

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**

2 December 2014

Twenty-eighth session

Item 2 (e) of the provisional agenda

Classification criteria and hazard communication:

Dust explosion hazards

Dust explosion hazards: status report, December meeting agenda and proposed continuance of work in next biennium

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

I. Introduction

1. At the 22nd session, the Correspondence group presented several workstreams to the Sub-Committee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals. 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 Safety Data Sheet (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.

2. 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 SDS guidance for the GHS.

3. 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)

II. Status report

4. The correspondence group met in October to discuss and further refine the definition of combustible dust and begin the discussion of criteria for these hazards. A summary of the meeting is presented in Annex I.

III. December Meeting agenda

5. The December meeting will be a continuation of the current discussions on the definition of combustible dust and criteria. The agenda for the meeting is presented in Annex II. As always, Sub-committee members are invited to participate in the meeting.

IV. Proposal to Continue the Work of the Informal Correspondence Group

6. The correspondence group discussed the proposed statement of work at the October meeting and proposes to continue work on Workstream 3 on a step-by-step basis. Using the agreements established in the 27th session of the Sub-Committee (See ST/SG/AC.10/C.4/54 and INF.17) and the October 2014 meeting, the correspondence group will continue discussions in the next biennium to:

- Create a definition for dust explosion hazards [“combustible dust”].
- Develop and define the related criteria, including identifying the factors contributing to the hazard.

Discuss hazard communication, including distinguishing between hazard and risk characteristics, by focusing on 1) combustible dusts in the form as presented, and 2) identifying what happens when substances or mixtures undergo processing.

- Decide if the agreed texts should be in the GHS in the form of a hazard class or in the form of guidance (e.g., an annex).

Annex I

Dust explosion hazards: October 26, 2014 meeting summary

Participants on the conference call included representatives from U.S. OSHA, U.S. Coast Guard, Health Canada, United Kingdom, Germany (both BAM and BAUA), The Netherlands, Australia, European Chemical Industry Council (CEFIC), European Chemicals Agency (ECHA), International Dry Bulk Terminals Group (IDBT), and National Grain and Feed Association (NGFA).

The chair reviewed the meeting agenda and the results of the July meeting.

Definition

The correspondence group evaluated the proposed definition modified to apply the concepts consistent with those used by the practical classification issues (PCI) group:

Combustible dust is a solid substance or mixture in the form of finely divided particles that are liable to catch fire or explode upon ignition when dispersed in air.

The group had some questions about the meaning of the phrase “finely divided solids,” expressing concern that this phrase may cause confusion. A suggestion was made that this phrase may be useful to help distinguish those solids which might agglomerate.

A suggestion was made that group members should check their sources for definitions or descriptions. Several members suggested that there are many definitions provided by the National Fire Protection Association (NFPA), in particular NFPA 654 and NFPA 652 use this phrase.

Concerns were raised as to whether the definition accurately identifies the hazard to be addressed. For example, some members questioned whether we should be including all dusts that will “catch fire”? Or should the hazard be described in some narrower way? In this regard, another member noted that the IEC definition of “explosive dust atmosphere,” is focused on dust that “permits self-sustaining propagation.”

During the discussion of how to proceed with the development of the criteria and definition, the correspondence group decided that it might be helpful to work on the criteria and then go back and review the definition. That is, to take an iterative approach to the process.

Discussion/development of criteria

The group also discussed criteria for identifying and classifying dust explosion hazards using the two proposals presented in the October thought starter. There were some questions about hazard mitigation. Proposals to move forward included:

- Identifying the hazards posed by dusts first to help the group better identify mitigation measures; and
- Using the questions posed in both thought starter proposals to determine if combustible dusts exist.

Additional concerns were raised about the difference between combustibility versus explosibility and what happens when a larger substance becomes processed to form a dust hazard and is transported or stored.

The chair reminded the team that a discussion on explosibility occurred early on in the team meetings. See the working paper ST/SG/AC.10/C.4/2012/28 from 2012 (attached to the transmittal email for your convenience).

The team determined that dusts can be combustible even if they are not flammable solids. Combustible dusts can result from any metal, plastic, or organic substance.

The team agreed to focus on three items. First, address combustible dusts in the form as presented. Second, identify what happens when substances or mixtures undergo processing. Third, discuss the hazard communication elements. The team also discussed the need for explanatory notes.

The team agreed that the correspondence group work is an iterative process, including the importance of working through various questions to identify whether the substance or mixture is a combustible dust.

Review of statement of work for next biennium

The team discussed the draft statement of work and agreed to approach the work on dust explosion hazards using a step-by-step approach, as well as an iterative process. The group suggested the statements be broad.

Using the agreements established in the 27th session of the Sub-Committee, the correspondence group will continue discussions in the next biennium to:

1. Create a definition for dust explosion hazards [“combustible dust”].
2. Develop and define the related criteria, including identifying the factors contributing to the hazard.
3. Discuss hazard communication, including distinguishing between hazard and risk characteristics, and by focusing on 1) combustible dusts in the form as presented, and 2) identifying what happens when substances or mixtures undergo processing.
4. Decide if the agreed texts should be in the GHS in the form of a Hazard Class or in the form of guidance (e.g., an annex).

Actions

- The representative from BAUA offered to send additional questions to help the group move forward establishing criteria.
- The chair agreed to draft a meeting summary and the draft informal paper for the group’s consideration. Since the December meetings are fast approaching, she proposed to draft the summary and informal paper for the group’s review by November 3rd, and asked the group to provide comments by November 10, so that she can submit the informal paper to the Sub-Committee secretariat the week of November 17th.

Annex II

Dust explosion hazards: December 2014 meeting agenda

Meeting agenda:

- Review October meeting results and actions completed
- Continue discussing/developing criteria
- Schedule next meeting and identify agenda

Report on actions

Based on questions posed at the October meeting about the meaning of the phrase “finely divided solids” or “finely divided particles,” the chair reviewed both of the suggested NFPA codes and found the following definition in the 2013 edition of NFPA 654. Although NFPA 652 is undergoing a revision cycle, the current edition of NFPA 652 uses several definitions extracted from NFPA 654. The terms “finely divided solids” or “finely divided particles” are not used by NFPA; a similar term, combustible particulate solid is used and defined below.

Combustible particulate solid. Any solid material composed of distinct particles or pieces, regardless of size, shape, or chemical composition that presents a fire hazard.

In addition, the chair found a description of “finely divided solids” in some U.S. OSHA materials. These solids are described as material composed of distinct particles or pieces—regardless of particle size, shape, or chemical composition.

During the October meeting, it appeared that the correspondence group preferred to focus on developing questions to better identify dust explosion hazards, with the expectation that the answers to these questions may be used to develop criteria. Since the work being done by the correspondence group is an iterative process, the questions may also be used to finalize the hazard’s definition as we proceed. As agreed, experts from Germany identified a series of questions for the correspondence group’s consideration. These are provided in Appendix A and will be the basis for the December meeting’s discussion.

I have moved the definition proposed by the correspondence group to Appendix B, along with the Canadian and IEC definitions and criteria, provided for the group’s reference.

Discussion of criteria

To evaluate the questions provided by the experts from Germany, members of the correspondence group should be prepared to

1. Evaluate and discuss each question,
2. Determine what questions (if any) should be added, deleted, or combined.
3. Determine the order in which the questions should be posed.

Since our meeting time is limited in December, the chair proposes that the group begin the question evaluation process, saving step 3 until the group is satisfied that the questions proposed to identify dust explosion hazards. As there is quite a list of questions, this discussion is expected to occur over several meetings.

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?
- May it form explosive mixtures with air at atmospheric pressure and normal temperatures?
- Has experience shown it burns or explodes when dispersed 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 5% or more of these 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 ?
- 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?

Appendix B

Correspondence group's proposed definition:

Based on the concepts consistent with those used by the PCI group, the proposed definition is shown below:

Combustible Dust is a solid substance or mixture in the form of finely divided particles that are liable to catch fire or explode upon ignition when dispersed in air.

Canada's Definition: "combustible dust" means a mixture or substance that is in the form of a powder that is liable to catch fire or explode when dispersed in a gas containing oxygen.

Canada's Classification criteria: A mixture or substance that: (a) has been shown to catch fire or explode when dispersed in a gas containing oxygen; or (b) is classified in a division of the hazard class "Flammable Solids" and 5% or more of its composition by weight has a particle size $\leq 500 \mu\text{m}$, is classified in Combustible Dusts – Category 1.

IEC's Definitions: "combustible dust": finely divided solid particles, $500 \mu\text{m}$ or less in nominal size, which may be suspended in air, may settle out of the atmosphere under their own weight, may burn or glow in air, and may form explosive mixtures with air at atmospheric pressure and normal temperatures

NOTE 1: This includes dust and grit as defined in ISO 4225.

NOTE 2: The term solid particles is intended to address particles in the solid phase and not the gaseous or liquid phase, but does not preclude a hollow particle.

"explosive atmosphere": mixture with air, under atmospheric conditions, of flammable substances in the form of gas, vapour, dust, fibres, or flyings which, after ignition, permits self-sustaining propagation

"explosive dust atmosphere": mixture with air, under atmospheric conditions, of flammable substances in the form of dust, fibres, or flyings which, after ignition, permits self-sustaining propagation
