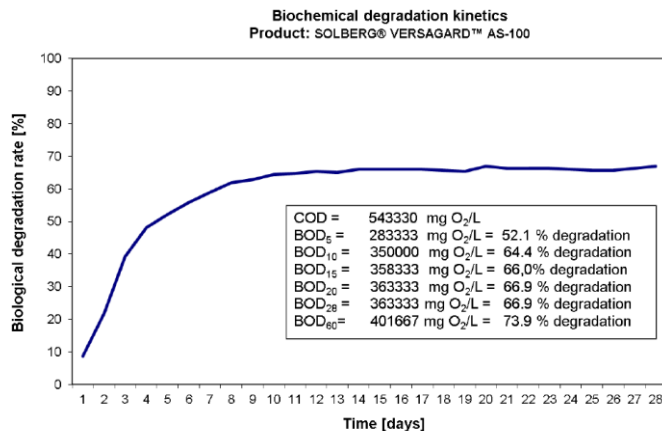
BIODEGRADATION (cont.):

28 days it amounts to approx 66.9% and an extension of the biodegradability test to 60 days shows the microbiological degradation of biochemical oxidisable ingredients to be 74%. According to Regulation (EC) No 1272/2008, a test substance is **readily biodegradable** in the environment if after 10 days, an oxygen consumption of 60% of the theoretical maximum (ThSB) has been demonstrated. The degradation rate for Solberg VERSAGARD AS-100 Foam Concentrate was 64.4% after a period of 10 days, and therefore this fire extinguishing agent is classified as “readily biodegradable”.

BOD₂₈ (28-Day) - 363,333 mg O₂/L = 66.9% **‘Readily biodegradable per (EC) N° 1272/2008)**

COD – 543,330 mg O₂/L

Biodegradation (conc.): >99% in 81 days (it may be assumed - from data in table below).



AQUATIC TOXICITY DATA:

Fish Toxicity Test (OECD 203) “Fish Acute Toxicity Test”

Zebra-fish (Danio rerio)

LC-50 (96hrs) 500 mg / L

LC-0 (96hrs) 200 mg / L

Daphnia Toxicity Test (OECD 202) “Acute Immobilisation Test”

Daphnia magna STRAUS

EC-50 (48hrs) 110 mg / L

EC-0 (48hrs) 50 mg / L

Algae Toxicity Test (OECD 201) “Growth Inhibition Test”

Green Algae (Scenedesmus subspicatus)

IC-50 (0 to 72 hrs) 30 mg / L

IC-10 (0 to 72 hrs) 8 mg / L

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AQUATIC TOXICITY (cont.):

From the results on the Algae toxicity (IC50) the Solberg VERSAGARD AS-100 Foam Concentrate would be considered as Slightly Toxic.

From the results on the Fish toxicity (LC50) and Daphnia toxicity (EC50) the Solberg VERSAGARD AS-100 Foam Concentrate would be considered as Practically Non-Toxic.

Aquatic EC or LC50 (freshwater)

Toxicity Category	Range (mg/L)
Super Toxic	< 0.01
Extremely Toxic	0.01 –0.1
Highly Toxic	0.1 –1
Moderately Toxic	1 –10
Slightly Toxic	10 –100
Practically Nontoxic	100 –1,000
Relatively Harmless	> 1,000

Table from Acute toxicity rating scale by Fish and Wildlife Service (FWS)

WATER HAZARD CLASSIFICATION

Based on the results of the toxicity testing and the determination of biodegradability, it has been independently deducted that product “**SOLBERG® VERSAGARD™ AS-100**” can be assigned the lowest classification as **Water Hazard Class “1”**, that is, “slightly hazardous to water” according to the German Ordinance on Installations for the Handling of Substance Hazardous to Water, AwSV:04-2017.

ORAL MAMMAL TOXICITY:

A calculation-based classification of the ATE for Solberg VERSAGARD AS-100 Foam Concentrate according to REGULATION (EC) No 1272/2008, indicates the product can be considered as-non acute oral toxic to mammal organisms.

FLUORINE FREE (PFAS) and SILOXANE FREE FOAM CONCENTRATES:

Solberg VERSAGARD AS-100 Foam Concentrate does not contain Siloxanes or PFAS chemicals, including but not limited to PFOS or PFOA, in its formulation. Further, we confirm that Solberg VERSAGARD AS-100 does not include any raw materials that contain intentionally added PFAS, including PFOS and PFOA. This has been verified by independent Laboratory testing using Total Oxidisable Pre-Cursor Assay (TOPA) and Total Organic Fluorine (TOF) methods (The TOPA and TOF Reports can be supplied on request).

ENVIRONMENTAL INFORMATION ON FOAM RUNOFF DURING FIREFIGHTING ACTIVITIES:

Firefighting Services which use Solberg VERSAGARD AS-100 Foam Concentrate in actual firefighting activities will release VERSAGARD AS-100 in its diluted form to soil and sometimes aquatic environments. The rate of its degradation will depend on the characteristics of the receiving environment. This product is expected to biodegrade rapidly once naturally occurring organisms capable of degrading Solberg VERSAGARD AS-100 Foam establish themselves.



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DISPOSAL OF PRODUCT:

For disposal of unused or collected material, Solberg Asia Pacific Pty Ltd recommends disposing of Solberg VERSAGARD AS-100 Foam by slowly discharging wastes to a properly operating wastewater treatment system. Solberg VERSAGARD AS-100 Foam has been assessed and concluded the disposal of the product through sewage systems (activated sludge) to wastewater treatment plants, that no negative effects are to be expected for the biologically operating section of the treatment plant as long as the concentrate is slowly introduced to allow for appropriate dilution (if already diluted to a finished foam solution, then ratio can be further reduced). The Solberg VERSAGARD AS-100 Foam is not classified as dangerous for the environment according to the criteria of Regulation (EC) No 1272/2008 and was determined to be rapidly biodegradable and inherently biodegradable to OECD testing. It is always recommended to consult with the local regulators or Authority Holding Jurisdiction (AHJ) to confirm this is an acceptable method of disposal.

If foaming is a problem reduce flow of foam / foam solution, or it may be possible to use an antifoam agent. The following list is provided as guidance, other antifoams are available, and you should consult with wastewater treatment facility on appropriate antifoams.

Antifoams	Wastewater Treatment flow (L/Hr)		
	10,000	50,000	100,000
Henkel WB-209	0.003333	0.016667	0.033333
GE Silicones AF9020	0.003333	0.016667	0.033333
Henkel Foammaster™ DS	0.003333	0.016667	0.033333
Wacker Silicones SRE	0.003333	0.016667	0.033333
Wacker Silicones SWS-214	0.006667	0.033333	0.066667
GE Silicones AF93	0.003333	0.016667	0.033333
GE Silicones AF72	0.003333	0.016667	0.033333
Wacker Silicones SE-36	0.005	0.025	0.05

This Data is taken from Testing carried out by Hygiene-Institut des Ruhrgebiets (Institut für Umwelthygiene und Toxikologie) according to the standardized OECD Test Guidelines and the regulations laid down in the German Standard Procedures

This data is intended for the use of a person qualified to evaluate environmental data. All statements, technical information and recommendations contained herein are of general nature and are based on laboratory tests or literature information we believe to be reliable, but the accuracy, completeness or applicability to particular circumstances is not guaranteed. Solberg Asia Pacific Pty Ltd makes no representation that the customer's use and disposal of the product will comply with all applicable environmental laws, regulations and rules.

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SOLBERG ASIA PACIFIC PTY LTD

A Division of Perimeter Solutions 3 Charles Street St. Marys NSW 2760 Australia
+61 2 9673 5300 perimeter-solutions.com

