# Public Comment No. 33-NFPA 780-2024 [ Section No. 1.1.1 ]

**1.1.1**

This document shall cover traditional lightning protection system installation requirements for the following:

(1) Ordinary structures

(2) Miscellaneous structures and special occupancies

(3) Heavy-duty stacks and corrosive environments

(4) Structures containing flammable vapors, flammable gases, or liquids that can give off flammable vapors

(5) Structures housing explosive materials

(6) Wind turbines

(7) Watercraft

(8) Airfield lighting circuits

(9) Solar arrays

## Statement of Problem and Substantiation for Public Comment

add corrosive environments

**Related Item**

• 4.1

## Submitter Information Verification

**Submitter Full Name:** Bruce Kaiser
**Organization:** Lightning Master Corporation
**Street Address:**
**City:**
**State:**
**Zip:**
**Submittal Date:** Wed May 29 12:07:35 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected

**Resolution:** There is not enough substantiation or information to make this change at this time.

# Public Comment No. 28-NFPA 780-2024 [ Section No. 1.6 ]

**1.6*** Maintenance of metal edge systems or gutters during installation of lightning protection systems .

Guidelines for the maintenance of the lightning protection system shall be provided to the owner at the completion of installation. Components of lightning protection systems attached to ANSI/SPRI/FM 4435/ES-1 or ANSI/SPRI GT-1 tested metal edge systems or gutters shall be installed with compatible brackets, fasteners or adhesives, in accordance with the metal edge systems or gutter manufacturer's installation instructions. Installation shall be as directed by a registered design professional when the metal edge system or gutter manufacturer is unknown.

## Statement of Problem and Substantiation for Public Comment

This comment emphasizes the critical need for lightning protection systems (LPS) to be installed in accordance with the manufacturer's installation instructions for roof assemblies, coverings, metal edge systems, or gutters. The term "manufacturer" refers to the entity responsible for producing these roof components, which could be the roofing contractor, the roofing membrane manufacturer, or another manufacturing company. This ensures that the LPS does not compromise the integrity and performance of the roof components.

Key Points:
1. Adherence to Manufacturer Instructions:
o LPS attachments must follow the installation guidelines provided by the manufacturers of the roof assembly, covering, metal edge systems, or gutters.
2. Definition of Manufacturer:
o The manufacturer is defined as the entity that produced the roof components, which could be a roofing contractor, membrane manufacturer, or another responsible manufacturing company.
3. Proper Flashing:
o Where LPS components attach to or penetrate the roof, proper flashing is essential to prevent leaks and maintain the roof's integrity.
4. Role of Design Professionals:
o In cases where the manufacturer of the roof components is unknown or out of business, a registered design professional must provide guidance on attachment methods that preserve the roof's integrity while allowing for the LPS installation.
5. Documented Failures:
o There have been documented failures of roof assembly components during moderate wind events where LPS were attached. These failures highlight the importance of proper attachment methods to prevent wind load alterations and performance issues such as restricted thermal movement, galvanic reactions, and leak points.
6. Independence of LPS Attachments:
o The comment encourages the use of methods and details that allow LPS systems to be attached independently of coping, fascia, gutters, and roof assembly components. This approach helps maintain the integrity of these tested components and the building envelope.
Importance of the Comment:
• Safety and Performance: Ensuring that LPS installations do not compromise the structural integrity and performance of roof components is crucial for safety and building longevity.
• Compliance with Codes: By following the manufacturer's instructions and ensuring proper flashing, the installations remain compliant with building codes and standards.
• Adaptability: Providing guidance for situations where the original manufacturer is unavailable ensures that LPS installations can still proceed without compromising roof integrity.
Conclusion:
This comment aims to maintain the integrity and performance of roof assemblies when installing lightning protection systems by adhering to manufacturer instructions and ensuring proper flashing. It

also addresses scenarios where manufacturer instructions are unavailable by involving registered design professionals to determine suitable attachment methods.

A coordinating proposal has been submitted to NFPA 5000 for consideration.

**Related Item**

• FR-46

## Submitter Information Verification

**Submitter Full Name:** Amanda Hickman
**Organization:** The Hickman Group
**Affiliation:** Single-Ply Roofing Industry (SPRI)
**Street Address:**
**City:**
**State:**
**Zip:**
**Submittal Date:** Fri May 17 12:41:15 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected

**Resolution:** The proposed revisions introduce new requirements that were not under consideration during the first draft, public input stage. The attachment of LPS lightning protection systems to metal edge systems or gutters is not a maintenance issue nor criteria that belongs in Chapter 1 – Administration. Information of this nature would be better located in the Annex associated with the applicable requirements in the main body of the standard.

# Public Comment No. 1-NFPA 780-2024 [ New Section after 3.3.9 ]

**40% Copper-Clad Steel Wire (40% CCS)**

40% Copper-Clad Steel Wire (40% CCS) Wire consisting of a core of homogeneous steel with a continuous outer cladding of copper metallurgically bonded to the core throughout to have minimum copper thickness of 9% of the wire diameter.

## Statement of Problem and Substantiation for Public Comment

This adds a definition for 40% CCS as a permitted wiring method for use in this standard when the material is in compliance with ASTM B 910 and B 227. A minimum copper thickness of 9% of the wire diameter equates to 40% copper
cladding. Copper-Clad Steel (CCS) has been widely used as a conductor material for lightning protection since the 1920s. It is referenced in NFPA 780 as an overhead ground wire to protect conductors and equipment positioned on distribution towers, providing evidence of its performance capability. 40% CCS is the commercially available grade of CCS with the highest copper content to ensure both maximum corrosion resistance and maximum conductivity. This PC defines 40% CCS in NFPA 780.

**Related Item**

• Public Input 10 NFPA 780-2023

## Submitter Information Verification


**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.
**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Sun May 12 07:09:24 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but held

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate

appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

# Public Comment No. 34-NFPA 780-2024 [ New Section after 3.3.32.2 ]

**TITLE OF NEW CONTENT**

Type your content here ...Class III materials shall meet the dimension, weight, and other requirements of Class II materials and shall be made of corrosion resistant materials.

## Statement of Problem and Substantiation for Public Comment

create a materials class that allows for the use of corrosion resistant materials

**Related Item**

• PI 116, 4.1.1.1.2

## Submitter Information Verification


**Submitter Full Name:** Bruce Kaiser
**Organization:** Lightning Master Corporation
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Wed May 29 12:19:00 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected
**Resolution:** There is not enough substantiation or information to make this change at this time.

# Public Comment No. 2-NFPA 780-2024 [ Section No. 4.1.1.1.1 ]

**4.1.1.1.1**

Structures not exceeding 75 ft (23 m) in height shall be protected with Class I materials as shown in Table 4.1.1.1.1.

Table 4.1.1.1.1 Minimum Class I Material Requirements

| | | - | - | ~~Copper~~ | - | Copper/Copper-Clad Steel | Alur |
|---|---|---|---|---|---|---|---|
| Type of Conductor | Parameter | US | SI | - | US | SI | |
| Air terminal, solid | Diameter | ⅜ in. | 9.5 mm | - | ½ in. | 12.7 mm | |
| Air terminal, tubular | Diameter | ⅝ in. | 15.9 mm | - | ⅝ in. | 15.9 mm | |
| | - | Wall thickness | 0.033 in. | 0.8 mm | - | 0.064 in. | 1.63 mm |
| Main conductor, cable | Size each strand | 17 AWG | 1.04 $mm^2$ | - | 14 AWG | 2.08 $mm^2$ | |
| | - | Weight per length | 187 lb/1000 ft<br>172 lb/1000 ft * | 278 g/m<br>-<br>256 g/m * | 95 lb/1000 ft | 141 g/m | |
| | - | Cross-section area | 57,400 cir. mils | 29 $mm^2$ | - | 98,600 cir. mils | 50 $mm^2$ |
| Bonding conductor, cable (solid or stranded) | Size each strand | 17 AWG | 1.04 $mm^2$ | - | 14 AWG | 2.08 $mm^2$ | |
| | Cross-section area | 26,240 cir. mils | 13.3 $mm^2$ | - | 41,100 cir. mils | 20.8 $mm^2$ | |
| Bonding conductor, solid strip | Thickness | 0.051 in. | 1.30 mm | - | 0.064 in. | 1.63 mm | |
| | - | Width | ½ in. | 12.7 mm | - | ½ in. | 12.7 mm |
| Main conductor, solid strip | Thickness | 0.051 in. | 1.30 mm | - | 0.064 in. | 1.63 mm | |
| | - | Cross-section area | 57,400 cir. mils | 29 $mm^2$ | - | 98,600 cir. mils | 50 $mm^2$ |

* Relevant to Copper-Clad Steel

## Statement of Problem and Substantiation for Public Comment

This adds 40% CCS to the table as an acceptable material type. History of usage as a conductor material employed in lightning protection applications, and the laboratory work of the CCS 780 Task

Group has provided sufficient evidence that 40% CCS meets the minimum requirements for performance.

**Related Item**

• Public Input NO. 11-NFPA 780-2023

## Submitter Information Verification

**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.
**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**
**Submittal Date:** Sun May 12 07:41:34 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but held

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

# Public Comment No. 3-NFPA 780-2024 [ Section No. 4.1.1.1.2 ]

**4.1.1.1.2**

Structures exceeding 75 ft (23 m) in height shall be protected with Class II materials as shown in Table 4.1.1.1.2.

Table 4.1.1.1.2 Minimum Class II Material Requirements

| | | - | - | ~~Copper~~ | - | Copper/Copper-Clad Steel | | Alu |
|---|---|---|---|---|---|---|---|---|
| Type of Conductor | Parameter | US | SI | - | US | SI | | |
| Air terminal, solid | Diameter | ½ in. | 12.7 mm | - | ⅝ in. | 15.9 mm | | |
| Main conductor, cable | Size each strand | 15 AWG | 1.65 $mm^2$ | - | 13 AWG | 2.62 $mm^2$ | | |
| | - | Weight per length | 375 lb/1000 ft<br>345 lb/1000 ft * | 558 g/m<br>-<br>513 g/m* | 190 lb/1000 ft | 283 g/m | | |
| | - | Cross-section area | 115,000 cir. mils | 58 $mm^2$ | - | 192,000 cir. mils | 97 $mm^2$ | |
| Bonding conductor, cable (solid or stranded) | Size each strand | 17 AWG | 1.04 $mm^2$ | - | 14 AWG | 2.08 $mm^2$ | | |
| | Cross-section area | 26,240 cir. mils | 13.2 $mm^2$ | - | 41,100 cir. mils | 20.8 $mm^2$ | | |
| Bonding conductor, solid strip | Thickness | 0.051 in. | 1.30 mm | - | 0.064 in. | 1.63 mm | | |
| | - | Width | ½ in. | 12.7 mm | - | ½ in. | 12.7 mm | |
| Main conductor, solid strip | Thickness | 0.064 in. | 1.63 mm | - | 0.1026 in. | 2.61 mm | | |
| | - | Cross-section area | 115,000 cir. mils | 58 $mm^2$ | - | 192,000 cir. mils | 97 $mm^2$ | |

* Revelant to CCS 40% Conductor Material

## Statement of Problem and Substantiation for Public Comment

This adds 40% CCS to the table along with copper (CU) as an acceptable alternative material type. History of usage as a conductor material employed in lightning protection applications, and the laboratory work of the CCS 780 Task Group has provided sufficient evidence that 40% CCS meets the minimum requirements for performance.

**Related Item**

• Public Input 12

## Submitter Information Verification

**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.
**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**
**Submittal Date:** Sun May 12 08:14:58 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but held

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

# Public Comment No. 5-NFPA 780-2024 [ Section No. 4.2.3 ]

**4.2.3**

Copper and 40% CCS lightning protection materials shall not be installed on or in contact with aluminum roofing, aluminum siding, or other aluminum surfaces.

## Statement of Problem and Substantiation for Public Comment

This adds 40% CCS to the table along with copper (CU) as an acceptable alternative material type. History of usage as a conductor material employed in lightning protection applications, and the laboratory work of the CCS 780 Task Group has provided sufficient evidence that 40% CCS meets the minimum requirements for performance.

**Related Item**

• Public Input 13 NFPA 780

## Submitter Information Verification


**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.
**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Sun May 12 08:36:45 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but held

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

# Public Comment No. 6-NFPA 780-2024 [ Section No. 4.2.5 ]

**4.2.5***

Lightning protection systems shall be designed to minimize the effects caused by runoff ~~from both copper~~ from copper, 40% CCS and aluminum lightning protection materials to prevent the deterioration of incompatible materials and minimize the degradation of building aesthetics caused by staining.

## Statement of Problem and Substantiation for Public Comment

This adds 40% CCS to the table along with copper (CU) as an acceptable alternative material type. History of usage as a conductor material employed in lightning protection applications, and the laboratory work of the CCS 780 Task Group has provided sufficient evidence that 40% CCS meets the minimum requirements for performance.

**Related Item**

• Public Input 14 2023 NFPA 780

## Submitter Information Verification


**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.
**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Sun May 12 08:38:45 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but held

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

# Public Comment No. 8-NFPA 780-2024 [ Section No. 4.3.2 ]

**4.3.2**

Copper or 40% CCS components installed within 24 in. (600 mm) of the top of a chimney or vent emitting corrosive gases shall be protected by a hot-dipped lead or tin coating.

## Statement of Problem and Substantiation for Public Comment

This ensures both CU and 40% CCS are properly protected from chimney or vent emitting corrosive gases.

**Related Item**

• Public Input No. 15-NFPA 780-2023

## Submitter Information Verification


**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.
**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Sun May 12 08:44:04 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but held

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

# Public Comment No. 9-NFPA 780-2024 [ Section No. 4.3.4.2 ]

**4.3.4.2**

Bimetallic connectors and fittings shall be used for splicing or bonding dissimilar metals.

Informational Note: Copper-clad steel is dissimilar to aluminum, and not dissimilar to copper

## Statement of Problem and Substantiation for Public Comment

Information guidance offered to users regarding the galvanic corrosion properties of CCS.

**Related Item**

• Public Input No. 16-NFPA 780-2023

## Submitter Information Verification


**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.
**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Sun May 12 08:48:42 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but held

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

# Public Comment No. 10-NFPA 780-2024 [ Section No. 4.5.4.6 ]

**4.5.4.6**

Connections between galvanized steel overhead ground wires and copper or 40% CCS conductors shall be made through a suitable component that does not permit direct contact between the two materials.

## Statement of Problem and Substantiation for Public Comment

The use of 40% CCS would have the same corrosive concerns as copper conductors have so needs to be added to this rule

**Related Item**

• Public Input No. 17-NFPA 780-2023

## Submitter Information Verification


**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.
**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Sun May 12 08:52:33 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but held

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

# Public Comment No. 11-NFPA 780-2024 [ Section No. 4.12.3.2 ]

**4.12.3.2***

The concrete-encased electrode shall consist of one of the following:

(1) Not less than 20 ft (6 m) of bare copper or 40% CCS main-size conductor

(2) At least 20 ft (6 m) of one or more bare or electrically conductive coated steel reinforcing bars or rods not less than ½ in. (12.7 mm) in diameter that have been effectively bonded together by welding, structural mechanical coupling, or overlapping 20 diameters and wire tying

## Statement of Problem and Substantiation for Public Comment

40% CCS is added to the section as the criteria for a copper concrete-encased electrode is the same for 40% CCS.

**Related Item**

• Public Input No. 18-NFPA 780-2023

## Submitter Information Verification


**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.
**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Sun May 12 09:18:19 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but held

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

# Public Comment No. 30-NFPA 780-2024 [ Section No. 4.19.3.7 ]

**4.19.3.7**

The conductor between the surge arrester and the line,_ and the surge arrester and the grounding connection shall either not be smaller than 6 AWG copper 4 AWG aluminum or use a conductive material that has a capacity and withstand rating equivalent to at least a 6 AWG copper conductor.

## Statement of Problem and Substantiation for Public Comment

There should be a comma added after "line" to match the NEC language to match the NEC language, e.g. 242.52.

242.52 Surge-Arrester Conductors.
The conductor between the surge arrester and the line, and the surge arrester and the grounding connection, shall not be smaller than 6 AWG copper or aluminum.

**Related Item**

• FR 31

## Submitter Information Verification

**Submitter Full Name:** David Gerstetter
**Organization:** UL Solutions
**Street Address:**
**City:**
**State:**
**Zip:**
**Submittal Date:** Mon May 20 13:42:09 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Accepted
**Resolution:** SR-3-NFPA 780-2024
**Statement:** A comma has been added after "line" to match the language in NEC Section 242.52.

# Public Comment No. 39-NFPA 780-2024 [ Section No. 6.2.1 ]

**6.2.1** General.

Materials shall be Class II or Class III as shown in Table 4.1.1.1.2 and as described in this chapter.

## Statement of Problem and Substantiation for Public Comment

allow the use of Class III material

**Related Item**

• PI 116, 4.1.1.1.2

## Submitter Information Verification


**Submitter Full Name:** Bruce Kaiser
**Organization:** Lightning Master Corporation
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Thu May 30 14:44:40 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected

**Resolution:** There is not enough substantiation or information to make this change at this time.

## Public Comment No. 13-NFPA 780-2024 [ Section No. 6.2.2 [Excluding any Sub-Sections] ]

Copper, 40% CCS, and bronze materials used on the upper 25 ft (7.6 m) of a stack shall have a continuous covering of lead having a minimum thickness of 0.064 in. (1.63 mm) to resist corrosion by flue gases.

## Statement of Problem and Substantiation for Public Comment

40% CCS is added to the section to ensure the material is effectively protected the same as copper and bronze materials.

**Related Item**

• Public Input No. 20-NFPA 780-2023

## Submitter Information Verification


**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.
**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Sun May 12 09:28:36 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but held

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

## Public Comment No. 40-NFPA 780-2024 [ Section No. 6.3 [Excluding any Sub-Sections] ]

Strike termination devices shall be made of solid copper, stainless steel, titanium,~~- or Monel® metal~~ Monel® or other suitable material of equivalent corrosion resistance .

## Statement of Problem and Substantiation for Public Comment

allow additional suitable corrosion resistant materials

**Related Item**

• PI 116, 4.1.1.1.2

## Submitter Information Verification

**Submitter Full Name:** Bruce Kaiser
**Organization:** Lightning Master Corporation
**Street Address:**
**City:**
**State:**
**Zip:**
**Submittal Date:** Thu May 30 14:46:57 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected
**Resolution:** There is not enough substantiation or information to make this change at this time.

# Public Comment No. 14-NFPA 780-2024 [ Section No. 6.4.1.1 ]

**6.4.1.1**

Conductors shall be copper or 40% CCS , weighing not less than 375 lb per 1000 ft (558 g per m) without the lead coating, or approved corrosion-resistant material or coating.

## Statement of Problem and Substantiation for Public Comment

This adds a requirement that 40% CCS conductors used for this application also meet the weight per 1,000 ft. criteria established for copper.

**Related Item**

• Public Input No. 21-NFPA 780-2023

## Submitter Information Verification


**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.
**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Sun May 12 11:32:44 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but held

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

# Public Comment No. 15-NFPA 780-2024 [ Section No. 8.4.2.4 ]

**8.4.2.4***

Ground ring electrodes shall be bare copper or 40% CCS conductors meeting or exceeding ~~105~~ 115 ,000 circular mils.

## Statement of Problem and Substantiation for Public Comment

This adds 40% CCS to the rule and increases the circular mil to 115,000 to revert back to sizing of Class II materials as defined in 2020 edition.

**Related Item**

• Public Input No. 22-NFPA 780-2023

## Submitter Information Verification


**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.
**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Sun May 12 11:35:14 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but held

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

# Public Comment No. 35-NFPA 780-2024 [ Section No. 8.6.1 ]

**8.6.1**

Power and metallic communications lines (including intrusion detection lines) shall enter the facility ~~in shielded cables or metallic conduit run~~ underground for at least 50 ft (15 m) from the structure.

8.6.1.1

Metallic conduit shall be installed where power and communication lines are not provided with surge protection located immediately adjacent to entering the conduit run.

8.6.1.2

Non-metallic conduit shall be permitted when the power and communication lines are provided surge suppression located immediately adjacent to entering the conduit run and at the service panel after entering the building.

## Statement of Problem and Substantiation for Public Comment

The use metallic conduit created an EES that includes multiple parallel paths (Ground Loops) which promote a situation where Objectionable Current that is specifically prohibited in the NEC (NFPA 70, Article 250.6) as it creates a personnel shock hazard. Historically, the implementation of metal conduit was to provide for reactance chocking of the lightning energy transition into the facility through the electric service. Surge protection technological advancement and implementation requirements (cascaded protective devices) in modern electric service installations has resulted in minimized impact from the reactance choke effects of this requirement.

**Related Item**

• First Draft Report

## Submitter Information Verification

**Submitter Full Name:** Christopher Batchelor
**Organization:** US Department of the Navy
**Street Address:**
**City:**
**State:**
**Zip:**
**Submittal Date:** Thu May 30 09:50:00 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected
**Resolution:** The comment proposes new material that has not had public review.

# Public Comment No. 31-NFPA 780-2024 [ Section No. 8.9.7.6 ]

**8.9.7.6** ~~Three-Point Fall-of-Potential Test.~~ Resistance to Earth Of Grounding Systems shall be measured iun accordance with 8.9.7.6.1 or 8.9.7.6.2.

**8.9.7.6.1**

The three-point fall-of-potential test method shall be used when measuring the resistance to earth of grounding systems for explosives facilities.

**8.9.7.6.2**

Where space or geophysical issues prevent the ability to drive test stakes or rods to properly perform the three-point fall-of potential test, a clamp-on ground resistance meter shall be used in accordance with the manufacturer's instructions as permitted by the AHJ.

## Statement of Problem and Substantiation for Public Comment

The original FR has has a requirement in 8.9.7.6.1 then a contradictory requirement in 8.9.7.6.2 The revised text more clearly indicates that both clauses are requirements and that the most applicable shall be used.

**Related Item**

• FR-44

## Submitter Information Verification


**Submitter Full Name:** David Gerstetter
**Organization:** UL Solutions
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Mon May 20 13:52:20 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but see related SR
**Resolution:** SR-1-NFPA 780-2024
**Statement:** The revision deletes the title and replaces it with pointers to the two separate compliance options.

# Public Comment No. 16-NFPA 780-2024 [ Section No. 10.2.2.1 ]

**10.2.2.1**

Copper and 40% CCS conductors shall be tinned.

## Statement of Problem and Substantiation for Public Comment

This adds 40% CCS to the rule as an equivalency for the needed protection of copper conductors.

**Related Item**

• Public Input No. 23-NFPA 780-2023

## Submitter Information Verification


**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.
**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Sun May 12 11:39:17 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but held

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

# Public Comment No. 17-NFPA 780-2024 [ Section No. 10.2.2.3 ]

**10.2.2.3**

The use of conducting materials other than copper, such as 40% CCS, aluminum, stainless steel, and bronze, shall be permitted, provided they meet all requirements in this chapter.

## Statement of Problem and Substantiation for Public Comment

The allowance of 40% CCS should also be required to comply with the provisions of this chapter along with the other listed material types.

**Related Item**

• Public Input No. 25-NFPA 780-2023

## Submitter Information Verification


**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.
**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Sun May 12 11:42:51 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but held

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

# Public Comment No. 18-NFPA 780-2024 [ Section No. 10.4.1.1 ]

**10.4.1.1***

A main conductor made of copper or 40% CCS shall have a cross-sectional area of at least 0.033 in.$^2$ (21 mm$^2$).

## Statement of Problem and Substantiation for Public Comment

40% CCS is added to this section to ensure it is sized equivalent to copper when used as a main conductor.

**Related Item**

• Public Input No. 26-NFPA 780-2023

## Submitter Information Verification


**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.
**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Sun May 12 11:45:05 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but held

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

# Public Comment No. 19-NFPA 780-2024 [ Section No. 10.4.2.1 ]

**10.4.2.1**

A bonding conductor made of copper or 40% CCS shall have a cross-sectional area of at least 0.013 $in.^2$ (8.3 $mm^2$).

## Statement of Problem and Substantiation for Public Comment

40% CCS is added to this section to ensure it is sized equivalent to copper when used as a bonding conductor.

**Related Item**

• Public Input No. 27-NFPA 780-2023

## Submitter Information Verification


**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.
**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Sun May 12 11:47:02 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but held

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

# Public Comment No. 20-NFPA 780-2024 [ Section No. 10.4.5.2.1 ]

**10.4.5.2.1**

The minimum contact area for a connection in a main conductor shall be given by 10.4.1.1 (for copper or 40% CCS ), 10.4.1.2 (for aluminum), or 10.4.1.3 (for other metals).

## Statement of Problem and Substantiation for Public Comment

This adds 40% CCS to align with similar action taken in 10.4.1.1.

**Related Item**

• Public Input No. 28-NFPA 780-2023

## Submitter Information Verification


**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.
**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Sun May 12 11:49:04 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but held

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

# Public Comment No. 21-NFPA 780-2024 [ Section No. 11.4.1.1 ]

**11.4.1.1***

The counterpoise conductor shall be a bare, annealed, or soft drawn, solid copper or 40% CCS conductor not smaller than 6 AWG.

## Statement of Problem and Substantiation for Public Comment

This adds 40% CCS as an alternative to copper for the counterpoise conductor.

**Related Item**

• Public Input No. 29-NFPA 780-2023

## Submitter Information Verification


**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.
**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Sun May 12 11:51:33 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but held

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

# Public Comment No. 22-NFPA 780-2024 [ Section No. 11.4.1.2 ]

**11.4.1.2***

In locations where bare copper ~~counterpoise~~ or 40% CCS counterpoise conductors will be adversely affected by the environment, corrosion-resistant materials (e.g., tinned copper, stainless steel) as permitted by the AHJ shall be utilized.

## Statement of Problem and Substantiation for Public Comment

This adds 40% CCS to the section and annex materials to ensure equivalent corrosion protection is provided.

**Related Item**

• Public Input No. 30-NFPA 780-2023

## Submitter Information Verification


**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.
**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Sun May 12 11:53:50 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but held

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

# Public Comment No. 24-NFPA 780-2024 [ Section No. 11.4.2.5 ]

**11.4.2.5**

Reinforcing steel, where used as part of the light base installation, shall be bonded to the metallic light base using a minimum 6 AWG bare solid copper or 40% CCS conductor.

## Statement of Problem and Substantiation for Public Comment

This adds 40% CCS as an alternative for this application.

**Related Item**

• Public Input No. 31-NFPA 780-2023

## Submitter Information Verification


**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.
**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Sun May 12 11:58:28 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but held

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

# Public Comment No. 25-NFPA 780-2024 [ Section No. 11.4.2.6.2.2 ]

**11.4.2.6.2.2***

Each light base or mounting stake shall be provided with a grounding electrode in accordance with one of the following methods:

(1) Where a metallic light base is used, the grounding electrode shall be bonded to the metallic light base or mounting stake with a minimum 6 AWG bare, annealed, or soft drawn, solid copper or 40% CCS conductor.

(2) Where a nonmetallic light base is used, the grounding electrode shall be bonded to the metallic light fixture or metallic base plate with a minimum 6 AWG bare, annealed, or soft drawn, solid copper or 40% CCS conductor.

## Statement of Problem and Substantiation for Public Comment

This adds 40% CCS as an alternative for this application.

**Related Item**

• Public Input No. 32-NFPA 780-2023

## Submitter Information Verification


**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.
**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Sun May 12 12:00:33 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but held

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

## Public Comment No. 26-NFPA 780-2024 [ Section No. 11.4.6 [Excluding any Sub-Sections] ]

A minimum 6 AWG stranded copper or 40% CCS green insulated bonding jumper shall be installed between the following items:

(1) In-pavement airfield lighting fixture and the metallic light base

(2) Elevated fixture base plate and metallic light base

(3) Surge arresters and metallic light base

## Statement of Problem and Substantiation for Public Comment

This adds 40% CCS as an alternative for this application.

**Related Item**

• Public Input No. 33-NFPA 780-2023

## Submitter Information Verification


**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.
**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Sun May 12 12:03:01 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but held

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

# Public Comment No. 4-NFPA 780-2024 [ Section No. A.4.1.1.1 ]

**A.4.1.1.1**

Main-size lightning conductors are not manufactured to standard American Wire Gauge (AWG) sizes. Bare AWG conductors are not typically “listed for the purpose” for lightning protection by any listing authority. Table A.4.1.1.1 provides comparisons between lightning protection conductors and the closest AWG sizes from Table 8 in Chapter 9 of *NFPA 70*.

Table A.4.1.1.1 Lightning Protection Conductors

| Lightning Conductor | Area |
|---|---|
| Class I main-size copper or 40% copper-clad steel lightning conductor | 57,400 cir. mils |
| #2 AWG | 66,360 cir. mils |
| #3 AWG | 52,620 cir. mils |
| Class I main-size aluminum lightning conductor | 98,600 cir. mils |
| #1 AWG | 83,690 cir. mils |
| #1/0 AWG | 105,600 cir. mils |
| Class II main-size copper or 40% copper-clad steel lightning conductor | 115,000 cir. mils |
| #1/0 AWG | 105,600 cir. mils |
| #2/0 AWG | 133,100 cir. mils |
| Class II main-size aluminum lightning conductor | 192,000 cir. mils |
| #3/0 AWG | 167,800 cir. mils |
| #4/0 AWG | 211,600 cir. mils |
| Lightning bonding conductor | - |
| ~~Copper~~ Copper or 40% copper-clad steel | 26,240 cir. mils |
| #6 AWG | 26,240 cir. mils |
| Lightning bonding conductor | - |
| Aluminum | 41,100 cir. mils |
| #4 AWG | 41,740 cir. mils |

## Statement of Problem and Substantiation for Public Comment

This adds 40% CCS to the table along with copper (CU) as an acceptable alternative material type. History of usage as a conductor material employed in lightning protection applications, and the laboratory work of the CCS 780 Task Group has provided sufficient evidence that 40% CCS meets the minimum requirements for performance.

**Related Item**

• Public Input 34 NFPA 780

## Submitter Information Verification

**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.

**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**
**Submittal Date:** Sun May 12 08:25:33 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but held

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

# Public Comment No. 7-NFPA 780-2024 [ Section No. A.4.2.5 ]

**A.4.2.5**

Aluminum, copper and ~~copper on~~ 40% CCS on any structure must be designed and installed to ensure compatibility such that the expected lifecycle for any given component can be realized. The AHJ or building owner must have a thorough understanding of these compatibility issues.

## Statement of Problem and Substantiation for Public Comment

This adds 40% CCS to the table along with copper (CU) as an acceptable alternative material type. History of usage as a conductor material employed in lightning protection applications, and the laboratory work of the CCS 780 Task Group has provided sufficient evidence that 40% CCS meets the minimum requirements for performance.

**Related Item**

• Public Input 14 NFPA 780 2023

## Submitter Information Verification


**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.
**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Sun May 12 08:40:44 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but held

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

# Public Comment No. 12-NFPA 780-2024 [ Section No. A.4.12.3.2 ]

**A.4.12.3.2**

Field experience has demonstrated that a copper or 40% CCS conductor could experience accelerated corrosion at the point where the copper or 40% CCS conductor exits the concrete. Concrete and soil composition could have a direct impact on the amount of corrosion, if any. Investigation of existing installations at the proposed site or chemical analysis of the concrete and soil composition would provide a basis to determine if additional corrosion protection is warranted. Each installation should be evaluated to determine the need for any additional corrosion protection. Tinned copper or 40% CCS conductors or installation of a nonmetallic sleeve over the conductor where the conductor exits the concrete are two methods that could mitigate corrosion. The nonmetallic sleeve should extend 6 in. (150 mm) on each side of the transition from concrete to soil. See Sections 4.2 and 4.3 for additional requirements.

## Statement of Problem and Substantiation for Public Comment

40% CCS is added to the section as the criteria for a copper concrete-encased electrode is the same for 40% CCS.

**Related Item**

• Public Input No. 18-NFPA 780-2023

## Submitter Information Verification

**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.
**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**
**Submittal Date:** Sun May 12 09:20:59 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but held

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate

appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

# Public Comment No. 37-NFPA 780-2024 [ Section No. A.4.15.2.5.1 ]

**A.4.15.2.5.1**

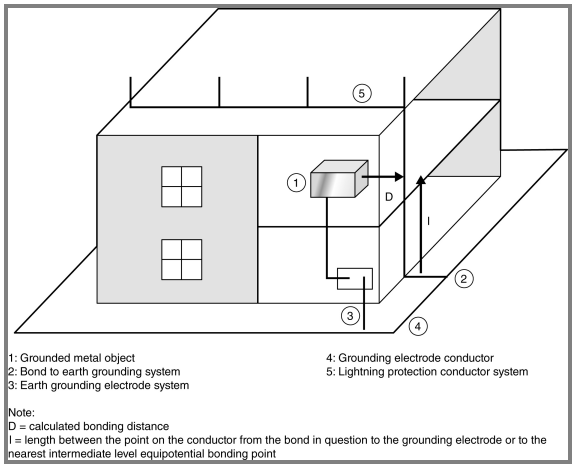
See Figure A.4.15.2.5.1 for an illustration of bonding distance.

**Figure A.4.15.2.5.1 Illustration of Bonding Distance.**

3. Grounding Electrode(also should this have a ground symbol like others in the standard?

4. Loop Conductor

5. Lightning Protection Main Conductor




1: Grounded metal object
2: Bond to earth grounding system
3: Earth grounding electrode system
4: Grounding electrode conductor
5: Lightning protection conductor system

Note:
D = calculated bonding distance
l = length between the point on the conductor from the bond in question to the grounding electrode or to the nearest intermediate level equipotential bonding point

## Statement of Problem and Substantiation for Public Comment

The terms in the diagram A.4.15.2.5.1 should be the same as terms used in the definitions.

**Related Item**

• Public Input No. 109

## Submitter Information Verification

**Submitter Full Name:** Mark Morgan
**Organization:** East Coast Lightning Equipment
**Street Address:**
**City:**
**State:**
**Zip:**
**Submittal Date:** Thu May 30 11:09:55 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but see related SR
**Resolution:** SR-4-NFPA 780-2024

| | |
|---|---|
| **Statement:** | The figure did not accurately depict the application of the formula. |

# Public Comment No. 23-NFPA 780-2024 [ Section No. A.11.4.1.2 ]

**A.11.4.1.2**

Corrosion, oxidation, chemical reaction, and electrolysis can all be considered adverse effects on a bare copper or 40% CCS counterpoise conductor. Most metals are subject to some form of corrosion, oxidation, chemical reaction, or electrolysis. Where the history of grounding systems (buried conductors, buried metallic objects) in the area is not known, a soil resistivity and soil pH profile in conjunction with the consultation of a materials/corrosion specialist could be necessary to properly design the grounding system. If stainless steel is to be used it should be a minimum of 154,000 CM (78 $mm^2$) corresponding to approximately ⅜ in. (9.5 mm) diameter.

## Statement of Problem and Substantiation for Public Comment

This adds 40% CCS to the section and annex materials to ensure equivalent corrosion protection is provided.

**Related Item**

• Public Input No. 30-NFPA 780-2023

## Submitter Information Verification


**Submitter Full Name:** Peter Graser
**Organization:** Copperweld Bimetallics, LLC.
**Affiliation:** American Bimetallic Association
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Sun May 12 11:56:07 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected

**Resolution:** A full report of results of the IEC 62561-1 stress test performed on the conductor using connectors commonly used for lightning protection was not available for review for sufficient time prior to the Second Draft meeting for proper review. Given that the material properties copper and steel are so different with respect to lightning parameters, the concept of including copper clad steel in NFPA 780 is based on it being equivalent to copper. The concept has not been proven at this time. There is no physical reason to expect that copper clad steel can be considered the same as copper. For example, conductivity of copper is significantly larger than that of steel and the tensile strength of steel is significantly larger than that of copper. Which means larger heating effects can be expected for steel conductors and different compressive effects can be expected which is important for compressive fittings. The submitter should research and evaluate appropriate copper clad steel conductor and component rating and sizes to show equivalency with the current NFPA 780 requirements.

# Public Comment No. 38-NFPA 780-2024 [ Section No. L.6.6.1.4 ]

**L.6.6.1.4**

The annual threat of occurrence due to flashes to an adjacent structure ($N_{DJ}$) at the end of an incoming service can be estimated using the following equation:

$$A_{DJ} = LW + 6H(L + W) + 9\pi H^2$$

The existing  equation for NDJ should be returned. Replaciing it with the equation for the area makes no sense. It is a nimber, not an area!

**[L.6.6.1.4]**

For additional details, see also L.4.1.1.

## Statement of Problem and Substantiation for Public Comment

The existing  equation for NDJ should be returned. Replacing it with the equation for the area makes no sense. It is a number, not an area!

**Related Item**

• FR71

## Submitter Information Verification

**Submitter Full Name:** Mitchell Guthrie
**Organization:** Engineering Consultant
**Affiliation:** Self
**Street Address:**
**City:**
**State:**
**Zip:**
**Submittal Date:** Thu May 30 14:08:17 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but see related SR
**Resolution:** SR-5-NFPA 780-2024
**Statement:** This corrects the name of the formula as Ndj does not exist.

# Public Comment No. 36-NFPA 780-2024 [ Section No. N.6 ]

**N.6** LEMP Mitigation.

~~It~~ Under appropriate engineering supervision, it might be advantageous to employ a level of protection applicable to the threat, such as a faraday-like approach coordinated with bonding, grounding, and transient suppression systems, to reduce electromagnetic field effects and to mitigate coupling of LEMP onto conductive masses and conductors on and in a tank.

## Statement of Problem and Substantiation for Public Comment

The section offers a set of guidelines that may or may not be applicable to each installation. The protection of plastic storage tanks is not a one size fits all solution, so the added language is intended to make the user aware that specific engineering for each installation should be considered.

**Related Item**

• Public Input No. 54

## Submitter Information Verification


**Submitter Full Name:** Mark Morgan
**Organization:** East Coast Lightning Equipment
**Street Address:**
**City:**
**State:**
**Zip:**

**Submittal Date:** Thu May 30 10:20:52 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Rejected but see related SR
**Resolution:** SR-6-NFPA 780-2024
**Statement:** The revision stresses the point that this is not a simple task and should be designed and inspected by designers familiar with the principles of electromagnetic pulse (EMP) protection.

# Public Comment No. 29-NFPA 780-2024 [ Section No. O.1.2.6 ]

**O.1.2.6** ~~UL~~ ULSE Publications.

~~Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.~~
UL Standards & Engagement 1603 Orrington Ave., Suite 2000 Evanston, IL 60201

UL 497, *Protectors for Paired-Conductor Communications Circuits*, 2001, revised 2022.

UL 497A, *Secondary Protectors for Communications Circuits*, 2001, revised 2019.

UL 497B, *Protectors for Data Communications and Fire-Alarm Circuits*, 2004, revised 2022.

UL 497C, *Protectors for Coaxial Communications Circuits*, 2001, revised 2022.

UL 497D, *Outline of Investigation for Component Secondary Protectors for Communications Circuits Used with Specified Voltage Suppression*, 2007.

UL 497E, *Outline of Investigation for Protectors for Antenna Lead-In Conductors*, 2011.

UL 1449, *Surge Protective Devices*, 2021, revised 2022.

## Statement of Problem and Substantiation for Public Comment

The source for UL Publications has changed to UL Standards & Engagement 1603 Orrington Ave., Suite 2000 Evanston, IL 60201

**Related Item**

• FR-53

## Submitter Information Verification

**Submitter Full Name:** David Gerstetter
**Organization:** ULSolutions
**Street Address:**
**City:**
**State:**
**Zip:**
**Submittal Date:** Mon May 20 13:30:47 EDT 2024
**Committee:** LIG-AAA

## Committee Statement

**Committee Action:** Accepted
**Resolution:** SR-2-NFPA 780-2024
**Statement:** The source for UL Publications has changed to UL Standards & Engagement 1603 Orrington Ave., Suite 2000 Evanston, IL 60201