STANDARDS UPDATE NOTICE (SUN)
ISSUED: October 24, 2022

STANDARD INFORMATION

Standard: NFPA 79
Standard ID: Electrical Standard for Industrial Machinery [NFPA 79:2020 Ed.2021]
Previous Standard ID:
Electrical Standard for Industrial Machinery [NFPA 79:2017 Ed.2018]
Electrical Standard for Industrial Machinery [NFPA 79:2014 Ed.2015]

EFFECTIVE DATE OF NEW/REVISED REQUIREMENTS

Effective Date: **June 1, 2024**

IMPACT, OVERVIEW, AND ACTION REQUIRED

Impact Statement: Per our accreditation, Intertek is required to review reports against the standard revisions to confirm compliance. Once compliance is confirmed, the standard reference in the report is updated to show continued compliance to the technical requirements of the standard. Reports not updated to this version by the effective date above will be withdrawn.

1. If the product includes the features shown in Table 1, UL Subject 2011 shall be used as the applicable electrical certification standard.
2. If the end user or manufacturer request NFPA 79, the following restrictions apply:
    a. If NFPA 79 is the only electrical standard chosen, the product is only eligible for an ETLus Classification.
    b. If additional standards are being used, and they cover the additional features on the product, an ETLus Listing may be performed.
        i. Examples include: UL 499 & NFPA 79 for a heating product, or UL 73 & NFPA 79 for a motor operated product.
3. Alternatively to item 2, UL Subject 2011 may be used for the ETLus Listings of these products.
    Note: If UL Subject 2011 is used, NFPA 79 is not required as all risks are addressed by the standard.

Table 1: Features List requiring UL Subject 2011 Evaluation
Industrial Additive Manufacturing Machines, including associated powder handling equipment
Semiconductor Equipment
Machines for Hazardous Locations
Machines with Cooling Systems
Machines with Pressure Rated Equipment and Pressure Vessels
Machines which use Lasers

All reports are required to be certified to the 2021 edition prior to the effective date.

Overview of Changes:

2018 edition:

- Requirements for circuits supplied from power conversion equipment have been added
- New marking for machine supply circuit disconnect
- Revision of requirements for surge-protective devices (SPDs)

2021 edition:

- Requirements on enclosure access and interlocking have been changed
- Voltage limitations and rejection capabilities for attachment plugs in protective extra low voltage (PELV) systems have been revised
- Language requiring surge-protection devices (SPDs) has been updated
- Control system grounding requirements have been updated
- Electromagnetic compatibility (EMC) involving transients has been revised

Specific details of new/revised requirements are found in table below.

Current Listings Not Active? – Please immediately identify any current Listing Reports or products that are no longer active and should be removed from our records. We will do this at no charge as long as Intertek is notified in writing prior to the review of your reports.

STANDARD INFORMATION

CLAUSE	VERDICT	COMMENT
		Additions to existing requirements are <u>underlined</u> and deletions are shown ~~lined out~~ below.
		The following changed reflect the 2018 edition:
4	Info	**General Operating Conditions**
4.4	Info	**Electrical Supply**
4.4.2	Info	**Alternating Current (ac) Supplies**
4.4.2.8		***New clause added;*** **Circuits Supplied From Power Conversion Equipment** Electrical conductors and equipment supplied by power conversion equipment as part of adjustable speed drive systems and servo drive systems shall be listed flexible motor supply cable marked type RHH, RHW, RHW-2, XHH, XHHW, or XHHW-2 or selected based on the equipment manufacturer's instructions.
5	Info	**Disconnecting Means**
5.3	Info	**Machine Supply Circuit Disconnecting (Isolating) Means**
5.3.1	Info	**General**
5.3.1.1.2		***New clause added;*** A supply circuit disconnecting means shall be marked as "Machine Supply Circuit Disconnect" if additional disconnecting means are supplied from the supply circuit disconnecting means.
6	Info	**Protection from Electrical Hazards**
6.2	Info	**Basic Protection**
6.2.1		**General** The basic protection (see 3.3.10) requirements of 6.2.2 or 6.2.3 shall be applied to live parts operating at 50 volts rms ac or 60 volts dc or more.
7	Info	**Protection of Equipment**
7.8	Info	**Protection Against Overvoltages Due to Lightning and Switching Surges**
7.8.1		**Surge-Protective Devices (SPDs)** SPDs shall be provided <u>for industrial machinery with safety interlock circuits</u> to protect against the effects of overvoltages due to lightning or switching surges.

CLAUSE	VERDICT	COMMENT
11	Info	**Control Equipment: Location, Mounting, and Enclosures**
11.2	Info	**Location and Mounting**
11.2.1	Info	**Accessibility and Maintenance**
11.2.1.10		***New clause added;*** Busbars shall be securely fastened in place. The minimum spacing between uninsulated parts of busbars, busbar terminals, and other bare metal parts for busbars in feeder circuits shall not be less than specified in Table 430.97(D) of NFPA 70.
14	Info	**Electric Motors and Associated Equipment**
14.10		***New clause added;*** **Motor Controllers** Motor controllers shall be provided in accordance with Article 430, Part VII, of NFPA 70
		The following changes reflect the 2021 edition:
4		**General Requirements and Operating Conditions**
4.5		**Physical Environment and Operating Conditions**
4.5.2		**Electromagnetic Compatibility (EMC)** Transient suppression, isolation, or other appropriate means shall be provided where necessary to ensure that the expected level of electromagnetic interference or electrical transients in the machine supply circuit(s) or generated by the electrical equipment of the machine does not lead to the loss of the safety-related control function(s) of the industrial machine.
5	Info	**Disconnecting Means**
5.1	Info	**Machine Supply Circuit and Disconnecting Means**
5.1.4		***New section added;*** **Back-Fed Terminations**
5.1.4.1		The connections to the machine supply circuit disconnecting means shall not be back-fed or reversed with the load side if it is marked line and load.
5.1.4.2		A machine supply circuit disconnecting means that is not marked line and load shall be permitted to be back-fed provided there is a marking on or adjacent to the disconnecting means identifying the line and load terminations.

CLAUSE	VERDICT	COMMENT
5.1.12	Info	**Operating Handle**
5.1.12.2		An operating handle of a machine supply circuit disconnecting means shall meet the following criteria: (1) Be readily accessible with the enclosure door(s) in the open or closed position (2) Maintain the environmental rating of the enclosure to the degree necessary for the application when installed through the control enclosure (3) Not be restricted by the enclosure door(s) when the door is in the open or closed position
5.2	Info	**Additional Disconnecting Means**
5.2.4		***New clause added;*** **Enclosure Access** Access to enclosures containing disconnecting means shall be in accordance with 6.2.3.1.
6	Info	**Protection from Electrical Hazards**
6.2	Info	**Basic Protection**
6.2.3		**Protection by Enclosures** Equipment enclosures, enclosure openings, and observation windows shall meet the requirements of UL 508, UL 508A, UL 50, or NEMA 250. Exception: If an enclosure is not rated, its suitability shall be permitted to be determined by using a test finger as described in Figure 6.2.3. The test finger shall not be able to contact live parts in any direction by applying minimal force in every opening in the enclosure, including openings created by removal of parts mounted through the enclosure walls, doors, or covers.
6.2.3.2		**Enclosure Access** Opening an enclosure (e.g., door, lid, cover) that contains live parts operating at or above 50 volts rms ac or 60 volts dc shall be permitted only under one or more of the following conditions: (1) The use of a key or tool is necessary for access to live parts operating at or above 50 volts rms ac or 60 volts dc. All live parts mounted on the inside of doors or covers that are operating at or above 50 volts rms ac or 60 volts dc shall be protected from unintentional direct contact by the inherent design of components or the application of barriers or obstacles such that a 50 mm (2 in.) sphere cannot contact any live parts. A safety sign shall be provided in accordance with 16.2.4. (2) The disconnecting means supplying the enclosure is interlocked with the enclosure door(s) in accordance with 6.2.3.2.

CLAUSE	VERDICT	COMMENT
		(3) Opening without the use of a key or a tool and without disconnection of live parts shall be permitted only when all live parts inside that are operating at or above 50 volts rms ac or 60 volts dc are separately enclosed or guarded such that there cannot be any contact with live parts. A safety sign shall be provided in accordance with 16.2.4.
6.2.3.2		***New clause added;*** **Enclosure Interlocking** If 6.2.3.1(2) is used to limit enclosure access, none of the interlocked enclosure door(s) shall open unless the power is disconnected and, upon closing the door(s), the interlock is automatically restored. Access shall be permitted without removing power if all of the following conditions are met: (1) It is possible at all times while the interlock is defeated to open the disconnecting means without the use of tools and lock the disconnecting means in the OFF (open) position. (2) Closing of the disconnecting means while the door of the enclosure containing the disconnecting means is open shall be prevented unless an interlock is operated by deliberate action. (3) All live parts mounted on the inside of the doors that are operating at or above 50 volts rms ac or 60 volts dc shall be protected from unintentional direct contact by the inherent design of components or the application of barriers of obstacles such that a 50 mm (2 in.) sphere cannot contact any live parts. (4) Relevant information about the procedures for the defeat of the interlock is provided with the instructions for use of the electrical equipment.
6.2.3.3		***New clause added;*** **Excepted Circuits** All parts operating at or above 50 volts rms ac or 60 volts dc that are still energized after switching off the machine supply circuit disconnecting means (see 5.1.13) shall be protected from unintentional contact by the inherent design of components or the application of barriers or obstacles such that a 50 mm (2 in.) sphere cannot contact any live parts.
6.5	Info	**Protection Against Residual Voltages**
6.5.3	Info	**Discharge of Stored Energy**
6.5.3.1		**Time of Discharge** The residual voltage of a capacitor shall be reduced to 50 volts, nominal, or less, within 1 minute after the capacitor is disconnected from the source of supply. Exception: Where the requirement would interfere with the functioning of the equipment, a safety sign that draws attention to the hazard and states the delay

CLAUSE	VERDICT	COMMENT
		required before entry to the enclosure shall be permitted to be displayed at a visible location on or immediately adjacent to the enclosure containing the capacitor(s).
6.5.3.2		**Means of Discharge** The discharge circuit shall be either permanently connected to the terminals of the capacitor or capacitor bank or provided with automatic means of connecting it to the terminals of the capacitor bank on removal of voltage from the line. Manual means of switching or connecting the discharge circuit shall not be used. Exception: Where conductors in the main power circuit are protected against direct contact and where the capacitor is being used as an energy storage device in accordance with the manufacturer's instructions, a manual means of switching or connecting the discharge circuit shall be permitted.
7	Info	**Protection of Equipment**
7.8	Info	**Protection Against Overvoltages Due to Lightning and Switching Surges**
7.8.1		**Surge-Protective Devices (SPDs)** Industrial machinery with safety circuits not effectively protected from the effects of overvoltages due to lightning or switching surges shall have surge protection installed. Exception: SPDs 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.
7.8.3	Info	**SPD Type and Location**
7.8.3.4		***New clause added;*** **Component Assembly and Other Type 4 SPD** Component assembly SPDs (Type 1, 2, or 3) shall be applied in accordance with 7.8.3.1 through 7.8.3.3 and any additional conditions of use specified by the device manufacturer. Where a Type 4 component assembly SPD or other component type is used, it shall be identified as suitable for the intended use. Component assembly SPDs or other component type SPDs shall only be installed by the industrial control panel manufacturer.
8	Info	**Grounding and Bonding**
8.1	Info	**General**
8.1.2		***New clause added;*** **Separately Derived Systems** Separately derived systems shall be installed in accordance with 250.30 of NFPA 70.

CLAUSE	VERDICT	COMMENT
		Control Circuits
8.3		Control circuits shall be permitted to be grounded or ungrounded. Exception: Exposed control circuits as permitted by Section 6.4 shall be grounded.
8.3.1		***New clause added;*** If the control system is grounded, the output shall be grounded as near as practicable to the control power source and before the first control device. Switching devices shall not be permitted in a grounded conductor(s) unless the control circuit conductor(s) is opened simultaneously. Exception: Overload relay contacts shall be permitted in the grounded conductor(s) if the conductor(s)does not extend beyond the control enclosure.
9	Info	**Control Circuits and Control Functions**
9.2	Info	**Control Functions**
9.2.5	Info	**Operation**
9.2.5.3	Info	**Stop**
9.2.5.3.1		Category 0, Category 1, and/or Category 2 stops shall be provided as required with the minimum of at least one stop function. The number of stop functions and the stop function category shall be determined by the risk assessment and the functional requirements of the machine. Category 0 and Category 1 stops shall be operational regardless of operating modes, and Category 0 shall take priority.
9.2.5.4	Info	**Emergency Operations (Emergency Stop, Emergency Switching Off)**
9.2.5.4.1	Info	**Emergency Stop**
9.2.5.4.1.3		The emergency stop shall function as either a Category 0 or a Category 1 stop (see 9.2.2). The choice of the category of the emergency stop shall be determined by the risk assessment of the machine. Exception: In some cases, to avoid creating additional risks, it can be necessary to perform a controlled stop and maintain the power to machine actuators even after stopping is achieved. The stopped condition shall be monitored and upon detection of failure of the stopped condition, power shall be removed without creating a hazardous situation.
9.4	Info	**Control Functions in the Event of Failure**
9.4.2	Info	**Protection Against Unintended Operation Due to Ground Faults and Voltage Interruptions**
9.4.2.1		Ground faults on any control circuit shall not cause unintentional starting or potentially hazardous motions or prevent stopping of the machine. Grounded control circuits shall be in accordance with Section 8.2 and Section 8.3. Ungrounded control circuits shall be provided with an insulation monitoring device that either indicates a ground fault or interrupts the circuit automatically after a

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		ground fault. A restart of the machine with a detected ground fault shall be prevented. Exception: Ungrounded Class 2 circuits as defined in Article 100 and as covered in Article 725 of NFPA 70 shall not require insulation monitoring so long as the ground fault(s) will not cause unintentional starting or potentially hazardous motions or prevent stopping of the machine.
10	Info	**Operator Interface and Control Devices**
10.7	Info	**Devices for Stop and Emergency Stop**
10.7.2	Info	**Types**
10.7.2.3		***New clause added;*** The devices for emergency stop described in 10.7.2.1shall be listed as emergency stop devices.
12	Info	**Conductors, Cables, and Flexible Cords**
12.5	Info	**Conductor Ampacity**
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.
15	Info	**Accessories and Lighting**
15.2	Info	**Local Lighting of the Machine and Equipment**
15.2.2	Info	**Supply**
15.2.2.1		The lighting circuit voltage shall not exceed 150 volts between conductors. Exception: Lighting systems designed for use and operating at voltage(s) greater than 150 volts shall be permitted where listed and in-stalled according to the manufacturer's instructions.