



NATIONAL FIRE PROTECTION ASSOCIATION

The leading information and knowledge resource on fire, electrical and related hazards

AGENDA

NFPA Technical Committee on Electrical Standard for Industrial Machinery (EEI-AAA) NFPA 79 First Draft Meeting (First Draft)

Monday, March 10th to Wednesday, March 12th, 2025
9:00 a.m. – 6:00 p.m. (Eastern)

TEAMS Web Meeting

To join the meeting, please contact scaldwell@nfpa.org

- 1. Call to order.** Luis Bas.
- 2. Introductions.** See committee roster attached.
- 3. Chair report.** Luis Bas.
- 4. Staff liaison report.** Michael S. McCabe.
- 5. Previous meeting minutes.** March 20, 2023, SD TEAMS meeting. See attached.
- 6. NFPA 79 First Draft.**
 - a. **Public Inputs.** See attached.
 - b. **Task group report(s).**
 - i. **Task Group 1.** Chair: George Schreck.
 - ii. **Task Group 2.** Chair: Keith Waters.
 - iii. **Task Group 3** Chair: Michael Steele
 - iv. **Task Group 4** Chair: Dan Neeser
 - c. **Presentation(s).** TBD.
- 7. Other Business.**
- 8. Future meetings.**
- 9. Adjournment.**

Address List No Phone

01/28/2025
Mike McCabe
EEI-AAA

Electrical Equipment of Industrial Machinery National Electrical Code®

Luis M. Bas Chair Intertek Testing Services 5522 Antler Trail Lakeland, FL 33811 Alternate: Adam Gilbert	RT 3/4/2009 EEI-AAA	David R. Carpenter Principal City of Florence, Alabama Chief Electrical Inspector 60 Evergreen Park Florence, AL 35633	E 10/4/2007 EEI-AAA
Jim Couch Principal Mazak Corporation 8025 Production Drive Florence, KY 41042 The Association for Manufacturing Technology	M 03/07/2013 EEI-AAA	Mike Dionne Principal Adaptive Resources 2021 Commerce Drive McKinney, TX 75069	SE 12/06/2019 EEI-AAA
Paul Dobrowsky Principal Innovative Technology Services 5701 South Holley Road Holley, NY 14470-9754	SE 1/23/2004 EEI-AAA	Gregory Doppke Principal General Motors 6848 Palms Road Ira, MI 48023	M 04/17/2024 EEI-AAA
Stephen W. Douglas Principal QPS Evaluation Services Inc. 81 Kelfield Street, Unit 8 Toronto, ON M9W 5A3 Canada Alternate: Jim Morrison	RT 03/05/2012 EEI-AAA	Nick Durazo Principal ETI Conformity Services 18515 Ashley Avenue Torrance, CA 90504	RT 08/11/2020 EEI-AAA
Matt Egloff Principal Montana Tech, University of Montana General Engineering Department 1300 West Park Street Butte, MT 59701	SE 10/29/2012 EEI-AAA	Heath Garrison Principal National Renewable Energy Laboratory 15013 Denver West Parkway Golden, CO 80401	E 12/06/2017 EEI-AAA
Bobby J. Gray Principal Hoydar/Buck, Inc. 207 Lone Piper Drive Chelan, WA 98816 National Electrical Contractor Association (NECA) Alternate: Jacob Bradley Chouinard	IM 10/29/2012 EEI-AAA	Palmer L. Hickman Principal Electrical Training Alliance 5001 Howerton Way, Suite N Bowie, MD 20715-4459 International Brotherhood of Electrical Workers	L 10/27/2009 EEI-AAA
Mark R. Hilbert Principal MR Hilbert Electrical Inspections & Training 32 Neal Hill Road Center Tuftonboro, NH 03816-5070 International Association of Electrical Inspectors Alternate: James H. Maxfield	E 10/23/2003 EEI-AAA	James Holton Principal International Union UAW Health and Safety Department 8000 East Jefferson Detroit, MI 48442	L 12/04/2024 EEI-AAA

Address List No Phone

01/28/2025
Mike McCabe
EEI-AAA

Electrical Equipment of Industrial Machinery National Electrical Code®

Peter Hoogerdijk	RT 04/17/2024	Douglas Johanneman	U 12/07/2018
Principal UL Solutions 60 Westervoortsedijk Arnhem, NL 6827AT Netherlands	EEI-AAA	Principal Toyota Motor Engineering & Manufacturing North America, Inc. 772 Emmett Creek Lane Lexington, KY 40515 Alternate: Chip Boertlein	EEI-AAA
Dino Mariuz	M 7/29/2005	Glenn Merrell	SE 03/20/2023
Principal Pilz Automation Safety L.P. 7150 Commerce Boulevard Canton, MI 48187 Alternate: Tim Huss	EEI-AAA	Principal FC / Industrial Control Systems Security 210 Bass Circle Lafayette, CO 80026	EEI-AAA
Daleep C. Mohla	U 10/29/2012	Daniel R. Neeser	M 8/2/2010
Principal DCM Electrical Consulting Services, Inc. 4702 Summer Lakes Missouri City, TX 77459-3958 IEEE-IAS/PES JTCC	EEI-AAA	Principal Eaton's Bussmann Division 873 Burgundy Lane Manchester, MO 63011 National Electrical Manufacturers Association Alternate: Ron Borowski	EEI-AAA
Thi Nguyen	U 07/29/2013	John A. Piller	SE 08/17/2017
Principal The Boeing Company 5202 146th Place, SE Everett, WA 98208	EEI-AAA	Principal J Piller Design and Consulting 50646 Elk Trail Granger, IN 46530	EEI-AAA
George M. Schreck	M 12/04/2024	Mike Soter	SE 10/27/2005
Principal Komatsu America Industries, LLC 8770 Bryn Mawr Avenue Suite 100 Chicago, IL 60631	EEI-AAA	Principal SDK Engineering, LLC 111 Golfcrest Drive Dearborn, MI 48124	EEI-AAA
Jason Sroczyński	IM 12/04/2024	Michael Steele	M 08/23/2023
Principal Leilac US Inc. 2140 South Dupont Highway Camden, DE 19934	EEI-AAA	Principal R.A. Jones 2701 Crescent Springs Road Covington, KY 41017	EEI-AAA
Andras Szende	RT 10/27/2009	Marco Tacchini	SE 04/11/2018
Principal TUV Rheinland of North America, Inc. 710 Resende Road, Bldg. 199 Webster, NY 14580 Alternate: Ivan Obelar	EEI-AAA	Principal GT Engineering Via Gutenberg 14 Poncarale, BS 25030 Italy Alternate: Guido Battista Zotti	EEI-AAA

Address List No Phone

01/28/2025
Mike McCabe
EEI-AAA

Electrical Equipment of Industrial Machinery National Electrical Code®

Jay Tamblingson	M 10/27/2009	Keith Waters	M 12/02/2020
Principal Rockwell Automation 1201 South 2nd Street Milwaukee, WI 53204 Alternate: Jonathan B. Johnson	EEI-AAA	Principal Schneider Electric 1601 Mercer Road Lexington, KY 40511	EEI-AAA
Benjamin Bradley Woods	U 12/07/2022	Lee Anderson Lindsay	M 08/23/2023
Principal Rivian Automotive 100 Rivian Motorway Normal, IL 61761 Alternate: Carlos Baron	EEI-AAA	Voting Alternate Honeywell 7901 Innovation Way Mason, OH 45040	EEI-AAA
Carlos Baron	U 08/29/2024	Chip Boertlein	U 04/14/2021
Alternate Rivian Automotive 100 Rivian Motorway Normal, IL 61761 Principal: Benjamin Bradley Woods	EEI-AAA	Alternate Toyota Motor Engineering & Manufacturing North America, Inc. 151 Engineering Way Georgetown, KY 40324 Principal: Douglas Johanneman	EEI-AAA
Ron Borowski	M 08/09/2012	Jacob Bradley Chouinard	IM 08/08/2019
Alternate Eaton Corporation W126N7250 Flint Drive Menomonee Falls, WI 53051-4404 National Electrical Manufacturers Association Principal: Daniel R. Neeser	EEI-AAA	Alternate Quality Electric Inc. 5272 W Irving Boise, ID 83706 National Electrical Contractor Association (NECA) Principal: Bobby J. Gray	EEI-AAA
Adam Gilbert	RT 04/11/2018	Tim Huss	M 08/11/2020
Alternate Intertek 1365 Adams Court Menlo Park, CA 94025 Principal: Luis M. Bas	EEI-AAA	Alternate Pilz Automation Safety 904 Blackwell Street Kaukauna, WI 54130 Principal: Dino Mariuz	EEI-AAA
Jonathan B. Johnson	M 08/29/2024	James H. Maxfield	E 8/5/2009
Alternate Rockwell Automation 1201 South Second Street Milwaukee, WI 53204 Principal: Jay Tamblingson	EEI-AAA	Alternate City of Dover Fire & Rescue Building Inspection Division 4 Danbury Lane Dover, NH 03820 International Association of Electrical Inspectors Principal: Mark R. Hilbert	EEI-AAA

Address List No Phone

01/28/2025
Mike McCabe
EEI-AAA

Electrical Equipment of Industrial Machinery National Electrical Code®

Jim Morrison	RT 10/29/2012	Ivan Obelar	RT 08/08/2019
Alternate QPS Evaluation Services Inc. 81 Kelfield Street, Unit 8 Toronto, ON M9W 5A3 Canada Principal: Stephen W. Douglas	EEI-AAA	Alternate TUV Rheinland Of North Amercia 12 Commerce Road Newtown, CT 06470 Principal: Andras Szende	EEI-AAA
Guido Battista Zotti	SE 03/20/2023	Mike McCabe	04/29/2019
Alternate GT Engineering Via Gutenberg 14 Poncarale, BS 25030 Italy Principal: Marco Tacchini	EEI-AAA	Staff Liaison National Fire Protection Association Staff Liaison 1 Batterymarch Park Quincy, MA 02169-7471	EEI-AAA



NATIONAL FIRE PROTECTION ASSOCIATION

The leading information and knowledge resource on fire, electrical and related hazards

MINUTES

**NFPA Technical Committee on Electrical Standard for Industrial Machinery (EEI-AAA)
NFPA 79 Second Draft Meeting
March 20th, 2023
10:00am – 6:00pm (Eastern)**

TEAMS Web meeting

1. **Call to order.** Luis Bas, chair, called the meeting to order at 10:00am on 3/20/2023.
2. **Introductions.** Attendees introduced themselves and identified their affiliation. NFPA staff took attendance, see below for list of attendees.
3. **Chair report.** Luis Bas welcomed attendees and provided an overview of the meeting.
4. **Staff liaison report.** Mike McCabe provided an overview of the standards development process and the revision cycle schedule.
5. **Previous meeting minutes.** The minutes from February 28, 2022 – March 2, 2022 were approved without revision.
6. **NFPA 79 Second Draft.**
 - Review of Public Comments and Committee Inputs.** The Technical Committee reviewed the Public Comments and Committee Inputs and developed Second Revisions as necessary. These will be available in the Second Draft Report at www.nfpa.org/79.
 - a. **Task group reports.** The following task groups provided their reports and recommendations.
 - i. **TG-1.** Keith Waters. The task group provided a report, the committee agreed with the recommended SR's. The task group has been discharged with thanks.
 - ii. **TG-2.** Marco Tacchini. The task group provided a report, second revisions were made pursuant to the TG's report. The task group has been discharged with thanks.
 - iii. **TG-3.** Bobby Gray. The task group provided a report, second revisions were made pursuant to the TG report. The task group has been discharged with thanks.
 - iv. **TG-4.** Daniel Neeser. The task group provided a report, second revisions were made pursuant to the TG report. The task group has been discharged with thanks.
 - b. **Presentation(s).** The committee heard presentations from the following individuals.
 - i. **Cybersecurity.** Keith Waters. An approximate 10-minute presentation was made prior to the TG report being presented. Presentation attached.

- c. **New task groups.** The following task groups were appointed to work subsequent to the meeting:

i. **None**

7. **Other Business.** None

8. **Future meetings.** The next committee meeting will be **Nashville, Phoenix, Dallas/Fort Worth**. A meeting notification will be posted at www.nfpa.org/79next when the meeting is scheduled. A meeting notification will be posted at www.nfpa.org/79next when the next meeting is scheduled.

9. **Adjournment.** The meeting was adjourned at 5:30pm on 3/20/2023.

Attendees

Committee Members:

Y	Bas, Luis	Chair	Intertek Testing Services
N	Brungs, William	Principal	Honeywell Intelligrated Systems
Y	Carpenter, David	Principal	City of Florence, Alabama
Y	Couch, Jim	Principal	The Association for Manufacturing
Y	Dionne, Mike	Principal	Adaptive Resources
Y	Dobrowsky, Paul	Principal	Innovative Technology Services
Y	Douglas, Stephen	Principal	QPS Evaluation Services Inc.
Y	Durazo, Nick	Principal	ETI Conformity Services
Y	Egloff, Matt	Principal	Montana Tech, University of Montana
Y	Garrison, Heath	Principal	National Renewable Energy Laboratory
Y	Gray, Bobby	Principal	National Electrical Contractors Association
Y	Gruendel, Robert	Principal	Amazon
Y	Hickman, Palmer	Principal	International Brotherhood of Electrical
Y	Hilbert, Mark	Principal	International Association of Electrical
N	Johanneman, Douglas	Principal	Toyota Motor Engineering & Manufacturing
N	Kovacik, John	Principal	UL LLC
Y	Mariuz, Dino	Principal	Pilz Automation Safety L.P.
N	McKinch, Terrance	Principal	Signal Energy Constructors
N	Mohla, Daleep	Principal	IEEE-IAS/PES JTCC
Y	Neeser, Daniel	Principal	National Electrical Manufacturers
Y	Nguyen, Thi	Principal	The Boeing Company

N	Piller, John	Principal	J Piller Design and Consulting
Y	Soter, Mike	Principal	SDK Engineering, LLC
Y	Szende, Andras	Principal	TUV Rheinland of North America, Inc.
Y	Tacchini, Marco	Principal	GT Engineering
Y	Tamblingson, Jay	Principal	Rockwell Automation
Y	Waters, Keith	Principal	Schneider Electric
N	Woods, Benjamin	Principal	Rivian Automotive
N	Boertlein, Chip	Alternate	Toyota Motor Engineering & Manufacturing
Y	Borowski, Ron	Alternate	National Electrical Manufacturers
N	Chouinard, Jacob	Alternate	National Electrical Contractors Association
N	Duta, Michael	Alternate	Rockwell Automation
Y	Fox, Steven	Alternate	Honeywell
Y	Gilbert, Adam	Alternate	Intertek Testing Services
N	Huss, Tim	Alternate	Pilz Automation Safety
Y	Maxfield, James	Alternate	International Association of Electrical
N	Morrison, Jim	Alternate	QPS Evaluation Services Inc.
Y	Obelar, Ivan	Alternate	TUV Rheinland Of North Amercia
Y	McCabe, Mike	Staff Liaison	National Fire Protection Association

Guests:

Jeff Sargent NFPA Staff

*Participated by teleconference

Total number in attendance: 26

Cyber Security Requirements into NFPA79?

PC#10 Ability to confirm Cybersecurity

Keith Waters, P.E. C.E.M
Manager, Industry Standards

NFPA Activity

- NFPA Cybersecurity Advisory Committee under development
- NFPA 72
- NEC 2023
- NFPA 1660 (ties to NEC Article 708)

Why the need for Cybersecurity for Industrial Machinery

1) Recent Survey by Trend Micro (May 2022)

1) 900 respondents within Manufacturing, Electricity Generation/Distribution & Oil/Gas Industry.

2) In the last 12 months

1) 89% stated their energy supply has been affected

2) 56% 4 days or more of disruption and 44% 3 days or less

1) 50% Mfg, 56% Elect. Supply, & 65% Oil/Gas

1) 50% IT Attacks

2) 50% OT Attacks

3) Average cost of damage \$2.8M

3) Level of Cybersecurity Maturity

1) 40% said their IT risks are recognized within organization

2) 30% said OT risks were partially addressed

Life Is On



In reviewing the response to the original PI, I still feel that cybersecurity is essential to properly protecting industrial machinery and a consensus standard is the best way to protect these systems in lieu of 51 different requirements from the federal government and the individual states. However, I understand that we need to create a starting point to learn the best methods before setting full requirements.

Cybersecurity should be considered as an aspect of safety and reliability in addition to the other factors affecting industrial machinery. If an attacker can affect the machinery control system, individual sensors or other IoT devices to the point of either preventing normal operation or displaying the appearance of normal operation while failing the system, creates an unsafe condition. The increase in cyber-attacks on industrial, utility, and other installations where industrial machinery can be made to create unsafe conditions. Examples of these unsafe conditions can be changing overcurrent protection rating of a circuit breaker, arc energy reduction settings, SCADA systems, emergency stop functions, motor controllers, or Fire Protection Systems. European Machine Directive is investigating Cybersecurity requirements.

4.10* Cybersecurity

Industrial Machinery that is connected to a communication network and permitted to control any part of the machinery shall be permitted to comply with (1) and (2).

(1) A Cybersecurity Assessment conducted on the connected system determine vulnerabilities to cyber-attacks.

(2) A Cybersecurity Commissioning Certification conducted on the connected system to ensure they are designed against cyber-attacks and known vulnerabilities.

Provide documentation of the assessment and certification to those authorized to inspect, operate, and maintain.

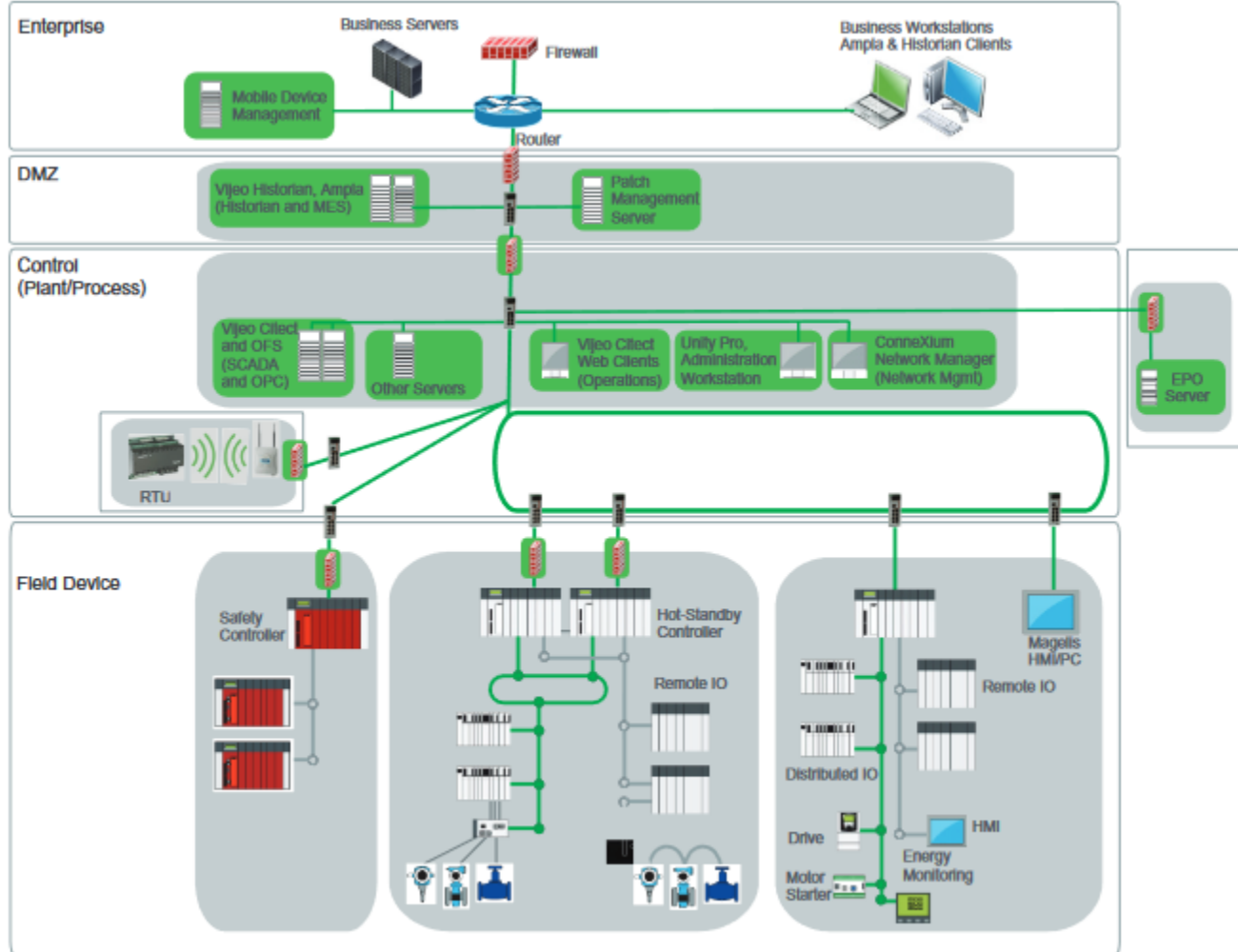
A.4.10 ANSI/ISA 62443 Cybersecurity Standards series can be utilized to meet the assessment requirement. Other options can include the NIST Framework for Improving Critical Infrastructure Cybersecurity, Version 1.1 , UL 2900-2-3 for Security and Life Safety Signaling Systems, and ISO/TR 22100-4, Safety of machinery. .

Examples of the commissioning certification includes one of the following :

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a nationally recognized test laboratory

(3) Manufacturer certification for the specific type and brand of system provided



Life Is On





Public Input No. 28-NFPA 79-2024 [Section No. 1.1.1]

1.1.1

The provisions of this standard shall apply to the electrical/electronic equipment, apparatus, or systems of industrial machines supplied from a nominal voltage of 1000 volts ac, 1500 volts dc, or less, and commencing at the point of connection of the supply circuit conductors to the electrical equipment of the machine.

Statement of Problem and Substantiation for Public Input

The expansion of the use of dc voltages in industry needs to be addressed within the document. This change correlates with NFPA 70 (NEC) Articles 240, 409, and 430 along with others that impact industrial machinery. This change provides the machinery manufacturers with guidance across both the ac and dc voltage ranges.

Submitter Information Verification

Submitter Full Name: Keith Waters

Organization: Schneider Electric

Street Address:

City:

State:

Zip:

Submittal Date: Wed Dec 18 16:59:48 EST 2024

Committee: EEI-AAA



Public Input No. 30-NFPA 79-2024 [Section No. 2.2]

2.2 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 70[®], National Electrical Code[®], 2023 _ 2026 _ edition.

NFPA 70E[®], Standard for Electrical Safety in the Workplace[®], 2024 _ 2027 _ edition.

Statement of Problem and Substantiation for Public Input

The next editions of NFPA 70 (NEC) and NFPA 70E will be published by the time this edition of NFPA 79 is published.

Submitter Information Verification

Submitter Full Name: Keith Waters

Organization: Schneider Electric

Street Address:

City:

State:

Zip:

Submittal Date: Wed Dec 18 17:13:03 EST 2024

Committee: EEI-AAA



Public Input No. 46-NFPA 79-2024 [Section No. 2.3.5]

2.3.5 NEMA Publications.

National Electrical Manufacturers Association, ~~1300 North 17th~~ 1812 North Moore Street, Suite 900 2200 , Arlington, VA 22209.

NEMA ICS 2, *Industrial Control and Systems: Controllers, Contactors, and Overload Relays Rated 600 Volts*, ~~2000, errata 2008~~ 2020 .

NEMA MG 1, *Motors and Generators*, ~~2016~~ 2024 .

NEMA ~~250~~ BI 50055 , *Enclosures for Electrical Equipment (1000 Volts Maximum)*, ~~2014~~ 2024 .

Statement of Problem and Substantiation for Public Input

Updated NEMA publication dates. Document name change for NEMA 250-2014. It is now NEMA BI 50055-2024. NEMA HQ address update as well.

Related Public Inputs for This Document

<u>Related Input</u>	<u>Relationship</u>
<u>Public Input No. 45-NFPA 79-2024 [Section No. K.1.2.7]</u>	NEMA Document references
<u>Public Input No. 45-NFPA 79-2024 [Section No. K.1.2.7]</u>	

Submitter Information Verification

Submitter Full Name: Keith Waters

Organization: Schneider Electric

Street Address:

City:

State:

Zip:

Submittal Date: Fri Dec 20 12:56:02 EST 2024

Committee: EEI-AAA



Public Input No. 34-NFPA 79-2024 [Section No. 2.3.6]

2.3.6 UL Publications.

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

UL 50, *Enclosures for Electrical Equipment, Non-Environmental Considerations*, ~~2020~~ 2024 .

UL 50E, *Enclosures for Electrical Equipment, Environmental Considerations*, ~~2018~~ 2020 , revised ~~2020~~ 2024 .

UL 508, *Industrial Control Equipment*, ~~2018, revised 2021~~ 2024 .

UL 508A, *Industrial Control Panels*, 2018, revised ~~2021~~ 2022 .

UL 870, *Wireways, Auxiliary Gutters, and Associated Fittings*, 2016, revised ~~2018~~ 2023 .

UL 1063, *Machine-Tool Wires and Cables*, ~~2017, revised 2020~~ 2023 .

UL 1581, *Electrical Wires, Cables, and Flexible Cords*, 2001, revised ~~2021~~ 2023 .

Statement of Problem and Substantiation for Public Input

The publication dates for this list of UL standards need to be updated. The official name and address of the UL organization responsible for these standards has changed so that information is updated.

Submitter Information Verification

Submitter Full Name: Keith Waters

Organization: Schneider Electric

Street Address:

City:

State:

Zip:

Submittal Date: Fri Dec 20 10:48:52 EST 2024

Committee: EEI-AAA



Public Input No. 88-NFPA 79-2025 [Section No. 2.3.6]

2.3.6 UL Publications.

Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

UL 50, *Enclosures for Electrical Equipment, Non-Environmental Considerations*, ~~2020~~ 2024 .

UL 50E, *Enclosures for Electrical Equipment, Environmental Considerations*, ~~2018~~ 2020 ,
revised ~~2020~~ 2024 .

UL 508, *Industrial Control Equipment*, ~~2018, revised 2021~~ 2024 .

UL 508A, *Industrial Control Panels*, 2018, revised ~~2021~~ 2024 .

UL 870, *Wireways, Auxiliary Gutters, and Associated Fittings*, 2016, revised ~~2018~~ 2023 .

UL 1063, *Machine-Tool Wires and Cables*, ~~2017, revised 2020~~ 2023 .

UL 1581, *Electrical Wires, Cables, and Flexible Cords*, 2001, revised ~~2021~~ 2023 .

Statement of Problem and Substantiation for Public Input

Updating references to most current publications.

Related Public Inputs for This Document

<u>Related Input</u>	<u>Relationship</u>
<u>Public Input No. 89-NFPA 79-2025 [Section No. K.1.2.10]</u>	

Submitter Information Verification

Submitter Full Name: Kelly Nicoletto

Organization: UL Solutions

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jan 07 16:29:00 EST 2025

Committee: EEI-AAA



Public Input No. 10-NFPA 79-2024 [Section No. 3.2.4]

3.2.4* Listed.

Equipment, materials, or services included in a list published by an organization ~~that~~ (i.e., Nationally Recognized Testing Laboratory) ~~that~~ is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

Statement of Problem and Substantiation for Public Input

Providing an example would provide context and make the standard more useable.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization: (None)

Street Address:

City:

State:

Zip:

Submittal Date: Fri Oct 04 11:02:56 EDT 2024

Committee: EEI-AAA



Public Input No. 11-NFPA 79-2024 [Section No. 3.3.9]

3.3.9 Attachment Plug (Plug Cap) (Plug).

A device that, by insertion in a receptacle, establishes a connection between the conductors of the attached flexible cord or festoon cable and the conductors connected permanently to the receptacle. [70, 2023]

Statement of Problem and Substantiation for Public Input

Festoon cable or cable should be named as an alternative to cord.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization: (None)

Street Address:

City:

State:

Zip:

Submittal Date: Fri Oct 04 11:11:08 EDT 2024

Committee: EEI-AAA



Public Input No. 12-NFPA 79-2024 [Section No. 3.3.13]

3.3.13 Branch Circuit (Branch-Circuit).

The circuit conductors between the final overcurrent device protecting the circuit and the outlet(s). [70, -2023] load.

Statement of Problem and Substantiation for Public Input

Revise the definition to be more closely aligned with or identical to UL508A, which is more appropriate for industrial machines.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization: (None)

Street Address:

City:

State:

Zip:

Submittal Date: Fri Oct 04 11:19:27 EDT 2024

Committee: EEI-AAA



Public Input No. 13-NFPA 79-2024 [Section No. 3.3.19]

3.3.19* ~~Color~~ Graphic Interface Device.

An interface between the operator and the machine, where a ~~color-video~~ graphic display and either a touch screen or touch pad or keyboard or mouse are used to initiate machine action by the selection of on-screen icons.

Statement of Problem and Substantiation for Public Input

Neither color nor video should be a condition of a graphic display.

Related: Update all use of Color Graphic Interface Device to Graphic Interface Device.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization: (None)

Street Address:

City:

State:

Zip:

Submittal Date: Fri Oct 04 11:22:34 EDT 2024

Committee: EEI-AAA



Public Input No. 66-NFPA 79-2024 [Section No. 3.3.22.2]

3.3.22.2 Indirect Contact.

Contact of persons with exposed non-current-carrying conductive parts that have become live under fault conditions.

Statement of Problem and Substantiation for Public Input

The aim is the alignment with the NEC terminology and harmonize it in NFPA 79.
The term Exposed Conductive Part is used in IEC 60364 series; NEC uses the term "exposed non-current-carrying metal parts".
However I think "conductive" is a better term compared with "metal".
That is the reason why the proposal is to use the term "exposed non-current-carrying conductive part(s)" throughout the new edition of the standard.

Related Public Inputs for This Document

<u>Related Input</u>	<u>Relationship</u>
Public Input No. 68-NFPA 79-2024 [Section No. 6.3.1 [Excluding any Sub-Sections]]	
Public Input No. 69-NFPA 79-2024 [Section No. 6.3.2.3]	

Submitter Information Verification

Submitter Full Name: Marco Tacchini
Organization: GT Engineering
Street Address:
City:
State:
Zip:
Submittal Date: Mon Dec 30 12:51:03 EST 2024
Committee: EEI-AAA



Public Input No. 14-NFPA 79-2024 [New Section after 3.3.35]

3.3.36 Electroactive

A material that exhibits a change in size or shape when stimulated by an electric field.

Statement of Problem and Substantiation for Public Input

Adding electroactive would recognize recent developments in plastics and nanofibers that exert force when electricity is applied to them.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization: (None)

Street Address:

City:

State:

Zip:

Submittal Date: Fri Oct 04 11:30:45 EDT 2024

Committee: EEI-AAA



Public Input No. 15-NFPA 79-2024 [Section No. 3.3.62]

3.3.62* Industrial Control Panel.

An assembly of two or more ~~components~~ devices, consisting of one of the following: (1) power circuit ~~components~~ devices only, such as motor controllers, overload relays, fused disconnect switches, and circuit breakers; (2) control circuit ~~components~~ devices only, such as pushbuttons, pilot lights, selector switches, timers, switches, and control relays; (3) a combination of power and control circuit components. These ~~components~~ devices, with associated wiring and terminals, are mounted on, or contained within, an enclosure or mounted on a subpanel. - [70, -2023] _

Statement of Problem and Substantiation for Public Input

The term "component" is not defined. The term "device" is defined. Replace component throughout the standard with device.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization: (None)

Street Address:

City:

State:

Zip:

Submittal Date: Fri Oct 04 11:38:26 EDT 2024

Committee: EEI-AAA



Public Input No. 16-NFPA 79-2024 [Section No. 3.3.63]

3.3.63 Industrial ~~Manufacturing~~ Machine System.

A systematic array of one or more industrial machines that is not portable by hand and includes any associated material handling, manipulating, gauging, measuring, or inspection equipment.

Statement of Problem and Substantiation for Public Input

The abbreviation IMS was formerly commonly know as Industrial Manufacturing System. Several ANSI and ISO standards have changed the abbreviation to Industrial Machine System due to not all industrial applications manufacture.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization: (None)

Street Address:

City:

State:

Zip:

Submittal Date: Fri Oct 04 11:42:11 EDT 2024

Committee: EEI-AAA



TITLE OF NEW CONTENT

3.XXX Off-Gassing. Typically a toxic vapor that is released from a failing(ed) electrolytic capacitor. Vapor is released due to pressure build-up by short circuit heating of electrolyte to where rupture/or blow-out plug occurs.

Statement of Problem and Substantiation for Public Input

Off-gassing is relatively unknown in industrial machinery. It is more common in the troubleshooting and repair of electronic equipment such as the printed circuit boards that control the Servo Drives. However with the advent of the external electrolytic capacitors (30,000mf (.3F)) placed in series, can raise the stored electrical charge to over 1 F at 400VDC. While some "home made" electrolytic capacitors are made with common household chemical items (baking soda, Borax, etc) to make up their electrolytes, industrial electrolytic capacitors use electrolytes made of toxic industrial chemicals. Chemi-Con (a Japanese capacitor maker) places such a warning in their catalog: "The gas that comes out of the open vent is vaporized electrolyte, not smoke. 2) The gas expelled from a venting capacitor is more than 100°C. Never expose your face to the capacitor. If your eyes are exposed to the gas or you inhale it, immediately flush your eyes and/or gargle with water. If the electrolyte comes in contact with the skin, wash with soap and water. Nippon Chemi-Con, CAT. No. E1001U." Similar warnings were seen from other industrial manufacturers.

Submitter Information Verification

Submitter Full Name: George Schreck
Organization: Komatsu America Industries, LLC
Affiliation: Komatsu America Industries, LLC
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jan 07 13:19:49 EST 2025
Committee: EEI-AAA



Public Input No. 35-NFPA 79-2024 [Section No. 3.3.79]

3.3.79— *_ Overcurrent Protective Device , ~~Branch-Circuit~~ (Branch-Circuit Overcurrent Protective Device) (OCPD).

A device capable of providing protection for ~~service, feeder, and branch circuits and equipment~~ over the full range of ~~overcurrents~~ overcurrent between its rated current and its interrupting rating. [70, ~~2023~~ 2026]

Statement of Problem and Substantiation for Public Input

Updated definition from 2026 NEC and additon of Annex material providing informational note information from the NEC.

Submitter Information Verification

Submitter Full Name: Keith Waters

Organization: Schneider Electric

Street Address:

City:

State:

Zip:

Submittal Date: Fri Dec 20 10:56:32 EST 2024

Committee: EEI-AAA



Public Input No. 29-NFPA 79-2024 [Section No. 4.4.3.1]

4.4.3.1 Voltage.

The electrical equipment shall be designed to operate correctly where the dc supply voltage of batteries is from 85 percent to 115 percent of the nominal voltage. A supply voltage from 70 percent to 120 percent of the nominal voltage shall be permitted for dc supplies to battery-operated machines (e.g., mobile robots, vehicles).

Statement of Problem and Substantiation for Public Input

The specificity of only use vehicles creates confusion. Broadening the term to "machinery" and giving examples will improve the standard.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization: (none)

Street Address:

City:

State:

Zip:

Submittal Date: Wed Dec 18 17:05:27 EST 2024

Committee: EEI-AAA



Public Input No. 83-NFPA 79-2025 [Section No. 4.10]

4.10* Cybersecurity.

Industrial 4.10.1*

Where required by governing laws, codes, or standards, or other parts of this standard, industrial machinery that is capable of being connected to a communication network and permitted to control any part of the machinery shall

be permitted to comply with the following:

- (1) A cybersecurity assessment conducted on the connected system to determine vulnerabilities to cyberattacks
- (2) A cybersecurity commissioning certification conducted on the connected system to ensure it is designed against cyberattacks and known vulnerabilities
- (3) Documentation of the assessment and certification provided to those authorized to inspect, operate, and maintain the system

provide cybersecurity in accordance with section 4.10 for equipment software, system support tools, installation methods, physical security of and access to equipment, data pathways, testing, and maintenance.

A.4.10.1

Cybersecurity is not required for every system or application; it is only required when other sections of this Code, authorities, or regulations mandate that cybersecurity be incorporated into the system(s). Generally, there are greater cybersecurity concerns when systems are connected to external networks. [72:A.11.1.1]

4.10.2* Network Connectable Equipment Software Development and Production Environments.

Development and production environments used to develop and manufacture network connectable equipment shall employ cybersecurity safeguards that are consistent with one or more of the following:

- (1) NIST's "The NIST Cybersecurity Framework 2.0"
- (2) ISO/IEC 27001, Information security management systems
- (3) ANSI/ISA/IEC 62443-4-1: Security for industrial automation and control systems - Part 4-1: Secure product development lifecycle requirements
- (4) IASME Consortium Cyber Essentials
- (5) Other equivalent standards acceptable to a nationally recognized testing laboratory
- (6) *Other applicable laws and regulations

[72:11.2]

A.4.10.2

The security practices for the design, development, production, and service of network connectable equipment includes the overall cybersecurity posture of the manufacturing company itself. For example, it does not matter how well a system is designed or deployed from a cybersecurity perspective if the manufacturer does not adequately secure its own development, manufacturing, and patch/update distribution systems. Threat actors can compromise products by installing covert back doors during initial development, or during the development and distribution of software updates. [72:A.11.2]

4.10.3* Security Levels for Network Connectable Equipment.

All interfaces used to communicate with network connectable equipment shall be protected in accordance with the following:

(1) For non-internet protocol wired interfaces one of the following:

(a) Security Level 1 (SL1) in accordance with ANSI/ISA/IEC 62443-4-2, Security for Industrial Automation and Control Systems, Part 4-2: Technical Security Requirements for IACS Components

(b) Security Level 1 (SL1) in accordance with ANSI/ISA/IEC 62443-3-3, Security for Industrial Automation and Control Systems, Part 3-3: System Security Requirements and Security Levels

(c) Security Level 1 (SL1) in accordance with CAN/UL 2900-2-3, Software Cybersecurity for Network-Connectable Products, Part 2-3: Particular Requirements for Security and Life Safety Signaling Systems

(d) Comparable level associated with Section 8.2.3(4)

(2) For non-internet protocol wireless interfaces or internet protocol wired and wireless interfaces that do not connect to publicly accessible networks, one of the following:

(a) Security Level 2 (SL2) in accordance with ANSI/ISA/IEC 62443-4-2

(b) Security Level 2 (SL2) in accordance with ANSI/ISA/IEC 62443-3-3

(c) Security Level 2 (SL2) in accordance with CAN/UL 2900-2-3

(d) Comparable level associated with Section 8.2.3 (4)

(3) For internet protocol wired or wireless interfaces that connect to publicly accessible networks, one of the following:

(a) Security Level 3 (SL3) in accordance with ANSI/ISA/IEC 62443-4-2

(b) Security Level 3 (SL3) in accordance with ANSI/ISA/IEC 62443-3-3

(c) Security Level 3 (SL3) in accordance with CAN/UL 2900-2-3

(d) Comparable level associated with Section 8.2.3 (4)

[72:11.3]

A.4.10.3

In general, there could be overlap in what this section requires and the end user's IT department's requirements. That overlap could require additional coordination in the case of Class N networks or internet communications, as IT departments could have more stringent requirements and certifications than listed in this Code. In those instances, IT compliance beyond this Code could be required for the owner. [72:A.11.3]

An example of a Security Level 1 (SL1) system consists of a fire alarm system with notification appliances and initiating devices that are connected using a proprietary protocol two-wire interface and that is not connected to the internet. [72:A.11.3]

An example of a Security Level 2 (SL2) system consists of a signaling system with devices connected to a control unit using internet protocol communications on a dedicated network that does not connect to the internet. [72:A.11.3]

An example of a Security Level 3 (SL3) system consists of internet gateway module for off-premises transmission of signals from a fire alarm system with notification appliances and initiating devices that are connected using a proprietary protocol two-wire interface. In this case the gateway is SL3, and the remainder of the system is SL1. [72:A.11.3]

4.10.4* Interconnecting Conductors, Cables, or Other Physical Pathways.

Interconnecting conductors, cables, or other physical pathways for use in Security Level 2 or higher applications in locations accessible to the public shall be protected by metal raceways or metal armored cables. [72:11.4]

A.4.10.4

An assumption is often made that attacks are launched remotely from the internet. However, there are many examples of attackers gaining access to a facility to enable an attack. For example, a system that has no networking capability, with only an RS-232 serial port can be connected to an RS-232-to-Ethernet adapter. This could be intended benignly, as a way of enabling remote monitoring or remote service, but it is a risk that should be considered, nonetheless. [72:A.11.4]

The protection by metal raceways or metal armored cables of interconnecting conductors, cables, or other physical pathways is also recommended for use in Security Level 1 applications. For improved physical security in systems where control units and data access points are not installed in restricted areas, using security tamper switches to produce a tamper signal for notification when an enclosure is opened should be considered. Tamper resistant fasteners can be employed on junction box covers to provide additional physical protection. [72:A.11.4]

4.10.5 Unused Physical Data Ports.

All unused physical data ports shall be protected in at least one of the following ways:

(1) Physically protected from unauthorized access

(2) Administratively disabled

(3) Configured to require a token-based authentication, certificate-based authentication, password, or other method that is consistent with the security requirements of the system

[72:11.6]

4.10.6* Data Connections to External Networks.

When any data connection is made from the system to an external network, the connection shall be protected by a gateway or firewall that ensures that only trusted traffic is allowed to pass. [72:11.7]

A.4.10.6

Figure A.4.10.6 depicts typical system typical firewall/gateway operation. Such functionality, when deployed, could take the form of physical hardware, firmware, or both. The firewall/gateway might be physically integrated into the control unit, as shown in the integrated control unit graphic, or a separate device/service that interacts with the control unit, as shown in the nonintegrated control unit. [72:A.11.7]

Many networks have additional protections, such as multiple firewalls.

Figure A.4.10.6 System Typical Firewall/Gateway Operation. [72:Figure A.11.7]

-

4.10.7 Network Connectable Equipment Cybersecurity Software Updates.

4.10.7.1

At least quarterly, the equipment manufacturer(s) shall do the following until the equipment is no longer supported by the manufacturer:

(1) Evaluate all relevant cybersecurity threats

(2) Determine if a software update is required to maintain the cybersecurity level achieved in

compliance with 4.10.2

[72:11.8]

4.10.7.2

The system installer shall provide the name and contact information of the system owner or their representative to the equipment manufacturer(s) at the time of system acceptance testing.
[72:11.8.2]

4.10.7.3*

The equipment manufacturer(s) shall notify the system owner or their representative of all required software security updates required to maintain the cybersecurity level achieved in compliance with 4.10.2, 4.10.3, and 4.10.4. [72:11.8.3]

A.4.10.7.3

As security vulnerabilities are discovered, existing systems could be affected. It is important for manufacturers to provide solutions when vulnerabilities are discovered. Likewise, it is important to carefully manage the update and patch management infrastructure to ensure that corrections are available, have not been modified or spoofed, and are applied successfully. [72:A.11.8.3]

4.10.7.4

Software for network connectable devices shall be maintained by installing software security updates as required by the equipment manufacturer(s) to maintain the cybersecurity level achieved in compliance with 4.10.2, 4.10.3, and 4.10.4. [72:11.8.4]

4.10.7.5

Software security updates that are deemed necessary by the equipment manufacturer(s) for compliance with 4.10.3 shall be installed at least annually. [72:11.8.5]

4.10.7.6

Cybersecurity software changes to systems or system components shall be permitted to be made by remote access.

4.10.8 Notification of Termination of Cybersecurity Update Support.

The manufacturer shall notify the system owner or their representative of the termination of cybersecurity software update support required by 4.10.7 for any element of the system.
[72:11.9]

4.10.9 Cybersecurity for System Support Tools.

A system support tool and the support tool interfaces shall comply with the requirements of Sections 4.10.3 through 4.10.10. [72:11.10]

4.10.10 Evidence of Compliance.

4.10.10.1

Evidence of cybersecurity compliance shall include one or more of the following:

- (1) Certification of compliance by a nationally recognized testing laboratory.
- (2) Manufacturer certification for the specific type and brand of system provided by the manufacturer
- (3) An assessment or certification program acceptable to the authority having jurisdiction

[72:11.11.1]

4.10.10.2

The validity of cybersecurity certificates shall be verified annually by the person testing the system. [72:11.11.2]

4.10.10.3

The validity of the equipment manufacturer's contact information for the system owner shall be verified annually by the person testing the system. [72:11.11.3]

4.10.11 Documentation.

The standards used and security levels employed in complying with Chapter 8 shall be identified in the system documentation. [72:11.12]

-

Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NFPA_79_Section_4.10_Proposal_based_on_72-2025_Chapter_111.docx	Word version (includes figure)	

Statement of Problem and Substantiation for Public Input

Substantiation:

This public input is submitted on behalf of the NFPA Cybersecurity Advisory Committee (CAC) (www.nfpa.org/cac). The NFPA CAC notes that the significance of cybersecurity protections has been considered as it relates to the scope of NFPA 79 and machinery in the scope of the technical committee.

The current text in 4.10 permits cybersecurity assessments for connected industrial machinery, but does not require any cybersecurity measures. The CAC recommends the committee consider using the cybersecurity chapter from NFPA 72 2025 Chapter 11 as a template for cybersecurity requirements in section 4.10.

NFPA 72 2025 Edition has taken a proactive approach to providing cybersecurity requirements for systems within its scope. It is reasonable for machinery whose use may represent a life safety hazard, or a risk of property damage, to conform to cybersecurity standards that are consistent with other equipment that is related to the protection of life or property.

The intent is that cybersecurity requirements in 79, are triggered when required by other applicable laws, codes, standards, or specific sections of 79 that might directly reference section 10.4. In this way, cybersecurity requirements do not apply by sole virtue of including 10.4 in 79. There will be some other trigger, but once triggered, 79 will provide acceptable requirements to guide manufacturers, owners, and AHJs. One example of such a law is California IoT Security Law (SB-327). This law requires manufacturers of connected devices, often referred to as Internet of Things (IoT) devices, to provide reasonable security features for those devices and prevent hackers from modifying them. It also requires either a unique password for each device or a user-set password before the first use. More information on this law can be found by searching for "Bloomberg Law, Professional Perspective, California's New IoT Cybersecurity Law: A Guide for Business".

Part of the reason for this proposal is to establish the discussion within the relevant technical committees of what cybersecurity requirements are suitable for 79, and provide a vetted example of the cybersecurity requirements that can apply to some of the equipment in scope, and provide the committee(s) a broad enough proposal that a task group(s) working between the first and second draft can provide alternate proposals that may be considered without the concern of it being ruled new

material.
Please see attached word file for referenced figure.

Submitter Information Verification

Submitter Full Name: Joshua Griffith
Organization: US Army Corps of Engineers (US
Affiliation: Cybersecurity Advisory Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jan 06 14:21:57 EST 2025
Committee: EEI-AAA

Important Notice: The document has been provided for the members of the Cybersecurity Advisory Committee. This document is the copyright property of the National Fire Protection Association (NFPA), Copyright © 2024 NFPA, and may not be used for any other purpose or distributed to any other persons or parties outside of the Committee.

4.10* **Cybersecurity**

Industrial machinery that is connected to a communication network and permitted to control any part of the machinery shall be permitted to comply with the following:

- (1) A cybersecurity assessment conducted on the connected system to determine vulnerabilities to cyberattacks
- (2) A cybersecurity commissioning certification conducted on the connected system to ensure it is designed against cyberattacks and known vulnerabilities
- (3) Documentation of the assessment and certification provided to those authorized to inspect, operate, and maintain the system

~~A.4.10—~~

~~The ANSI/ISA 62443 series of cybersecurity standards can be utilized to meet the assessment requirement. Other options include the NIST Framework for Improving Critical Infrastructure Cybersecurity, Version 1.1; UL 2900-2-3, Software Cybersecurity for Network-Connectable Products, Part 2-3; Particular Requirements for Security and Life Safety Signaling Systems; and ISO/TR 22100-4, Safety of machinery — Relationship with ISO 12100 — Part 4: Guidance to machinery manufacturers for consideration of related IT security (cyber security) aspects.~~

~~Examples of the commissioning certification include the following:~~

- ~~(1) The ISA Security Compliance Institute (ISCI) conformity assessment program~~
- ~~(2) A certification of compliance by a nationally recognized test laboratory~~
- ~~(3) Manufacturer certification for the specific type and brand of system provided~~

Formatted: Indent: Left: 0.6"

4.10.1*

Where required by governing laws, codes, or standards, or other parts of this standard, industrial machinery that is capable of being connected to a communication network and permitted to control any part of the machinery shall provide cybersecurity in accordance with section 4.10 for equipment software, system support tools, installation methods, physical security of and access to equipment, data pathways, testing, and maintenance.

Formatted: Indent: Left: 0.28"

A.4.10.1

Cybersecurity is not required for every system or application; it is only required when other sections of this Code, authorities, or regulations mandate that cybersecurity be incorporated into the system(s). Generally, there are greater cybersecurity concerns when systems are connected to external networks. [72:A.11.1.1]

Formatted: Indent: Left: 0.5"

4.10.2* Network Connectable Equipment Software Development and Production Environments.

Development and production environments used to develop and manufacture network connectable equipment shall employ cybersecurity safeguards that are consistent with one or more of the following:

- (1) NIST's "The NIST Cybersecurity Framework 2.0"
- (2) ISO/IEC 27001, Information security management systems
- (3) ANSI/ISA/IEC 62443-4-1: Security for industrial automation and control systems - Part 4-1: Secure product development lifecycle requirements
- (4) IASME Consortium Cyber Essentials
- (5) Other equivalent standards acceptable to a nationally recognized testing laboratory
- (6) *Other applicable laws and regulations

[72:11.2]

A.4.10.2

The security practices for the design, development, production, and service of network connectable equipment includes the overall cybersecurity posture of the manufacturing company itself. For example, it does not matter how well a system is designed or deployed from a cybersecurity

Formatted: Indent: Left: 0.5"

Important Notice: The document has been provided for the members of the Cybersecurity Advisory Committee. This document is the copyright property of the National Fire Protection Association (NFPA), Copyright © 2024 NFPA, and may not be used for any other purpose or distributed to any other persons or parties outside of the Committee.

perspective if the manufacturer does not adequately secure its own development, manufacturing, and patch/update distribution systems. Threat actors can compromise products by installing covert back doors during initial development, or during the development and distribution of software updates. [72:A.11.2]

4.10.3* Security Levels for Network Connectable Equipment.

All interfaces used to communicate with network connectable equipment shall be protected in accordance with the following:

- (1) For non-internet protocol wired interfaces one of the following:
 - (a) Security Level 1 (SL1) in accordance with ANSI/ISA/IEC 62443-4-2, *Security for Industrial Automation and Control Systems, Part 4-2: Technical Security Requirements for IACS Components*
 - (b) Security Level 1 (SL1) in accordance with ANSI/ISA/IEC 62443-3-3, *Security for Industrial Automation and Control Systems, Part 3-3: System Security Requirements and Security Levels*
 - (c) Security Level 1 (SL1) in accordance with CAN/UL 2900-2-3, *Software Cybersecurity for Network-Connectable Products, Part 2-3: Particular Requirements for Security and Life Safety Signaling Systems*
 - (d) Comparable level associated with Section 8.2.3(4)
- (2) For non-internet protocol wireless interfaces or internet protocol wired and wireless interfaces that do not connect to publicly accessible networks, one of the following:
 - (a) Security Level 2 (SL2) in accordance with ANSI/ISA/IEC 62443-4-2
 - (b) Security Level 2 (SL2) in accordance with ANSI/ISA/IEC 62443-3-3
 - (c) Security Level 2 (SL2) in accordance with CAN/UL 2900-2-3
 - (d) Comparable level associated with Section 8.2.3 (4)
- (3) For internet protocol wired or wireless interfaces that connect to publicly accessible networks, one of the following:
 - (a) Security Level 3 (SL3) in accordance with ANSI/ISA/IEC 62443-4-2
 - (b) Security Level 3 (SL3) in accordance with ANSI/ISA/IEC 62443-3-3
 - (c) Security Level 3 (SL3) in accordance with CAN/UL 2900-2-3
 - (d) Comparable level associated with Section 8.2.3 (4)

[72:11.3]

A.4.10.3

In general, there could be overlap in what this section requires and the end user's IT department's requirements. That overlap could require additional coordination in the case of Class N networks or internet communications, as IT departments could have more stringent requirements and certifications than listed in this Code. In those instances, IT compliance beyond this Code could be required for the owner. [72:A.11.3]

An example of a Security Level 1 (SL1) system consists of a fire alarm system with notification appliances and initiating devices that are connected using a proprietary protocol two-wire interface and that is not connected to the internet. [72:A.11.3]

An example of a Security Level 2 (SL2) system consists of a signaling system with devices connected to a control unit using internet protocol communications on a dedicated network that does not connect to the internet. [72:A.11.3]

Formatted: Indent: Left: 0.5"

Important Notice: The document has been provided for the members of the Cybersecurity Advisory Committee. This document is the copyright property of the National Fire Protection Association (NFPA), Copyright © 2024 NFPA, and may not be used for any other purpose or distributed to any other persons or parties outside of the Committee.

An example of a Security Level 3 (SL3) system consists of internet gateway module for off-premises transmission of signals from a fire alarm system with notification appliances and initiating devices that are connected using a proprietary protocol two-wire interface. In this case the gateway is SL3, and the remainder of the system is SL1. [72:A.11.3]

4.10.4* Interconnecting Conductors, Cables, or Other Physical Pathways.

Interconnecting conductors, cables, or other physical pathways for use in Security Level 2 or higher applications in locations accessible to the public shall be protected by metal raceways or metal armored cables. [72:11.4]

A.4.10.4

An assumption is often made that attacks are launched remotely from the internet. However, there are many examples of attackers gaining access to a facility to enable an attack. For example, a system that has no networking capability, with only an RS-232 serial port can be connected to an RS-232-to-Ethernet adapter. This could be intended benignly, as a way of enabling remote monitoring or remote service, but it is a risk that should be considered, nonetheless. [72:A.11.4]

The protection by metal raceways or metal armored cables of interconnecting conductors, cables, or other physical pathways is also recommended for use in Security Level 1 applications. For improved physical security in systems where control units and data access points are not installed in restricted areas, using security tamper switches to produce a tamper signal for notification when an enclosure is opened should be considered. Tamper resistant fasteners can be employed on junction box covers to provide additional physical protection. [72:A.11.4]

4.10.5 Unused Physical Data Ports.

All unused physical data ports shall be protected in at least one of the following ways:

- (1) Physically protected from unauthorized access
- (2) Administratively disabled
- (3) Configured to require a token-based authentication, certificate-based authentication, password, or other method that is consistent with the security requirements of the system

[72:11.6]

4.10.6* Data Connections to External Networks.

When any data connection is made from the system to an external network, the connection shall be protected by a gateway or firewall that ensures that only trusted traffic is allowed to pass. [72:11.7]

A.4.10.6

Figure A.4.10.6 depicts typical system typical firewall/gateway operation. Such functionality, when deployed, could take the form of physical hardware, firmware, or both. The firewall/gateway might be physically integrated into the control unit, as shown in the integrated control unit graphic, or a separate device/service that interacts with the control unit, as shown in the nonintegrated control unit. [72:A.11.7]

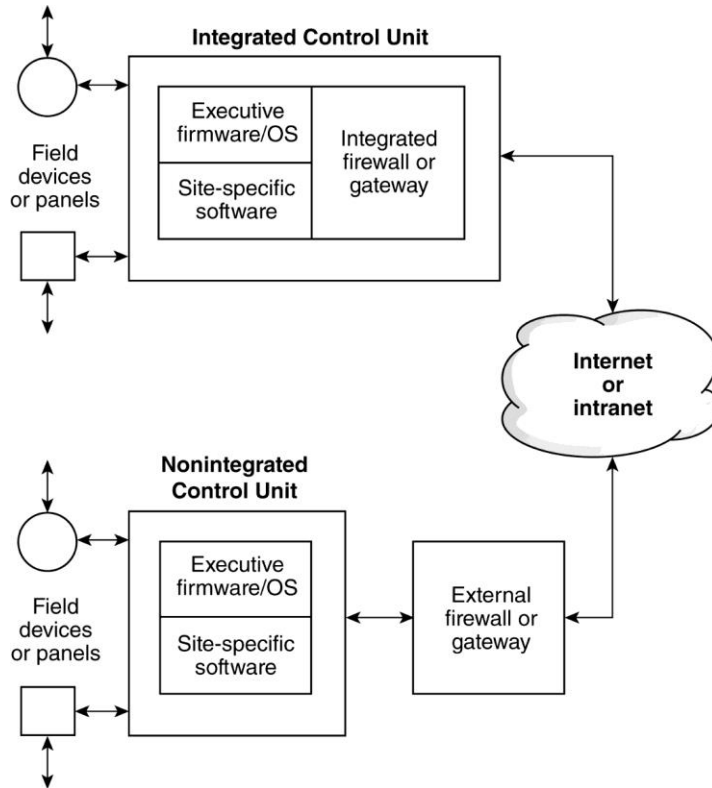
Many networks have additional protections, such as multiple firewalls.

Figure A.4.10.6 System Typical Firewall/Gateway Operation. [72:Figure A.11.7]

Formatted: Indent: Left: 0.5"

Formatted: Indent: Left: 0.5"

Important Notice: The document has been provided for the members of the Cybersecurity Advisory Committee. This document is the copyright property of the National Fire Protection Association (NFPA), Copyright © 2024 NFPA, and may not be used for any other purpose or distributed to any other persons or parties outside of the Committee.



4.10.7 Network Connectable Equipment Cybersecurity Software Updates.

4.10.7.1

At least quarterly, the equipment manufacturer(s) shall do the following until the equipment is no longer supported by the manufacturer:

- (1) Evaluate all relevant cybersecurity threats
- (2) Determine if a software update is required to maintain the cybersecurity level achieved in compliance with 4.10.2

[72:11.8]

4.10.7.2

The system installer shall provide the name and contact information of the system owner or their representative to the equipment manufacturer(s) at the time of system acceptance testing. [72:11.8.2]

4.10.7.3*

The equipment manufacturer(s) shall notify the system owner or their representative of all required software security updates required to maintain the cybersecurity level achieved in compliance with 4.10.2, 4.10.3, and 4.10.4. [72:11.8.3]

Important Notice: The document has been provided for the members of the Cybersecurity Advisory Committee. This document is the copyright property of the National Fire Protection Association (NFPA), Copyright © 2024 NFPA, and may not be used for any other purpose or distributed to any other persons or parties outside of the Committee.

A.4.10.7.3

As security vulnerabilities are discovered, existing systems could be affected. It is important for manufacturers to provide solutions when vulnerabilities are discovered. Likewise, it is important to carefully manage the update and patch management infrastructure to ensure that corrections are available, have not been modified or spoofed, and are applied successfully. [72:A.11.8.3]

4.10.7.4

Software for network connectable devices shall be maintained by installing software security updates as required by the equipment manufacturer(s) to maintain the cybersecurity level achieved in compliance with 4.10.2, 4.10.3, and 4.10.4. [72:11.8.4]

4.10.7.5

Software security updates that are deemed necessary by the equipment manufacturer(s) for compliance with 4.10.3 shall be installed at least annually. [72:11.8.5]

4.10.7.6

Cybersecurity software changes to systems or system components shall be permitted to be made by remote access.

4.10.8 Notification of Termination of Cybersecurity Update Support.

The manufacturer shall notify the system owner or their representative of the termination of cybersecurity software update support required by 4.10.7 for any element of the system. [72:11.9]

4.10.9 Cybersecurity for System Support Tools.

A system support tool and the support tool interfaces shall comply with the requirements of Sections 4.10.3 through 4.10.10. [72:11.10]

4.10.10 Evidence of Compliance.

4.10.10.1

Evidence of cybersecurity compliance shall include one or more of the following:

- (1) Certification of compliance by a nationally recognized testing laboratory
- (2) Manufacturer certification for the specific type and brand of system provided by the manufacturer
- (3) An assessment or certification program acceptable to the authority having jurisdiction

[72:11.11.1]

4.10.10.2

The validity of cybersecurity certificates shall be verified annually by the person testing the system. [72:11.11.2]

4.10.10.3

The validity of the equipment manufacturer's contact information for the system owner shall be verified annually by the person testing the system. [72:11.11.3]

4.10.11 Documentation.

The standards used and security levels employed in complying with Chapter 8 shall be identified in the system documentation. [72:11.12]

Formatted: Indent: Left: 0.5"

Substantiation:

This public input is submitted on behalf of the NFPA Cybersecurity Advisory Committee (CAC) (www.nfpa.org/cac). The NFPA CAC notes that the significance of cybersecurity protections has been considered as it relates to the scope of NFPA 79 and machinery in the scope of the technical committee.

The current text in 4.10 permits cybersecurity assessments for connected industrial machinery, but does not require any cybersecurity measures. The CAC recommends the committee consider using the

Important Notice: The document has been provided for the members of the Cybersecurity Advisory Committee. This document is the copyright property of the National Fire Protection Association (NFPA), Copyright © 2024 NFPA, and may not be used for any other purpose or distributed to any other persons or parties outside of the Committee.

cybersecurity chapter from NFPA 72 2025 Chapter 11 as a template for cybersecurity requirements in section 4.10.

NFPA 72 2025 Edition has taken a proactive approach to providing cybersecurity requirements for systems within its scope. It is reasonable for machinery whose use may represent a life safety hazard, or a risk of property damage, to conform to cybersecurity standards that are consistent with other equipment that is related to the protection of life or property.

The intent is that cybersecurity requirements in 79, are triggered when required by other applicable laws, codes, standards, or specific sections of 79 that might directly reference section 10.4. In this way, cybersecurity requirements do not apply by sole virtue of including 10.4 in 79. There will be some other trigger, but once triggered, 79 will provide acceptable requirements to guide manufacturers, owners, and AHJs. One example of such a law is California IoT Security Law (SB-327). This law requires manufacturers of connected devices, often referred to as Internet of Things (IoT) devices, to provide reasonable security features for those devices and prevent hackers from modifying them. It also requires either a unique password for each device or a user-set password before the first use. More information on this law can be found by searching for “Bloomberg Law, Professional Perspective, California’s New IoT Cybersecurity Law: A Guide for Business”.

Part of the reason for this proposal is to establish the discussion within the relevant technical committees of what cybersecurity requirements are suitable for 79, and provide a vetted example of the cybersecurity requirements that can apply to some of the equipment in scope, and provide the committee(s) a broad enough proposal that a task group(s) working between the first and second draft can provide alternate proposals that may be considered without the concern of it being ruled new material.



Public Input No. 31-NFPA 79-2024 [Section No. 5.1.9.1]

5.1.9.1

A machine supply circuit disconnecting means shall be provided for the following:

- (1) Each machine supply circuit
- (2) Each machine supply circuit to a machine or a number of machines connecting to a feeder system using collector wires, collector bars, slip-ring assemblies, or flexible cable systems (reeled, festooned)
- (3) Each on-board power source (e.g., batteries, generators, uninterruptible power supplies)

Exception: Communication, remote control, and signaling circuits of less than 50 volts rms ac or 60 volts dc shall not be required to be provided with a machine supply circuit disconnecting means.

Statement of Problem and Substantiation for Public Input

Battery is added since it is not the same as a UPS, which has an inverter. Batteries are a primary source of power for many mobile industrial machines.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization: (None)

Street Address:

City:

State:

Zip:

Submittal Date: Wed Dec 18 17:17:32 EST 2024

Committee: EEI-AAA



Public Input No. 81-NFPA 79-2025 [Section No. 5.1.9.4]

5.1.9.4

The machine supply circuit disconnecting means shall disconnect the electrical equipment of the machine, including all control circuits, from the machine supply circuit when required (e.g., for work on the machine, including the electrical equipment). With the Main Disconnect Switch in the "OFF" position and with a locking device applied, the enclosure door can be opened and closed without the locking device's removal. Circuits that are not required to be disconnected by the machine supply circuit disconnecting means shall comply with 5.1.13.

Statement of Problem and Substantiation for Public Input

Some rotary, through the door, Disconnect Switch operators, when a lock or other controlled means is applied, do not allow the enclosure door to be either opened or closed, without the lock or controlling means being removed. Removal of the "locking means" negates "LOTO" requirements, as the re-installation may not occur.

Illustrative pictures are available to demonstrate the above.

Submitter Information Verification

Submitter Full Name: George Schreck
Organization: Komatsu America Industries, LLC
Affiliation: Komatsu America Industries, LLC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jan 06 13:04:48 EST 2025
Committee: EEI-AAA



Public Input No. 26-NFPA 79-2024 [Section No. 5.1.9.5]

5.1.9.5

Applies to indoor equipment only!

Each machine supply circuit disconnecting means other than attachment plugs and receptacles shall be mounted within the control enclosure it supplies or immediately adjacent thereto.

Exception: Externally mounted machine supply circuit disconnecting means shall be permitted to be mounted up to 6 m (20 ft) away from the control enclosure, provided the control enclosure is marked to indicate the location of the machine supply circuit disconnecting means and the machine supply circuit disconnecting means complies with all the following:

- (1) *Is in sight of the control enclosure it supplies*
- (2) *Is readily accessible*
- (3) *Is marked in accordance with 5.1.9.2*

Statement of Problem and Substantiation for Public Input

The way this is written it would mean we have to put disconnects for remotely operated outdoor equipment. For instance on sludge ponds, sewer ponds, leachate ponds, kiln drying wood ponds. This is impractical for outdoor installation with remote operating rotating equipment. Further this is covered under Lock out Tag Out procedures that keep the remote equipment from being reenergized. I would go so far as to indicate there is a need to have outdoor and remote operations have their own sections or have NEC 79 clearly indicate indoor facilities only.

Submitter Information Verification

Submitter Full Name: Robert Ballantyne

Organization: Resource West Inc

Street Address:

City:

State:

Zip:

Submittal Date: Wed Dec 18 16:28:13 EST 2024

Committee: EEI-AAA



Public Input No. 9-NFPA 79-2024 [Section No. 5.1.12.1]

5.1.12.1

The center of the grip of the operating handle of a supply circuit disconnecting means, when in its ~~highest position, shall~~ lowest position shall be not less than 0.6 m (2 ft) above the servicing level, and highest position shall be not more than 2.0 m (6 ft 7 in.) above the servicing level. A permanent operating platform, readily accessible by means of a permanent stair(s) or ladder, shall be considered the servicing level.

Statement of Problem and Substantiation for Public Input

The current NFPA79 2024 standard does not define a lower limit, only upper limit. In addition this change would better harmonize NFPA79 with European standard EN 60204-1 section 5.3.4.

EN60204-1 section 5.3.4 has an upper limit (74.8") which I purposely did not reference in the suggested revision since the current NFPA79 upper limit gives a greater range at 79".

Submitter Information Verification

Submitter Full Name: Michael Steele

Organization: R.A. Jones

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jul 23 12:34:44 EDT 2024

Committee: EEI-AAA



Public Input No. 64-NFPA 79-2024 [Section No. 5.1.13]

5.1.13 Excepted Circuits.

5.1.13.1

The following circuits shall not be required to be disconnected by the machine supply circuit disconnecting means:

- (1) Lighting circuits for lighting needed during maintenance or repair
- (2) Attachment plugs and receptacles for the exclusive connection of repair or maintenance tools and equipment (e.g., hand drills, test equipment)
- (3) Undervoltage protection circuits that are only used for automatic tripping in the event of supply circuit failure
- (4) Circuits supplying equipment that need to remain energized for satisfactory operation [e.g., temperature-controlled measuring devices, product (work in progress) heaters, program storage devices, inputs, non-motion outputs, displays, and safety interlocks]
- (5) Circuits supplying a bsence of voltage detection devices and absence of voltage testers used for verifying absence of voltage if listed for use on the line side of the disconnecting means.

5.1.13.2

Excepted circuits shall be provided with all of the following:

- (1) A disconnecting means, isolating transformer, and overcurrent protection mounted in an enclosure adjacent to or within the control enclosure containing the machine supply circuit disconnecting means

~~Line~~

- (2) Exception: This requirement shall not apply to circuits containing voltage detection devices and absence of voltage testers provided the supply circuit conductors do not extend beyond the enclosure containing the machine supply circuit disconnecting means.
- (3) Line side (of the machine supply circuit disconnecting means) supply circuit conductors, when internal to the control enclosure, that are separate from and do not share a raceway with other conductors and that are encased in a raceway if they are longer than 460 mm (18 in.)

5.1.13.3

The control interlocking circuits shall be capable of being disconnected at the control panel from which they are sourced.

5.1.13.4

Where the excepted circuits are not disconnected by the machine supply circuit disconnecting means, all of the following requirements shall be met:

- (1) A permanent safety sign(s) is located adjacent to the machine supply circuit disconnecting means operating handle(s) indicating that it does not de-energize all the exposed live parts when it is in the open (off) position as in 16.2.4.
- (2) A statement containing the information from 16.2.4 is included in the machine documentation.
- (3) A permanent safety sign is located on a nonremovable part inside the control enclosure in proximity to each excepted circuit or each excepted circuit is identified by color as defined in 13.2.4. Exception to (1), (2) and (3): These requirements shall not apply to circuits containing voltage detection devices and absence of voltage testers if these devices have no exposed live parts.

Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
Public_Input_No._64-NFPA_79_5.1.13_Excepted_Circuits.docx		

Statement of Problem and Substantiation for Public Input

An absence of voltage detection device is a permanently-mounted device that is used to verify that a circuit is de-energized prior to opening an electrical enclosure that contains energized electrical conductors and circuit parts. An absence of voltage detection device is provided with voltage test points that allow for insertion of meter probes to perform absence of voltage tests from outside an electrical enclosure.

An absence of voltage tester (AVT) is a permanently-mounted test device that is used to verify that a circuit is de-energized prior to opening an electrical enclosure that contains energized electrical conductors and circuit parts. An AVT is provided with a test circuit with active indications to verify the absence of phase-to-phase voltage and phase-to-ground voltage. AVTs are provided with a test circuit and visual indicators to confirm that the tester is functioning properly before and after the process of determining that voltage is absent.

Absence of voltage detection devices and AVTs provide a means to verify that a circuit is de-energized prior to opening an electrical enclosure that contains energized electrical conductors and circuit parts. This reduces the likelihood of arc flash and shock hazards as the use of these devices does not require direct contact with energized electrical conductors and circuit parts.

Testing for the absence of voltage is part of the process for establishing and verifying an electrically safe work condition as defined in the Standard for Electrical Safety in the Workplace, NFPA 70E.

Section 120.5 defines all of the steps required to be performed in a specific order to establish and verify an electronically safe work condition.

Section 120.5 (7) specifies the use of an adequately rated portable test instrument to test each phase conductor or circuit part to test for the absence of voltage. Each phase conductor or circuit part, both phase-to-phase and phase-to-ground shall be tested. An absence of voltage detection device is provided with voltage test points that facilitate the use of a portable test instrument to perform the required tests. The combination of the absence of voltage detection device and portable test instrument allow the tests to be conducted without opening the electrical enclosure and exposing the tester to live electrical parts and increasing the risk of an arc flash hazard.

Section 120.5(7) Exception No. 1 recognizes the use of an AVT for absence of voltage testing. The Exception states "An adequately rated permanently mounted absence of voltage tester shall be permitted to be used to test for the absence of voltage of the conductors or circuit parts at the work location..." The text continues stating the AVT must meet certain requirements which include being listed and labeled for the purpose of testing for the absence of voltage.

Using an absence of voltage detection device or AVT to verify the absence of voltage in enclosures containing the machine supply circuit disconnecting means would require connecting the device to the supply side of the disconnecting means. Requiring voltage detection devices to be listed, would ensure that they have been evaluated specifically for their ability to test for the absence of voltage and to be connected to the line side of the disconnecting means.

Overcurrent protection devices should not be installed in the conductors supplying voltage detection

devices to allow them to perform their intended function. A blown fuse or a tripped circuit breaker providing protection for these conductors would allow a false reading to be provided by the detection device. Such an occurrence could pose a serious risk to an individual relying upon the detection device to determine the absence of voltage. The proper installation of these devices is connecting their supply conductors to the line terminals of the disconnecting means without any of the conditions specified in 5.1.13.2. These conditions only serve to diminish the value provided by these devices.

The safety signs required in 5.1.13.4 are unnecessary if these devices have no exposed live parts. Voltage detection devices have been used in control panels for many years and this usage should be recognized in NFPA 79.

A clean copy of this Public Input is attached as all changes appearing in Terraview and not correct.

Submitter Information Verification

Submitter Full Name: John Kovacik

Organization: Trusted Safety Solutions

Street Address:

City:

State:

Zip:

Submittal Date: Fri Dec 27 21:24:55 EST 2024

Committee: EEI-AAA

Public Input for NFPA 79 - 5.1.13 Excepted Circuits

Including Voltage Detection Devices and Absence of Voltage Testers

PROPOSAL:

5.1.13 Excepted Circuits.

5.1.13.1

The following circuits shall not be required to be disconnected by the machine supply circuit disconnecting means:

- (1) Lighting circuits for lighting needed during maintenance or repair
- (2) Attachment plugs and receptacles for the exclusive connection of repair or maintenance tools and equipment (e.g., hand drills, test equipment)
- (3) Undervoltage protection circuits that are only used for automatic tripping in the event of supply circuit failure
- (4) Circuits supplying equipment that need to remain energized for satisfactory operation [e.g., temperature-controlled measuring devices, product (work in progress) heaters, program storage devices, inputs, non-motion outputs, displays, and safety interlocks]

(5) Circuits supplying absence of voltage detection devices and absence of voltage testers used for verifying absence of voltage if listed for use on the line side of the disconnecting means.

5.1.13.2

Excepted circuits shall be provided with all of the following:

- (1) A disconnecting means, isolating transformer, and overcurrent protection mounted in an enclosure adjacent to or within the control enclosure containing the machine supply circuit disconnecting means

Exception: This requirement shall not apply to circuits containing voltage detection devices and absence of voltage testers provided the supply circuit conductors do not extend beyond the enclosure containing the machine supply circuit disconnecting means.

(2) Line side (of the machine supply circuit disconnecting means) supply circuit conductors, when internal to the control enclosure, that are separate from and do not share a raceway with other conductors and that are encased in a raceway if they are longer than 460 mm (18 in.)

5.1.13.3

The control interlocking circuits shall be capable of being disconnected at the control panel from which they are sourced.

5.1.13.4

Where the excepted circuits are not disconnected by the machine supply circuit disconnecting means, all of the following requirements shall be met:

(1) A permanent safety sign(s) is located adjacent to the machine supply circuit disconnecting means operating handle(s) indicating that it does not de-energize all the exposed live parts when it is in the open (off) position as in 16.2.4.

(2) A statement containing the information from 16.2.4 is included in the machine documentation.

(3) A permanent safety sign is located on a nonremovable part inside the control enclosure in proximity to each excepted circuit or each excepted circuit is identified by color as defined in 13.2.4.

Exception to (1), (2) and (3): These requirements shall not apply to circuits containing voltage detection devices and absence of voltage testers if these devices have no exposed live parts.

RATIONALE:

An absence of voltage detection device is a permanently-mounted device that is used to verify that a circuit is de-energized prior to opening an electrical enclosure that contains energized electrical conductors and circuit parts. An absence of voltage detection device is provided with voltage test points that allow for insertion of meter probes to perform absence of voltage tests from outside an electrical enclosure.

An absence of voltage tester (AVT) is a permanently-mounted test device that is used to verify that a circuit is de-energized prior to opening an electrical enclosure that contains energized electrical conductors and circuit parts. An AVT is provided with a test circuit with active indications to verify the absence of phase-to-phase voltage and phase-to-

ground voltage. AVTs are provided with a test circuit and visual indicators to confirm that the tester is functioning properly before and after the process of determining that voltage is absent.

Absence of voltage detection devices and AVTs provide a means to verify that a circuit is de-energized prior to opening an electrical enclosure that contains energized electrical conductors and circuit parts. This reduces the likelihood of arc flash and shock hazards as the use of these devices does not require direct contact with energized electrical conductors and circuit parts.

Testing for the absence of voltage is part of the process for establishing and verifying an electrically safe work condition as defined in the Standard for Electrical Safety in the Workplace, NFPA 70E. Section 120.5 defines all of the steps required to be performed in a specific order to establish and verify an electronically safe work condition.

Section 120.5 (7) specifies the use of an adequately rated portable test instrument to test each phase conductor or circuit part to test for the absence of voltage. Each phase conductor or circuit part, both phase-to-phase and phase-to-ground shall be tested. An absence of voltage detection device is provided with voltage test points that facilitate the use of a portable test instrument to perform the required tests. The combination of the absence of voltage detection device and portable test instrument allow the tests to be conducted without opening the electrical enclosure and exposing the tester to live electrical parts and increasing the risk of an arc flash hazard.

Section 120.5(7) Exception No. 1 recognizes the use of an AVT for absence of voltage testing. The Exception states “An adequately rated permanently mounted absence of voltage tester shall be permitted to be used to test for the absence of voltage of the conductors or circuit parts at the work location...” The text continues stating the AVT must meet certain requirements which include being listed and labeled for the purpose of testing for the absence of voltage.

Using an absence of voltage detection device or AVT to verify the absence of voltage in enclosures containing the machine supply circuit disconnecting means would require connecting the device to the supply side of the disconnecting means. Requiring voltage detection devices to be listed, would ensure that they have been evaluated specifically for their ability to test for the absence of voltage and to be connected to the line side of the disconnecting means.

Overcurrent protection devices should not be installed in the conductors supplying voltage detection devices to allow them to perform their intended function. A blown fuse or a tripped circuit breaker providing protection for these conductors would allow a false reading to be provided by the detection device. Such an occurrence could pose a serious risk to an individual relying upon the detection device to determine the absence of voltage. The proper installation of these devices is connecting their supply conductors to the line terminals of the disconnecting means without any of the conditions specified

in 5.1.13.2. These conditions only serve to diminish the value provided by these devices.

The safety signs required in 5.1.13.4 are unnecessary if these devices have no exposed live parts.

Voltage detection devices have been used in control panels for many years and this usage should be recognized in NFPA 79.



Public Input No. 80-NFPA 79-2025 [Section No. 5.1.13.1]

5.1.13.1

The following circuits shall not be required to be disconnected by the machine supply circuit disconnecting means:

- (1) Lighting circuits for lighting needed during maintenance or repair
- (2) ~~Attachment plugs and~~ Circuits supplying receptacles for the exclusive connection of repair or maintenance tools and equipment (e.g., hand drills, test equipment)
- (3) Undervoltage protection circuits that are only used for automatic tripping in the event of supply circuit failure
- (4) Circuits supplying equipment that need to remain energized for satisfactory operation [e.g., temperature-controlled measuring devices, product (work in progress) heaters, program storage devices, inputs, non-motion outputs, displays, and safety interlocks]

Statement of Problem and Substantiation for Public Input

List item 2 is not consistent with the wording in the other list items of 5.1.13.1. The wording in the charging paragraph of 5.1.13.1 refers to the list items as circuits. Attachment plugs and receptacles are not excepted circuits, they are supplied by excepted circuits. Also, the revision deletes the term “attachment plugs” as they would be part of the power supply cord for the repair or maintenance tools and equipment and not supplied with the control panel.

Submitter Information Verification

Submitter Full Name: John Kovacik

Organization: Trusted Safety Solutions

Street Address:

City:

State:

Zip:

Submittal Date: Fri Jan 03 15:46:49 EST 2025

Committee: EEI-AAA



5.1.13.2

Excepted circuits shall be provided with all of the following:

- (1) A disconnecting ~~means, isolating transformer, and~~ means and overcurrent protection mounted in an enclosure adjacent to or within the control enclosure containing the machine supply circuit disconnecting means
- (2) Line side (of the machine supply circuit disconnecting means) supply circuit conductors, when internal to the control enclosure, that are separate from and do not share a raceway with other conductors and that are encased in a raceway if they are longer than 460 mm (18 in.)

Statement of Problem and Substantiation for Public Input

To impose an isolating transformer on all Excepted Circuit is an excessive burden for the Panel Manufacturer as it has no safety reasons.

An Isolating transformer reduces the Available Fault Current (AFC). A control panel can be designed safe even without an isolating transformer on all its incoming power lines: that is the reason why the calculation of the SCCR is important. If the $SCCR > AFC$, there is no issue with short circuits.

In the future, excepted circuits, without an insulating transformer, will influence the whole control panel (electrical equipment) SCCR, without any reduction in safety.

Submitter Information Verification

Submitter Full Name: Marco Tacchini

Organization: GT Engineering

Street Address:

City:

State:

Zip:

Submittal Date: Mon Dec 30 12:08:42 EST 2024

Committee: EEI-AAA



Public Input No. 78-NFPA 79-2025 [Section No. 5.2]

5.2 Additional Disconnecting Means.

5.2.1

In addition to the machine supply circuit disconnecting means, devices shall be permitted to be provided for disconnecting electrical equipment to enable work to be performed on individual portions of the machine and its electrical equipment.

5.2.2*

The following devices shall be permitted to fulfill the function of 5.2.1:

- (1) Devices described in 5.1.10
- (2) * A listed manual motor controller additionally marked “suitable as motor disconnect” in a single motor branch circuit where located between the last motor branch-circuit short-circuit and ground-fault protective device and the motor.
- (3) System isolation equipment that incorporates one or more control lockout stations and is listed for disconnection purposes where located on the load side of overcurrent protection and its disconnecting means. The disconnecting means shall be one of the types permitted by 5.1.10(1) through (4).

5.2.3

An operating means of the additional disconnecting means in 5.2.2 shall be as follows:

- (1) Readily accessible and complies with 5.1.12
Exception: Switches and circuit breakers installed adjacent to motors, appliances, or other equipment that they supply shall be permitted to be accessible by portable means.
- (2) Within sight of the part of the machine requiring disconnection
- (3) Readily identifiable as a disconnecting means and marked to identify the equipment that is disconnected
- (4) For other than attachment plugs, provided with permanent means for locking in the off position only

5.2.4 Enclosure Access.

Access to enclosures containing disconnecting means shall be in accordance with 6.2.3.1.

Statement of Problem and Substantiation for Public Input

The revised text clarifies that additional disconnecting means (such as local motor disconnects) shall be permitted where needed to perform work on individual portions of the machine and/or its electrical equipment. Prior language may have been interpreted to imply only mechanical work only was intended.

In addition, the systems isolation equipment requirement was revised to reflect that one or more lockout stations may be provided.

Submitter Information Verification

Submitter Full Name: Jay Tamblingson

Organization: Rockwell Automation

Street Address:

City:

State:

Zip:

Submittal Date: Fri Jan 03 11:07:52 EST 2025

Committee: EEI-AAA



Public Input No. 27-NFPA 79-2024 [Section No. 5.2.3]

5.2.3

An operating means of the additional disconnecting for indoor equipment means in 5.2.2 shall be as follows:

- (1) Readily accessible and complies with 5.1.12
Exception: Switches and circuit breakers installed adjacent to motors, appliances, or other equipment that they supply shall be permitted to be accessible by portable means.
- (2) Within sight of the part of the machine requiring disconnection
- (3) Readily identifiable as a disconnecting means and marked to identify the equipment that is disconnected
- (4) For other than attachment plugs, provided with permanent means for locking in the off position only

Statement of Problem and Substantiation for Public Input

The line of site requirement makes this unenforceable in outdoor rotating equipment remotely located from the control shed. The safety is the Lock Out Tag Out procedure. Requiring line of site can be OK for an indoor factory but with remote located ponding equipment such as aerators, stirring units and evaporation units this is not possible. I believe adding INDOOR EQUIPMENT will clarify the line of site to the disconnect is not applicable to outdoor equipment where lock out tag out is the safety.

Submitter Information Verification

Submitter Full Name: Robert Ballantyne

Organization: Resource West

Street Address:

City:

State:

Zip:

Submittal Date: Wed Dec 18 16:36:59 EST 2024

Committee: EEI-AAA



Public Input No. 32-NFPA 79-2024 [Section No. 5.3.3]

5.3.3*

Where other means of removal of power are used, ~~a single failure of any of its components shall not result in an inadvertent or unexpected start-up.~~ the alternative protection plan (e.g., engineering controls, administrative measures) must achieve the performance determined by the risk assessment and related risk reduction measures.

Statement of Problem and Substantiation for Public Input

The other measures requirement for no single point of failure is greater than the performance of a disconnect switch and, separately, is not aligned with the OSHA LOTO enforcement policy which permits an alternative protection plan based on minor servicing exception and risk.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization: (None)

Street Address:

City:

State:

Zip:

Submittal Date: Wed Dec 18 17:42:34 EST 2024

Committee: EEI-AAA



Public Input No. 33-NFPA 79-2024 [Section No. 5.3.4]

5.3.4

Other means of removal of power shall be employed only for situations that ~~include the following:~~

- ~~(1) Routine exchange of work pieces, fixtures, and tools requiring no significant dismantling of the machine~~
- ~~(2) Work on the electrical equipment where all of the following conditions exist:~~
 - ~~(3) There is no hazard arising from electric shock and burn.~~
 - ~~(4) The switching-off means cannot be negated by the work.~~
 - ~~(5) The work is of a minor nature (e.g., replacement of plug-in devices without disturbing existing wiring).~~
 - ~~(6) There is no hazard arising from the unexpected energizing or de-energizing of circuits.~~

are considered minor servicing per OSHA lockout - tagout enforcement policy. Isolation of energy is required for all tasks considered servicing. The minor servicing exception to lockout - tagout allows an alternative protection plan based on specific scenarios and risk.

Statement of Problem and Substantiation for Public Input

This section is notionally aligned with OSHA's LOTO enforcement policy. The user may be misled by NFPA 79. We need to align completely or, simply, reference OSHA as the regulatory source.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization: (None)

Street Address:

City:

State:

Zip:

Submittal Date: Wed Dec 18 17:47:05 EST 2024

Committee: EEI-AAA



Public Input No. 68-NFPA 79-2024 [Section No. 6.3.1 [Excluding any Sub-Sections]]

Fault protection (see 3.3.48) preventing hazardous conditions to continue in the event of an insulation fault between live and exposed non-current-carrying conductive parts shall be provided.

Statement of Problem and Substantiation for Public Input

The aim is the alignment with the NEC terminology and harmonize it in NFPA 79.
The term Exposed Conductive Part is used in IEC 60364 series; NEC uses the term "exposed non-current-carrying metal parts".
However I think "conductive" is a better term compared with "metal".
That is the reason why the proposal is to use the term "exposed non-current-carrying conductive part(s)" throughout the new edition of the standard.

Related Public Inputs for This Document

<u>Related Input</u>	<u>Relationship</u>
Public Input No. 66-NFPA 79-2024 [Section No. 3.3.22.2]	

Submitter Information Verification

Submitter Full Name: Marco Tacchini
Organization: GT Engineering
Street Address:
City:
State:
Zip:
Submittal Date: Mon Dec 30 13:02:14 EST 2024
Committee: EEI-AAA



Public Input No. 69-NFPA 79-2024 [Section No. 6.3.2.3]

6.3.2.3 Protection by Automatic Disconnection of Supply.

Automatic disconnection of the supply of any circuit affected by the particular circuit overcurrent protective device in the event of a fault shall prevent an exposure to a continuous hazardous touch voltage with the following protective measures:

- (1) Protective bonding of ~~exposed~~ exposed non-current-carrying conductive parts (see 8.2.3)
- (2) The use of overcurrent protection devices for the automatic disconnection of the supply in the event of a fault

Statement of Problem and Substantiation for Public Input

The aim is the alignment with the NEC terminology and harmonize it in NFPA 79.

The term Exposed Conductive Part is used in IEC 60364 series; NEC uses the term "exposed non-current-carrying metal parts".

However I think "conductive" is a better term compared with "metal".

That is the reason why the proposal is to use the term "exposed non-current-carrying conductive part(s)" throughout the new edition of the standard.

Related Public Inputs for This Document

<u>Related Input</u>	<u>Relationship</u>
<u>Public Input No. 66-NFPA 79-2024 [Section No. 3.3.22.2]</u>	

Submitter Information Verification

Submitter Full Name: Marco Tacchini

Organization: GT Engineering

Street Address:

City:

State:

Zip:

Submittal Date: Mon Dec 30 13:06:43 EST 2024

Committee: EEI-AAA



Public Input No. 75-NFPA 79-2025 [Section No. 6.4.1]

6.4.1 General Requirements.

6.4.1.1

The use of PELV, as described in Section 6.4, shall be permitted to protect persons against electric shock from indirect contact and limited area direct contact.

6.4.1.2

Class 2 circuits, as covered in 13.1.1 and Article 725 of *NFPA 70* (NEC), shall be permitted to be used to provide protection from electric shock and other hazards.

6.4.1.3

Where electrical devices are marked to require supply from PELV or Class 2 sources, those sources and circuits supplying the devices shall be in accordance with Section 6.4

Statement of Problem and Substantiation for Public Input

6.4.1.1 was editorially revised to add "shall be permitted" as use of PELV is not mandatory and the wording is consistent with those for Class 2 circuits in 6.4.1.2

6.4.1.3 adds new requirements to clarify that devices that require use of PELV or Class 2 sources shall have their supply circuits and sources comply with the requirements of this section.

Submitter Information Verification

Submitter Full Name: Jay Tamblingson

Organization: Rockwell Automation

Street Address:

City:

State:

Zip:

Submittal Date: Thu Jan 02 11:13:21 EST 2025

Committee: EEI-AAA



Public Input No. 18-NFPA 79-2024 [Section No. 6.4.1.2]

6.4.1.2

Class 2 circuits ~~as covered in 13.1.1 and~~ Article 725 of *NFPA 70* (NEC), shall be permitted to be used to provide protection from electric shock and other hazards.

Statement of Problem and Substantiation for Public Input

Better clarity. There is no specific reference to Class 2 circuits in 13.1.1

Submitter Information Verification

Submitter Full Name: Craig Twining

Organization: Kaufman Engineered Systems

Street Address:

City:

State:

Zip:

Submittal Date: Thu Nov 14 16:07:00 EST 2024

Committee: EEI-AAA



Public Input No. 38-NFPA 79-2024 [Section No. 6.4.1.2]

6.4.1.2

Class 2 circuits, as covered in 13.1.1 and ~~Article~~ Articles 720, 721, 722, and 725 of *NFPA 70* (NEC), shall be permitted to be used to provide protection from electric shock and other hazards.

Statement of Problem and Substantiation for Public Input

2026 NEC has expanded the number of articles that contain class 2 power limited circuit information.

Submitter Information Verification

Submitter Full Name: Keith Waters

Organization: Schneider Electric

Street Address:

City:

State:

Zip:

Submittal Date: Fri Dec 20 11:17:16 EST 2024

Committee: EEI-AAA



Public Input No. 47-NFPA 79-2024 [New Section after 6.5]

6.5 Protection by the Use of Class 4 Fault-Managed Power System (FMPS)

6.5.1 General Requirements.

6.5.1.1

The use of FMPS shall protect persons against electric shock from indirect contact and limited area direct contact.

6.5.1.2

Class 4 circuits, as covered in Article 726 of NFPA 70 (NEC), shall be permitted to be used to provide protection from electric shock and other hazards.

6.5.2

FMPS circuits shall satisfy all of the following conditions:

- (1) The nominal voltage shall not exceed 450 volts ac (rms value) or dc (ripple-free) when the equipment is used in normally dry locations and when large area contact of live parts with the human body is not expected
- (2) Live parts of FMPS circuits shall be electrically separated from other live circuits.
- (3) Conductors of each FMPS circuit shall be physically separated from those of any other circuit. When this requirement is impracticable, the insulation provisions of 13.1.3 shall apply.
- (5) Attachment plugs and receptacles for a FMPS circuit shall conform to the following: (a) Attachment plugs shall not be able to enter receptacles of other voltage systems. (b) Receptacles shall not admit plugs of other voltage systems.

6.5.3 Sources for FMPS .

The source for FMPS shall be an identified electronic power supply conforming to standards specifying measures to be taken to ensure that, even in the case of an internal fault, the voltage at the outgoing terminals does not exceed the values specified in 6.5.

Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
new_6.5.docx	protection by Class 4	

Statement of Problem and Substantiation for Public Input

Class 4 power includes the mitigation of shock and arc flash hazards. This should be recognized in the standard.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization: Figure AI

Street Address:

City:

State:

Zip:

Submittal Date: Thu Dec 26 17:14:05 EST 2024

Committee: EEI-AAA

(new)

6.5 Protection by the Use of Class 4 Fault-Managed Power System (FMPS)

6.5.1 General Requirements.

6.5.1.1

The use of FMPS shall protect persons against electric shock from indirect contact and limited area direct contact.

6.5.1.2

Class 4 circuits, as covered in Article 726 of *NFPA 70* (NEC), shall be permitted to be used to provide protection from electric shock and other hazards.

6.5.2

FMPS circuits shall satisfy all of the following conditions:

- (1) The nominal voltage shall not exceed 450 volts ac (rms value) or dc (ripple-free) when the equipment is used in normally dry locations and when large area contact of live parts with the human body is not expected
- (2) Live parts of FMPS circuits shall be electrically separated from other live circuits.
- (3) Conductors of each FMPS circuit shall be physically separated from those of any other circuit. When this requirement is impracticable, the insulation provisions of 13.1.3 shall apply.
- (5) Attachment plugs and receptacles for a FMPS circuit shall conform to the following: (a) Attachment plugs shall not be able to enter receptacles of other voltage systems. (b) Receptacles shall not admit plugs of other voltage systems.

6.5.3 Sources for FMPS.

The source for FMPS shall be an identified electronic power supply conforming to standards specifying measures to be taken to ensure that, even in the case of an internal fault, the voltage at the outgoing terminals does not exceed the values specified in 6.5.



Public Input No. 40-NFPA 79-2024 [Section No. 7.2.10.1.2 [Excluding any Sub-Sections]]

Table 7.2.10.1.1 shall not apply to Design B energy efficient or premium efficient motor circuits, or Design BE motor circuits .

Statement of Problem and Substantiation for Public Input

The NEC has contained language on premium efficiency motors for some time and needs to be included. The addition of Design BE motors needs to be included as it has been added to 2026 NEC. The US DOE requirements for motor energy efficiency have driven the design of the new motor design and inclusion into the NEC and Ansi/NEMA MG1.

Submitter Information Verification

Submitter Full Name: Keith Waters

Organization: Schneider Electric

Street Address:

City:

State:

Zip:

Submittal Date: Fri Dec 20 11:29:48 EST 2024

Committee: EEI-AAA



Public Input No. 41-NFPA 79-2024 [Section No. 7.2.10.1.2.1]

7.2.10.1.2.1

The provisions of *NFPA 70* shall be observed for Design B energy efficient, Design B premium efficient, and Design BE motor circuits.

Statement of Problem and Substantiation for Public Input

The need to add NEMA Design BE motors is necessary as the DOE is driving these designs as a federal requirement. NEMA BE motors have been included in the 2026 NEC. The inclusion of premium efficient motors includes motors that have been documented in the NEC for several cycles.

Submitter Information Verification

Submitter Full Name: Keith Waters

Organization: Schneider Electric

Street Address:

City:

State:

Zip:

Submittal Date: Fri Dec 20 11:33:34 EST 2024

Committee: EEI-AAA



Public Input No. 42-NFPA 79-2024 [Section No. 7.2.10.1.10]

7.2.10.1.10

Where a listed self-protected combination controller has an adjustable, instantaneous trip setting, the setting shall not exceed 1300 percent of full-load motor current for other than Design B energy efficient motors and not more than 1700 percent of full-load motor current for Design B energy efficient, Design B premium efficient, and Design BE motors.

Statement of Problem and Substantiation for Public Input

The addition of the two additional motor designs correlates NFPA 79 with the 2026 NEC. The US DOE has made motor energy efficiency requirements such the new NEMA Design BE motors are going to required for motors 100HP-250HP in 2027.

Submitter Information Verification

Submitter Full Name: Keith Waters

Organization: Schneider Electric

Street Address:

City:

State:

Zip:

Submittal Date: Fri Dec 20 11:37:56 EST 2024

Committee: EEI-AAA



Public Input No. 37-NFPA 79-2024 [Section No. 7.2.12]

7.2.12 ~~Programmable~~ Electronic System Power Supply (programmable or fixed) Input Overcurrent Protection.

~~Programmable electronic~~ Electronic system power supply inputs shall be protected by overcurrent protective devices either externally or internally. The overcurrent protection size or rating shall be in accordance with the manufacturer's instructions.

Statement of Problem and Substantiation for Public Input

Stating programmable excludes fixed (non-programmable) power supplies. Removing this term would broaden the allowance.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization: (None)

Street Address:

City:

State:

Zip:

Submittal Date: Fri Dec 20 11:07:53 EST 2024

Committee: EEI-AAA



Public Input No. 8-NFPA 79-2024 [New Section after 7.2.14]

7.2.15 Sensors, Control Devices, and their Associated Cables or Cordsets - Conductors that are part of a jacketed, multiconductor cable or cordset and intended to be used with field installed sensors and or control devices shall be protected by an overcurrent protective device in accordance with the conductors ampacity rating.

Statement of Problem and Substantiation for Public Input

Chapter 7.2.13 includes sensors with control devices being protected with an OCPD no larger than 10A. This amperage size (10A) does not appropriately protect the typical 22awg and 24awg sensor and cordset cable conductors found in industry.

Submitter Information Verification

Submitter Full Name: Michael Steele

Organization: R.A. Jones

Street Address:

City:

State:

Zip:

Submittal Date: Fri Jun 28 10:47:00 EDT 2024

Committee: EEI-AAA



Public Input No. 39-NFPA 79-2024 [Section No. 7.8.1 [Excluding any Sub-Sections]]

Industrial machinery with safety circuits shall have SPD(s) to protect against the effects of overvoltages due to transients or switching surges. The type of SPD(s) shall be selected to protect, at a minimum, the safety circuit devices and shall be permitted to be integral to secondary derived voltage sources.

Exception No. 1 : SPD(s) shall not be required where the risks associated with the effects of overvoltages are mitigated such that the safety performance determined by a risk assessment is met.

Exception No. 2: SPD(s) shall not be required when equipment is fed from lightning-isolated power supplies and switching surges are inherently eliminated (e.g., fixed batteries and protective chargers).

Statement of Problem and Substantiation for Public Input

Exception 2 further clarifies that isolated power supplies do not need SPD's.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization: (None)

Street Address:

City:

State:

Zip:

Submittal Date: Fri Dec 20 11:27:21 EST 2024

Committee: EEI-AAA



Public Input No. 48-NFPA 79-2024 [Section No. 8.1.1]

8.1.1 Applicability.

This chapter provides the requirements for grounding, bonding, and for the grounded conductor.

Note (or Annex A informative): In the case battery or capacitor powered mobile equipment, the ground refers to the anode or negatively charged pole.

Statement of Problem and Substantiation for Public Input

Clarifying that mobile devices have a power system with the equivalent of a ground will reduce confusion.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization: Figure AI

Street Address:

City:

State:

Zip:

Submittal Date: Thu Dec 26 23:35:04 EST 2024

Committee: EEI-AAA



Public Input No. 71-NFPA 79-2024 [Section No. 8.2.1 [Excluding any Sub-Sections]]

~~The equipment frame and all~~
~~All non-current-carrying conductive parts,~~

~~material, or other equipment~~
~~and other metal parts likely to become energized , shall be~~

~~bonded together and~~
~~connected to an equipment grounding conductor or bonding jumper.~~

~~In case of metal parts likely to become energized, the connection may be applied to the part~~
~~that (because of its proximity to a live part) is most likely to become energized.~~

Exception: Small parts such as screws, rivets, and nameplates that are not likely to become energized shall not be required to be grounded.

Statement of Problem and Substantiation for Public Input

Let's suppose a situation whereby several conductive parts are in touch with each other and where only one final part or element, is in contact with an insulated live part.

In case of an insulation failure, all parts become energized.

However, to protect people, it is enough that only the part in contact with the insulated live part be connected with the equipment grounding conductor. That will guarantee the opening of the fault loop, after which, all conductive parts, in contact with each other, will be at a safe potential.

Related Public Inputs for This Document

<u>Related Input</u>	<u>Relationship</u>
Public Input No. 72-NFPA 79-2024 [Section No. 8.2.1.2.1]	

Submitter Information Verification

Submitter Full Name: Marco Tacchini

Organization: GT Engineering

Street Address:

City:

State:

Zip:

Submittal Date: Mon Dec 30 13:24:29 EST 2024

Committee: EEI-AAA



Public Input No. 72-NFPA 79-2024 [Section No. 8.2.1.2.1]

8.2.1.2.1

~~The machine and all exposed, non~~ All exposed non -current-carrying conductive parts, material, and equipment parts, and other metal parts _ likely to become energized shall be connected in a manner that provides an effective ground-fault current path.

Statement of Problem and Substantiation for Public Input

Let's suppose a situation whereby several conductive parts are in touch with each other and where only one final part or element, is in contact with an insulated live part.

In case of an insulation failure, all parts become energized.

However, to protect people, it is enough that only the part in contact with the insulated live part be connected with the equipment grounding conductor. That will guarantee the opening of the fault loop, after which, all conductive parts, in contact with each other, will be at a safe potential.

Related Public Inputs for This Document

<u>Related Input</u>	<u>Relationship</u>
Public Input No. 71-NFPA 79-2024 [Section No. 8.2.1 [Excluding any Sub-Sections]]	

Submitter Information Verification

Submitter Full Name: Marco Tacchini

Organization: GT Engineering

Street Address:

City:

State:

Zip:

Submittal Date: Mon Dec 30 13:39:32 EST 2024

Committee: EEI-AAA



Public Input No. 49-NFPA 79-2024 [Section No. 8.3.2]

8.3.2

Ungrounded control circuits shall be provided with an insulation-monitoring device that either indicates a ground fault or interrupts the circuit automatically after a ground fault.

Exception Exception1 : Class 2 circuits as defined in Article 100 and as covered in Article 725 of NFPA 70 shall not require insulation monitoring unless required by 9.4.2.1.

Exception2: Class 4 circuits as defined in Article 100 and as covered in Article 726 of NFPA 70 shall not require insulation monitoring.

Statement of Problem and Substantiation for Public Input

There is a need to broaden the allowance to include Class 4.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization:

Street Address:

City:

State:

Zip:

Submittal Date: Thu Dec 26 23:42:37 EST 2024

Committee: EEI-AAA



Public Input No. 51-NFPA 79-2024 [Section No. 9.2.5.4.1.4]

9.2.5.4.1.4*

Where a Category 0 or Category 1 stop is used for the emergency stop function, it shall have a circuitry design (including sensors, logic, and actuators) according to the relevant risk as required by Section 4.1 and 9.4.1. Final removal of power to the machine actuators shall be ensured and shall be by means of ~~electromechanical components~~ devices designed for safety-related functions according to relevant safety standards. Where relays are used to accomplish a Category 0 emergency stop function, they shall be nonretentive relays.

~~*Exception: Drives, or solid state output devices, designed for safety-related functions shall be allowed to be the final switching element, when designed according to relevant safety standards.*~~

Statement of Problem and Substantiation for Public Input

Eliminating the exception and recognizing all devices that are designed per the relevant safety standards improves the standard overall.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization:

Street Address:

City:

State:

Zip:

Submittal Date: Fri Dec 27 13:37:31 EST 2024

Committee: EEI-AAA



Public Input No. 52-NFPA 79-2024 [Section No. 10.8.2.1]

10.8.2.1*

The types of devices that initiate an emergency switching off operation shall be permitted to include, but are not limited to, the following:

- (1) Pushbutton-operated switches
- (2) Pull-cord-operated switches
- (3) Rotary switches
- (4) Bifurcating pull plug

Statement of Problem and Substantiation for Public Input

The additional examples recognize rotary action and battery isolation by mains bifurcation as permitted types.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization: Figure AI

Street Address:

City:

State:

Zip:

Submittal Date: Fri Dec 27 16:10:42 EST 2024

Committee: EEI-AAA



Public Input No. 4-NFPA 79-2024 [Section No. 11.2.1.3.1]

11.2.1.3.1

Exposed, nonarcing, bare, live parts operating at or greater than 50 volts ac rms or 60 volts dc within an enclosure or compartment shall have an air space of not less than 13 mm ($\frac{1}{2}$ in.) between them and the uninsulated walls of the enclosure or compartment, including conduit fittings. The air space for uninsulated doors of an enclosure shall be not less than 25mm (1 in).

Exception: Listed or labeled equipment shall be installed and used in accordance with any instructions included in the listing or labeling.

Statement of Problem and Substantiation for Public Input

Ultimately this change moves NFPA79 2024 section 11.2.1.3.2 into 11.2.1.3.1 so the added exception can apply to the air space requirements with both uninsulated walls and doors. The exception was added for scenarios when the component OEM has NRTL status justifying an installation criteria that may differ from 11.2.1.3.1 requirements.

Related Public Inputs for This Document

<u>Related Input</u>	<u>Relationship</u>
<u>Public Input No. 5-NFPA 79-2024 [Section No. 11.2.1.3.2]</u>	
<u>Public Input No. 7-NFPA 79-2024 [New Section after A.10.9]</u>	

Submitter Information Verification

Submitter Full Name: Michael Steele

Organization: R.A. Jones

Street Address:

City:

State:

Zip:

Submittal Date: Fri Jun 14 15:49:37 EDT 2024

Committee: EEI-AAA



Public Input No. 5-NFPA 79-2024 [Section No. 11.2.1.3.2]

11.2.1.3.2 –

~~The air space for uninsulated doors of an enclosure shall be not less than 25 mm (1 in.).~~

Statement of Problem and Substantiation for Public Input

The text in 11.2.1.3.2 was merged into 11.2.1.3.1 to support my suggested change to 11.2.1.3.1

Related Public Inputs for This Document

<u>Related Input</u>	<u>Relationship</u>
<u>Public Input No. 4-NFPA 79-2024 [Section No. 11.2.1.3.1]</u>	NFPA79 2024 section 11.2.1.3.2 text added to 11.2.1.3.1
<u>Public Input No. 6-NFPA 79-2024 [Section No. 11.2.1.3.3]</u>	

Submitter Information Verification

Submitter Full Name: Michael Steele

Organization: R.A. Jones

Street Address:

City:

State:

Zip:

Submittal Date: Fri Jun 14 16:01:57 EDT 2024

Committee: EEI-AAA



Public Input No. 6-NFPA 79-2024 [Section No. 11.2.1.3.3]

11.2.1.3.3 2

Where barriers between metal enclosures or compartments and arcing parts are required, they shall be of flame-retardant, noncarbonizing insulating materials.

Statement of Problem and Substantiation for Public Input

My suggested change to 11.2.1.3.1 included the text of 11.2.1.3.2 causing a number restructure so I am changing 11.2.1.3.3 to 11.2.1.3.2

Related Public Inputs for This Document

<u>Related Input</u>	<u>Relationship</u>
<u>Public Input No. 5-NFPA 79-2024</u> <u>[Section No. 11.2.1.3.2]</u>	due to 11.2.1.3.2 text being moved to 11.2.1.3.1 this requires a restructure so 11.2.1.3.3 becomes 11.2.1.3.2

Submitter Information Verification

Submitter Full Name: Michael Steele

Organization: R.A. Jones

Street Address:

City:

State:

Zip:

Submittal Date: Fri Jun 14 16:05:22 EDT 2024

Committee: EEI-AAA



Public Input No. 53-NFPA 79-2024 [Section No. 11.4.8]

11.4.8

A print pocket sized to accommodate physical electrical diagrams or software media shall be attached to the inside or outside of the door of the control enclosure or compartment.

11.4.8.1

It shall be permissible to place a pocket that is suitable for the environment outside the door of the control enclosure or compartment in a well-identified location.

11.4.8.2

Single-door and multi-door enclosures shall have at least one print pocket.

11.4.8.3

It shall be permissible to place the electrical diagrams or software media at a stationary location (e.g., maintenance shop) for mobile equipment (e.g., autonomous mobile robots) and omit the pocket.

Statement of Problem and Substantiation for Public Input

An improvement would be to recognize that mobile equipment will be serviced in a specific location and the schematics are permitted to be stored in the same location.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization: Figure AI

Street Address:

City:

State:

Zip:

Submittal Date: Fri Dec 27 16:27:54 EST 2024

Committee: EEI-AAA



Public Input No. 54-NFPA 79-2024 [Section No. 11.5 [Excluding any Sub-Sections]]

Access and working space for stationary control cabinets and compartments operating at 1000 volts, nominal, or less to ground and likely to require examination, adjustment, servicing, or maintenance while energized shall comply with the provisions of Chapter 11. Sufficient access and working space shall be provided and maintained around all control cabinets and compartments to permit ready and safe operation and maintenance of such control cabinets and compartments. Working space for cabinets and compartments that contain supply conductors to industrial machinery that are covered by Article 670 of *NFPA 70* shall be in accordance with the *NEC*._

Access and working space for movable control cabinets and compartments operating at 1000 volts, nominal, or less to ground and likely to require examination, adjustment, servicing, or maintenance while energized shall comply with the provisions of Chapter 11 as it relates to working space after the control cabinet is moved to a position in order to satisfy the minimum working space.

Statement of Problem and Substantiation for Public Input

The recognition that mobile equipment are able to be positioned to maximize working space is an improvement to the standard. After all possible movements are considered, the 11.5 requirements must be satisfied.

Submitter Information Verification

Submitter Full Name: Robert Gruendel
Organization: Figure AI
Street Address:
City:
State:
Zip:
Submittal Date: Fri Dec 27 16:35:48 EST 2024
Committee: EEI-AAA



Public Input No. 87-NFPA 79-2025 [Section No. 12.2.1]

12.2.1 Conductor Material.

Conductors shall be copper or aluminum .

Exception: Aluminum alloy busbars, located internal to the enclosure, shall be permitted where suitable for the application.

Statement of Problem and Substantiation for Public Input

It is time that NFPA 79 reviews the wiring material that is suitable to connect internal components within an industrial machine. NFPA 79 is based on using copper only and this is a legacy type thought process based on the quality of the aluminum alloys that were made decades ago. The aluminum alloys are vastly improved and are used in greater abundance in today's world.

This public input is not mandating the use of copper but would allow the option for manufacturers to use both materials.

To thoroughly address this issue a task group should be formed to study the expansion of aluminum conductors internal to a machine and what sizes would be permitted. It is understood that certain smaller sizes may not be appropriate due to mechanical strength and flexibility.

Table 12.5.1. should be updated to include aluminum conductors of certain sizes that are appropriate.

Submitter Information Verification

Submitter Full Name: Lawrence Ayer

Organization: Biz Com Electric, Inc.

Affiliation: IEC

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jan 07 13:24:19 EST 2025

Committee: EEI-AAA



Public Input No. 85-NFPA 79-2025 [New Section after 12.2.6]

12.2.7 Field Wiring

Field wiring terminals shall be suitable for use with Copper (Cu.) and Aluminum (Al) conductors.

Statement of Problem and Substantiation for Public Input

Most machines that I am familiar with are marked internally with a label that states "Copper Conductors only". This label creates a confusion to the installer/maintainer for which the installer assumes that all field wiring to the machine must be copper as well. There is no technical reason that the field wiring that is installed up to the machine terminals cannot be of aluminum material.

This thinking has probably been a result of a legacy thought process where aluminum alloys were not as robust as today's aluminum solutions. Each machine should be designed such that input conductors can be either aluminium or copper and should not rely on this legacy practice.

In addition to this, NFPA 79 should put together a task group to fully research this issue to determine if Aluminum conductors may be suitable for all internal wiring down to certain sizes.

Submitter Information Verification

Submitter Full Name: Lawrence Ayer

Organization: Biz Com Electric, Inc.

Affiliation: IEC

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jan 07 13:12:14 EST 2025

Committee: EEI-AAA



Public Input No. 55-NFPA 79-2024 [Section No. 12.3.1]

12.3.1

The insulation and the finished conductors and cables shall have flame-retardant properties and temperature limits and characteristics as follows:

- (1) MTW — Moisture-, Heat-, and Oil-Resistant Thermoplastic 60°C (140°F) Wet Locations 90°C (194°F) Dry Locations
- (2) THHN — Heat-Resistant Thermoplastic 90°C (194°F) Dry Locations
- (3) THW — Moisture- and Heat-Resistant Thermoplastic 75°C (167°F) Dry and Wet Locations
- (4) THWN — Moisture- and Heat-Resistant Thermoplastic 75°C (167°F) Dry and Wet Locations
- (5) RHH — Thermoset 90°C (194°F) Dry Locations
- (6) RHW — Moisture-Resistant Thermoset 75°C (167°F) Dry and Wet Locations
- (7) RHW-2 — Moisture-Resistant Thermoset 90°C (194°F) Dry and Wet Locations
- (8) XHHW — Moisture-Resistant Thermoset 75°C (167°F) Wet Locations 90°C (194°F) Dry Locations
- (9) XHHW-2 — Moisture-Resistant Thermoset 90°C (194°F) Dry and Wet Locations
- (10) XLPO - Heat-Resistant Thermoset 150 °C (302°F) Dry Locations
- (11) XLPE - Heat-Resistant Thermoset 150 °C (302°F) Dry Locations
- (12) EPDM - Heat-Resistant Rubber 200°C 392°F Dry and Wet Locations
- (13) Z - Heat-Resistant Thermoset 150 °C (302°F) Dry Locations
- (14) TFE - Heat-Resistant Thermoset 200 °C (392°F) Dry Locations

Statement of Problem and Substantiation for Public Input

Include the extreme temperature insulations in preparation for new terminal ratings and wiring methods that can support the higher temperatures.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 56-NFPA 79-2024 [Section No. 12.5.1]	Codependency
Public Input No. 56-NFPA 79-2024 [Section No. 12.5.1]	
Public Input No. 57-NFPA 79-2024 [Section No. 12.5.5]	
Public Input No. 58-NFPA 79-2024 [Section No. 12.6.1.1]	

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization:

Street Address:

City:

State:

Zip:

Submittal Date: Fri Dec 27 17:01:14 EST 2024

Committee: EEI-AAA



Public Input No. 56-NFPA 79-2024 [Section No. 12.5.1]

12.5.1

The ampacities of conductors shall not exceed the corresponding temperature values given in Table 12.5.1 before any correction factors for ambient temperature or adjustment factors for the number of current-carrying conductors have been applied.

Table 12.5.1 Conductor Ampacity Based on Copper Conductors with 60°C (140°F), 75°C (167°F), ~~and 90°C (194°F)~~, 150°C, 200°C, and 250°C Insulation in an Ambient Temperature of 30°C (86°F)

<u>Conductor Size (AWG)</u>	<u>60°C (140°F)</u>	<u>Ampacity</u>	
		<u>75°C (167°F)</u>	<u>90°C (194°F)</u>
30	—	0.5	0.5
28	—	0.8	0.8
26	—	1	1
24	2	2	2
22	3	3	3
20	5	5	5
18	7	7	14
16	10	10	18
14	15	20	25
12	20	25	30
10	30	35	40
8	40	50	55
6	55	65	75
4	70	85	95
3	85	100	115
2	95	115	130
1	110	130	145
1/0	125	150	170
2/0	145	175	195
3/0	165	200	225
4/0	195	230	260
250	215	255	290
300	240	285	320
350	260	310	350
400	280	335	380
500	320	380	430
600	355	420	475
700	385	460	520
750	400	475	535
800	410	490	555
900	435	520	585
1000	455	545	615

Notes:

(1) Conductor types listed in 12.3.1 shall be permitted to be used at the ampacities listed in this table.

(2) The source for the ampacities in this table is Table 310.15(B)(16) of ~~16, 17, and 18~~ of *NFPA 70*.

Statement of Problem and Substantiation for Public Input

Add ampacities for 150C, 200C and 250C. Due to this addition, the notes must be updated.

Related Public Inputs for This Document

<u>Related Input</u>	<u>Relationship</u>
<u>Public Input No. 55-NFPA 79-2024 [Section No. 12.3.1]</u>	Related topic and codependency
<u>Public Input No. 55-NFPA 79-2024 [Section No. 12.3.1]</u>	
<u>Public Input No. 57-NFPA 79-2024 [Section No. 12.5.5]</u>	
<u>Public Input No. 58-NFPA 79-2024 [Section No. 12.6.1.1]</u>	

Submitter Information Verification

Submitter Full Name: Robert Gruendel
Organization:
Street Address:
City:
State:
Zip:
Submittal Date: Fri Dec 27 17:16:17 EST 2024
Committee: EEI-AAA



Public Input No. 57-NFPA 79-2024 [Section No. 12.5.5]

12.5.5

Where ampacity correction for ambient temperature correction for other than 30°C (86°F) or adjustment for more than three current-carrying conductors in a raceway or cable is required, the factor(s) shall be taken from Table 12.5.5(a) and Table 12.5.5(b). Sizing of conductors within control enclosures in wiring harnesses or wiring channels shall be based on the ampacity in cable or raceway. These factors shall apply to Class 1 control conductors, Article 725 of NFPA 70 only if their continuous load exceeds 10 percent of the conductor ampacity.

Exception: The provisions of 376.22 of NFPA 70 shall be permitted to be applied for conductors in metallic wireways.

Table 12.5.5(a) Ambient Temperature Correction Factors

For ambient temperatures other than 30°C (86°F), multiply the allowable ampacity by the appropriate factor shown below.

<u>Ambient Temperature</u> <u>(°C)</u>	<u>Correction Factor</u> <u>60°C</u>	<u>Correction Factor</u> <u>75°C</u>	<u>Correction Factor</u> <u>90°C</u>
21–25	1.08	1.05	1.04
26–30	1.00	1.00	1.00
31–35	0.91	0.94	0.96
36–40	0.82	0.88	0.91
41–45	0.71	0.82	0.87
46–50	0.58	0.75	0.82
51–55	0.41	0.67	0.76
56–60	—	0.58	0.71
61–70	—	0.33	0.58
71–80	—	—	0.41

Table 12.5.5(b) Adjustment Factors for More Than Three Current-Carrying Conductors in a Raceway or Cable

<u>Number of Current-Carrying</u> <u>Conductors</u>	<u>Percent of Values in Table 12.5.5(a) as Adjusted for</u> <u>Ambient Temperature if Necessary</u>
4–6	80
7–9	70
10–20	50
21–30	45
31–40	40
41 and above	35

Statement of Problem and Substantiation for Public Input

Add correction factors for 150C, 200C, and 250C per NFPA 70.

Related Public Inputs for This Document

Related Input

[Public Input No. 56-NFPA 79-2024 \[Section No. 12.5.1\]](#)
[Public Input No. 55-NFPA 79-2024 \[Section No. 12.3.1\]](#)
[Public Input No. 58-NFPA 79-2024 \[Section No. 12.6.1.1\]](#)

Relationship

codependency
codependency

Submitter Information Verification

Submitter Full Name: Robert Gruendel
Organization:
Street Address:
City:
State:
Zip:
Submittal Date: Fri Dec 27 18:16:03 EST 2024
Committee: EEI-AAA



Public Input No. 58-NFPA 79-2024 [Section No. 12.6.1.1]

12.6.1.1

16 AWG shall be permitted where individual conductors are used in a cabinet or enclosure or where part of a jacketed multiconductor cable assembly or flexible cord under the following conditions:

- (1) In non-motor power circuits of 8 amperes or less, provided all the following conditions are met:
 - (2) The circuit is protected in accordance with Chapter 7.
 - (3) Overcurrent protection does not exceed 10 amperes.
 - (4) Overcurrent protection is provided by one of the following:
 - (5) A listed molded-case circuit breaker marked for use with 16 AWG conductors
 - (6) Listed fuses marked for use with 16 AWG conductors
 - (7) Class CC, Class J, Class CF, or Class T fuses
- (8) In motor power circuits supplying a motor having a full-load current rating of 8 amperes or less, provided all the following conditions are met:
 - (9) The circuit is protected in accordance with Chapter 7.
 - (10) The circuit is provided with Class 10 overload protection.
 - (11) Overcurrent protection is provided by one of the following:
 - (12) A listed molded-case circuit breaker marked for use with 16 AWG conductors
 - (13) Listed fuses marked for use with 16 AWG conductors
 - (14) Class CC, Class J, Class CF, or Class T fuses
- (15) In motor power circuits supplying a motor having a full-load current rating of 5.5 amperes or less, provided all the following conditions are met:
 - (16) The circuit is protected in accordance with Chapter 7.
 - (17) The circuit is provided with Class 20 overload protection.
 - (18) Overcurrent protection is provided by one of the following:
 - (19) A listed molded-case circuit breaker marked for use with 16 AWG conductors
 - (20) Listed fuses marked for use with 16 AWG conductors
 - (21) Class CC, Class J, Class CF, or Class T fuses
- (22) In Class 4, non-motor power or motor power circuits provided all the following conditions are met:
 - (23) The circuit is protected in accordance with Chapter 7 and is fed by Class 4 fault managed power source or a fault monitoring device that achieves the same performance of a Class 4 fault managed power source with the ability to open the circuit within 1ms of a fault being detected .
 - (24) The Class 4 overload setting is set to the current capacity of the conductor based on NFPA 70 current at 30C, derated based on ambient temperature, and derated based on current carrying raceway or cable conductors.

Statement of Problem and Substantiation for Public Input

With the new Class 4 sources, 250C insulation, and power fault monitoring devices that are entering the market, the allowance to use small conductors at a higher amperage should be added.

Related Public Inputs for This Document

<u>Related Input</u>	<u>Relationship</u>
Public Input No. 57-NFPA 79-2024 [Section No. 12.5.5]	Codependency
Public Input No. 56-NFPA 79-2024 [Section No. 12.5.1]	Codependency
Public Input No. 55-NFPA 79-2024 [Section No. 12.3.1]	Codependency
Public Input No. 59-NFPA 79-2024 [Section No. 12.6.1.2]	

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization:

Street Address:

City:

State:

Zip:

Submittal Date: Fri Dec 27 18:25:33 EST 2024

Committee: EEI-AAA



Public Input No. 59-NFPA 79-2024 [Section No. 12.6.1.2]

12.6.1.2

18 AWG shall be permitted where individual conductors are used in a cabinet or enclosure or where part of a jacketed multiconductor cable assembly or flexible cord under the following conditions:

- (1) In non-motor power circuits of 5.6 amperes or less, provided all the following conditions are met:
 - (2) The circuit is protected in accordance with Chapter 7.
 - (3) Overcurrent protection does not exceed 7 amperes.
 - (4) Overcurrent protection is provided by one of the following:
 - (5) A listed molded-case circuit breaker marked for use with 18 AWG conductors
 - (6) Listed fuses marked for use with 18 AWG conductors
 - (7) Class CC, Class J, or Class CF, Class T fuses
- (8) In motor power circuits supplying a motor having a full-load current rating of 5 amperes or less, provided all the following conditions are met:
 - (9) The circuit is protected in accordance with Chapter 7.
 - (10) The circuit is provided with Class 10 overload protection.
 - (11) Overcurrent protection is provided by one of the following:
 - (12) A listed molded-case circuit breaker marked for use with 18 AWG conductors
 - (13) Listed fuses marked for use with 18 AWG conductors
 - (14) Class CC, Class J, Class CF, or Class T fuses
- (15) In motor power circuits supplying a motor having a full-load current rating of 3.5 amperes or less, provided all the following are met:
 - (16) The circuit is protected in accordance with Chapter 7.
 - (17) The circuit is provided with Class 20 overload protection.
 - (18) Overcurrent protection is provided by one of the following:
 - (19) A listed molded-case circuit breaker marked for use with 18 AWG conductors
 - (20) Listed fuses marked for use with 18 AWG conductors
 - (21) Class CC, Class J, Class CF, or Class T fuses
- (22) In Class 4 non-motor power or motor power circuits provided all the following conditions are met:
 - (23) The circuit is protected in accordance with Chapter 7 and is fed by Class 4 fault managed power source or a fault monitoring device that achieves the same performance of a Class 4 fault managed power source with the ability to open the circuit within 1ms of a fault being detected.
 - (24) The Class 4 overload setting is set to the current capacity of the conductor based on NFPA 70 current at 30C, derated based on ambient temperature, and derated based on current carrying raceway or cable conductors.

Statement of Problem and Substantiation for Public Input

See PI 58 explanation.

Related Public Inputs for This Document

<u>Related Input</u>	<u>Relationship</u>
Public Input No. 58-NFPA 79-2024 [Section No. 12.6.1.1]	Correlated

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization:

Street Address:

City:

State:

Zip:

Submittal Date: Fri Dec 27 18:40:09 EST 2024

Committee: EEI-AAA



Public Input No. 77-NFPA 79-2025 [Section No. 13.1.3]

13.1.3 Conductors of Different Circuits.

Conductors of different circuits shall be permitted to be laid side by side and occupy the same raceway or be in the same multiconductor cable ~~assembly, provided that the~~ assembly where the arrangement does not impair the functioning of the respective circuit and where in accordance with the manufacturer's installation instructions for devices connected to such circuits. Functionally associated circuit conductors, including power, control, remote input/output, signaling, and communication cables shall be permitted in the same raceway or cable assembly regardless of voltage, provided all are insulated for the maximum voltage of any circuit within the raceway or cable assembly. Where those circuits operate at different voltages, the conductors shall be separated by barriers or shall be insulated for the highest voltage to which any conductor within the same raceway or cable assembly is subjected.

Exception: Different voltage insulation levels or conductor properties shall be permitted in the same cable assembly, provided the cable assembly has been designed and tested to the identified application.

Statement of Problem and Substantiation for Public Input

Device manufacturers may provide requirements regarding installation of conductors with other circuits. The proposed changes clarifies that these must be considered in addition to proper functioning of equipment.

Submitter Information Verification

Submitter Full Name: Jay Tamblingson

Organization: Rockwell Automation

Street Address:

City:

State:

Zip:

Submittal Date: Fri Jan 03 10:18:55 EST 2025

Committee: EEI-AAA



Public Input No. 2-NFPA 79-2024 [Section No. 13.2.2.1]

13.2.2.1*

The color GREEN with or without one or more YELLOW stripes shall be used to identify the equipment grounding conductor where insulated or covered. This color identification shall be strictly reserved for the equipment grounding conductor. ~~GREEN- The color GREEN shall be the predominant color when~~ where used in combination with one or more YELLOW stripes stripes shall be permitted to have a bicolor combination such that one of the colors covers at least 30 percent and not more than 70 percent of the surface of the conductor, and the other color covers the remainder of the surface .

Exception No. 1: Conductors with green insulation or insulation that is green with one or more yellow stripes shall be permitted to be used for other than equipment grounding purposes where all of the following conditions are met:

- (1) The conductor is part of a multiconductor cable.*
- (2) The multiconductor cable containing the conductor contains only circuits supplied from a source limited to less than 50 volts.*
- (3) The multiconductor cable containing the conductor contains only circuits supplied from a source limited to no more than a power-limited Class 2 energy level.*
- (4) The conductor is reidentified at all accessible locations, or the multiconductor cable is part of a listed assembly.*

Exception No. 2: It shall be permitted to use conductors of any color, provided the insulation or cover is appropriately identified at all points of access.

Exception No. 3: For grounded control circuits, use of a GREEN insulated conductor with or without one or more YELLOW stripes or a bare conductor from the transformer terminal to a grounding terminal on the control panel shall be permitted.

Statement of Problem and Substantiation for Public Input

I have found most cable OEMs such as Olflex/Lapp, Lutze, SAB, etc. build to IEC 60204-1 where the conductor colors have a 70% to 30% ratio. Most often the yellow is 70% and green is 30%.

Technically the user would not be in compliance with NFPA79 by using a 70% yellow and 30% green since the NFPA 2024 section 13.2.2.1 requires green be the "predominant" color. In addition this change helps harmonize NFPA79 with IEC 60204-1.

Related Public Inputs for This Document

<u>Related Input</u>	<u>Relationship</u>
Public Input No. 3-NFPA 79-2024 [Section No. A.13.2.2.1]	

Submitter Information Verification

Submitter Full Name: Michael Steele

Organization: R.A. Jones

Street Address:

City:

State:

Zip:

Submittal Date: Fri Jun 14 15:18:13 EDT 2024

Committee: EEI-AAA



Public Input No. 1-NFPA 79-2024 [Section No. 13.5.6.2.3]

13.5.6.2.3

Hinged covers shall be capable of opening at least 90 degrees.

Exception: Where the wireway is routed underneath a piece of equipment as a pass-through. The length of the pass-through is not to exceed 8ft.

Statement of Problem and Substantiation for Public Input

There are times when, in order to run wiring to a particular location in a system, wireway must be routed under equipment as the most direct or effective path. Depending on the size of the wireway and the height of said equipment, it may not be possible to run the wireway underneath and allow for the cover to open 90 degrees. Adding this exception for pass-through routing (max 8ft) will allow more flexibility in system wireway design.

Submitter Information Verification

Submitter Full Name: Craig Twining

Organization: Kaufman Engineered Systems

Street Address:

City:

State:

Zip:

Submittal Date: Wed Jun 12 10:17:23 EDT 2024

Committee: EEI-AAA



Public Input No. 60-NFPA 79-2024 [Section No. 16.2.4]

16.2.4

A safety sign shall be provided adjacent to the disconnecting means operating handle(s) where the disconnecting means ~~that is interlocked with the enclosure door or cover~~ does not de-energize all the exposed live parts when the disconnecting means is in the open (off) position.

Statement of Problem and Substantiation for Public Input

Interlocking is no longer a strict requirement. The text needs to be updated to cover all scenarios.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization:

Street Address:

City:

State:

Zip:

Submittal Date: Fri Dec 27 19:21:38 EST 2024

Committee: EEI-AAA



Public Input No. 61-NFPA 79-2024 [New Section after 16.5]

16.4.6

Where equipment includes safeguarding (e.g., impact reduction textile) to reduce injuries, but prevents the nameplate from being visible, the nameplate shall be permitted to be located under the safeguarding and made visible a part of the process to gain access to the electrical equipment.

Statement of Problem and Substantiation for Public Input

Industrial mobile robots may employ impact reduction materials that cause the nameplate to be not visible until uncovered. This additional text would state the requirements to permit a covered nameplate.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization: Figure AI

Street Address:

City:

State:

Zip:

Submittal Date: Fri Dec 27 19:45:46 EST 2024

Committee: EEI-AAA



Public Input No. 62-NFPA 79-2024 [Section No. 17.7.2]

17.7.2*

Pertinent information such as motor horsepower, frame size, and speed shall be listed adjacent to its symbol.

Exception: Custom motors that do not align with NEMA motor standards shall be documented with the manufacturer's model number.

Statement of Problem and Substantiation for Public Input

The text needs to accommodate custom motors that are not readily replaceable using industrial standard motors.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization: Figure AI

Street Address:

City:

State:

Zip:

Submittal Date: Fri Dec 27 19:56:49 EST 2024

Committee: EEI-AAA



Public Input No. 43-NFPA 79-2024 [Section No. 17.9.3]

17.9.3

Where service procedures requiring electrical work while equipment is energized, the technical documentation shall make reference to appropriate maintenance requirements, such as the requirements of NFPA 70B, and safe work practices, such as the requirements of NFPA 70E or OSHA regulations in 29 CFR 1910.331–335.

Statement of Problem and Substantiation for Public Input

The change of NFPA 70B from a recommended practice to a standard provides an opportunity to for the maintenance procedures for electrical equipment that may not be covered in the machinery maintenance documentation supplied. Inclusion of 70B much like 70E does to expand worker safety, expands the opportunity for the owner of the machinery to better maintain it extended its life and maintaining the safety functions.

Related Public Inputs for This Document

<u>Related Input</u>	<u>Relationship</u>
<u>Public Input No. 44-NFPA 79-2024 [Section No. K.1.1]</u>	

Submitter Information Verification

Submitter Full Name: Keith Waters
Organization: Schneider Electric
Street Address:
City:
State:
Zip:
Submittal Date: Fri Dec 20 12:31:04 EST 2024
Committee: EEI-AAA



Sections 19.3.3, 19.3.4, 19.3.5

19.3.3

Servo motor power conductors shall satisfy one of the following requirements:

(1) Unshielded servo motor power conductors shall be run in a separate ferrous raceway from other control and instrumentation conductors, from the servo drive enclosure to the servo motor.

Exception: Where either the servo motor power, or control/instrumentation conductors, or both, are installed in raceway system(s) or by separation that shall provide the equivalent level of EMI protection as ferrous raceway utilizing Table 19.3.3

(2) Where unshielded servo motor power conductors and unshielded control/instrumentation conductors are not isolated by ferrous raceways, separation by distance shall be used per Table 19.3.3 unless otherwise specified by the manufacturer.

(3) Where unshielded servo motor power conductors and unshielded control/instrumentation conductors are not contained in ferrous raceways, are separated along the majority of the path per Table 19.3.3, but cross each other from the servo drive enclosure to the servo motor, they shall be installed perpendicular to each other.

(4) Where the servo motor power to motor conductors are contained in one assembly, the device shall pass testing for electromagnetic interference immunity.

Table 19.3.3 Minimum Conductor Separation (Center to Center)

<u>Ampacity</u>	<u>Separation</u>	
	<u>mm</u>	<u>in.</u>
20 A or less	100	4
Over 20 A and not greater than 40 A	150	6
Over 40 A and not greater than 80 A	200	8
Over 80 A	*	-

*Each doubling of current adds 50 mm (2 in.) more to the separation distance.

~~19.3.4 –~~

~~Where unshielded servo motor power conductors and unshielded control/instrumentation conductors are not contained in ferrous raceways and cross each other, they shall be installed perpendicular to each other.~~

~~19.3.5 –~~

~~Where unshielded servo motor power conductors and unshielded control/instrumentation conductors are not isolated by ferrous raceways, separation by distance shall be used per Table 19.3.3 unless otherwise specified by the manufacturer.~~

Statement of Problem and Substantiation for Public Input

Several of the clauses seemed to conflict and combining into a list of routes clarifies the options.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization: Figure AI
Street Address:
City:
State:
Zip:
Submittal Date: Fri Dec 27 20:11:33 EST 2024
Committee: EEI-AAA



External Electrolytic Capacitor Enclosure

19.6 Additional electrolytic capacitors (and related control equipment) used as an auxiliary energy storage device, not physically part of the Servo Drive System, shall be contained within a separate enclosure.

19.7 The door or cover of the separate enclosure shall be interlocked with the machine's main disconnect switch to "trip" the disconnect.

19.8 The enclosure door or cover, shall be able to maintain both the increase in pressure (electrolytic capacitor pressure device rupture - off-gassing) and/or potential explosion of the electrolytic capacitors (one or all simultaneously), such that no debris or "off-gassing" vapor is uncontrollably released by the fault event.

19.9 Visual means shall be provided to readily indicate to all personnel, that a catastrophic event has occurred and is being contained within the enclosure.

19.20 Warning sign to be affixed near cover mounting means alerting to potential "Toxic" material (off-gassing) may be contained within, to use appropriate PPE before opening.

Statement of Problem and Substantiation for Public Input

Recent use of external electrolytic capacitors to provide additional electrical power conservation has been applied to a number of servo controlled machines (i.e. Mechanical Servo Power Presses). This capacity (size) of these electrolytic capacitors, especially when "ganged" together, can provide electric storage charge greater than 1 Farad (not micro-farad). These additional capacitors are connected into the Servo Drive to enhance the capability of the drive designs existing electrolytic capacitor use. Failures of these large capacitors has likely already occurred (event at Fabtech-Chicago 2024 and potential "de-rating" of machine capability). With the electrolyte used, one manufacture implies the vapor being "toxic" and what counter-measures need to be done to counteract the "vapors' effects.

"The gas that comes out of the open vent is vaporized electrolyte, not smoke.

2) The gas expelled from a venting capacitor is more than 100°C.

Never expose your face to the capacitor. If your eyes are exposed to the gas or you inhale it, immediately flush your eyes and/or gargle with water. If the electrolyte comes in contact with the skin, wash with soap and water."

Nippon Chemi-Con, CAT. No. E1001U (no page number noted)

As for potential explosive events (using much smaller capacity electrolytic capacitors) please follow --- <https://youtu.be/k1fJALWTaA0?si=bEUczZwiMvBYZt3v> --- There are many vid's of guys blowing up Electro Caps.

Submitter Information Verification

Submitter Full Name: George Schreck

Organization: Komatsu America Industries, LLC

Affiliation: Komatsu America Industries, LLC

Street Address:

City:

State:

Zip:

Submittal Date: Mon Jan 06 13:41:41 EST 2025

Committee: EEI-AAA



Public Input No. 36-NFPA 79-2024 [New Section after A.3.3.78]

A.3.3.79 Overcurrent Protective Device (OCPD)

In prior editions of the NEC, the term *branch-circuit overcurrent protective device* included devices suitable for providing protection for service, feeder, and branch circuits. The term has been revised to a more generalized *overcurrent protective device (OCPD)*. The specific requirements using this term can include modifiers (e.g., branch OCPD, feeder OCPD, service OCPD) to specify location or application of the OCPD, or to specify variations (e.g., supplementary OCPD). See NEC 240.7 for a list of OCPDs suitable for providing protection for service, feeder, branch circuits, and equipment.

Statement of Problem and Substantiation for Public Input

adding informational note details into the NFPA 79 Annex.

Submitter Information Verification

Submitter Full Name: Keith Waters

Organization: Schneider Electric

Street Address:

City:

State:

Zip:

Submittal Date: Fri Dec 20 11:03:57 EST 2024

Committee: EEI-AAA



Public Input No. 7-NFPA 79-2024 [New Section after A.10.9]

A.11.2.1.3 Air Space and Barriers.

See ANSI/UL 508A-2022 Part 1 Section 10 for industrial control panel component spacings.

Statement of Problem and Substantiation for Public Input

Adding explanatory text to support 11.2.1.3. I realized my suggested placement is after A.10.9 however I could not figure out how to place it as first item in A.11 section with this editing program.

Related Public Inputs for This Document

<u>Related Input</u>	<u>Relationship</u>
<u>Public Input No. 4-NFPA 79-2024 [Section No. 11.2.1.3.1]</u>	Adding explanatory text to support 11.2.1.3

Submitter Information Verification

Submitter Full Name: Michael Steele
Organization: R.A. Jones
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jun 14 16:35:14 EDT 2024
Committee: EEI-AAA



Public Input No. 3-NFPA 79-2024 [Section No. A.13.2.2.1]

A.13.2.2.1

~~The international standards reserve the~~ IEC 60204-1 allows the use of the bicolor combination GREEN-AND-YELLOW for this purpose. The bicolor combination is such that on any 15 mm (0.6 in.) or greater length, one of the colors covers at least 30 percent and not more than 70 percent of the surface of the conductor, and the other color covers the remainder of the surface.

Statement of Problem and Substantiation for Public Input

Adding clarity by identifying a specific IEC standard.

Related Public Inputs for This Document

<u>Related Input</u>	<u>Relationship</u>
<u>Public Input No. 2-NFPA 79-2024 [Section No. 13.2.2.1]</u>	Same topic

Submitter Information Verification

Submitter Full Name: Michael Steele

Organization: R.A. Jones

Street Address:

City:

State:

Zip:

Submittal Date: Fri Jun 14 15:37:55 EDT 2024

Committee: EEI-AAA



Public Input No. 50-NFPA 79-2024 [Section No. C.5]

C.5 Material-Handling Machines.

Examples of material-handling machines are as follows:

- (1) ~~Industrial robots~~
- (2) Transfer machines
- (3) Sortation machines
- (4) Conveyors and conveying machines

Statement of Problem and Substantiation for Public Input

Delete robots due to new entry in this section.

Related Public Inputs for This Document

<u>Related Input</u>
<u>Public Input No. 19-NFPA 79-2024 [New Section after C.7]</u>

<u>Relationship</u>
New section makes this existing section redundant.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization:

Street Address:

City:

State:

Zip:

Submittal Date: Thu Dec 26 23:51:59 EST 2024

Committee: EEI-AAA



Public Input No. 19-NFPA 79-2024 [New Section after C.7]

C.8 Robotics

Examples of robots are as follows:

- (1) Robots that are permanently mounted:
 - (2) Multi-axis articulated arms
 - (3) Cartesian gantry
 - (4) Delta arm
 - (5) Selective Compliance Assembly Robot Arm (SCARA)
 - (6) Dual arm
- (7) Robots that are mobile:
 - (8) Wheeled
 - (9) Tracked
 - (10) Legged

Statement of Problem and Substantiation for Public Input

Robotics are part of industrial equipment and the relevant ANSI robotic standards refer to NFPA 79.

Related Public Inputs for This Document

<u>Related Input</u>	<u>Relationship</u>
Public Input No. 50-NFPA 79-2024 [Section No. C.5]	

Submitter Information Verification

Submitter Full Name: Robert Gruendel
Organization: (none)
Street Address:
City:
State:
Zip:
Submittal Date: Mon Nov 18 20:58:48 EST 2024
Committee: EEI-AAA



Public Input No. 70-NFPA 79-2024 [Section No. J.3]

J.3 Terms and Definitions Relating to Protective and Functional Bonding Used in IEC 60204-1, 6th Edition.

Cable Trunking System. A system of enclosures consisting of a base and a removable cover intended for the complete surrounding of insulated conductors, cables, and cords.

Discussion. Cable trunking is commonly used within enclosures to support and contain conductors.

Duct. An enclosed channel designed expressly for holding and protecting electrical conductors, cables, and busbars.

Equipotential Bonding. Provision of electric connections between conductive parts, intended to achieve equipotentiality.

[IEC 195-1-10]

Discussion. Connecting conductive parts together minimizes voltage differences but by itself does not provide an effective fault current path.

Exposed Conductive Part. Conductive part of electrical equipment, which can be touched and which is not live under normal operating conditions, but which can become live under fault conditions.

[IEC 826-12-10, modified]

Discussion. Often linked with “structural parts”; electrical parts that are not normally live generally do need to be bonded to the protective bonding circuit.

Extraneous Conductive Part. Conductive part not forming part of the electrical installation and liable to introduce a potential, generally the earth potential.

[IEC 826-12-11, modified]

NOTE: Examples of extraneous conductive parts can include ladders, ~~handrails~~, pipes, ~~machine parts~~, etc., that appear with this definition.

Discussion. Generally, the machine metal structure is not considered an extraneous conductive part.

Fault Protection. Protection against electric shock under single-fault conditions.

[IEC 195-06-02]

Discussion. Overcurrent protective devices and double insulation are types of fault protection.

Functional Bonding. Equipotential bonding necessary for proper functioning of electrical equipment.

Discussion. PLCs and drives generally do not need special bonding, and there are only a few devices that need separate “functional” bonding, such as some scales.

Live Part. Conductor or conductive part intended to be energized in normal use, including a neutral conductor, but, by convention, not a PEN conductor.

NOTE: This term does not necessarily imply a risk of electric shock.

Neutral Conductor N. Conductor electrically connected to the neutral point of a system and capable of contributing to the distribution of electrical energy.

[IEC 195-02-06, modified]

Plug/Socket Combination. Component and a suitable mating component, appropriate to terminate conductors, intended for connection or disconnection of two or more conductors.

NOTE: Examples of plug/socket combinations include:

- connectors which fulfill the requirements of IEC 61984
- a plug-and-socket-outlet, a cable coupler, or an appliance coupler in accordance with IEC 60309-1
- a plug-and-socket outlet in accordance with IEC 60884-1 or an appliance coupler in accordance with IEC 60832-1

Protective Bonding. Equipotential bonding for protection against electric shock.

NOTE: Measures for protection against electric shock can also reduce the risk of burns or fire.

Discussion. The network of protective conductors, along with the necessary bonding jumpers, provide the protective bonding, including the connection to the "main earthing terminal PE."

Protective Bonding Circuit. Protective conductors and conductive parts connected together to provide protection against electric shock in the event of an insulation failure.

Protective Conductor. Conductor required for protective bonding by some measures for protection against electric shock for electrically connecting any of the following parts:

- exposed conductive parts
- extraneous conductive parts
- main earthing terminal (PE)

[IEC 826-13-22, modified]

Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
IEC_60204-1_AMD_1.jpg	Abstract from IEC 60204-1 AMD 1: 2021. Paragraph 8.2.2 Protective Conductor	

Statement of Problem and Substantiation for Public Input

According to IEC 60204-1 AMD 2021 "Structural Metal parts of the machine" are in general not to be considered Extraneous Conductive Parts.
Please refer to the attached image from IEC 60204-1 AMD 1

Submitter Information Verification

Submitter Full Name: Marco Tacchini
Organization: GT Engineering
Street Address:
City:
State:
Zip:
Submittal Date: Mon Dec 30 13:15:22 EST 2024
Committee: EEI-AAA



Public Input No. 44-NFPA 79-2024 [Section No. K.1.1]

K.1.1 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 70[®], *National Electrical Code*[®], 2026 edition.

NFPA 70B[®], *Standard for Electrical Equipment Maintenance*[®], 2023 edition.

NFPA 70E[®], *Standard for Electrical Safety in the Workplace*[®], 2021 edition.

NFPA 70E[®], *Standard for Electrical Safety in the Workplace*[®], 2024 edition.

NFPA 77, *Recommended Practice on Static Electricity*, 2024 edition.

Statement of Problem and Substantiation for Public Input

update the NEC which will be in effect when this document is published. Add, NFPA 70B for Electrical Equipment Maintenance as it is included in an earlier PI

Related Public Inputs for This Document

<u>Related Input</u>	<u>Relationship</u>
<u>Public Input No. 43-NFPA 79-2024 [Section No. 17.9.3]</u>	References NFPA 70B

Submitter Information Verification

Submitter Full Name: Keith Waters

Organization: Schneider Electric

Street Address:

City:

State:

Zip:

Submittal Date: Fri Dec 20 12:48:21 EST 2024

Committee: EEI-AAA



Public Input No. 74-NFPA 79-2024 [Section No. K.1.1]

K.1.1 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 70[®], *National Electrical Code*[®], 2023 edition.

NFPA 70E[®], *Standard for Electrical Safety in the Workplace*[®], 2021 edition. ~~NFPA 70E[®],
Standard for Electrical Safety in the Workplace[®], 2024 edition.~~

NFPA 77, *Recommended Practice on Static Electricity*, 2024 edition.

Statement of Problem and Substantiation for Public Input

Previous version of 70E was deleted.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization:

Street Address:

City:

State:

Zip:

Submittal Date: Mon Dec 30 20:06:07 EST 2024

Committee: EEI-AAA



Public Input No. 73-NFPA 79-2024 [Section No. K.1.2.6]

K.1.2.6 ISO Publications.

International Organization for Standardization, ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland.

ISO 7000, *Graphical symbols for use on equipment —Registered symbols*, 2019.

ISO 12100, *Safety of machinery — General principles for design — Risk assessment and risk reduction*, 2010.

ISO 13849-1, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*, ~~2015~~ 2023 .

ISO 13849-2, *Safety of machinery — Safety-related parts of control systems — Part 2: Validation*, 2012.

ISO 13850, *Safety of machinery — Emergency stop function — Principles for design*, 2015.

ISO/TR 22100-4, *Safety of machinery — Relationship with ISO 12100 — Part 4: Guidance to machinery manufacturers for consideration of related IT-security (cyber security) aspects*, 2018.

Statement of Problem and Substantiation for Public Input

The most current version publish date was updated.

Submitter Information Verification

Submitter Full Name: Robert Gruendel

Organization:

Street Address:

City:

State:

Zip:

Submittal Date: Mon Dec 30 18:34:52 EST 2024

Committee: EEI-AAA



Public Input No. 45-NFPA 79-2024 [Section No. K.1.2.7]

K.1.2.7 NEMA Publications.

National Electrical Manufacturers Association, ~~1300 North 17th~~ 1812 North Moore Street, Suite ~~900 2200~~, Arlington, VA 22209.

NEMA MG 1, *Motors and Generators*, ~~2016~~ 2024.

NEMA 250, *Enclosures for Electrical Equipment (1000 Volts Maximum)*, ~~2020~~ 2024.

Statement of Problem and Substantiation for Public Input

Update NEMA standards listed with current publication dates. Correct address of NEMA HQ.

Related Public Inputs for This Document

<u>Related Input</u>	<u>Relationship</u>
<u>Public Input No. 46-NFPA 79-2024 [Section No. 2.3.5]</u>	NEMA Document and address updates in two locations
<u>Public Input No. 46-NFPA 79-2024 [Section No. 2.3.5]</u>	

Submitter Information Verification

Submitter Full Name: Keith Waters

Organization: Schneider Electric

Street Address:

City:

State:

Zip:

Submittal Date: Fri Dec 20 12:53:52 EST 2024

Committee: EEI-AAA



Public Input No. 89-NFPA 79-2025 [Section No. K.1.2.10]

K.1.2.10 UL Publications.

Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

UL 50, *Enclosures for Electrical Equipment, Non-Environmental Considerations*, ~~2015~~ 2024 .

UL 62, *Flexible Cord and Cables*, 2018, revised 2023 .

UL 248-14, *Low-Voltage Fuses — Part 14: Supplemental Fuses*, 2000, revised 2020.

UL 489, *Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures*, 2016, revised 2019.

UL 498, *Attachment Plugs and Receptacles*, 2017, revised ~~2021~~ 2024 .

UL 508, *Industrial Control Equipment*, ~~2018, revised 2021~~ 2024 .

UL 508A, *Industrial Control Panels*, 2018, revised ~~2021~~ 2022 .

UL 651, *Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings*, 2011, revised ~~2020~~ 2022 .

UL 758, *Appliance Wiring Material*, 2014, revised ~~2021~~ 2024 .

UL 1004-1, *Rotating Electrical Machines — General Requirements*, 2012, revised 2020.

UL 1077, *Supplementary Protectors for Use in Electrical Equipment*, 2015, revised 2021.

UL 1682, *Plugs, Receptacles, and Cable Connectors of the Pin and Sleeve Type*, ~~2017~~ 2024 .

UL 2237, ~~*Outline of Investigation for Multi-Point Interconnection Power Cable Assemblies for Industrial Machinery*~~, 2019, revised 2021.

UL 2238, *Cable Assemblies and Fittings for Industrial Control and Signal Distribution*, 2018, revised ~~2021~~ 2023 .

UL 2900-2-3, *Software Cybersecurity for Network-Connectable Products, Part 2-3: Particular Requirements for Security and Life Safety Signaling Systems*, 2020, revised 2023 .

UL 6420, *Standard for Equipment Used for System Isolation and Rated as a Single Unit*, 2012, revised ~~2018~~ 2023 .

UL 60947-4-1, *Low-Voltage Switchgear and Controlgear — Part 4-1: Contactors and Motor-Starters — Electromechanical Contactors and Motor-Starters*, ~~2014, revised 2017~~ 2022 .

UL 60950-1, *Information Technology Equipment — Safety — Part I: General Requirements*, 2007, revised 2019.

UL 61010-1, *Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use — Part 1: General Requirements*, 2012, revised ~~2019~~ 2024 .

Statement of Problem and Substantiation for Public Input

Updating references to most current publications. UL2237 was republished from an outline to a standard.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 88-NFPA 79-2025 [Section No. 2.3.6]	

Submitter Information Verification

Submitter Full Name: Kelly Nicoello

Organization: UL Solutions

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jan 07 16:32:08 EST 2025

Committee: EEI-AAA