

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

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

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Item 2 (e) of the provisional agenda

Classification criteria and hazard communication:

Dust explosion hazards

Dust explosion hazards: status report

**Transmitted by the expert from the United States of America on behalf
of the informal correspondence group on dust explosion hazards**

I. Introduction

1. This informal paper provides an update of the work performed by the correspondence group both at and since the 28th session of the Sub-Committee.

II. Background

2. At the 22nd session, the correspondence group presented several workstreams to the Sub-Committee. The Sub-Committee reviewed and reached consensus on the workstreams presented below.

- (a) Workstream 1: review the existing national consensus and reference regulations developed by competent authorities, identify the common pieces of information used to communicate the hazards, and determine how and if this information is to be addressed;
- (b) Workstream 2: ensure that any information proposed to be included in section 9 of the SDS is communicated to the working group on Section 9 of Annex 4;
- (c) Workstream 3: start the discussion and develop an outline or work plan for guidance or a separate chapter in the GHS containing more detailed information on the conditions under which a dust explosion hazard could be encountered.

3. The correspondence group completed its work on Workstream #1 in the 2011-12 biennium. For Workstream #2, representatives from the dust explosion hazards correspondence group have worked with the Annex 4, Section 9 correspondence group to develop safety data sheet guidance for the GHS.

4. The dust explosion hazards correspondence group began work on Workstream #3 in 2013 and continued this work through 2014. Throughout the discussions on this workstream, views remained divided on the nature of the hazard and how to proceed on the issue. At the 27th session of the Sub-Committee, there was a lively discussion on how to address dust explosion hazards in the GHS. After some discussion, the Sub-Committee agreed that the dust explosion hazards correspondence group should continue work on the

issues using a step-by-step approach. The Sub-Committee agreed that the correspondence should agree on a definition for “combustible dust” and then develop the related criteria and discuss hazard communication. At that point, a decision will be made whether to include dust explosion hazards in the GHS as a new hazard class or as guidance. (See ST/SG/AC.10/C.4/54)

III. Status report

5. At the 28th session, the correspondence group met and began its discussions of the questions listed in Appendix A to Annex II of INF.26. [UN/SCEGHS/28/INF.26] The December 2014 meeting summary is provided in Annex I to this paper.

6. The Sub-Committee agreed to keep the work being done on dust explosion hazards on its programme of work for the 2015-2016 biennium. [See ST/SG/AC.10/C.4/56]

7. The correspondence group met in February and April 2015 to discuss and further refine the definition of explosible dust and began the discussion of developing a flow chart for the hazard. Currently, the correspondence group is focusing on substances in the dust form. Once this discussion is complete, the correspondence group will turn its focus to addressing liquids or solids that, through processing, could result in a dust explosion hazard. A summary of the meetings is presented in Annex II and III. Note that the April meeting summary identifies two flowcharts – one developed by BAM and the other a combined flowchart for substances presented in dust form. The April meeting was the first time the correspondence group reviewed and discussed these flowcharts. The correspondence group chair feels it is premature to provide the flowcharts for the Sub-Committee’s consideration at this time. Once the flowcharts are more fully developed by the correspondence group, they will be provided to the Sub-Committee for review and discussion.

8. The next correspondence group meeting is planned for July 9, 2015. A meeting agenda and teleconferencing information will be sent once conferencing arrangements are complete.

Annex I

Dust explosion hazards: December 11, 2014 Meeting summary

1. Participants at the correspondence group meeting included representatives from U.S. OSHA, Health Canada, United Kingdom, Germany (both BAM and BAUA), The Netherlands, Finland, Sweden, Argentina, Brazil, Russia, Japan, European Union (European Commission and European Chemicals Agency (ECHA)), European Chemical Industry Council (CEFIC), International Petroleum Industry Environmental Conservation Association (IPIECA), Grain and Feed Trade Association (GAFTA), International Dry Bulk Terminals Group (IDBT) or International Bulk **Terminals** Association (IBTA), and National Grain and Feed Association (NGFA).
2. The chair reviewed the meeting agenda and the results of the October meeting.
3. The group discussed the list of possible questions to be answered to identify dust explosion hazards. This list was provided included as Appendix A to Annex I of the December Informal Paper (<http://www.unece.org/fileadmin/DAM/trans/doc/2014/dgac10c4/UN-SCETDG-28-INF26e.pdf>). The corrections and clarifications made during the discussions are shown in Appendix A in track-changes. The group stopped the discussion at new number 9 on the list and agreed to continue the discussion at the next meeting.
4. The chair noted that as correspondence group members identify new items, they would be kept in the “Parking Lot” so that the group can continue with the current discussion. The items in the Parking Lot will be discussed in future meetings. The current Parking Lot is provided in Appendix B.
5. The representative from Argentina explained his concerns about including flours, grains, and cereal in the scope of this hazard and suggested a definition of combustible dust that specifically excluded flours, grains and cereals. The complete intervention is shown in Appendix C of the meeting summary. Representatives from Brazil and the agricultural sector, including GAFTA, supported the intervention by Argentina.
6. Representatives from the United States of America and Health Canada explained that the scope of the GHS is explained in Chapter 1.1.2.4 of the GHS. In this section of the GHS, the Interorganization Programme for the Sound Management of Chemicals (IOMC) Coordinating Group clarified the scope as follows:

The work on harmonization of hazard classification and labelling focuses on a harmonized system for all chemicals, and mixtures of chemicals. The application of the components of the system may vary by type of product or stage of the life cycle. Once a chemical is classified, the likelihood of adverse effects may be considered in deciding what informational or other steps should be taken for a given product or use setting. Pharmaceuticals, food additives, cosmetics, and pesticide residues in food will not be covered by the GHS in terms of labelling at the point of intentional intake. However, these types of chemicals would be covered where workers may be exposed, and, in transport if potential exposure warrants. The Coordinating Group for the Harmonization of Chemical Classification Systems (CG/HCCS) recognizes that further discussion will be required to address specific application issues for some product use categories which may require the use of specialized expertise.

7. The chair reminded the group that the scope of work for the correspondence group is for substances or mixtures supplied in a form that pose a dust explosion hazard (see the May 2014 correspondence group meeting summary). Issues related to the scope of the GHS are outside of the purview of the correspondence group and should be presented to the Sub-Committee.

8. To facilitate discussion and continuation of the work, the chair suggested the correspondence group meet by teleconference two times before the next Sub-Committee meeting in July 2015. The correspondence group agreed that the technical issues needed at this point are more easily discussed outside of the plenary room. Meeting dates for February and April will be proposed in a doodle poll sent along with the meeting summaries.

Annex I, Appendix A

Possible questions to be answered to identify dust explosion hazards

- Is the substance or the mixture a solid?
- Is it classified as “flammable solid”?
- Is it ~~not~~ completely oxidized?
- Will it burn or glow in air?
- ~~Will May~~ it form explosi~~bleve~~ mixtures with air at atmospheric pressure and normal temperatures?
- Has experience shown it burns or explodes when dispersed in air and ignited?
- ~~Has experience shown it might explode when dispersed and ignited but does not necessarily burn?~~
- ~~Has experience shown that even if finely divided and dispersed in air it will not burn or explode?~~
- Does the substance contain particles of a nominal size <500 µm?
- Does it contain some minimum concentration 5% or more of ~~these~~ <500 µm particles?
- ~~Can the small particles be dispersed in air?~~
- Will small particles agglomerate to particle sizes >500 µm?
- May particles settle out of the atmosphere under their own weight?
- Is the moisture content (or the content of other desensitizers) of the substance lower than _x_?
- Could particles of a nominal size <500 µm develop due to handling during transport of the substance?
- Will the content of the moisture or the desensitizer be reduced during the intended use?
- Will the substance be able to form a dust cloud under the intended use?
- May the dust cloud form an explosive atmosphere under the intended use?

Annex I, Appendix B

Parking lot

Processing of liquids that could produce combustible/explosible dusts

Define minimum concentration of particles (see question #8 in the list of possible questions to be answered to identify dust explosion hazards)

The need for explanatory notes, including self-sustaining propagation, confinement issues, and the IEC explanations

Annex I, Appendix C

10-12 Dec 2014, Sub-Committee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals

Twenty-eighth session

Intervention of Argentina

Our concrete concerns relate to the possible inclusion under the definition of "combustible dust" of dust produced by flours, grains and cereals because of the trade implications that such an inclusion could produce.

From our point of view dust originated from flours, grains and cereals should not be classified as "hazardous chemical substances" mainly for the following reasons:

- Flours, grain and cereal dust are not a chemical substance;
- The dust originated from flour, grain and cereal have not any intrinsic explosive property; and,
- This very same dust is not a dangerous substance in itself.

For the aforementioned reasons, we consider that basic products or agricultural commodities (such as flours, grains and cereals) should not be classified as a "chemical hazard" through the "Globally Harmonized System of Classification and Labelling of Chemicals". Consequently, food and product of agricultural origin must be excluded from the labelling for chemical substances.

In other words, it is not possible to grant to agricultural products the same treatment as to chemical substances, such as gun powder.

Summing up, we consider that flours, grains and cereals must be excluded explicitly from the definition of "combustible dust".

Annex II

Dust explosion hazards: February 18, 2015 Meeting summary

1. Participants at the correspondence group meeting included representatives from U.S. OSHA, Health Canada, U.S. Coast Guard, United Kingdom, Germany (both BAM and BAUA), The Netherlands, Finland, Sweden, Australia, European Union (European Commission and European Chemicals Agency (ECHA)), European Chemical Industry Council (CEFIC), International Paint and Printing Council (IPPIC), Grain and Feed Trade Association (GAFTA), International Dry Bulk Terminals Group (IDBT) or International Bulk **Terminals** Association (IBTA), and National Grain and Feed Association (NGFA).
2. The chair reviewed the meeting agenda and the results of the December meeting.
3. The group discussed the list of possible questions to be answered to identify dust explosion hazards. As there were no corrections and clarifications made to the December meeting minutes on Appendix A, the proposed changes from the December meeting were accepted. The discussions and clarifications made during the February meeting are shown in Appendix A in track-changes.
4. The group completed the discussion of the questions and agreed that the next meeting should focus on a flowchart showing how these questions might lead to identifying a combustible dust/dust explosion hazard.
5. The updated Parking Lot is provided in Appendix B.
6. Meeting dates for April will be proposed in a doodle poll sent along with the meeting summary.

Annex II, Appendix A

Possible questions to be answered to identify dust explosion hazards

- Is the substance or the mixture a solid?
- Is it classified as “flammable solid”?
- Is it completely oxidized?
- Will it burn or glow in air?
- Will it form explosible mixtures with air at atmospheric pressure and normal temperatures?
- Has experience shown it burns or explodes when dispersed in air and ignited?
- a. Does the substance contain particles of a nominal size <500 µm?
- b. Does the substance it contain some minimum concentration or more of <500 µm particles? [KAL-O1]
- ~~Will small particles agglomerate to particle sizes >500 µm?~~

Use and Handling

- ~~Can small May particles accumulate to form layers? [Substance, Process] [KAL-O2] settle out of the atmosphere under their own weight?~~
- a. Is the moisture content such that it suppresses the possibility of the formation of an explosible dust? [Substance, Process] ~~(or the content of other desensitizers) of the substance lower than x?~~
- b. Could the content of the moisture or the desensitizer be reduced during use?
- Could particles of a nominal size <500 µm develop due to handling ~~during transport~~ of the substance in the supply chain (e.g., storage and transport)?
- ~~Will the content of the moisture or the desensitizer be reduced during the intended use?~~
- Could particles of a nominal size <500 µm develop due to handling during use of the substance (e.g., mixing, milling, grinding, conveying)?
- ~~Is Will~~ the substance ~~be~~ able to form a dust cloud during under the intended use? [Handling, Processing]
- ~~May the dust cloud form an explosive atmosphere under the intended use? [KAL-O3]~~

Annex II, Appendix B

Parking lot

Processing of liquids that could produce combustible/explosible dusts

Define minimum concentration of particles (see question #8 in the list of possible questions to be answered to identify dust explosion hazards)

The need for explanatory notes, including self-sustaining propagation, confinement issues, and the IEC explanations

Discuss hazard versus risk.

Annex III

Dust explosion hazards: April 29, 2015 Meeting agenda

1. Participants at the correspondence group meeting included representatives from U.S. OSHA, Health Canada, U.S. Coast Guard, Germany (both BAM and BAUA), The Netherlands, Finland, Sweden, Switzerland, Australia, Argentina, Russian Federation, European Union (European Commission), European Chemical Industry Council (CEFIC), International Paint and Printing Council (IPPIC), Syngenta, Grain and Feed Trade Association (GAFTA), International Dry Bulk Terminals Group (IDBT) or International Bulk Terminals Association (IBTA), and National Grain and Feed Association (NGFA).
2. The chair reviewed the meeting agenda and the results of the February meeting.
3. The group continued discussions on the list of possible questions to be answered to identify dust explosion hazards [see Appendix A].
 - The team proposed to define concentration in air (amount) and the space in which confinement occurs and determine how or if this should be addressed for this hazard. This action is placed in the Parking Lot.
 - Regarding Question # 9a, the team agreed to think about and better understand the details of moisture conditions and how it may impact explosible dust/air mixtures. For example, “moisture” may be of two types (i.e., added water as in a substance or mixture with water versus a hydrate from of a substance or mixture). How does the moisture content suppress the formation of an explosible dust/air mixture? This action is placed in the Parking Lot.
 - Regarding Question #10, the team clarified that substances presented in the dust form applies to person filling and person removing the substance from container. This clarification is left as a note in the list of questions.
4. The group completed the discussion of the questions and all track changes were accepted and incorporated.
5. Two flowcharts (explained below) were provided for the group’s consideration and review. The group began reviewing the flowcharts, with a focus on the combined flowchart for substances presented in dust form.
 - (a) BAM flowchart: The proposed BAM flowchart attempts to show the decision flow of the dust substance through the larger process - shipping, processing, and handling.
 - (b) Combined flowchart for substance presented in dust form: The proposed combined flowchart shows similarities between the BAM and the simplified flow-chart presented at the February meeting. The combined chart poses decision questions for substances presented in the dust form and attempts to present the first seven questions as agreed at the February meeting. The chart on the right compares the questions from the February meeting with the relevant associated questions from the proposed BAM flowchart, shown on the left.
6. Several comments were made on the combined flowchart, including the following. To clarify, substances or mixtures presented in the dust form is the material that leaves the manufacturer or producer. The draft flowchart addresses substances or mixtures presented in the dust form at this time; the group will consider handling and processing later.

- (a) Correcting the reference to combustible dust to explosible dust/air mixture.
- (b) Adding clarifying comments for questions #4, #5, and #6.

The updated combined flowchart for substances presented in the dust form is provided in a separate attachment as a PowerPoint file. Note that the comment numbers appear out of order, as I cannot control how the program assigns the comment numbers.

- 7. The updated Parking Lot is provided in Appendix B.
- 8. Meeting dates for July will be proposed in a doodle poll and sent along with the meeting summary.

Annex III, Appendix A

Possible questions to be answered to identify dust explosion hazards

- Is the substance or the mixture a solid?
- Is it classified as “flammable solid”?
- Is it completely oxidized?
- Will it burn or glow in air?
- Will it form explosible mixtures with air at atmospheric pressure and normal temperatures?
- Has experience shown it burns or explodes when dispersed in air and ignited?
- Does the substance contain particles of a nominal size <500 µm?

Use and Handling

NOTE: The bracketed text indicates that the actions referred to in the questions can occur by virtue of the nature of the substance [or mixture] and during processing or handling.

- Can small particles accumulate to form layers? [Substance [or mixture], Process]
- Is the moisture content of the substance [or mixture] particles such that it suppresses the possibility of the formation of an explosible dust/air mixture? [Substance [or mixture], Process]
- Could the content of the moisture or the desensitizer be reduced during use?
- Could particles of a nominal size <500 µm develop due to handling of the substance [or mixture] in the supply chain (e.g., storage and transport)?
- NOTE: Substances presented in the dust form – applies to person filling and person removing substance [or mixture] from container.
- Could particles of a nominal size <500 µm develop due to handling during use of the substance [or mixture] (e.g., mixing, milling, grinding, conveying)?
- Is the substance [or mixture] able to form a dust cloud during use? [Handling, Processing]

Annex III, Appendix B

Parking lot

Processing of liquids and solids that could produce explosible dusts

Define minimum concentration of particles (see question #8 in the list of possible questions to be answered to identify dust explosion hazards)

The need for explanatory notes, including self-sustaining propagation, confinement issues, and the IEC explanations

Discuss hazard versus risk.

Define concentration in air (amount) and the space in which confinement occurs and determine how or if this should be addressed for this hazard.

Regarding Question # 9a, think about and better understand the details of moisture conditions and how it may impact explosible dust/air mixtures. For example, "moisture" may be of two types (i.e., added water as in a substance or mixture with water versus a hydrate from of a substance or mixture). How does the moisture content suppress the formation of an explosible dust/air mixture? [See Appendix A, Possible questions to be answered to identify dust explosion hazards, in April 2015 meeting summary]

Discuss/review explosible dust/air mixtures
