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What will change for cleaning products as a result of the Globally Harmonised System (GHS) of classification and labelling? ☆

■ Introduction

The »Globally Harmonised System« (GHS) aims to bring about the worldwide harmonisation of classification and labelling in consumer protection and industrial safety as well as during transport. One of the objectives is to ensure that the existing level of protection in all three areas is not impaired. The European Commission currently prepares the integration of the GHS provisions on the labelling and classification of substances and mixtures into a regulation under Community law. The EU regulation on the GHS is to replace the classification and labelling provisions of the existing substances directive (67/548/EEC) and preparations directive (1999/45/EC). Under the GHS the term »mixtures« replaces the term »preparations« used so far.

Just like in the field of transport law the different hazards are subdivided into classes. The severity of possible damage is expressed by categories within the classes. To a far greater degree than current Community law, the draft EU regulation envisages classification by virtue of conclusions by analogy or even by substantiated judgements of experts. At present it is already possible in Germany and Switzerland to use external experts within the framework of the trustee expert model (TGM) if formal but inappropriate labelling as irritant would apply (1). However, the TGM is not accepted in several member states of the EU which means that classification and labelling must be determined by using formal calculations.

Abstract

The concentration limits of the GHS were applied to five examples of typical end-consumer products (acid bathroom cleaner, all-purpose cleaner, hand dishwashing detergent, hand dishwashing concentrate, drain cleaner) to determine their future classification and labelling. For four of the above-mentioned cleaning products, the new concentration limits under the GHS lead to much tighter classification and labelling even though their formulations and intrinsic properties remain the same. For example, a hand dishwashing detergent and an alkaline drain cleaner both will have to be labelled as corrosive. In future, this lack of differentiation will make it difficult to continue providing consumers – by means of product labels – with adequate information on the safe use of quite diverse products. If concentration limits alone are applied, GHS will not achieve the goal of maintaining the present level of consumer protection where cleaning products are concerned. For this reason, it is important to focus on possible solutions under the GHS (such as the expert judgement). It is also essential to ensure that experts in small and medium-sized companies can put these solutions into practice.

Classification based on conclusions by analogy or internal company experts requires more profound knowledge and wider experience than is normally available in many small or mid-sized companies. Against this backdrop, the consequences of the application of the GHS to labelling are shown when these are determined exclusively by taking into account the specific concentration limits for the substances contained therein.

For the labelling of cleaning products classified as hazardous there will be two noticeable changes in future:

- The symbols for the hazardous properties are no longer displayed on squares with an orange background. Instead, the symbols will be on a white background in a red edged square set at a point. For the hazard symbol »corrosive« the change will be as follows:

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So far
(Substances Directive)



In future
(GHS)



- The current symbol for the hazardous property »irritant«, the St Andrew's cross will no longer be used. For skin or eye irritating substances and mixtures a black exclamation mark on a white background in a red edged square set at a point will be used:

So far
(Substances Directive)



In future
(GHS)



- From certain categories of hazard onwards there will, moreover, be so-called signal words (»warning« and »danger«)

Attention is drawn to the fact that according to the GHS all substances and mixtures must be reassessed. There will be no automatic procedure for labelling, e. g. according to the principle »today St Andrews' Cross – tomorrow exclamation mark« as is illustrated by the following examples. The GHS will also lead to a tightening of the provisions which is not, however, because the substances and mixtures were not classified strictly enough or have different properties from the ones they had in the past. This tightening will be due to the fact that the formal classification and labelling criteria will change.

R.-U. Förster and M. Wiertulla (2) have already examined the possible impact of the GHS and looked at the classification based on acute oral toxicity.

In their paper they have shown that due to the changeover to the GHS the number of substances and, more particularly, the number of mixtures classified as toxic will increase. Since the provisions of many downstream legal areas (e. g. emission control, plant safety, industrial safety) refer directly to the classifica-

tions of substances and preparations, this may also result in tighter provisions for these downstream legal areas. This paper looks at classification and labelling as irritant or corrosive.

In future there will no longer be any distinction between corrosive substances with the risk phrase R35 (causes severe burns) and those with the risk phrase R34 (causes burns). The concentration limits from which a substance currently classified as corrosive with R34 will be classified as skin corrosive or irritant are as low under the GHS as the limits which apply so far to substances with risk phrase R35 (Table 1).

For the labelling concerning a corrosive/irritating effect on the eyes, the GHS likewise provides for lower concentration limits as is illustrated by the follow-

ing example of a substance currently classified as irritant with R41 (risk of serious damage to eyes) if it causes irreversible damage to eyes (Table 2).

Finally, the hazardous property »corrosive to metal« must be taken into account within the framework of the GHS for labelling in the areas of industrial safety and consumer protection. Whereas this criterion is not included in the substances and preparations directives, it has been relevant for some time now for dangerous goods. It is being tested for steel (3) and aluminium (4). Against the backdrop of harmonisation with transport law, the European Commission intends to classify substances and mixtures as corrosive for consumer protection and industrial safety, too, if they have a corrosion rate of more than 6.25 mm per





Currently: Labelling of the preparation (Preparations Directive)		In future: Labelling of the mixture (GHS)
Triggering content in percent, symbol Hazardous property, risk phrase	%	Triggering content in percent symbol category / SIGNAL WORD
10 % Corrosive Causes burns 	10 - 100	5% Corrosive Category 1 / DANGER 
5 to < 10% Irritant Irritating to skin 	5 - 10	1 to < 5% Category 2 / WARNING 
0 to < 5%: no labelling	1 - 5	0 to < 1 %: no labelling
	0 - 1	

Table 1

year at a test temperature of 55 °C. Because of the prescribed testing in aluminium this may mean that some acid or alkaline detergents and cleaning products will be classified as corrosive and must, *inter alia*, be labelled with the corrosive symbol.

■ Terms of Reference of the Review

Based on five simple or simplified formulation examples for cleaning products

- acid bathroom cleaner,
- all purpose cleaner,

- hand dishwashing detergent,
- hand dishwashing concentrate,
- drain cleaner

the classification and labelling provisions of the GHS concerning a corrosive or irritating effect on skin and eyes were applied. This review is based on the Proposal for a Regulation of the European Parliament and the Council on classification, labelling and packaging of substances and mixtures presented by the European Commission, status 27 June 2007 (5).


Currently: Labelling of the preparation (Preparations Directive)		In future: Labelling of the mixture (GHS)
Triggering content in percent, symbol hazardous property, risk phrase	0/0	Triggering content in percent, symbol Category / SIGNAL WORD
10%  Irritant Risk of serious damage to eyes	10 - 100	 3% Category 1 / DANGER
5 to < 10%  Irritant Irritating to eyes	5 - 10	
0 to < 5%: no labelling	3 - 5	 1 to < 3% Category 2 / WARNING
	1 - 3	
	0 - 1	

Table 2

■ Formulations of the examples of cleaning products reviewed and probable GHS classifications and labelling

Acid bathroom cleaner

Concentration	Substance	EU Classification	GHS Skin	GHS Eye
< 5.0%	Organic acid	Xi; R36	Cat 2 (irritant)	Cat 2 (irritant)
2.0%	Non-ionic surfactant	Xi; R41		Cat 1 (damage)
4.0%	Solvent	None		
0.5%	Perfume oil	Xn; R65, R68		
		Xi; R38, R43		
		N; R51/53		
Ad 100	Water			



	Currently according to the conventional method of the Preparations Directive	In future according to the GHS
Classification	No labelling	Skin: Category 2 Eyes: Category 2
Labelling symbol		

Result for the mixture

According to the calculation method the product need not be labelled at the present time. In future, labelling will require the exclamation mark symbol, the corresponding signal word (WARNING) as well as the corresponding risk and safety phrases.

All purpose cleaner

Concentration	Substance	EU Classification	GHS Skin	GHS Eye
4.0%	Non-ionic surfactant	Xi; R41		Cat 1 (damage)
4.0%	Anionic surfactant	Xn; R22-38-41	Cat 2 (irritant)	Cat 1 (damage)
0.01%	Preservative	Xn; N; R22-41-43-50	Cat 1 (corrosive)	
1.0%	Soap	None		
0.5%	Solubiliser	None		
0.3%	Organic salt	None		
0.1%	Solvent	Xi; R36	Cat 2 (irritant)	Cat 2 (irritant)
Ad 100	Water	None		

	Currently according to the conventional method of the Preparations Directive	In future according to the GHS
Classification	Xi; R36	Skin: Category 2 Eyes: Category 1
Labelling symbol		



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Result for the mixture

According to the calculation method the product must currently be labelled with the St Andrew's cross. In future, under the GHS it will have to bear the symbol corrosive with the corresponding signal word (DANGER). This does not correspond to the actual hazard potential of this product.

Hand dishwashing detergent

Concentration	Substance	EU Classification	GHS Skin	GHS Eye
15.0%	Anionic surfactant A	Xi; R38-41	Cat 2 (irritant)	Cat 1 (damage)
1.0%	Anionic surfactant B	Xi; R38-41	Cat 2 (irritant)	Cat 1 (damage)
< 0.5%	NaOH	C; R35	Cat 1 A	Cat 1
< 1.0%	Preservative	Xi; R38-41-43		
< 1.0%	Sodium chloride			
< 1.0%	Sodium hydrogen carbonate			
0.2%	Perfume oil			
0.001%	Cosmetic colorant			
Ad 100	Water			



	Currently according to the conventional method of the Preparations Directive	In future according to the GHS
Classification	Xi; R41	Skin: Category 2 Eyes: Category 1
Labelling symbol		

Result for the mixture

According to the calculation method the product must currently be labelled with the St Andrew's cross and in future according to the GHS with the corrosive symbol and the corresponding signal word (DANGER). This does not correspond to the actual hazard potential of this product.

Hand dishwashing concentrate

Concentration	Substance	EU Classification	GHS Skin	GHS Eye
24.0%	Anionic surfactant C	Xi; R38-41	Cat 2 (irritant)	Cat 1 (damage)
6.0%	Anionic surfactant D	Xi; R38-41	Cat 2 (irritant)	Cat 1 (damage)
5.0%	Amphoteric surfactant	Xi; R36		Cat 1 (damage)
5.0%	Ethanol	F; R11		Cat 2 (irritant)
Ad 100	Water			

	Currently according to the conventional method of the Preparations Directive	In future according to the GHS
Classification	Xi; R41, R38	Skin: Category 2 Eyes: Category 1
Labelling symbol		



Result for the mixture

According to the calculation method the product must currently be labelled with the St Andrew's cross and in future according to the GHS with the corrosive symbol and the corresponding signal word (DANGER). This does not correspond to the actual hazard potential of this product.

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Drain Cleaner

Concentration	Substance	EU Classification	GHS Skin	GHS Eye
4.0%	Bleaching agent on a chlorine basis	C; R35	Cat 1 B	Cat 1 (damage)
3.0%	Sodium hydroxide	C; R35	Cat 1 A	Cat 1 (damage)
2.0%	Surfactant	Xi; R36/38	Cat 2	Cat 1 (damage)
Ad 100	Water			

	Currently according to the conventional method of the Preparations Directive	In future according to the GHS
Classification	C; R34	Skin: Category 1A Eyes: Category 1
Labelling symbol		

Result for the mixture

According to the provisions of the Preparations Directive the product is currently to be classified and labelled as corrosive. This is also justified for factual reasons and will be maintained under the GHS. It allows consumers to use these products with the necessary care.

■ Discussion and Conclusions

For four of the five cleaning products considered, tighter labelling provisions are to be expected in future under the GHS system although their formulations and the hazard potential have not changed. For consumers all products to be labelled as corrosive will appear to be equally hazardous, i. e. the mild hand dishwashing detergent will, for instance, be considered just as dangerous as the highly alkaline drain cleaner. This will mean that the degree of care exercised when using the drain cleaner will be reduced if the labelling suggests that it is to be used with the same degree of care as a hand dishwashing detergent. The classification and labelling are levelled. This renders proper information of the consumer more difficult if the admissible formal approach is used.

Experts from IKW member companies expect that some 90 percent of detergents and cleaning products would have to be labelled as corrosive, according to the concentration limits of GHS.

The classifications lead to the following conclusions:

- An important goal of the GHS, i. e. maintenance of the protection level, is not reached in consumer protection because of the imposed over-labelling of certain cleaning products.
- As a result of the identical and partly exaggerated labelling, consumers are given the impression that the products must be handled with the same care or may be handled in the same careless manner. There are, therefore, concerns that a drain cleaner will be used in the same, but inappropriate way as a hand dishwashing detergent.
- If a majority of products have to be labelled as corrosive, the warning effect of this labelling will clearly decrease because it then appears to be »normal« or »ordinary«.
- Even products which are currently sealed in a normal manner would have to be provided with childproof closures or could no longer be offered in self service.
- Furthermore, products classified as corrosive must carry a tactile warning symbol. Visually challenged people will no longer be able to make the important distinction between products which are actually corrosive and those only classified and labelled as corrosive according to the new formal rules without actually having that effect.
- Differentiated consumer information will become more difficult with the GHS because many mixtures will be labelled in some way as hazardous which does not correspond to the hazard they actually entail that is known to the consumers. It is, therefore, indispensable to use the other options of the GHS in order to avoid unjustified classifications and hence over-labelling.
- The classification as corrosive under chemicals law currently leads to a classification in Class 8 (corrosive) under dangerous goods law. This means that higher requirements also apply in respect of transport.
- The assignment to storage classes requires an extension of capacity for the mixtures classified as corrosive.
- The application of the bridging principles (Article 6(b) i and ii) and expert judgements (Article 7, No 3) will play a major role in future in avoiding these unjustified classifications. These two aspects were not considered in the examples reviewed in order to demonstrate the difficulties facing small and mid-sized companies which have neither the human nor other resources required and have to rely on a highly formal way of looking at these things.

Literature

- (1) Description (in German) of the trustee expert model under <http://www.ikw.org>, menu »Information« and »Infos für Hersteller«, click on the British flag, followed by menu item »Information«
- (2) Ralf-Udo Förster, Manfred Wiertulla, Zeitschrift für Stoffrecht 2/2006, page 48-58
- (3) Steel grade S235JR+CR (1.0037 resp St 37-2), S275J2G3+CR (1.0144 resp St 44-3), ISO 3574, Unified Numbering System (UNS) G10200 or SAE 1020
- (4) Aluminium, non-clad types 7075-T6 or AZ5GY-T6
- (5) http://ec.europa.eu/enterprise/reach/ghs_en.htm

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