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

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Item 11 (i) of the provisional agenda

Issues relating to the Globally Harmonized System of Classification and Labelling of Chemicals: miscellaneous

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

Twenty-seventh session

Geneva, 2 – 4 July 2014

Item 3 (d) of the provisional agenda

Classification criteria and related hazard communication: dust explosion hazards

Dust explosion hazards

Transmitted by the European Chemical Industry Council (CEFIC)

Introduction

1. This document is submitted to elucidate the position of CEFIC regarding the discussion on dust explosion properties and GHS. Documents considered are the informal documents INF.28 (26th session, report of the informal working group on dust explosion hazards), informal document INF.21 (Canada) and informal document INF.16 (USA/Canada/Australia). This information paper is also submitted to the Sub-Committee of experts of the Transport of Dangerous Goods being the focal point for physical-hazards.

Summary of arguments to be considered

2. CEFIC is of the opinion that the following aspects have to be considered in the discussions regarding dust explosion properties and GHS:

(a) Dust explosion is <u>not an intrinsic</u> property (i.e. depends on the form, particle size, humidity, presence of oxygen and ignition source, processing conditions, accumulation of dust layers etc.). See for more details the Annex 1.

(b) Based on the above and with reference to section GHS 1.3.2.2.1 *(The GHS uses the term "hazard classification" to indicate that only the intrinsic hazardous properties of substances or mixtures are considered)* classification of dust explosion properties <u>contradicts</u> the concept of hazard classification as defined by GHS.

(c) Dust explosion properties are NOT only applicable to chemicals but also to food, wood, and mechanical processing of articles made of plastics, metals etc. and only under specific handling conditions.

(d) For dust explosion hazards, regional or national detailed regulations are in place which address dust explosion characteristics, presence of explosive atmospheres & definitions of zones, handling aspects, evaluation of ignition sources, use of explosion proof equipment etc.

Existing hazard communication elements

3. CEFIC fully agrees to have hazard communication elements and guidance regarding dust explosion hazards included the GHS. In the current GHS the following elements are already addressed:

(a) In section 1.5.3.3, SDS content, the dust explosion hazard is addressed in section 2 of SDS. See Table 1.5.2, minimum information for an SDS, section 2, Hazard identification (C).

(b) In P phrase P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment, Flammable solids (chapter 2.7), – if dust clouds can occur

(c) In A4.3.2.3 Other hazards which do not result in classification provide information on other hazards which do not result in classification but may contribute to the overall hazards of the material, for example, formation of air contaminants during hardening or processing, **dust explosion hazards**, suffocation, freezing or environmental effects such as hazards to soil-dwelling organisms. The statement "**May form explosible dust-air mixture if dispersed**" is appropriate in the case of a dust explosion hazard.

(d) A4.3.5.1 Suitable extinguishing media Provide information on the appropriate extinguishing media. In addition, indicate whether any extinguishing media are inappropriate for a particular situation involving the substance or mixture (e.g. avoid high pressure media which could cause the formation of a **potentially explosible dust-air mixture**).

(e) In A4.3.8.2 Appropriate engineering controls

The description of appropriate exposure control measures should relate to the intended modes of use of the substance or mixture. Sufficient information should be provided to enable a proper risk assessment to be carried out. Indicate when special engineering controls are necessary, and specify which type. Examples include:

- (a) "maintain air concentrations below occupational exposure standards", using engineering controls if necessary;
- (b) "use local exhaust ventilation when…";
- (c) "use only in an enclosed system";
- (d) "use only in spray paint booth or enclosure";
- (e) "use mechanical handling to reduce human contact with materials"; or
- (f) "use **explosive dust handling controls".**

4. Proposal

(a) In conclusion, CEFIC does not support the creation of a separate class about dust explosible substances. We strongly believe that the hazard communication in the SDS as decided by the UN Subcommittee is the most appropriate way forward.

(b) CEFIC proposes to further develop guidance on dust explosion properties that contains the various hazard communication elements already present in GHS and missing elements that seem to be appropriate to be included.

(c) Furthermore, existing regulations and standards are in place in various regions of the world and applied successfully. CEFIC proposes to include references in this guidance. Well known standards are for instance:

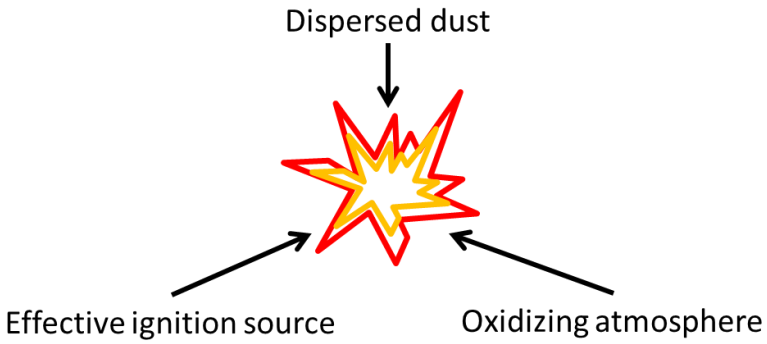
- ATmosphères EXplosibles (ATEX), ATEX 137 workplace directive (1999/92/EC) and ATEX 95 equipment directive (94/9/EC)
- NFPA 61: standard for the prevention of fires and dust explosions in agricultural and food processing facilities
- NFPA 654: standard for the prevention of fire and dust explosions from the manufacturing, processing, and handling of combustible particulate solids
- N 123-ФЗ «Технический Регламент о требованиях пожарной безопасности» (Russian Technical Regulations on Fire Safety Requirements)

Annex 1

Details of dust explosion hazards

1. Three factors are required for a dust explosion to occur:

- A dust (particle size < 500 µm) is dispersed in
- an oxidizing atmosphere (in most cases, air)
- and initiated by an effective ignition source



Flammable liquids, however, form flammable mixtures with air near or above their flashpoints, and thus a gas phase explosion hazard has always to be taken into account, since the minimum ignition energy is much lower than for solids. Substances and mixtures classified as flammable, will be able to form explosible dust-air mixtures under the aforementioned conditions. Creating a class “combustible dusts” next to the existing class “flammable solids” would create strong inconsistencies and confusion.

2. As such, dust explosibility is not an intrinsic hazard and does not agree with the concept of classification in the GHS Document which states that for hazard classification only the intrinsic properties of substances and mixtures are considered (see section 1.3.2.2.1).

3. Dusts explosions usually occur during mechanical processing, especially in grinding, milling and conveying.). Almost any combustible material is able to pose a dust explosion hazard in the aforementioned circumstances: Coal, flour, wood, sugar, organic chemicals, dried paint, plastics, paper, fibres from clothing.

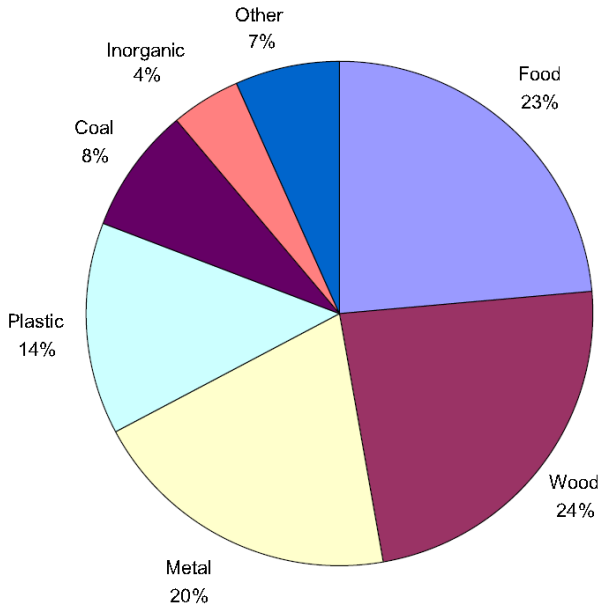


Diagram 1: Materials involved in dust explosions in the United States

4. Even very small amounts of finely dispersed material deposited in lateral areas pose a severe hazard when swirled up. This becomes evident in numerous explosions in grain elevators and silos: not the grain itself caused the dust explosion but small amounts of other organic material. The majority of incidents happen in the metal, wood and food industry (see diagram[1]).

5. Thus, the issue needs a much more comprehensive approach than simple hazard communication by classification. This is why the European legislation, the so-called ATEX.[2] Directive, covers explosive atmospheres as a whole, i.e. from gases, liquids and dusts. The approach is not classification, but rather prevention of or protection against explosions whatever the cause may be. Key elements are the assessment of explosion risks and the identification of places where explosive atmospheres may occur (concept of zones reflecting the likelihood of the presence of explosive atmospheres). In other countries, similar regulations or standards exist (i. e. NFPA 654 in the USA).

6. An appropriate way of communicating the hazard in the SDS, along with statements of fire extinguishing media and operations and conditions which create new risks has been found by decision of the UN GHS Subcommittee in Dec. 2012 (see documents ST/SG/AC.10/C.4/48 and ST/SG/AC.10/C.4/2012/28).

7. Introduction of a separate class in the GHS would create numerous liability lawsuits, especially if incidents occur in downstream processing. Disputes would arise about the content, particle size distribution and relevance for classification of minor fractions of material in conditions of delivery and processing.

8. The term "combustible dust" suggested by Canada for substances possessing a dust explosion hazard is expected to give rise to confusion as well, especially versus the existing class of flammable solids.

9. For a class of substances having a dust explosion hazard, a new symbol would have to be created. Industry is afraid that such a pictogram would create severe confusion with the existing symbol for explosives both in GHS and transport. Employees might even use the wrong symbol to label explosives, and thus a serious impairment of safety would be the consequence.

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[1] A.S. Blair, Dust explosion incidents and regulations in the United States, Journal of Loss Prevention in the Process Industries **20** (2007), 523.

[2] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2000:023:0057:0064:EN:PDF