



National Fire Protection Association

1 Batterymarch Park, Quincy, MA 02169-7471
Phone: 617-770-3000 • Fax: 617-770-0700 • www.nfpa.org

MEMORANDUM

TO: NFPA Technical Committee on Electrical Equipment in Chemical Atmospheres

FROM: Joanne Goyette

DATE: November 12, 2010

SUBJECT: NFPA 499 ROP **TC FINAL** Ballot Results (F2011)

The Final Results of the NFPA 499 ROP Letter Ballot are as follows:

- 18 Members Eligible to Vote**
- 1 Not Returned** (B. Lapp)
- 3 Negatives** (T. Myers, E. Ural, and D. Wechsler)
- 1 Abstention** (M. Driscoll)

There are two criteria necessary to pass ballot [(1) affirmative $\frac{2}{3}$ vote and (2) simple majority].

- (1) The number of affirmative votes needed for the proposal to pass is **11**.
 $18 \text{ eligible to vote} - 1 \text{ not returned} - 1 \text{ abstention} = 16 \times 0.66 = 10.56$
- (2) In all cases, an affirmative vote of at least a simple majority of the total membership eligible to vote is required. This is the calculation for simple majority:
 $[18 \text{ eligible} \div 2 = 9 + 1 = \mathbf{(10)}]$

Reasons for negative votes, etc. from alternate members are not included unless the ballot from the principal member was not received.

According to the final ballot results, all ballot items received the necessary $\frac{2}{3}$ required affirmative votes to pass ballot.

Attachment:
Final Circulation Explanation Report

499-1 Entire Document (Log # CP2)

Negative

Myers, T. Changing from the current Ignition Sensitivity (IS) and Explosion Severity (ES) criteria to the new ASTM E1226 Go/No-Go criterion will increase the number of dusts that are classified under this recommended practice. There are dusts that have $IS < 0.2$ and $ES < 0.5$ but produce a "Go" in the E1226 test. Comment should be sought during the ROC phase about whether the current criteria provide an adequate level of safety when determining electrical classification and what additional level of safety would be provided by using the new criterion. While the technical basis for the historic IS and ES criterion has been criticized, it has been used for electrical classification by industry and OSHA for decades, and the substantiation for the proposal does not provide evidence that there are fires and explosions with materials with $IS < 0.2$ and $ES < 0.5$ that are ignited by non-classified electrical equipment.

The document should reference the new version of ASTM E1226, ASTM E1226 -2010 Standard Test Method for the Explosibility of Dust Clouds. The previous version of the ASTM E1226 does not include a Go/No-Go test.

Ural, E. While this document treats certain threshold dust accumulations (e.g. 1/8" and 1/32") as Gospel, NEC does not provide any mandatory prescription for the user to decide how much dust accumulation should trigger the use of classified equipment. The requirements of NEC is more like those for performance based design. The likelihood of a dust to be heated to ignition temperature when accumulated on the outside of an electrical enclosure or piece of electrical equipment is a function of the thickness, thermal conductivity, bulk density and combustion chemistry of the dust layer as well as the fractional coverage of the equipment's heat dissipation area and time it remains on the heated equipment. In its present and proposed form, the document creates a lot of unnecessary confusion within the user and enforcer communities.

Abstain

Driscoll, M. After reviewing the proposed changes and comments I don't feel I have the necessary background to make a fully informed decision on this matter - I will ensure I am at future meetings to get adequate background on these types of matters.

Affirmative with Comment

Wechsler, D. As noted in another Committee log (499-4) this committee became aware of the apparent difference in the NEC and NFPA 499 definition for Group G. It is suggested that as part of the CP2 action that the NEC Group G definition be applied in this revision of NFPA 499, thus making the NEC and this document have the same definitions for Group G. This would read: Group G: 'Atmospheres containing combustible dusts not included in Group E or F, including flour, grain, wood, plastic, and chemicals'.

The definition of a combustible dust is critical to the application of this document. A great deal of manhours have been spent attempting to productively develop a basic definition to reflect the appropriate hazards created by these types of materials under certain conditions of use. Any user needs to understand if the material being used constitutes the appropriate hazards or not to be defined as being a combustible dust. Clearly not knowing or understanding these material aspects have, requires more work and likely will involve testing. The Committee is asked to consider a modification of the presented combustible dust definition which includes input from an ISA and an IEC working group:

Combustible Dust. Finely divided solid phase particles which when dispersed and ignited in air are a dust explosion hazard. Dust particles of 500 microns or smaller (or material passing a U.S. No. 40 Standard Sieve as defined in ASTM E 11-04) are considered to present a dust explosion hazard unless determined otherwise.

This revision uses a 'soft' conversion like is done with meters to feet conversion to address the issue of particle size 420 microns vs. 500 microns. Also from a global language condition the term flash-fire which was introduced to address the dust layer and rapid burning conditions which could result in dust being expelled into a cloud and then ignited, has been removed. Flash-fire, even with the extraction from NFPA 2113 understanding seems to create more questions than it does address the issue. Flash-fire is also not specifically addressed in the currently identified testing methods. Lastly, if the material will produce an overpressure making it an dust which when dispersed and ignited in air is a dust explosion hazard, then there seems to be little value to single out the layer effects when the layer-cloud are considered together as being the 'combustible dust' criteria.

499-2 Entire Document (Log # CP1)

Abstain

Driscoll, M. After reviewing the proposed changes and comments I don't feel I have the necessary background to make a fully informed decision on this matter - I will ensure I am at future meetings to get adequate background on these types of matters.

499-3 Entire Document (Log # 1)

Abstain

Driscoll, M. After reviewing the proposed changes and comments I don't feel I have the necessary background to make a fully informed decision on this matter - I will ensure I am at future meetings to get adequate background on these types of matters.

499-4 Entire Document (Log # 3)

Negative

Wechsler, D. During our meeting the Committee took extra time to try and understand some rationale as to why the NEC Group G definition does not agree with that currently in NFPA 499. Many of us were aware of the Standards Council 1995 action (95-6) which essentially stated that NEC CMP-14 was responsible for establishing NEC material Groups, but NFPA 497/499 was responsible for the definitions of those groups.

The differing of definitions and the proposed Committee action on 499 Log #3, the Group F proposal, are of great concern. These combined events seem to present to NEC and NFPA 499 readers an implied assertion that this Committee has identified a significant potential hazard, which was not known before. For the reasons stated below, I think this is an inappropriate action and I think we should instead simply establish as the Committee action to have NFPA 499 and the soon to be published NEC have the same Group G definition which would be that in the NEC.

The action taken on the Proposal was to 'accept in principle in part' with the following revised definition: 'Group G: Atmospheres containing combustible dusts not included in Group E or F, including flour, grain, wood, plastic, and chemicals, including combustible carbonaceous dusts that have equal to or less than 8 percent total entrapped volatiles unless shown otherwise by testing'.

As a bit of NEC history from my records I found the following:

In 1978 the NEC definition for Group G changed to 'Atmospheres containing flour, starch or grain dust'.

In 1981, the NEC definition was changed again to read: 'Group G: Atmospheres containing flour, starch, grain or combustible plastics or chemical dusts having resistivities greater than 10^8 ohm-centimeter.'

In 1984 Group F was eliminated and placed the groups under FPN's. At that time Group G became: 'Atmospheres containing combustible dusts having resistivities greater than 10^8 ohm-centimeter or greater'.

In 1987 Group F was reintroduced as FPN No. 14, and all the groups were still FPN's.

In 1990 there were no group changes.

In 1993 the Groups were changed from FPNs to clauses and the definition for Group G became 'Atmospheres containing combustible dusts not included in Group E or F, including flour, grain, wood, plastic, and chemicals', which is the NEC Group G text used in the current NEC.

Since 1993 from the NEC perspective, the definition for Group G has remained consistent. Is a change now warranted?

Currently the NFPA 499 Group G definition is: 'Atmospheres containing other combustible dusts, including flour, grain, wood flour, plastic, and chemicals.' This definition and that in the NEC are similar, but not exact. I personally do not see a significant difference in these, but I do feel that there is no basis for retaining different definitions for the same Group G condition. This EEC Committee, per the Standards Council action 95-6 needs to take action so that both the NFPA 499 document and the NEC document have the same definition. Given that the NEC will be published shortly and NFPA 499 will follow, an excellent case can be made for this Committee to use the NEC Group G definition.

The proposed action on this log is the inclusion of the additional phrase reading: 'including combustible carbonaceous dusts that have equal to or less than 8 percent total entrapped volatiles unless shown otherwise by testing.' I do not see this added statement as being sufficiently justified for the following reasons:

1) At present we have no data to suggest that we have a significant number of incidents involving combustible carbonaceous dusts that have equal to or less than 8 percent total entrapped volatiles.

2) We also may have some suspicions, but again no data to suggest that combustible carbonaceous dusts that have equal to or less than 8 percent total entrapped volatiles were not already being addressed under the current Group G definitions.

3) Lastly, this proposed phrase provides an escape clause by the term "unless shown otherwise by testing". However if the materials are not combustible dusts, suggesting some testing was already performed, then they would not be under the 'combustible dust' groups in the first place.

Based upon this, I consider the best Committee action on this log is to use the current NEC Group G definition for NFPA 499 which will provide alignment and get us back into the Standards Council action dealing with NFPA 497/499 and NEC Groups without unduly alarming users into thinking they may have some new dust problems. The Committee should therefore reject this log with an action to make the NFPA 499 Group G definition the same as the NEC Group G definition.

Abstain

Driscoll, M. After reviewing the proposed changes and comments I don't feel I have the necessary background to make a fully informed decision on this matter - I will ensure I am at future meetings to get adequate background on these types of matters.

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499-6 3.3.3 Combustible Dust and A.3.3.3 (Log # 2)

Negative

Ural, E. Definition given 499-1 is deficient and open to abuse or misuse. It needs to be fixed.

Abstain

Driscoll, M. After reviewing the proposed changes and comments I don't feel I have the necessary background to make a fully informed decision on this matter - I will ensure I am at future meetings to get adequate background on these types of matters.

499-7 3.3.X Unclassified Locations (Log # CP3)

Abstain

Driscoll, M. After reviewing the proposed changes and comments I don't feel I have the necessary background to make a fully informed decision on this matter - I will ensure I am at future meetings to get adequate background on these types of matters.

499-8 Table 4.5.2 (Log # 4)

Negative

Ural, E. The Committee substantiation for rejection is not valid. I understand, FM and UL use cornstarch or maize starch in Approval/Listing tests. The likelihood of a dust to be heated to ignition temperature is not only dependent on the layer thickness but on the thermal conductivity, bulk density and combustion chemistry of the dust layer as well. Hence, the implicit safety factor the Committee is presuming can be inadequate for dusts other than corn or maize starch.

Abstain

Driscoll, M. After reviewing the proposed changes and comments I don't feel I have the necessary background to make a fully informed decision on this matter - I will ensure I am at future meetings to get adequate background on these types of matters.

499-9 4.7.2 (Log # 5)

Negative

Ural, E. The Committee did not clarify the meaning of organic dust. Contrary to Committee's claim, the proposal included a possible text for clarification which is: compounds "containing carbon" or "containing hydrocarbon groups" by organic dust.

The logic behind this section is backwards. Instead of requiring user to test for layer ignition temperature and derating it to 165, it would make much more sense to turn it around: use 165, unless you can prove the material will not carbonize, then you can do the layer ignition test.

Abstain

Driscoll, M. After reviewing the proposed changes and comments I don't feel I have the necessary background to make a fully informed decision on this matter - I will ensure I am at future meetings to get adequate background on these types of matters.

499-10 Figures 5.8(a) through 5.8(i) (Log # CP5)

Abstain

Driscoll, M. After reviewing the proposed changes and comments I don't feel I have the necessary background to make a fully informed decision on this matter - I will ensure I am at future meetings to get adequate background on these types of matters.