

**Committee of Experts on the Transport of Dangerous Goods
and on the Globally Harmonized System of Classification
and Labelling of Chemicals**

16 June 2016

**Sub-Committee of Experts on the
Transport of Dangerous Goods**

Forty-ninth session

Geneva, 27 June – 6 July 2016

Item 2 (h) of the provisional agenda

**Explosives and related matters: Review of
Chapter 2.1 of the GHS**

**Sub-Committee of Experts on the Globally Harmonized
System of Classification and Labelling of Chemicals**

Thirty-first session

Geneva, 5– 8 July 2016

Item 2 of the provisional agenda

**Joint work with the Sub-Committee of Experts on the
Transport of Dangerous Goods (TDG Sub-Committee)**

**Status report on the work of the informal correspondence group on the
revision of GHS Chapter 2.1**

Transmitted by the expert from Sweden

Introduction

1. The Sub-Committee of Experts on the Globally Harmonized System (SCEGHS) at its 29:th session accepted the expert from Sweden to lead the work on the revision of GHS Chapter 2.1, in accordance with informal document INF.13 to that session.¹ An Informal Correspondence Group (ICG) was formed for the task, which mainly consist of members from the Working Group on Explosives (EWG) under the Sub-Committee of Experts on the Transport of Dangerous Goods (SCETDG).
2. Since the ICG was formed in September 2015, there has been substantial email exchange within the group. A progress report on the work was submitted to the 30:th session of the SCEGHS² and 48:th session of the SCETDG³, and the topic was discussed at the meeting of the EWG during that session of the SCETDG in December 2015. The conclusion of the EWG was to give priority to the work of the ICG, while noting that some complementary additional work was needed which would be better defined.⁴
3. Two organisations representing industry, and which are both members of the ICG, have to the summer 2016 sessions of both Sub-Committees submitted documents on the revision of Chapter 2.1. In the documents from the Australian Explosives Industry Safety Group (AEISG), suggestions and discussion points for a substantial revision of the whole chapter, including the labelling, are given.⁵ The document from the Sporting Arms and Ammunitions Manufactures Institute (SAAMI) contains an analysis on the potential consequences of relabeling, and includes suggestion for labelling of ‘explosives

¹ See the report from the 29:th session of the SCEGHS, document ST/SG/AC.10/C.4/58

² INF.32 to the 48:th session of the SCETDG

³ INF.9 to the 30:th session of the SCEGHS, INF.32 to the 48:th session of the SCETDG

⁴ INF.53 to the 48:th session of the SCETDG

⁵ Working document 2 and INF.5 to the 31:st session of the SCEGHS, working document 7 and INF.15 to the 49:th session of the SCETDG

in a form other than classified for transport⁶.⁶ There are thus parallel initiatives on the review of Chapter 2.1 of the GHS, and the discussions on these largely involve the same experts from the EWG that form the majority of the ICG led by the expert from Sweden.

Description of the situation

4. From the discussions within the ICG it has become clear that the task at hand is not easily resolved. The heart of the problem lies in the fact that the classification of Explosives in the GHS is inherently dependent on the packaging or incorporation into articles, and thus not only based on the intrinsic properties of the substance or mixture. This is obvious from the flow charts in Figures 2.1.1 – 2.1.3 of Chapter 2.1 of the GHS, which have been more or less duplicated from Part I of UN Manual of Tests and Criteria. The flow chart and the various tests it refers to were originally designed to accommodate classification of Explosives for transport purposes only, and assumes them being packaged for transport.

5. As a consequence of the package dependence of the GHS-classification of Explosives, also the GHS-labelling of Explosives is dependent on the packaging, as is clear from Table 2.1.2 in Chapter 2.1. The hazard statements assigned to the various Divisions of Explosives sets out to describe the explosive behaviour, but this description is in principle valid only in the packaging in which the classification was done. Since the same scheme is used for classification of Explosives for transport, and classification procedure is quite extensive, the common situation is that the classification is in practice only known for the product in its transport packaging.

6. As the transport packaging is in some cases intentionally designed to suppress the explosive properties, in order to facilitate the safe transport of the product, the explosive behaviour may be very different when that transport packaging is removed. Consequently the GHS hazard communication elements assigned on basis of the classification in the transport packaging may underestimate the hazardous behaviour of any inner packages, thus giving a false impression of the hazard. This situation is most pronounced for the transport classification Division 1.4, and in particular for Compatibility Group S, where careful packaging often is used to suppress the effect of even mass-explosives so that there is no hazardous effect outside the transport packaging. When out of that packaging, however, the explosive behaviour may well be more severe than what is described by the GHS hazard communication for Division 1.4, i.e. the signal word “Warning” and the hazard statement “Fire or projection hazard”.

7. In informal document INF.13 to the 29:th session of the SCEGHS, the expert from Sweden stipulated three Workstreams addressing what in his views were the three main problematic areas associated with the discrepancy between the classification in the transport packaging and the resulting GHS-labelling of inner packages:

Workstream 1:

- (a) Identify whether there are cases where substances, mixtures or articles with explosive properties lead to no labelling for that property.
- (b) Propose amendments to GHS Chapter 2.1 to address any gaps found, as appropriate.

⁶ Working document 10 to the 31:st session of the SCEGHS, working document 47 to the 49:th session of the SCETDG

Workstream 2:

- (a) Identify cases where the current GHS-classification of substances, mixtures or articles with explosive properties leads to inappropriate labelling for that property.
- (b) Propose amendments to GHS Chapter 2.1 to address any gaps found, as appropriate.

Workstream 3:

- (a) Find appropriate criteria for how explosive properties of substances, mixtures and articles that are not packaged for transport can be identified.
- (b) Find appropriate GHS-labelling for such substances, mixtures and articles.
- (c) Propose amendments to GHS Chapter 2.1 to address substances, mixtures and articles with explosive properties that are not packaged for transport, as appropriate.

8. In the progress report for the work of the ICG submitted to the 30:th session of the SCEGHS and 48:th session of the SCETDG⁷, the following fundamental principles to guide the work were additionally laid down, as agreed within the ICG:

- (a) No classification of new substances, mixtures or articles as explosives
- (b) No new classification procedures or new mandatory tests
- (c) Assigned GHS-labelling elements for all explosives
- (d) Keep it as simple as possible

9. The classification of Explosives is thus usually performed in the transport packaging only. However, transport is only one of the sectors to which the GHS can be applied, and labelling for an explosive effect that is suppressed by a transport packaging has limited value to a user of such a product in another context where that packaging has been removed. While classification of the product also in the inner package would avoid this problem, it would in principle require additional testing of Explosives which is both impractical and an added burden to industry. It would therefore be preferable if an alternative solution could be found that requires no additional testing.

Summary of the work since December 2015

10. The expert from Sweden has to the ICG proposed a few ideas for how to resolve the above Workstreams through special labelling provisions for Explosives taken out of the packaging in which they have been classified. Thus far, however, these have gained limited support from the members of ICG – many of which have pointed out a number of problems with the ideas put forward. During the course of the discussions within the ICG, it has become clear that the fundamental package-dependence of the classification of Explosives is not easily circumvented by special provisions for the labelling of packages other than those in which classification was performed. The ideas put forward and a summary of the discussions are reflected in the Annex to this paper.

11. During the discussions in the ICG, it has also been brought forward by a few members of the group that the current denotation and hazard statement “Unstable explosive” does not describe that classification properly. While this issue is outside the scope of the three Workstreams above, there have been ideas put forward for a new denotation of this Division, such as “Division 1.0”, as well as denotations and hazard statements relating this classification to the unsuitability for transport.

⁷ INF.9 to the 30:th session of the SCEGHS, INF.32 to the 48:th session of the SCETDG

Future outlook

12. As things stand, a perfect solution to the problem of GHS-labelling of Explosives appears not to be near in sight. As stated already, the underlying fundamental problem of package-dependent classification is not easily circumvented, and attempts to do so are likely to continue to be insufficient in one way or another. Continued work within the ICG will show whether a solution for the GHS-labelling that is “good enough” can be found within the current biennium, or whether the fundamentals of GHS classification for Explosives need to be altered which will likely take more time.

Meeting times

13. It is anticipated that this topic will be debated during the meeting of the EWG that takes place in parallel to the 49:th session of the SCETDG. Meeting time has also been scheduled in connection with the 31:st session of the SCEGHS⁸ in order to facilitate for experts from that Sub-Committee to contribute their views, especially since some of the discussions within the ICG touch upon issues of a more fundamental nature which may extend beyond the hazard class of Explosives alone.

⁸ See INF.6 to the 31:st session of the SCEGHS

Annex 1 – Ideas put forward and summary of the discussions

A. Analysis of the Workstreams and possible ways forward

In late February 2016, the expert from Sweden put forward to the ICG an elaborate analysis of the three Workstreams.

Workstream 1 concerns substances and mixtures which show explosive properties according to Testseries 2 but escape classification as Explosives in the transport packaging, and are therefore not labelled for this property.

The analysis and discussions give at hand that this constitutes a minor problem only, because only very few substances and mixtures are concerned. In order to address this problem, either the principle of classification must be changed completely or additional testing needs to be done for the inner packages. Since the problem is minor, it may be sufficient to retain the current Note 2 of Section 2.1.3 in Chapter 2.1, although it could be considered to simplify the wording of it. It could also be considered to change the example given in Section 10.5 of the UN Manual of Tests and Criteria, which is an example of the above and therefore constitutes an exemption.

Workstream 2 concerns substances, mixtures and articles that are classified as Explosives in their transport packaging, but where the explosive behaviour is different once that (outer) packaging is removed. For these cases, the GHS-labelling of the inner packaging will give a false impression of the actual hazard.

From the analysis and the discussions it appears that this is the core problem and that it concerns mostly some substances, mixtures and articles that are classified as Division 1.3 or 1.4 in their transport packaging. There are many cases, in particular within Division 1.4, where the explosive behaviour indeed is suppressed by the transport packaging so that it is more severe when that packaging has been removed. It is, however, not straight-forward to try to predict the explosive behaviour of inner packages (or unpackaged articles), but some ideas were put forward as to how this could be done.

Workstream 3 concerns substances and mixtures with explosive properties which are never packaged and therefore not subjected to the full classification procedure for Explosives.

This Workstream constitutes a fundamental problem, since the classification of Explosives is inherently package-dependent and hence the full procedure cannot be performed without the packaging. Therefore, the problem of Workstream 3 cannot easily be solved in the context of classification without fundamentally altering the classification procedure. However, it may be worthwhile developing guidance to this end, as advice for different situations in which explosive substances, mixtures and articles are handled.⁹

B. Making use of the Compatibility Groups

In March 2016, the expert from Sweden circulated an idea on how to tackle the problem of Workstream 2 for the GHS-labelling of Explosives classified as Division 1.4 in their transport packaging. The idea was to predict the explosive behaviour on basis of the Compatibility Group (CG) that is assigned to Explosives according to Section 2.1.2 of the UN Model Regulations.

⁹ It is noted that guidance is currently being developed to address the problems associated with dust explosion hazards, see informal document INF.32 to the 30:th session of the SCEGHS.

For Division 1.4, there are seven possible Compatibility Groups, and the suggestion put forward by the expert from Sweden was to assign the GHS-labelling corresponding to Division 1.1 for any detonating substances/mixtures and articles that contain them, and the GHS-labelling corresponding to Division 1.3 for any deflagrating substances/mixtures and articles that contain them. Compatibility Group S is a special case, since in principle both detonating and deflagrating substances/mixtures can be comprised, and there are also articles that are in themselves designed so that there is no explosive effect outside the article (“inherently 1.4S articles”).

CG	Description (shortened) ¹⁰	Suggested most appropriate GHS-labelling
B	Article containing a primary explosive, and some articles, such as detonators, also without primary explosives.	As Div. 1.1
C	Propellant or other deflagrating explosive, or articles containing it.	As Div. 1.3
D	Secondary detonating explosive or article containing it, without means of initiation and without propelling charge.	As Div. 1.1
E	Article containing a secondary detonating explosive, without means of initiation, with a propelling charge.	As Div. 1.1
F	Article containing a secondary detonating explosive, with its own means of initiation, with a propelling charge.	As Div. 1.1
G	Pyrotechnic mixture or article containing it.	As Div. 1.3
S	Substance/mixture or article so packed or designed that any hazardous effects arising from accidental functioning are confined within the package.	As Div. 1.1 if Special Provision 347 applies As Div. 1.4 for “inherently Div. 1.4S articles” As Div. 1.3 else

Several problems to this idea were however been pointed out by members of the ICG. Some experts pointed out that there are instances where GHS-labelling as Division 1.3 would under- or overestimate the hazard and that assigning GHS-labelling using the Compatibility Group is not in all cases correct either. It was also been brought forward that there is no definition of “inherently 1.4S articles”. Representatives from industry pointed out that different labelling for inner and for outer packages will be impractical and that there could be significant downstream consequences of labelling inner packages in another way than corresponding to the transport classification.

C. Summary and generalised labelling for Workstream 2

In early May 2016, the expert from Sweden sent out an email to the ICG constituting the conclusions and possible ways forward for Workstream 2.

For Workstream 2, the following conclusions were suggested:

1. A simple prescription that will (more or less) correctly assign the classification of Explosives in their inner packages based on “educated guessing” seems not to be possible.

¹⁰ For the full description, see Section 2.1.2 of the UN Model Regulations, 19:th revised edition

2. Reclassification of explosives in their inner packages is likely to have downstream consequences.
3. Relabeling of explosives in their inner packages using existing hazard communication for another Division could be misinterpreted as reclassification, and hence likely have the same downstream consequences as reclassification.
4. As long as the word “explosive” is mentioned in the labelling, the distinction between different kinds of explosiveness is not too important.
5. Different labelling of different layers of packaging of explosives may be confusing and may be burdensome to industry.

Based on this, the following options seem to be available for Workstream 2:

- a) Retain the status quo
This means leaving Chapter 2.1 as it currently is, which is a simple option that does however not solve the problem, i.e. there will continue to be cases where the labelling of the inner package does not correctly describe the actual hazard.
- b) Change the principles of GHS-classification
This would tentatively comprise omission of the package-dependence of the classification. However, this is a complicated option that is unlikely to be resolved within the current UN-biennium and is likely to have a lot of consequences.
- c) Devise generalized labelling of inner packages
This could be done either in general or be limited only to cases where the explosive behaviour is more severe than in the transport packaging. The generalized labelling needs preferably to adhere to the following conditions:
 - (i) Give no detailed description on how the explosive will behave in its inner package.
 - (ii) Do not reclassify explosives in the inner package.
 - (iii) Do not use the labelling for an existing Division unless the Explosive is classified in that Division.
 - (iv) Use the word “explosive” in the labelling (possibly with some exceptions).
 - (v) Preferably do not differentiate the labelling for different layers of packaging.

One very simple way of achieving the above is to label all Explosives with the following GHS labelling elements:

Symbol: Exploding bomb

Signal Word: Danger

Hazard Statement: Explosive

This would, however, no longer make it possible to discriminate between the different Divisions from the GHS-labelling. Furthermore, there would be no difference in labelling for mass-explosives (Division 1.1 and 1.5) as compared to fireworks and ammunition (Division 1.3 and 1.4), although their explosive effect is very different. It would also mean that products in Division 1.4 would be labelled with the word “Explosive”, which

they are currently not. If it is deemed appropriate to make exemptions from this generalized labelling, e.g. for “inherently 1.4S articles”, the products to which such an exemption would apply need to be defined, which is also not an easy task.

D. Guidance for Workstream 3

Also in early May 2016, the expert from Sweden in accordance with the analysis under point A above, sent out an email to the ICG with a rough draft of a guidance document to tackle the issue of Workstream 3, i.e. to analyse explosive properties in substances and mixtures which are not packaged for transport and therefore not subjected to the classification procedure. In the discussions within the ICG it has been put forward that e.g. manufacturing poses special challenges that may need to be addressed, and questions were raised on whether the GHS can, and is intended to, cover such specialised handling. It may, however, be premature to start a process on guidance at the current stage of the work of the ICG – as also pointed out by some members of that group.
