

Sub-Committee of Experts on the
Transport of Dangerous Goods

(Nineteenth session,
2-6 July 2001, agenda item 11 (c)(i))

**GLOBAL HARMONIZATION OF SYSTEMS OF CLASSIFICATION
AND LABELLING OF CHEMICALS**

**Physical Hazards
Criteria for Flammable Aerosols**

Transmitted by the Consumer Specialty Products Association (CSPA)

1. CSPA is putting forth its recommended proposal for an aerosol flammability classification scheme for consideration by the UN/ILO Working Group on Physical Hazards in making its final decision on the remaining issues. This paper further builds on the work already completed by the Working Group as referenced in Annex 5 of the Report of the Committee of Experts on its Twenty-First Session (4-13 December 2000), document ST/SG/AC.10/27. It outlines the sequence of testing (see Attachment 1) as well as addresses the remaining unresolved endpoints described in the Federation of European Aerosols (FEA) and CSPA Joint Information Paper (ST/SG/AC.10/C.3/2001/8) and CSPA Background Paper (ST/SG/AC.10/C.3/2001/9).
2. It was anticipated that a common proposal would be issued before the end of June 2001 addressing the two remaining issues: Ignition Distance Test cut-off value for Extremely Flammable, and Enclosed Space Ignition Test cut-off values for time equivalency and deflagration density. This did not happen despite efforts by CSPA and FEA to negotiate a final common position.

Flammable Content Screen

3. CSPA and FEA both agreed in paragraph 4(c) of ST/SG/AC.10/C.3/2001/8 to pair the % flammable content with the chemical heat of combustion (ChHc) values as a screen. Aerosols with 1% or less of flammable components and with a ChHc less than 20 kJ/g should be classified as non-flammable, and aerosols with 85% or more flammable components and a ChHc greater than or equal to 30 kJ/g should be classified as extremely flammable.
4. No testing is required if aerosol products meet these conditions. This item expands on the criteria agreed upon by the Working Group in paragraph 8 of Annex 5 of ST/SG/AC.10/27.

Chemical Heat of Combustion Method (ChHc)

5. At the last session in December 2000, the Expert from the United States originally presented the Chemical Heat of Combustion, as defined by the National Fire Protection Association Publication 30B, as an alternative to the Enclosed Space Ignition Test (see ST/SG/AC.10/2000/26). At that meeting, the Expert from Italy introduced the chemical heat of combustion as a screen, which was agreed to by the Working Group as noted in paragraphs 11 and 12 in Annex 5 of ST/SG/AC.10/27. CSPA would like to maintain this method of classification for producers to be able to classify based on ChHc, without having to conduct expensive and dangerous testing.

This would apply to all aerosols, not just spray aerosols as referenced in paragraphs 11 and 12 in Annex 5 of ST/SG/AC.10/27.

6. As such, for aerosols, if the chemical heat of combustion is equal to or above 20 kJ/g and less than 30 kJ/g, the aerosol would be classified as flammable. CSPA proposes that if the chemical heat of combustion is equal to or above 30 kJ/g, the aerosol would be classified as extremely flammable. This value was bracketed from the December 2000 discussions. CSPA and FEA agreed to a value of 30 kJ/g for extremely flammable as part of the Flammable Content Screen (see paragraph 3 above). Producers should also have the option of testing to seek a lower hazard classification level.
7. The exception would be for aerosols with a chemical heat of combustion less than 20 kJ/g. These products would need to be tested by the Ignition Distance Test if a spray jet, or by the Aerosol Foam Flammability Test if a foam aerosol.

Aerosol Foam Flammability Test

8. For foam aerosols, the Working Group agreed in ST/SG/AC.10/27, Annex 5, paragraph 10, that if there is a stable flame of 4 cm height for not less than 2 seconds, the aerosol should be considered as flammable. Further, CSPA and FEA agreed in ST/SG/AC.10/C.3/2001/8, paragraph 4(b), that if there is a stable flame height equal to or above 20 cm for greater than or equal to 2 sec, or if there is a stable flame height equal to or above 4 cm for greater than or equal to 7 sec, the aerosol should be considered as extremely flammable.

Ignition Distance Test

9. For spray aerosols, the Working Group agreed in ST/SG/AC.10/27, Annex 5, paragraph 12 that it should be considered as positive [flammable] if the ignition occurred at a distance comprised between 15 cm and 90 cm (in increments of 15 cm). It should be noted that CSPA and FEA had originally included the 15 cm observable level for testing and research purposes only, and that it was later made part of the criteria.
10. In paragraph 13, it was proposed that if ignition occurred at a distance of [45 cm/90 cm] (to be confirmed) or more, the aerosol would be considered for classification in the next higher flammability level [extremely flammable]. CSPA believes our testing supports the 90 cm distance for extremely flammable. CSPA and U.S. government officials believe that there should be a clear differentiation (appreciable difference) between the flammable and extremely flammable levels. It was noted by a FEA representative at the December 2000 meeting that the further away, the riskier the flammability. Extremely flammable should be reserved for those aerosol products for which a significantly lesser degree of misuse is required to create a dangerous situation. From an April 9, 2001 conference call, FEA and CSPA had agreed in principle to compromise on the values and move in by an increment of 15 cm each. Therefore, CSPA indicates a willingness to compromise to 75 cm which would be a position that we could support.
11. If there were no positive results in the ignition distance test, an enclosed space test should be carried out. CSPA agrees with this statement in ST/SG/AC.10/27, Annex 5, paragraph 14 for a product with a ChHc equal to or greater than 20 kJ/g. However, if a producer is seeking a lower hazard classification level through testing rather than from the ChHc method, CSPA further proposes that if the ignition distance is between 15 cm and less than 90 cm and the ChHc is greater than or equal to 30 kJ/g, then an enclosed space test should be carried out.

Enclosed Space Ignition

12. As agreed upon in the July 2000 Meeting, ST/SG/AC.10/C.3/36, Annex 4, paragraph 12, CSPA supports the time equivalency value of 150 s/m³ (less than or equal to) for flammable. In addition, CSPA recommends a time equivalency of less than or equal to 70 s/m³ for extremely flammable. Both of these values are a departure from our original proposal of 100 and 60 s/m³ respectively, based on the good correlation found between the ChHc values and proposed CSPA time equivalency endpoints for flammable and extremely flammable as found in the CSPA Background Paper ST/SG/AC.10/C.3/2001/9.
13. CSPA is opposed to any deflagration density value different than that proposed for time equivalency. There should not be two sets of standards. Assuming a standard spray rate of 1g/s, the deflagration value and the time equivalency should be equal. Arbitrary values for deflagration density would undermine the entire testing scheme as proposed above and skew the classification towards an ultra conservative stance.
14. Please also refer to the CSPA Positions, paragraphs 17 through 32, and the accompanying table and charts in ST/SG/AC.10/C.3/2001/9 for support of our positions.

Labeling Issues

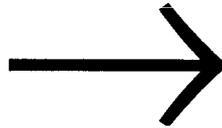
15. In order to mitigate the concerns that some regulators might have in regards to aerosol products classified as non-flammable, CSPA proposes that all aerosol products contain a standard phraseology such as "Caution: Contents under pressure. Keep away from heat or flame source. Do not puncture or incinerate." This is the current practice in the U.S.

16 Proposed Aerosol Flammability Classification Scheme (6/20

FLAMMABLE CONTENT SCREEN

* Content
 : < 20 kJ/g -- NON-FLAMMABLE
 e* Content
 : > 30 kJ/g ---> EXTREMELY FLAMMABLE

with flash point <_ 93°C



Everything else
must undergo
testing

CHEMICAL HEAT OF COMBUSTION (ChHc) METHOD

If ChHc < 20 kJ/g -> Must conduct further testing
 If ChHc > 20 kJ/g and < 30 kJ/g -- FLAMMABLE
 If ChHc > 30 kJ/g --->EXTREMELY FLAMMABLE

* Producer has option to test out



If Foam FOAM TEST

< 4cm or Flame duration < 2 sec
NON-FLAMMABLE

> 4cm and Flame duration > 2 sec
FLAMMABLE

> 20 cm and Flame duration > 2 sec

Time > 7 sec and Flame height > 4 cm
EXTREMELY FLAMMABLE

CLASSIFICATION IS BASED ON HIGHEST
CATEGORY ACHIEVED FROM TEST RESULTS

If Spray Jet IGNITION DISTANCE TEST

No Ignition and ChHc < 20 kJ/g -> NON-FLAMMABLE
(If ChHc > 20 kJ/g --) Do Enclosed Space Ignition Test

Ignition Distance = 15, 30, 45, 60, and 75 cm ---> FLAMMABLE
(If ChHc > 30 kJ/g) -> Do Enclosed Space Ignition Test

Ignition Distance = 90 cm -EXTREMELY FLAMMABLE

ENCLOSED SPACE IGNITION TEST

> 150 s/m³ -> NON-FLAMMABLE

> 70 s/m³ and < 150 s/m³ -> FLAMMABLE

< 70 s/m³ -4 EXTREMELY FLAMMABLE

* Equivalent time (s/m³) should be equal to deflagration density (g/m³) based on typical aerosol flow rate (1 g/s spray rate).