National Fire Protection Association

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M E M O R A N D U M

TO: NFPA Technical Committee on Electrical Equipment in Chemical Atmospheres

FROM: Joanne Goyette

DATE: April 22, 2011

SUBJECT: NFPA 499 ROC **TC** Letter Ballot (F2011)

The ROC letter ballot for NFPA 499 is attached. The ballot is for formally voting on whether or not you concur with the committee's actions on the comments. Reasons must accompany all negative and abstention ballots.

Please do not vote negatively because of editorial errors. However, please bring such errors to my attention for action.

Please complete and return your ballot as soon as possible but no later than **Friday, May 6, 2011.** As noted on the ballot form, please return the ballot to Joanne Goyette either via e-mail to jgoyette@nfpa.org or via fax to 617-984-7110. You may also mail your ballot to the attention of Joanne Goyette at NFPA, 1 Batterymarch Park, Quincy, MA 02169.

The return of ballots is required by the Regulations Governing Committee Projects.

Attachments:

Comments
Letter Ballot

499-1 Log #5 Final Action: Accept
(Entire Document)

Submitter: David Wechsler, Freeport, TX
Comment on Proposal No: 499-1
Recommendation: Delete the items added to provide tracking between the former NFPA 499 document and the proposed revised document. For example, see 5.1.7 [4.1.7, 4.1.7.1.....] that information within the brackets should not be retained in the final NFPA 499 document.

5.1.7 Electrical equipment in Division 2 locations is designed so that normal operation of the electrical equipment does not provide a source of ignition. ~~[4.1.7, 4.1.7.1, 4.1.7.2, 4.1.7.3]~~

Substantiation: The bracketed information was provided to track existing texts with the revised document to better assure no loss of existing texts. This tracking is not needed in the final draft of NFPA 499 and should be removed as an editorial correction.
Committee Meeting Action: Accept

499-2 Log #12 Final Action: Accept in Principle
(Entire Document)

Submitter: David Wechsler, Dow Chemical Company
Comment on Proposal No: 499-1
Recommendation: SI units use ohm/m and not ohm/cm. See A 3.3.4.
Substantiation: Correct units for SI are ohm/m and not ohm/cm.
Committee Meeting Action: Accept in Principle

In the ROP draft of A.3.3.3, revise the units from "ohm/cm" to "ohm-cm" in three places.

Committee Statement: The Committee notes that this is the extracted information from the 1984 NEC Section 500-2 (Fine Print Note). The Committee believes that this meets the submitter's intent.

499-3 Log #2 Final Action: Accept in Part

(3.3.3 Combustible Dust)

Submitter: David B. Wechsler, The Dow Chemical Company

Comment on Proposal No: 499-1

Recommendation: Revise text to read as follows:

3.3.3* Combustible Dust. Finely divided solid particles that present a ~~dust flash-fire or~~ dust explosion hazard when dispersed and ignited in air. The term 'solid particles' addresses particles in the solid phase and not those in a gaseous or liquid phase and can include hollow particles. Dust which can accumulate on equipment and includes particles of 420 microns or smaller (material passing a U.S. No. 40 Standard Sieve) is considered to present a ~~dust flash-fire or~~ dust explosion hazard unless testing shows otherwise. (See ASTM E1226 or ISO 6184/1.)

Delete 3.3.x Flash Fire and A.3.3.x Flash Fire.

Substantiation: NFPA 499 does not provide any testing or criteria to address 'flash-fire'. NFPA 499 is dealing with a combustible dust, whose primary potential hazard is an overpressure condition developed by a dust in a cloud. While a fire which spreads rapidly may be a significant concern, this specific NFPA recommended practice does not address this specific fire condition.

Committee Meeting Action: Accept in Part

1. Revise text to read as follows:

3.3.3* Combustible Dust. Finely divided solid particles that present a dust ~~flash~~ fire or dust explosion hazard when dispersed and ignited in air. The term 'solid particles' addresses particles in the solid phase and not those in a gaseous or liquid phase and can include hollow particles. [Use third sentence revised by Comment 499- (Log #3)]. (See ASTM E 1226 or ISO 6184/1.)

2. Delete 3.3.x Flash Fire and A.3.3.x Flash Fire.

Committee Statement: The Committee accepted the submitter's recommendation to revise the definition of Combustible Dust by accepting the deletion of the word "flash" that was proposed in the accepted definition in the ROP Draft. The Committee also accepted the deletion of the proposed definition for 3.3.x Flash Fire and its proposed Annex material.

The Committee did not accept the deletion of the words "dust fire or". The Committee believes that this definition serves the purposes of this document. The Committee did not accept the submitter's wording for the third sentence in the definition. See Comment 499-4 (Log #3).

499-4 Log #3 Final Action: Accept in Principle in Part
(3.3.3 Combustible Dust)

Submitter: David Wechsler, Dow Chemical / Rep. American Chemistry Council
Comment on Proposal No: 499-1
Recommendation: Revise the third sentence of the revised Combustible dust definition to read:
Dust ~~which can accumulate on equipment and includes~~ particles of 500 ~~420~~ microns or smaller (material passing a U.S. No. 40 Standard Sieve as defined in ASTM E 11-04) are ~~is~~ considered to present a ~~dust flash-fire or~~ dust explosion hazard unless determined ~~testing shows~~ otherwise. (See ASTM E1226 or ISO 6184/1.)
Substantiation: The revised text provides a historic perspective that correctly addressed a combustible dust and yet still permits a determination which may be testing, published data or other information as to why dust particles of small size (500 microns or less) should not be considered a combustible dust. Making some type of correlation about the dusts accumulating on equipment really has no bearing on whether or not the dust is a combustible dust. As an example, a process operation may have outstanding housekeeping so that there is no dust accumulations and yet the material being processed may still be a combustible dust.
Committee Meeting Action: Accept in Principle in Part
1. Revise the third sentence of the submitter's recommendation for the definition of Combustible Dust to read:
Dust ~~which can accumulate on equipment and includes~~ particles of 500 ~~420~~ microns or smaller (material passing a U.S. No. 35 ~~40~~ Standard Sieve as defined in ASTM E 11, Standard Specification for Wire Cloth and Sieves for Testing Purposes) are ~~is~~ considered to present a dust ~~flash~~ fire or dust explosion hazard unless determined ~~testing shows~~ otherwise. (See ASTM E 1226 or ISO 6184/1.)
2. Add the title and year for ASTM E 11 into Chapter 2 to read:
ASTM E 11, Standard Specification for Wire Cloth and Sieves for Testing Purposes, 2004 edition.
Committee Statement: The Committee accepted the submitter's revised particle size of 500 microns in the Combustible Dst definition; they corrected the sieve size to "U.S. No. 35" that correlates with the 500 micron size particle, and accepted the text that was struckout as shown in the third sentence. The Committee deleted the "-04" following ASTM E 11, as it refers to the edition date. The Committee did not accept deleting the words "dust fire or". See Committee Action on Comment 499-3 (Log #2).

499-5 Log #4 Final Action: Accept in Principle in Part
(3.3.3 Combustible Dust and 3.3.x Flash Fire (New))

Submitter: David Wechsler, Freeport, TX
Comment on Proposal No: 499-1
Recommendation: Replace 3.3.3* Combustible Dust with the following:
Combustible Dust. Any finely divided solid material, less than 420 microns in diameter (material passing a US No. 40 Standard Sieve), that presents a fire or deflagration hazard. If a sample of the dust that is at least 95% by weight less than 74 microns in diameter (US 200 mesh) explodes when tested in accordance with ASTM E1226 “Standard Test Method for Pressure and Rate of Pressure Rise for Combustible Dust” it is termed “explosible” and should be considered a dust explosion hazard.
Delete 3.3.x Flash Fire and A.3.3.x Flash Fire.
Substantiation: Flash fire is not addressed in the Hazardous Area Classification assessment for combustible dusts and therefore should not be addressed in a definition under this code.
The modified definition improves that suggested by the document revision.
Committee Meeting Action: Accept in Principle in Part
1. See Committee Action for the accepted revisions to the definition of Combustible Dust in Comments 499-3 (Log #2) and 499-4 (Log #3).
2. Accept the deletion of the definition of 3.3.x Flash Fire and its Annex A.3.3.x.
Committee Statement: The Committee accepted the deletion of the definition of 3.3.x Flash Fire and its Annex A.3.3.x. The Committee did not accept the revisions to the balance of the definition. See Committee Action on Comments 499-3 (Log #2) & 499-4 (Log #3).

499-6 Log #16 Final Action: Accept in Principle in Part
(3.3.3 Combutible Dust, 4.2.1, A.3.3.3, and A.4.2.1)

Submitter: Marcelo M. Hirschler, GBH International
Comment on Proposal No: 499-1
Recommendation: Revise text to read as follows:

3.3.3* Combustible Dust. Finely divided solid particles that present a dust flash fire or dust explosion hazard when dispersed and ignited in air. ~~Particles in the solid phase and not those in a gaseous or liquid phase and can include hollow particles. Dust that can accumulate on equipment and includes particles of 420 microns or smaller (material passing a U.S. No. 40 Standard Sieve) is considered to present a dust flash fire or dust explosion hazards unless testing shows otherwise. (See ASTM E 1226, *Standard Test Method for Pressure and Rate of Pressure Rise for Combustible Dusts*, or ISO 6184/1, Explosion Protection Systems – Part 1: Determination of Explosion Indices of Combustible Dust in Air.)~~

4.2.1* Testing under this section can be done to verify if the dust is a combustible dust.

A.4.2.1 The following materials do not require testing:

(1) Noncombustible materials – Noncombustible materials should be established by a recognized test procedure or self-evident chemical structure (e.g., completely oxidized metal, silicate talc, etc.).

(2) Resilient pellets – Pellets or other coarse material significantly greater than 420 microns, which are nonfrangible (which will not break into smaller particles during normal handling or pneumatic conveying), do not require testing.

A.3.3.3 Combustible Dust. ~~Materials not requiring testing as follows:~~

~~(1) Noncombustible materials – Noncombustible materials should be established by a recognized test procedure or self-evident chemical structure (e.g., completely oxidized metal, silicate talc, etc.).~~

~~(2) Resilient pellets – Pellets or other coarse material significantly greater than 420 microns, which are nonfrangible (which will not break into smaller particles during normal handling or pneumatic conveying), do not require testing.~~

Combustible dust includes particles in the solid phase and not those in a gaseous or liquid phase and can include hollow particles. Dust that can accumulate on equipment and includes particles of 420 microns or smaller (material passing a U.S. No. 40 Standard Sieve) should be considered to present a dust flash fire or dust explosion hazards unless testing shows otherwise. (See ASTM E 1226, *Standard Test Method for Pressure and Rate of Pressure Rise for Combustible Dusts*, or ISO 6184/1, Explosion Protection Systems – Part 1: Determination of Explosion Indices of Combustible Dust in Air.)

Prior to the 1981 edition of the *National Electrical Code* (NEC) (1978 and prior editions), all Group E dusts (metal dusts such as aluminum, magnesium, and their commercial alloys) and Group F dusts (carbonaceous dusts such as carbon black, charcoal, or coke dusts having more than 8 percent total volatile materials) were considered to be electrically conductive. As a result, areas containing Group E or Group F dusts were all classified Division 1, as required by the definition of a Class II, Division 1 location . It was only possible to have a Division 2 location for Group G dusts.

The 1984 edition of the NEC eliminated Group F altogether. Carbonaceous dusts with resistivity of less than 105 ohm/cm were considered conductive and were classified as Group E. Carbonaceous dusts with resistivity of 10^5 ohm/cm or greater were considered nonconductive and were classified as Group G. This reclassification allowed the use of Group G, Division 2 electrical equipment for many carbonaceous materials.

The 1987 edition of the NEC reinstated Group F because the close tolerances in Group E motors necessary for metal dusts are unnecessary for conductive carbonaceous dusts, and the low temperature specifications in Group G equipment necessary for grain, flour, and some chemical dusts are unnecessary for nonconductive carbonaceous dusts. This imposed an unwarranted expense on users.

This change allowed the use of Group F, Division 2 electrical equipment for carbonaceous dust with a resistivity greater than 10^5 ohm/cm.

The problem with this work was that the resistivity value, a number that related to the dust's ability to conduct an electric current, was not a constant and varied considerably based on dust particle size and extent of oxidation, the moisture content, voltage applied, temperature, and test apparatus and technique. No standardized test method for the resistivity value considering long-term environmental effects has been developed. Finally, the resistivity value is not directly related to the explosion hazard.

The 1990 edition of the NEC removed the low temperature consideration for Group G.

Also revise the title and date of ASTM E 1226 in Chapter 2 to read as follows:

ASTM E 1226, *Standard Test Method for Explosibility of Dust Clouds, 2010.* ~~*Pressure and Rate of Pressure Rise for Combustible Dusts*, 2005~~.

Also, add ASTM E 1226, Standard Test Method for Explosibility of Dust Clouds, 2010, into a new section B.1.2.1 on

ASTM publications

Also: remove section 2.3.2 on ISO Publications and ISO 6184 from Chapter 2 and add into a new section B.1.2.4 in a non mandatory Annex,

ISO 6184/1, Explosion Protection Systems — Part 1: Determination of Explosion Indices of Combustible Dust in Air, 1985.

Substantiation: The proposed definition is in conflict with the manual of style for two reasons: (a) multiple sentences are not allowed in definitions and (b) requirements are not allowed in definitions.

The information regarding testing is more appropriately placed in the annex under 4.2.1 and not under the definition of combustible dust.

ASTM E 1226 has a 2010 date and a revised title.

Committee Meeting Action: Accept in Principle in Part

1. Accept the portion of the submitter's recommendation identified to add the text for materials that do not require testing as Annex for 4.2.1 as shown below:

A.4.2.1 The following materials would not need to be tested:

(1) Noncombustible materials – Noncombustible materials should be established by a recognized test procedure or self-evident chemical structure (e.g., completely oxidized metal, silicate talc, etc.).

(2) Resilient pellets – Pellets or other coarse material significantly greater than ~~420~~ 500 microns, which are nonfrangible (which will not break into smaller particles during normal handling or pneumatic conveying), do not require testing.

2. Accept the submitter's deletion of the text that was shown as struckthrough in the beginning of the Annex text for A.3.3.3 Combustible Dust.

3. Accept new title and edition of ASTM E 1226, *Standard Test Method for Explosibility of Dust Clouds*, 2010 edition, and add this reference into Chapter 2 in a new Section B.1.2.1 for ASTM publications.

4. Add the ISO Standard Publication title and date into Chapter 2 for ISO 6184/1, *Explosion Protection Systems - Part 1: Determination of Explosion Indices of Combustible Dust in Air*, 1985.

5. Update the identified references in Annex B to be consistent with their appearance in updated Annex A material.

Committee Statement: The Committee accepted the addition of the underlined text in A.4.2.1 with minor revision, revised the particle size from "420" to "500" microns, and accepted the deletion of the first two subparts (1) and (2) in the beginning of A.3.3.3 for Combustible Dust. See Committee Action on Comments 499-3 (Log #2) & 499-4 (Log #3).

The Committee did not accept the submitter's recommendation to delete text from the definition of 3.3.3 Combustible Dust because they believe that the text is essential information for the definition of Combustible Dust.

The Committee accepted the new title of ASTM E 1226 and the relocation of the ISO Standards Publications into Chapter 2 and Annex B according to the NFPA Manual of Style.

499-7 Log #1 **Final Action: Accept**

(3.3.4.3 Group G)

Submitter: David B. Wechsler, The Dow Chemical Company

Comment on Proposal No: 499-1, 499-4

Recommendation: Replace existing text of 3.3.4.3 with the following:

Group G: Atmospheres containing combustible dusts not included in Group E or F, including flour, grain, wood, plastic, and chemicals.

Substantiation: As noted in another log 499-4, this committee became aware of the apparent difference in the NEC and NFPA 499 definition for Group G. Acceptance of this comment will align the definitions for Group G in the NEC and in this document which was the intent of this Committee and action by the NFPA Standards Council.

Committee Meeting Action: Accept

Committee Statement: The Committee accepted the submitter's proposed recommendation to reflect an agreement between this Committee and the National Electrical Code Committee, which was achieved via a Standards Council decision.

499-8 Log #6 Final Action: Accept in Principle
(4.1.4.4 (4.7.2 former))

Submitter: David Wechsler, Dow Chemical Company
Comment on Proposal No: 499-1, 499-9
Recommendation: Add as Annex/appendix material the following:
*4.1.4.4
As stated in 4.1.3.2 combustible dust layers can cause electrical equipment to overheat as these layers tend to act as insulation. In many instances, the increased temperature resulting from overheating can also cause moisture in the dust to be driven off. This is what happens when a dust dehydrates. Further heating of the dust may additionally result in the formation of a carbonized dust layer. Both these conditions are known to cause the layer ignition temperature to decrease. Unfortunately the lack of standardized tests prevents having a means to correlate how the layer ignition temperature may decrease due to dehydrating or carbonization effects.
The solution therefore when the combustible dust may be known to result in carbonization or dehydration has been the use of a conservative design to apply the lower of either the layer ignition temperature by test or 165°C. However in nearly all cases for organic combustible dusts the 165°C will be the lower values and this then raises the question about the practical value of some of the data presented in Table 5.6.2 (former 4.5.2) and the benchmark basis for the 165°C value.
It is the general belief that the 165°C layer surface temperature design value came from the US Bureau of Mines (USBM) testing in which the two lowest test results found from testing Bruceton bituminous coal (like Pittsburgh coal) dust at 170°C and No 7. Illinois bituminous coal dust at 160°C were averaged. Coal dust is also a dust which has undergone aging, which is another condition not addressed in standardized testing methods for combustible dusts. Therefore, while a conservative design as addressed in this recommended practice and in the National Electrical Code both reflect the use of the lower of the actual layer ignition temperature or 165°C, by performing additionally analysis of the combustible dust users should be better able to select ignition temperature designs which are more representative of the specific combustible dust hazards.
Substantiation: Some combustible dusts may be prone to dehydration and carbonization. Both of these conditions in a layer, will decrease the layer temperature. However no standardized testing has been established to address how the onset of these conditions will affect the layer ignition temperature of any given time period. Therefore, users are really left with only applying the 165°C temperature for these types of combustible dusts. What most users do not know, is that this 165°C comes from coal testing and therefore the use of this lower layer ignition temperature may in fact be too conservative. With this modified material users may be able to make better decisions. Additionally, since the NEC contains 'the lower of the actual layer ignition temperature or 165°C' language and it refers to NFPA 499 as a reference, correction here seems an appropriate first step.
Committee Meeting Action: Accept in Principle
Add the following text as Annex material for A.4.1.4.4 to read:
A.4.1.4.4 As stated in 4.1.3.2, combustible dust layers can cause electrical equipment to overheat as these layers tend to act as insulation. In many instances, the increased temperature resulting from overheating can also cause moisture in the dust to be driven off, thus dehydrating the dust. Further heating of the dust could additionally result in the formation of a carbonized dust layer. Both conditions are known to cause the layer ignition temperature to decrease. Unfortunately, the lack of standardized tests prevents having a means to correlate how the layer ignition temperature could decrease due to dehydrating or carbonization effects.
The data presented in Table 5.6.2 does not reflect the effects of aging or dehydration on ignition temperature. The conservative design approach has been to apply the lower of either the layer ignition temperature by test or 165°C. However, in nearly all cases for organic combustible dusts, 165°C will be the lower value.
Historically, the 165°C layer surface temperature design value came from the U.S. Bureau of Mines testing in which the two lowest test results found from testing Bruceton bituminous coal (like Pittsburgh coal) dust at 170°C and No. 7 Illinois bituminous coal dust at 160°C were averaged. Dust aging is another condition not addressed in standardized testing methods for combustible dusts. Therefore, while a conservative design as addressed in both this recommended practice and the National Electrical Code reflects the use of the lower of the actual layer ignition temperature or 165°C, by performing additional analysis of the combustible dust, users should be better able to select ignition temperature designs which are more representative of the specific combustible dust hazards.
Committee Statement: The Committee revised the submitter's recommended text to better convey information to the reader.

499-9 Log #CC1 Final Action: Accept

(4.2.1.1, 4.2.1.1, 4.2.3.4, A.4.2.3.4, 4.2.3.5, 4.2.4, 4.2.4.3, A.4.2.4.3, 4.2.4.4, 4.2.4.5, Figure 4.2)

Submitter: Technical Committee on Electrical Equipment in Chemical Atmospheres,

Comment on Proposal No: 499-1

Recommendation: Revise the proposed text in the ROP for Section 4.2 as identified:

1. Revise proposed 4.2.1.1 in the ROP Draft to read:

4.2.1.1 Figure 4.2 diagrams the combustible dust testing logic.

2. Revise proposed ROP text for 4.2.3.4 to read:

4.2.3.4* If the material ignites, use the results of the combustible dust layer ignition temperature test to determine the suitability of the equipment for the installation. (See 4.2.4.3.)

3. Revise A.4.2.3.4 in the ROP Draft to read:

A.4.2.3.4 For existing installations, equipment surface temperature could be determined using a contact temperature measurement device. The testing should be performed by determining the maximum temperature at the surface of the equipment below the normal dust accumulation (layer) while the equipment is operating at its maximum service conditions. The measured temperature should not exceed 80% of the dust layer ignition temperature in degrees C.

Section 500.8(D)(2) of the NFPA 70, *National Electrical Code* provides the following guidance on the alignment of the maximum surface temperature and the ignition temperature of the dust.

(D) Temperature.

(2) Class II Temperature. The temperature marking specified in Section 500.8(D)(2) shall be less than the ignition temperature of the specific dust to be encountered. For organic dusts that may dehydrate or carbonize, the temperature marking shall not exceed the lower of either the ignition temperature or 165°C (329°F). [NFPA 70: 500.8(D)(2), 2011]

For equipment listed or approved prior to 1987, Section 500.8(D)(2) of the NEC provides the following guidance:

The ignition temperature for which equipment was approved prior to this requirement shall be assumed to be as shown in Table 500.8(D)(2).

Table 500.8(D)(2) Class II Temperatures

**** INSERT Table 500.8(D)(2) HERE***

4. Delete 4.2.3.5 and A.4.2.3.5 as proposed in the ROP.

5.(a) Revise Figure 4.2 as shown: (LH side proposed changes)

Under the diamond “Apply 4.2.3...” by combining the two separate temperature branches which each begin with “ Temperature…” into one box to read:

"Material Ignites. Use the results of the combustible dust layer ignition temperature to determine the suitability of the equipment for the installation. (See 4.2.3.4)” and modify the first branch (box 1) to read: "Melts or sublimes before achieving ignition."

5.(b) Revise Figure 4.2 as proposed in the ROP as shown : (RH side)

Under the diamond “Apply 4.2.4...” combining the two separate temperature branches which each begin with “ Temperature…” into one box to read: “Material Ignites. Use the results of the combustible dust cloud ignition temperature to determine the suitability of the equipment for the installation. (See 4.2.4.4.)"

****Insert Figure 4.2 Here********

6. Renumber 4.2.3.6 to 4.2.3.5 to agree with the other changes made in this section.

7. Revise the proposed ROP text for 4.2.4 to read:

4.2.4 Combustible Dust Cloud Ignition Temperature Testing.

8. Revise 4.2.4.3 as proposed in the ROP to read:

4.2.4.3* If the material ignites, use the results of the combustible dust cloud ignition temperature test to the determine the suitability of the equipment for the installation.

9. Revise A.4.2.4.3 as proposed in the ROP to read:

A.4.2.4.3 See A.4.2.3.4.

10. Delete 4.2.4.4 and 4.2.4.5 as proposed in the ROP.

Substantiation: 1. The Committee revised 4.2.1.1 as proposed in the ROP editorially to lead into Figure 4.2.

2. The Committee revised 4.2.3.4 as proposed in the ROP to clarify that 450°C is not an appropriate criterion.

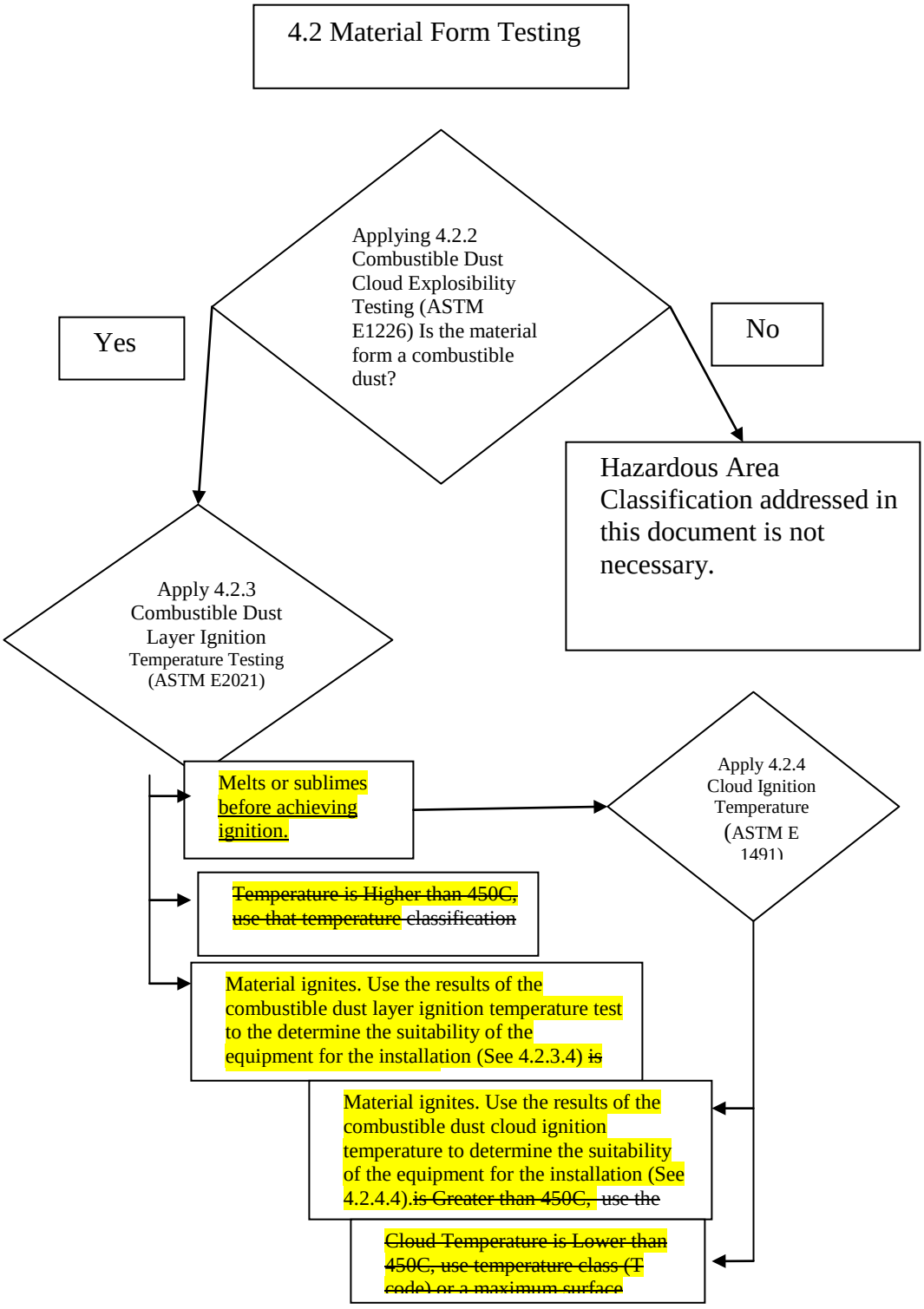
3. The Committee referenced NEC extracted text to address the suitability of the equipment.

Table 500.8(D)(2) Class II Temperatures

Equipment Not Subject to Overloading			Equipment (Such as Motors or Power Transformers) That May Be Overloaded			
			Normal Operation		Abnormal Operation	
Class II Group	**°C**	**°F**	**°C**	**°F**	**°C**	**°F**
E	200	392	200	392	200	392
F	200	392	150	302	200	392
G	165	329	120	248	165	329

[NFPA 70: 500.8 (D)(2), 2011]

NFPA® 499 ROC Include File for Log #CC1



Changes to Figure 4.2 include those items in yellow highlight. These include on the left the change in the first box under 4.2.3, to read "Melts or sublimes before achieving ignition". The box below this is deleted.
The box below this is revised to read: "Use the results of the combustible dust layer ignition temperature test to the determine the suitability of the equipment for the installation"
On the box under 4.2.4, revise the text to read: "Use the results of the combustible dust layer ignition temperature test to the determine the suitability of the equipment for the installation". Delete the box below this.

4. The Committee deleted 4.2.3.5 and its Annex for correlation with Action 1 on this Committee Action.
5. The Committee revised Figure 4.2 to agree with the Action 1 & 3 above in this Committee Action.
6. The Committee editorially renumbered 4.2.3.6 as 4.2.3.5 to be consistent with the deletion in Action 3.
7. The Committee did not agree with the submitter's recommendation to apply an infrared thermal temperature measurement as this would not provide a measurement on the equipment surface beneath the dust layer.
8. The Committee revised 4.2.4.3 as proposed in the ROP to clarify that 450°C is not an appropriate criterion.
9. The Committee referenced NEC extracted text for correlation with Action 3 above to address the suitability of the equipment.
10. The Committee deleted 4.2.4.4 and 4.2.4.5 for correlation with Action 4 on this Committee Action.

Committee Meeting Action: Accept

499-10 Log #8 **Final Action: Reject**

(Table 4.2.1.1 and 4.1.4.4)

Submitter: David Wechsler, Dow Chemical Company

Comment on Proposal No: 499-1

Recommendation: Table 4.2.1.1 seems to conflict with 4.1.4.4 with 4.1.4.4 stating: "The ignition temperature of a layer of organic dust on heat-producing equipment can decrease over time if the dust dehydrates or carbonizes. For such materials the NEC specifies that the surface temperature of the heat-producing equipment not exceed the lower of either the ignition temperature or 165°C (329°F)." Revise the information in the table or that within 4.1.4.4.

Substantiation: Resolve the conflict of testing found in Table 4.2.1.1 with statement 4.1.4.4.

Committee Meeting Action: Reject

Committee Statement: The Committee rejected the comment because no text was offered for the Committee to consider. See Committee Action on Comment 499-9 (Log #6) which proposes new Annex material that clarifies the relationship between the tabular data values and the 165°C limitation.

499-11 Log #7 **Final Action: Reject**

(4.2.3 and 6.3.2)

Submitter: David Wechsler, Dow Chemical Company

Comment on Proposal No: 499-1

Recommendation: Resolve the apparent discrepancy between the new 6.3.2 dust layer greater than 1/8 in. and typical sections 4.2.3 in which layer testing is done with ½ in. thickness of dust. It is known that thinner dust layers will often have lower ignition temperatures. Use 1/8 in. for testing.

Substantiation: The new 6.3.2 dust layer reflects that greater than 1/8 in. is a Division 1 location. However in the new sections dealing with layer ignition testing like 4.2.3, the testing reflects use of 1/2 in. layer thickness. It is known that thinner dust layers will often have lower ignition temperatures. So why does this practice reflect this significant difference? It seems like the testing should also be done at the Division 1 condition.

Committee Meeting Action: Reject

Committee Statement: The Committee rejected the comment because no text was offered for the Committee to consider. The submitter's comment was not submitted in accordance with paragraph 4.4.5[c] of the NFPA Regulations Governing Committee
Projects.

499-12 Log #13 Final Action: Accept in Principle in Part
(4.2.3.4)

Submitter: David Wechsler, Dow Chemical Co
Comment on Proposal No: 499-1
Recommendation: Revise text to read as follows:

If the results of the ASTM E2021 test indicate that the material will ignite, then this test temperature would be used in the design critieria for the operating equipment. Temperatures below 450°C could apply the NEC temperature class (T-Code).

Revise A.4.2.3.4 with the following additional statement taken from A.4.2.3.5:

Per NEC 500.8(A) "suitability of equipment" can be used to if equipment would be suitable for the layer ignition temperature. It is not the intent when testing for combustible dust layer ignition temperatures that equipment be marked for the appropriate Temperature Code as a result of such testing. Appropriate equipment surface temperature verifications can be undertaken by users documenting the results of thermal temperature measurements, such as IR, performed by persons trained in the use of such instruments.

Delete 4.2.3.5 and A.4.2.3.5 completely.

Modify Table 4.2 under the diamond "Apply 4.2.3..." by combining the two separate temperature branches which each begin with " Temperature…" into one branch, to read, "Apply the results of the layer ignition temperature test to the design. See 4.2.3.4)" Also revise the first branch to read: "Melts or sublimes before reaching ignition ~~450°C~~"

Renumber 4.2.3.6 to 4.2.3.5 to agree with the other changes made in this section.

Substantiation: These changes make the requirement clear. If the material is found to be a combustible dust, then there is a need to understand the characteristics addressed by the layer ignition temperature testing. The rational of having two statements which address the same design temperature in slightly different ways offers little value to users and no overall safety improvement for the installation. The clarification to the Annex for 4.2.3.4 provides an improved method to address the results from the layer ignition temperature testings.

Committee Meeting Action: Accept in Principle in Part

See Comment 499-8 (Log #CC1) for the action to modify Figure 4.2 and 4.2.3.4.

Committee Statement: See Comment 499-8 (Log #CC1) for the action to revise Figure 4.2 and its supporting text.

The Committee did not agree with the submitter's recommendation to apply an infrared thermal temperature measurement, as this would not provide a measurement on the equipment surface beneath the dust layer.

499-13 Log #14 Final Action: Accept in Principle in Part
(4.2.4.3)

Submitter: David Wechsler, Dow Chemical Co
Comment on Proposal No: 499-1
Recommendation: Revise text to read as follows:

If the results of the ASTM E1491 test indicate that the material will ignite, then this cloud ignition temperature would be used in the design critieria for the operating equipment. Temperatures below 450°C could apply the NEC temperature class (T-Code).

Revise A.4.2.4.3:

Per NEC 500.8(A) "suitability of equipment" can be used to if equipment would be suitable for the layer ignition temperature. It is not the intent when testing for combustible dust layer ignition temperatures that equipment be marked for the appropriate Temperature Code as a result of such testing. Appropriate equipment surface temperature verifications can be undertaken by users documenting the results of thermal temperature measurements, such as IR, performed by persons trained in the use of such instruments.

Modify Table 4.2 by combining the two separate temperature branches under the diamond Apply 4.2.4 into one branch, to read, "Apply the results of the cloud ignition temperature test to the design. (See 4.2.4.3)"

Delete 4.2.4.4 and 4.2.4.5.

Substantiation: These changes make the requirement clear. If the material is found to be a combustible dust, and then from the layer ignition temperature test the material melts, then there is a need to understand the characteristics addressed by the cloud ignition temperature testing. The rational of having two statements which address the same design temperature in slightly different ways offers little value to users and no overall safety improvement for the installation. The clarification to the Annex for 4.2.4.3 provides an improved method to address the results from the ignition temperature tests.

Committee Meeting Action: Accept in Principle in Part

See Comment 499-8 (Log #CC1) for the action to modify 4.2.4.3.

Committee Statement: See Comment 499-8 (Log #CC1) for the action to revise Figure 4.2 and its supporting text.

The Committee did not agree with the submitter's recommendation to apply an infrared thermal temperature measurement, as this would not provide a measurement on the equipment surface beneath the dust layer.

499-14 Log #15 Final Action: Accept
(4.4.6.2)

Submitter: David Wechsler, Dow Chemical Co
Comment on Proposal No: 499-1
Recommendation: Revise text to read as follows:

Potential fire hazards such as flash-fires, and other ~~Other~~ sources of potential heat, such as hot process surfaces, smoldering nests, self heating and friction sources, should also be considered independently of the recommended practice.

Substantiation: Concerns about potential fire hazards which seem to involve 'flash-fires' considerations exist. While such concerns are valid, they are outside the scope of this practice and this revision makes it clear that these conditions are addressed in other standards. Hot process surfaces are addressed in this practice with a need to control surface temperatures as needed by the process materials.

Committee Meeting Action: Accept

Committee Statement: The Committee notes that this action should be applied to 4.6.2.

499-15 Log #11 Final Action: Reject
(5.5.7)

Submitter: David Wechsler, Dow Chemical Company
Comment on Proposal No: 499-1
Recommendation: Add new text to read as follows:
Note: See 6.7 Housekeeping.
Substantiation: Housekeeping may be an effective means for controlling dust accumulations and through such appropriate designed systems, like localized vacuum pickups, different equipment may be used.
Committee Meeting Action: Reject
Committee Statement: The identified section number does not exist in the Committee Action draft proposed for NFPA 499. Housekeeping is already addressed in the document in Section 6.7.

499-16 Log #10 Final Action: Accept in Principle in Part
(A.4.2.4.3)

Submitter: David Wechsler, Dow Chemical Company
Comment on Proposal No: 499-1
Recommendation: Revise text to read as follows:
A.4.2.4.3 Per NEC 500.8(A) "suitability of equipment" can be used to determine the maximum surface temperature. It is not the intent when testing for combustible dust layer ignition temperatures that equipment be marked for the appropriate Temperature Code as a result of such testing. Appropriate equipment surface temperature verifications can be undertaken by users documenting the results of thermal temperature measurements, such as IR, performed by persons trained in the use of such instruments.
Housekeeping measures which would prevent hazardous accumulation of combustible dust on equipment may also be another control method.
Substantiation: This revision clarifies that it is not the intent that with the introduction of specific testing for combustible dusts that equipment surface temperatures need to require replacement equipment. This testing is not a retroactive requirement. Users may verify surface temperature by using testing instruments, like IR. This revision also addresses the use of housekeeping as an alternative control method.
Committee Meeting Action: Accept in Principle in Part
See Comment 499-8 (Log #CC1) for the action to modify A.4.2.4.3.
Committee Statement: The Committee agreed with the submitter to revise A.4.2.4.3 and the changes are reflected in Comment 499-8 (Log #CC1).
The Committee did not agree with the submitter's recommendation to apply an infrared thermal temperature measurement, as this would not provide a measurement on the equipment surface beneath the dust layer.
The Committee did not agree with the submitter's recommendation to address housekeeping in this section because 4.2.4.3 covers testing.

499-17 Log #9 Final Action: Reject
(A.4.4.3.1)

Submitter: David Wechsler, Dow Chemical Company
Comment on Proposal No: 499-1
Recommendation: Revise line 4 of this table as follows:
Bulking Brush (Cone Discharge) 10-20 correct resistivities to read 10^9 Ohm/m
Substantiation: Editorial correction.
Committee Meeting Action: Reject
Committee Statement: Paragraph 4.4.5(d) of the NFPA Regulations Governing Committee Projects requires comments that intend to add or revise material to be technically justified, and the submitter's substantiation is not consistent with the proposed additional text.