



Recommendations on glove properties in SDS Section 8.2

NVZ Guidance

Introduction

Some products in the detergents industry sector require personal protection equipment, like gloves, to ensure safe use. Glove use is mainly required for products classified as corrosive, irritant or sensitizing to the skin. If glove use is applicable, specifications must be provided in the Safety Data Sheet (SDS) of the product. The REACH Regulation (1907/2006 EC) prescribes what information a Safety Data Sheet should contain. With regards to gloves, REACH prescribes:

“The type of gloves to be worn when handling the substance or mixture shall be clearly specified based on the hazard of the substance or mixture and potential for contact and with regard to the amount and duration of dermal exposure, including:

- the type of material and its thickness,
- the typical or minimum breakthrough times of the glove material.”

Many formulators of mixtures struggle to comply with this part of REACH. The glove recommendations from the suppliers of the relevant ingredients are often too thick or too expensive to work with in practice. Furthermore, these glove recommendations are often overly conservative as the substances are heavily diluted in the mixture. Testing mixtures to determine glove specifications may provide ideal information, but this is in most cases not a possibility given the costs of testing and the amount of products that would have to be tested.

[This guidance aims to support formulators of detergents on how to determine appropriate glove properties for their products.](#)

Considerations on glove specifications

When a product is classified as hazardous to skin (corrosive, irritant or sensitizing), exposure of the product to skin needs to be avoided. This could be achieved by eliminating potential exposures altogether (e.g. automated dosing systems for cleaning machines), but in most cases exposure to the hands is likely to occur during normal use of a cleaning product.

Wearing gloves can eliminate the risk of exposure to hands, but only when the following considerations are taken into account:

- The glove material is chemically resistant to the substances in the product;
- The glove is practically suitable for the type of work; and
- The glove is suitably protective against any physical hazard risks during the work.

Although the latter two considerations need to be taken into account primarily by the end-user of a product, as supplier of a hazardous product only you are fully aware of the ingredients in your mixture. It is therefore important to determine what glove-material and –thickness are suitable for long- or short-term use of the product. It is also important to take into account the situation of the end-user - although the most expensive, thick gloves may perfectly avoid hand exposure, they are not suitable for working with most cleaning products.

Determining what glove-material and thickness are suitable for working with your product needs to be done at ingredient-level. The ingredient with the highest concentration (in most cases water) should be considered first. In case of water-based cleaning products, all water-soluble glove materials (like polyvinyl alcohol (PVA) aren't suitable for use as the glove will quickly degrade in contact with water. When looking at the ingredients with lower concentrations (acids, bases, surfactants, ...) similar considerations need to be made: can this ingredient degrade the glove material at this concentration, potentially exposing the skin underneath to the product?

[Annex I of this guidance contains an overview of sources where information can be found on suitable glove properties for a number of substances. In case of surfactants, solvents and/or acids and bases, the following can be considered:](#)

Surfactants

Surfactants can cause dehydration of the skin, but in concentrations below 50% they are chemically not able to cause degradation of the glove material. Therefore, surfactants in concentrations below 50% do not need to be considered when choosing a suitable glove material for your product.

Solvents

Solvents are the ingredients with in most cases the heaviest impact on suitable glove material, as they may also be able to dissolve or degrade the material. As mentioned above, polyvinyl alcohol (PVA) dissolves in water and can therefore not be used as glove material for any water-based mixtures. Hydrocarbon-based solvents, like most naphta-mixtures or d-limonene, can easily degrade the following glove materials: butyl, natural rubber (e.g. latex), polyvinyl chloride (PVC) and to some extent neoprene. Even relatively low concentrations (e.g. 5%) do impact the choice of glove material. Water-miscible solvents like isopropyl alcohol or glycol ethers have less impact on the choice of glove material when determining long-term use gloves, but need to be considered in concentrations higher than 5% for determining short-term (disposable) gloves.

Acids and bases

Acids and bases need to be considered on a case-by-case basis with regards to glove determination, they cannot be considered as a group. Concentration of the substance is also very important for acids and bases. Sodium and potassium hydroxide may be very corrosive to skin in high concentrations, but many glove materials (except PVA) are suitable. Concentrated sulphuric acid (>95%) can degrade multiple common glove materials (nitrile, natural rubber), but in concentration <40% both nitrile and natural rubber can provide sufficient protection for long-term use.

Ansell glove recommendations for NVZ reference formulations

With abovementioned considerations, in many cases formulators can already determine appropriate, practical glove specifications based on glove recommendations in the safety data sheets of the glove-driving-ingredients.

With abovementioned considerations, in many cases formulators can already determine appropriate, practical glove specifications based on glove recommendations in the safety data sheets of the glove-driving-ingredients. In cases where multiple ingredients impact glove considerations however, it may be difficult to determine suitable gloves. To support members in such cases glove manufacturer Ansell was found willing to provide recommendations on a set of reference

formulations often found in the detergents industry. Combined with other sources of information as mentioned in Annex I, formulators can use the recommendations from Ansell to determine appropriate gloves for safely working with their products.

[The reference formulations were determined by an NVZ working group consisting of a representable group of member companies, and can be found in Table 1.](#)

Table 1: overview of NVZ Reference Formulations

Code	Category	Corrosive or irritant ingredients (CAS#)	Solvent*
NVZ_Ref_01	Alkaline + solvent	KOH (1310-58-3) or NaOH (1310-73-2) 10% + MEA (141-43-5) 10%	Propylene glycol methyl ether (107-98-2) 10%, WATER 70%
NVZ_Ref_02	Alkaline + solvent	KOH (1310-58-3) or NaOH (1310-73-2) 10%	Butylglycol (111-76-2) 15% + WATER 75%
NVZ_Ref_03	Alkaline + solvent	KOH (1310-58-3) or NaOH (1310-73-2) 10%	Naphta (64742-95-6) 15% + WATER 75%
NVZ_Ref_04	Alkaline + solvent	KOH (1310-58-3) or NaOH (1310-73-2) 10%	D-Limonene (5989-27-5) 6% + WATER 89%
NVZ_Ref_05	Hypochlorite solution (consumer)	NaClO (7681-52-9) 5% + NaOH (1310-73-2) 5%	WATER 90%
NVZ_Ref_06	Hypochlorite solution (professional)	NaClO (7681-52-9) 10% + NaOH (1310-73-2) 25%	WATER 65%
NVZ_Ref_07	Acid + alcohol	Phosphoric acid (7664-38-2) 15% + citric acid (77-92-9) 10%	Isopropylalcohol (67-63-0) or ethanol (64-17-5) 10% + WATER 65%
NVZ_Ref_08	Acid	Acetic acid (64-19-7) 30% + peracetic acid (79-21-0) 15% + hydrogen peroxide (7722-84-1) 20%	WATER 35%

* WATER is often a combination of water and other substances not considered for glove specifications (surfactants, non-classified substances, etc.)

Recommendation data received from Ansell were based on results of laboratory tests performed on the palm area of the glove or based on extrapolations from the results of laboratory tests. The results can be found in Annex II.

Proposed text for SDS Section 8.2.2.2 b (hand protection)

From the sources mentioned in Annex I as well as through extrapolation from the Ansell recommendations in Annex II, formulators can determine appropriate glove recommendations for Section 8.2.2.2 in the SDS of the product.

Dependant on the type of product and intended use, both gloves for “long-term or submersion protection” and for “short-term (≤ 30 min) or splash protection” can be recommended. As specified in REACH, reference should be made to the appropriate CEN-standards – in case of gloves EN 374:2003. Finally, end-users should be advised training of the workers and on local factors that may influence the choice of gloves. In the text below an example is given on how Section 8.2.2.2 of the SDS of a product can be phrased:

(b) Skin protection

(i) Hand protection

Use protective gloves during use. Training of the worker in relation to proper use and maintenance of personal protective equipment must be ensured.

- Long-term or submersion protection
For long-term or submersion protection use [specify suitable material(s)] gloves with a thickness of at least [specify suitable thickness] (thickness dependant on glove type and quality) for a breakthrough time of up to 480 minutes, approved according to standard EN 374:2003.
- Short-term (≤ 30 min) or splash protection
For short-term (≤ 30 min) or splash protection use [specify suitable material(s)] gloves with a thickness of at least [specify suitable thickness] (thickness dependant on glove type and quality) for a breakthrough time of at least 30min, approved according to standard EN 374:2003.

IMPORTANT NOTICE: To ensure safe use the following needs to be taken into account to choose suitable protective gloves:

- The use of other chemical products while wearing the gloves;
- Necessary protection against physical hazards like cutting and piercing, or thermal hazards; and
- Instructions and/or specifications supplied by the glove manufacturer.

Annex I: Sources of information on glove recommendations for substances

In Europe, chemical resistance of gloves is described in the EN374 standard, the most recent version being EN374:2003. Several sources of information can be considered where this standard is used to determine glove material suitability:

- Ansell Europe has carried out testing based on the EN374:2003 standards. Results can be found via the following link:
industrialcatalogue.ansell.eu/chemicalagentstid?tid=0
- Swedish glove manufacturer Skydda has developed a similar Chemical Resistance Guide based on EN374:2003 standards, and can be found via the following link:
www.guide.eu/files/pdf/GUI_Kem-EN.pdf
- The European Solvents Industry Group has developed Best Practice Guidelines on the safe use of gloves for the handling of solvents in particular, and also contains an overview of suitable materials for specific solvents. The Best Practice Guidelines can be found via the following link:
www.esig.org/uploads/ModuleXtender/Publications/161/BPG_UK_web_0611.pdf

Annex II: Ansell glove recommendations per NVZ reference formulation

The table below provides a summary of the glove recommendations received from Ansell. NVZ members can request the full report by contacting NVZ.

Ansell disclaimer: Data given in this recommendation are based on results of laboratory tests performed on the palm area of the glove or are based on extrapolations from the results of laboratory tests. These tests were run using standard test methods that may not adequately replicate any specific conditions of end use. Because Ansell has no detailed knowledge or control over the conditions of end use, any of these data must be advisory only, and Ansell must decline any liability.

Table 1

Permeation breakthrough times according to EN374 (minutes)

0	1	2	3	4	5	6
<10	10 - 30	30 - 60	60 - 120	120 - 240	240 - 480	>480
Not recommended	Splash protection		Medium protection		High protection	

Table 2

Material	Thickness	KOH or NaOH 10% MEA 10% PGME 10% WATER 70%	KOH or NaOH 10% Butylglycol 15% WATER 75%	Naphta 15% WATER 75%	KOH or NaOH 10% D-Limonene 6% WATER 89%	NaClO 5% NaOH 5% WATER 90%	NaClO 10% NaOH 25% WATER 65%	Phosphoric acid 15% Citric acid 10% IPA or ethanol 10% WATER 65%	Acetic acid 30% Peracetic acid 15% Hydr. peroxide 20% WATER 35%
		NVZ_Ref_01	NVZ_Ref_02	NVZ_Ref_03	NVZ_Ref_04	NVZ_Ref_05	NVZ_Ref_06	NVZ_Ref_07	NVZ_Ref_08
Butyl	0.35 mm	>480'	>480'	<10'	30-60'	>480'	>480'	>480'	>480'
LLDPE*	0.062 mm	>480'	>480'	>480'	>480'	>480'	>480'	>480'	>480'
Natural rubber	0.2 mm	240-480'	>480'	<10'	60-120	>480'	>480'	240-480'	>480'
Natural rubber	0.75 mm	240-480'	>480'	<10'	120-240'	>480'	>480'	240-480'	>480'
Natural rubber	0.12 mm	120-240'	120-240'	<10'	30-60'	>480'	>480'	60-120	60-120
Natural rubber	0.43 mm	240-480'	>480'	<10'	60-120	>480'	>480'	240-480'	>480'
Neoprene	0.25 mm	>480'	>480'	60-120	>480'	>480'	>480'	>480'	>480'
Nitrile	0.4 mm	>480'	>480'	>480'	>480'	>480'	>480'	>480'	>480'
Nitrile	0.31 mm	>480'	>480'	>480'	>480'	>480'	>480'	>480'	>480'
Nitrile	0.38 mm	>480'	>480'	>480'	>480'	>480'	>480'	>480'	>480'
Nitrile	0.12 mm	240-480'	120-240'	240-480'	120-240'	>480'	>480'	240-480'	120-240'
PVA	N/A	<10'	<10'	<10'	<10'	<10'	<10'	<10'	<10'
PVC	0.2 mm	240-480'	>480'	10-30'	120-240'	>480'	>480'	>480'	>480'
Viton Butyl	0.7 mm	>480'	>480'	>480'	>480'	>480'	>480'	>480'	>480'

*: LLDPE gloves may provide good chemical resistance, but due to the thinness of the material they tear easily and provide poor dexterity because they are loosely-fitted.

Colofon

This is a publication of NVZ for her members. The information in this publication is given in good faith, but does not imply the acceptance of any legal liability or responsibility whatsoever by the NVZ and the contributors for any inaccuracies and for the consequences of its use or misuse in any particular circumstances.

All rights are reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without prior permission of NVZ.

www.nvz.nl

© 2016 NVZ, Zeist