Product-Related Scopes of NEMA Product Groups

NEMA Product Scopes

Revised November 2024

NEMA – THE ASSOCIATION OF ELECTRICAL EQUIPMENT AND MEDICAL IMAGING MANUFACTURERS

National Electrical Manufacturers Association

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The Built Environment Sector

Automated Window Covering – Pending Board Approval

Automated window covering systems are used in indoor and outdoor commercial, industrial, and residential spaces to control glare, reduce energy consumption, and provide visual and physical comfort, among other benefits. Included in the Section scope are automated and motorized window, door, skylight, and other fenestration coverings operated using an electric motor or other automated system. Also included are related controls and building management interface protocols.

Excluded from this scope are the systems and products covered in the scope of other NEMA Sections.

Connected Building Systems

Connected Building Systems (CBS) are an integrated system of hardware, software and interfacing communications to automatically monitor and control building sub-systems (such as HVAC, lighting, power, fire, access control and security) in order to optimize building occupants' comfort, energy performance, safety and security. Connected Building Systems include:

- Systems and components that connect a building's mechanical, electrical, power, communications, and lighting using devices such as sensors, monitors, actuators, controllers and communication technology.
- Systems that provide control outputs to optimize the building occupants' comfort, energy performance, safety, and security.
- Systems that include interface for configuration, initialization, system maintenance, fault detection, diagnostics, predictive maintenance, and continuous improvement.
- Systems that include "dashboarding" to provide building performance information to facility operators.

Excluded from this scope are the following systems and products covered in the scope of other NEMA Section including:

- Industrial Automation Control Products and Systems
- Lighting Controls
- Motor and Generator
- Residential and Commercial Controls
- Fire, Life Safety, Security and Emergency Communication
- Electrical Submeter
- Electric Vehicle Supply Equipment/Systems
- Low-Voltage Distribution Equipment
- Wiring Device
- Energy Storage
- Electrical Measuring Equipment

Electrical Submeter

Submeters are electrical metering devices and associated data acquisition and communication equipment that are connected downstream from the utility meter and provide details of energy use for one or more electrical loads and/or one or more portions of the facility. Such equipment is rated at not more than 1000 volts AC and 1500 volts DC.

Section product scope includes, but is not limited to:

- Enclosed, panel mount, modular, portable, and embedded Submeters.
- Submeters used for electrical monitoring and/or tenant billing.
- Submeter devices with capability to monitor one or multiple electrical circuits.
- Submeters used to measure energy use/production of non-utility operated electrical co-generation and/or storage equipment.
- Current transformers and other current and energy sensing devices for use with Submeters.
- Data acquisition and communications equipment, software and protocols specifically intended for use with Submeters.
- Components specifically associated with Submeters.

Excluded from this scope are:

- Primary electrical meters and associated equipment that are primarily operated by, or on behalf of, electrical utilities for the measurement of electricity consumed by a utility customer.
- Metering products listed under the product scope of the NEMA *Low-Voltage Distribution Equipment Section*.
- Products within the scope of other NEMA sections.

Fire, Life Safety

1. Audible and visual signals, including bells, horns, speakers and strobes for use in fire alarm systems.
2. Automatic detectors for fire protection and other life safety hazards including heat, smoke, flame, gas biohazard detectors, etc.
3. Smoke Alarms, CO Alarms and combination Alarms.
4. Life safety protective signaling systems include:
   - 4.1. Fire Detection and Notification
     - 4.1.1. In-Building Fire Emergency Voice/Alarm Communications Systems (EVACS)
   - 4.2. Mass Notification
     - 4.2.1. In-Building Mass Notification Systems
     - 4.2.2. Wide-Area Mass Notification Systems
     - 4.2.3. Distributed Recipient Mass Notification Systems (DRMNS)
   - 4.3. First Responder Interface
     - 4.3.1. Emergency Communication Systems (ECS)
     - 4.3.2. Emergency Responder Communications Enhancement Systems (ERCES)
     - 4.3.3. In-Building Auxiliary Radio Communication Systems (ARC Systems)
     - 4.3.4. Two-Way, In-Building Wired Emergency Services Communications Systems
     - 4.3.5. Two-Way Radio Communications Enhancement Systems
     - 4.3.6. Two-Way Emergency Communications Systems for Rescue Assistance
   - 4.4. Elevator Monitor Status
   - 4.5. BAS and Smoke Control Interface
   - 4.6. Suppression, Supervisory and other Special Hazardous System Monitoring
   - 4.7. Supervisory Signaling Station Notification
   - 4.8. Electronic Security
     - 4.8.1. Access Control
     - 4.8.2. CCTV
     - 4.8.3. Intrusion
     - 4.8.4. Combination Systems
5. Two Voting Classifications have been authorized but are not yet organized.

5.1. Paging Systems, Devices or Accessories Voting Classification paging systems, devices or accessories including those of the audible and visual type.
5.2. Manual and Automatic Operated Contact Devices Voting Classification manual and automatic operated contact devices of the type principally used as accessories for, or components of products falling with the scope of the *Fire, Life Safety, Security and Emergency Communication Section.*

Ground Fault Personnel Protection

1. The purpose of this Section is to further the development of, in association with other related NEMA Sections, technology, application standards, product standards, and consumer and user education.
2. The products included are intended primarily to protect normal* human beings from harmful effects of electric shock by sensing ground fault(s) and/or leakage current(s) on grounded and/or ungrounded systems rated 1000 volts AC or DC and below, and interrupting the electric circuit to the load when a fault current to ground and/or leakage current(s) exceeds some predetermined value that is less than that required to operate the over-current protective device of the supply circuit.
3. The interrupting mechanism of this equipment may be separate from the sensing device or integral with the sensing device. Ground fault circuit interrupters may be combined with other signaling or limiting products.
4. Excluded are products primarily intended for ground fault protection for equipment.

*The word “normal” as used here is intended to exclude persons who are electrically sensitive, either because of their unusual current conductivity or a physical defect.

Health Care Communication

1. Nurse Call Systems.
2. Emergency call systems used in healthcare and senior living facilities such as patient-to-staff communication systems, personal emergency response systems, medical alert devices or medical emergency response systems.
3. Other Healthcare Communications Systems including patient and resident monitoring, facility access control, and staff and asset tracking systems (e.g., Real-time location systems (RTLS) and Wi-Fi monitoring systems that track and monitor patient and staff activity and equipment location). The integration with other systems, such as RTLS used in conjunction with nurse call and emergency call systems are also included.

Health Care Facility Equipment

1. Medical Modular Walls and Consoles Integrated service centers and products that comprise integrated service centers for patient utilities in health care facilities. Such utilities include, but are not necessarily limited to:
   1.1. Electrical power system distribution equipment grounded or isolated.
   1.2. Clinical gas and suction system components.
   1.3. Intercommunication system components.
   1.4. Medical lighting fixtures and controls.
2. Isolating Systems and Panels Prefabricated systems designed to provide a source of ungrounded isolated power for patient areas of health care facilities. Prefabricated power and/or ground modules.
3. Ancillary Equipment Isolation transformers, line isolation monitors, ground integrity meters or monitors, and other test equipment related to power sources in patient areas of health care

facilities.

4. Excluded are: Products within the product scope of other Sections of NEMA.

Lighting: Ballast and Driver

The scope of the Ballast and Driver Section covers any device, other than the lamp itself, whose primary function is to convert mains power into a form suitable for a light source. This scope includes, but is not limited to:

1. Electronic and electromagnetic ballasts used for fluorescent, high intensity discharge (HID), and low-pressure sodium (LPS) lighting systems, used in both interior and exterior applications.
2. Transformers and other conversion devices used in the operation of low voltage lighting systems,
3. Light emitting diode (LED) and organic light emitting diode (OLED) drive circuits and power supplies for electrodeless lamps.

Lighting: Emergency Lighting

The scope of the Emergency Lighting Section includes automatic, standby, emergency and auxiliary electric power equipment of all voltages, rechargeable battery operated, incorporating a charging means, a battery and switch over device to supply power to emergency and egress lighting loads automatically upon failure of the normal power supply. This scope also specifically includes all types of electrically illuminated exit and emergency directional signs.

Lighting: Light Source

The scope of the Light Source Section covers any device whose primary function is to produce visible or near visible radiant energy for general illumination and specialty applications. The scope includes, but is not limited to:

a. Large incandescent lamps
b. Projection lamps
c. Three-way lamps
d. Reflector and PAR lamps
e. Infrared lamps
f. Tungsten halogen lamps
g. Decorative lamps
h. Special purpose incandescent lamps
i. Miniature and subminiature incandescent lamps (including automotive)
j. Sealed beam lamps
k. Fluorescent lamps
l. Compact fluorescent lamps (pin-based and medium screw-based)
m. High intensity discharge lamps
n. UV and miscellaneous electric discharge lamps
o. Lamps for holiday lighting
p. Plasma lamps
q. Electrodeless, or induction lamps
r. Semiconductor light sources, such as:
    a. Light Emitting Diodes (LEDs)
    b. Laser Diodes
    c. Organic LEDs and
    d. Any other semiconductor light source. It will be generally understood that "semiconductor light source" refers to lighting devices that utilize semiconductors as a light source and not necessarily the semiconductor itself.

Lighting: Lighting Controls

The purpose of the Lighting Controls Section of the NEMA Lighting Division is to promote the benefits of the application of lighting controls, monitor and communicate about issues affecting lighting controls and the lighting systems they serve, provide a forum for manufacturers of lighting controls, lighting control systems and lighting equipment to address lighting control systems issues of mutual concern, and resolve technical, market, and application issues for products within the Lighting Controls Section scope.

The Lighting Controls Section shall engage in code standards issues associated with products within its scope and in the promotion, at the system level, of lighting control products that could also belong within the *Wiring Device Section's* product scope. Both *Lighting Controls* and *Wiring Device* shall, through the sharing of minutes, keep each other fully apprised of any codes, standards, and regulatory positions involving these products that are proposed or advocated.

The Lighting Controls Section scope includes devices, techniques, and protocols used for the control of lighting. Thus, the Lighting Controls Section scope includes the following:

1.1 Control devices
- 1.1.1 Programmable master lighting controllers
- 1.1.2 Lighting control panels and modules specifically for control of lighting circuits
- 1.1.3 Light sensors and daylighting control devices
- 1.1.4 Occupancy sensors, photosensors, vacancy sensors, multi-level control sensors and power packs primarily for lighting control
- 1.1.5 Timers primarily for control of lighting circuits
- 1.1.6 Lighting dimmers, lighting level and scene select controls
- 1.1.7 Other control devices primarily for lighting control that is not included in the scope of other sections

1.2 Lighting control protocols

1.3 Gateways between lighting controls protocols and building management protocols

1.4 Existing and emerging lighting control technologies such as but not limited to:
- 1.4.1 Wireless
- 1.4.2 Power line carrier control of lighting systems

Lighting: Luminaire

1. The Luminaire Section encompasses products that produce, control, and distribute light so as to provide general and/or localized artificial illumination for all workplaces in industry, public, institutional, residential, and commercial applications, including interior, exterior, and hazardous/adverse locations. They are complete lighting units consisting of one or more light sources and some or all of the following integral components: optical control devices designed to distribute the light, sockets or mountings to position and protect the light sources and to connect the light sources to a supply of electric power; the mechanical components required to support or attach the luminaire; and various electrical and electronic components to start, operate, dim, or otherwise control and maintain the operation of the light sources. The products, luminaires may be equipped to receive signals from an automatic or manual control to dim or turn off the light source(s).

Excluded from the Luminaire Section are the following:

1.1 Searchlights (regardless of light source).

1.2 Devices in the scope of the *Ballast and Driver Section*.

1.3 Lighting units generally referred to as portable residential, table, or floor lamps.

1.4 Replacement parts for products within the Section scope unless specifically covered above.
1.5 Light sources that are not integral to the luminaire, in the scope of the *Light Source Section*.
1.6 Lampholders, attachments, and other accessories that are sold as not integral to the luminaire, in the scope of the *Wiring Device Section*.
1.7 Electrical boxes that are sold as not integral to the luminaire, in the scope of the *Outlet and Switch Box Section*. Fittings that are sold as not integral to the luminaire, in the scope of the *Conduit Fittings Section*.
1.8 Dimmer switches, timer switches, occupancy-sensor controls, and motion-sensing controls that are not integral to the luminaire, in the scopes of the *Wiring Device Section* or the *Lighting Controls Section*.

Limited-Energy Systems – Pending Board Approval

Limited-Energy Systems are the equipment and cables of an end-to-end system that are power-restricted to ensure the energy delivered into any fault provides acceptable protection for fire prevention and electric shock. Limited-energy systems can function to transmit both power and data for the control and operation of lighting systems, appliances, utilization equipment, network equipment, data centers, computer systems, and communications systems.

Limited-Energy Systems include:

- Power sources for limited-energy systems including Class 2 or Class 3 transformers and power supplies; Class 2 battery source or battery source system; audio/video, information technology, communications, and industrial equipment limited-power sources; and Class 4 power sources (transmitters).
- Limited-energy cables for power-limited circuits, fault-managed power circuits, optical fiber circuits, and communications circuit equipment.
- Class 1, Class 2, and Class 3 power-limited circuit equipment including Class 1, Class 2, and Class 3 power-limited remote-control and signaling circuit equipment that are not an integral part of a device or utilization equipment.
- Class 4 fault-managed power system equipment including receivers, utilization equipment, output terminals, socket outlets, connectors and connecting hardware.
- Overvoltage protection of limited-energy systems including primary protectors, secondary protectors, coaxial radio frequency surge protectors, single- and multiple-pair air gap arresters, gas tube arresters, or solid-state arresters, with or without fuses or other voltage-limiting devices.
- Communications system equipment including optical fiber systems, antenna systems, and network- and premises-powered broadband systems.

Excluded from this scope are the systems and products covered in the scope of other NEMA Sections.

Low-Voltage Distribution Equipment

The scope of the Low-Voltage Distribution Equipment Section comprises equipment primarily used in industrial, commercial and residential applications to distribute and switch electrical power and to protect the electrical circuit. Such equipment is rated at not more than 1,000V AC nor 1,200V DC. The products are in four distinct groups as shown below and include but are not limited to:

Molded Case Circuit Breakers

1. Molded case circuit breakers interrupting current in air, single and multi-pole, assembled as complete units in supporting and enclosing housings of insulating materials and providing overload and/or short circuit protection. Molded case circuit breakers include circuit breakers, circuit breaker frames,

and circuit breaker trip units. Devices are thermal-magnetic, dual magnetic, or electronic trip and may exist in a number of styles including, but not limited to, the following:

1.1. Instantaneous only circuit breakers (MCP)
1.2. Circuit breakers and ground fault circuit interrupter (GFCI)
1.3. Circuit breaker with equipment ground fault protection
1.4. Circuit breakers and arc fault circuit interrupter (AFCI)
1.5. Marine circuit breakers
1.6. Naval circuit breakers
1.7. Classified circuit breakers
1.8. Mining duty circuit breakers
1.9. Circuit breakers with secondary surge arrestors
1.10. Circuit breakers with transient voltage surge suppressors (TVSS)
1.11. Circuit breakers for use with uninterruptible power supplies
1.12. Current limiting circuit breakers
1.13. Integrally fused circuit breakers
1.14. Remote control circuit breakers
1.15. Circuit breakers with SWD, HID, and/or HACR ratings
1.16. Special purpose circuit breakers

2. Insulated case circuit breakers interrupting current in air assembled as complete units in supporting and enclosing housings of insulating materials and providing overload and short circuit protection. Insulated case circuit breakers include circuit breakers, circuit breaker frames, and circuit breaker trip units. Devices are thermal magnetic or electronic trip and may exist in a number of styles including, but not limited to, the following:
    2.1. Naval circuit breakers
    2.2. Marine circuit breakers
    2.3. Mining duty circuit breakers
    2.4. Circuit breakers with HACR ratings
3. Molded case switches interrupting current in air, single and multi-pole, consisting of molded case circuit breaker assemblies or insulated case circuit breaker assemblies, without overload tripping mechanisms, intended primarily for use as disconnectors or isolators.
4. Accessories and electrical and remote operating mechanisms, either internal or external, intended for use with molded case circuit breakers, insulated case circuit breakers, and molded case switches, such as, but not limited to the following:
    4.1. Trip elements (e.g. shunt trip, UV trip).
    4.2. Ground Fault sensors, when ground fault protection is integral with the circuit breaker or tripping system.
    4.3. Current limiting fuse elements specifically for use with molded case breakers, when the fuse elements are integral with the circuit breakers.
    4.4. Connection means including but not limited to mounting bases, plug-in connections, drawout bases, bus connectors, and wire connectors
5. Enclosures of the type described in NEMA Standards Publication 250—Enclosures for Electrical Equipment (1000 volts Maximum), intended to house single circuit breakers.

<u>Exclusions:</u>

- Renewal parts.
- Molded case circuit breakers, interrupting in air, of the type used exclusively by the various branches of the Armed Forces of the United States.
- Circuit Breaker products in the scope of the *Outdoor High Voltage Power Circuit Breaker Voting*

Classification of the *Switchgear Section.*

Panelboards and Distribution Boards

(See *Switchgear Section* and *Industrial Automation Control Products and Systems Section*)

1. Panelboards and Enclosing Cabinets—Single panelboards, panel assemblies or groups of panel units and accessories suitable for assembly in the form of a single panelboard, intended for commercial and industrial construction, including bus structure, equipment enclosures, fronts, and with or without switches and/or overload protective devices (fuses or circuit breakers) and ground fault sensors. Includes door, lock, directory frame and gutter spacing.
2. Distribution Switchboards—Assemblies of devices for switching, measuring, ground fault sensing, transformation, circuit control and/or protection usually assembled on a framework designed for floor mounting.
3. Theater Control Boards—Boards for the control of circuits including dimming of lights for theaters, auditoriums, schools, lodges, etc.
    3.1. Excluded: Resistance, reactor, electronic and auto-transformer dimmers. (Also see *Industrial Automation Control Products and Systems Section*)
4. Load Center Equipment
    4.1. Panelboard devices accepting circuit breaker or fusible branches with or without circuit breaker or fusible mains and primarily intended for residential and light commercial construction.
    4.2. Panelboard devices in combination with a single meter socket. These devices have one or more main disconnects and may or may not accept circuit breaker or fusible branches/feeders.
    4.3. Excluded: Devices having receptacles or their provisions and intended for use with supply cords. (See 2.7)
5. Combination meter socket and circuit breaker equipment having multiple meter sockets and circuit breakers. This category includes multiple or group metering and the accessories including the main-disconnects, tap boxes, pull boxes, etc.
6. Power outlet and temporary service devices having receptacles and/or power cords or their provisions to supply power to mobile homes, RVs, construction sites, etc. This category of devices may also be combined with meter sockets.
7. Equipment Ground Fault Protection Devices Equipment ground fault protection devices sold separately or as an integral part of the products in this Section's scope.
8. Specifically included in the equipment specified in paragraphs 2.1 through 2.7 are the enclosures that form a part of those items and meeting requirements of one or more enclosure types specified in NEMA Standards Publication 250—Enclosures for Electrical Equipment (1000 volts Maximum).
9. Specifically excluded from the scope are products within the scopes of the *Conduit Fittings Section, Switchgear Section* and *Industrial Automation Control Products and Systems Section*.

Switches

Air break switches, fused or unfused, and their accessories open and enclosed, including but not limited to the following:

1. Disconnecting and Isolating Switches (Safety Switches) described as General Duty or Heavy- Duty Butt contact switches, blade contact switches, and sliding contact switches intended to serve as either circuit disconnectors or isolators.
2. Bolted Pressure Contact Switches. Switches operating with a mechanical tightening of the moving contact by the final motion of the operating mechanism, intended to serve either as circuit

disconnectors or isolators.
3. High Pressure Butt Contact Switches. Switches having butt-type contacts and a spring-charged mechanism intended to serve either as circuit disconnectors or isolators.
4. Pull Out Switches.
5. Separately mounted, manually operated, isolating or disconnecting switches in which the switch is operated by physically removing (pulling out) a section of the switch assembly.

Excluded: Snap Switches (See *Wiring Device Section*)

Busway

1. Products consisting of enclosed sectionalized prefabricated busbars rated at 100 amperes or more, and fittings classified as follows:
   1.1 Feeder Busways: Busway having no plug-in openings and intended primarily for conduction electric power from sources of supply to centers of distribution.
   1.2 Plug-In Busways: Busway having plug-in openings on one or both sides at spaced intervals and offering the means for electrical connection of plug-in or bolt-on devices to the busbars.
   1.3 Accessories:
      1.3.1 All power take-off devices applicable to busways within the scope of this Section.
      1.3.2 All corrective, protective, and indicating devices applicable to busways within the scope of this Section.
   1.4 Specifically excluded from this scope are trolley ducts and lighting ducts.

Note: Busway enclosures may be constructed of a metallic, non-metallic, or composite material.

MITA: Magnetic Resonance

Complete magnetic resonance (MR) imaging and/or scanning systems or MR magnets for diagnostic purposes on humans, and MR compatible accessory devices such as radio frequency coils, patient monitoring devices, and stereotactic localization devices.

MITA: Medical Imaging Informatics

All equipment, components, and accessories used in medical imaging informatics. (Excluded are components within the scope of other NEMA sections.)

These products provide one or more of the following functions:
- Information and Workflow management in the imaging department.
- Integration of imaging information with other information in the imaging department.
- Connection to image acquisition devices with analog or digital output.
- Digital archiving and storage. Excluded are storage devices dedicated to specific acquisition devices.
- Communication using local and/or extended networks, telecommunications, or video networks.
- Analog or digital electronic display, capable of being used for more than one image acquisition device.
- Image coding (e.g., data compression, error detection and correction)
- Image processing
- Integration of imaging and/or information systems
- Image distribution

Products include, but are not limited to:
- Electronic archives with data base management (e.g., optical disk jukeboxes)
- Analog to digital converters, for example, film digitizers

- Digital to analog converters, for example, ink jet printers, laser printers, and multiformat cameras
- HIS/RIS Interfaces and functions
- Image workstations with or without image processing and/or manipulation functions.
- Gateways
- Software

MITA: Molecular Imaging

All equipment, components, and accessories, radiopharmaceuticals used for molecular imaging in vivo studies and therapeutic treatments. These products include but are not limited to:

Equipment:

- Scanners
- Scintillation camera
- Diagnostic probe systems Accessories:
- Film systems
- Image processing system
- Data processing systems
- Crystals

MITA: Radiation Therapy

All equipment, components, and accessories used for planning and executing radiation therapy, which employs X-ray, ion, electron, neutron, microwave, radio frequency or isotope radiation. (Note that relative to Section membership manufacturers of products which may be incorporated into or used as an accessory with a medical system or instrument and are also used in essentially the same form in other non-medical applications are not eligible. However, such products should be included by the NEMA manufacturers in their report of net domestic sales for dues purposes.) These products include but are not limited to:

Equipment:

- Betatrons
- Hyperthermia
- Ionizing radiation equipment used for radiation
- Linear Accelerators
- Neutron Generators
- Proton Accelators
- Radionuclide Radiation Therapy Equipment (including Brachytherapy devices)
- Radiographic Simulators
- CT Simulators
- Treatment Planning Systems
- Record and Verify Systems
- Portal Imaging Systems Accessories:
- Dosimeters
- Water Phantom and Film Dosimetry Systems
- Instrumentation
- Localizing and Positioning Devices
- Monitoring Equipment
- Test Equipment
- Treatment Couches
- Treatment Planning Equipment

- X-Ray Tubes
- Quality Assurance Tools

MITA: Ultrasound Imaging

All ultrasound diagnostic instruments and systems. These products include but are not limited to:
Equipment:

- Imaging Systems
- Monitoring Systems
- Measuring Systems Accessories:
- Ultrasound Transducers
- Test Instrumentation
- Ultrasound Display Equipment

MITA: X-Ray Imaging Products

All equipment, accessories, and devices used in the application of X-rays for medical diagnostic, dental, inspection, and nondestructive testing or analysis purposes. (Note that relative to Section membership, manufacturers of products which may be incorporated into or used as an accessory with a medical diagnostic imaging system and are also used in essentially the same form in other non-medical applications are not eligible. However, such products should be included by the NEMA manufacturer in their report of net domestic sales for dues purposes.) These products include but are not limited to:
X-Ray Systems:

- Radiography
- Mobile Radiography
- Digital Radiography
- RF
- Mammography
- Digital Mammography
- Angiography
- CT
- Tomographic
- Cardiac
- Stationary C Arms
- Mobile C Arms
- Vascular
- Fluoroscopy
- Digital Fluoroscopy
- Urological
- Combination Systems that include one of the above systems (e.g. CT-PET, etc.)
- Generators
- Tables: Tilting, Bucky, G.U. and Special Procedures
- Tubestands: Floor to ceiling, ceiling mount
- Mobile and portable X-ray units
- Fluoroscopes
- X-ray tubes and housings

X-Ray Equipment:

- Spot film devices
- Image Intensifier tubes
- Mammography Units

- Rapid film changers
- Film holders, Cassette changers
- C, U, and L Supports
- Digital Imaging Equipment
- Head stands
- CT and X-Ray Tomography
- Automatic X-Ray Exposure Controls
- Timers
- Grids, Buckys
- Cameras-TV, Cine, Spot, Video format (single and multiple)
- Recorders
- Image Display Devices (e.g. CRT monitor, etc.)

Accessories:

- Rotor Controllers
- X-ray tube heat monitors
- Automatic X-ray exposure controls
- Localizing and positioning devices (i.e. lasers, etc.)
- Automatic processors
- Manual processors
- Film drying equipment
- Film holders
- Film illuminators and view boxes
- Stereoscopes
- Film storage and retrieval equipment
- Leaded X-ray protective devices
- Cassettes
- Screens
- Stationary grids
- Test, monitoring and instrumentation equipment

Computed Tomography

All equipment, components, and accessories, used in the application of X-rays for medical diagnostic examination, (Please note that relative to Section membership, manufacturers of products which may be incorporated into or used as an accessory with a medical diagnostic imaging system and are also used in essentially the same form in other non-medical applications are not eligible. However, such products should be included by the NEMA manufacturer in their report of net domestic sales for dues purposes.) These products include but are not limited to:

1. To review and coordinate all work of the Association in the development of technical standards and specifications concerning energy management, both within the Association and in cooperation with other organizations, subject to final approval of the Codes and Standards Committee as set forth in Article II, Section 4, Subsection D, Paragraph 2 of the NEMA By-Laws. The Council shall review all energy management standards proposals prior to submittal to the Codes and Standards Committee.
2. To establish an Engineering Committee which is authorized to:
   2.1. review technical matters requiring Council input and
   2.2. develop energy management standards and specifications outside of the scope of any single EMA Section, when directed by the Council.
3. Membership of the Engineering Committee shall consist of one voting representative and alternate(s) of any member of the Association; and non-voting members who are representatives of non-member

companies or outside bodies, as approved by the Council. The Officers of the Engineering Committee shall be a Chairman and a Vice Chairman appointed by the Council. The majority of the members of the Engineering Committee shall constitute a quorum at all meetings.

4. To review and make recommendations on proposed changes in Section scopes concerning energy management products and systems, prior to submittal to the Product Scopes Committee.
5. To coordinate and administer for NEMA, activities related to the field of energy management which are not within the scope of a particular Section of NEMA.

Equipment:

- X-Ray Generator
- Image Processor
- Scan Unit
- Display Terminals

Components:

- Recorders
- Cameras

Accessories:

- Film processing equipment
- Film handling equipment
- Film interpretation equipment
- Positioning and localizing devices

Interventional

All equipment, components, accessories, and software used for planning and executing Fluoroscopically Guided Interventional procedures, including all technologies used to conduct procedures involving the introduction of a device, such as a needle or catheter, into a patient using radioscopy as the principal means of guidance, and intended to effect treatment or diagnosis of the medical condition of the patient. Excluded from this scope are products and systems included in the scope of other NEMA Sections.

General Fluoroscopy

All equipment, components, accessories, and software used for planning and executing Fluoroscopy procedures, including all technologies used to generate X-ray images and present them simultaneously and continuously as visible images. Excluded from this scope are products and systems included in the scope of other NEMA Sections.

Mammography

All equipment, components, accessories, and software used for planning and executing Mammography, including all technologies that use X-ray to capture images (mammograms) of the internal structure of the breasts. Excluded from this scope are products and systems included in the scope of other NEMA Sections

Power Electronics (UPS)

(See *Arc Welding Section, Industrial Automation Control Products and Systems Section)*

1. Power Conversion Equipment used in Uninterruptible Power Systems

Power conversion equipment used in uninterruptible power systems, including, but not limited to:

1.1. Static electrical power conversion equipment such as, but not limited to, to following:
  1.1.1. AC/DC power converters
  1.1.2. DC/AC power converters
  1.1.3. AC/AC power converters

1.1.4. DC/DC power converters
1.2. Flywheel energy storage systems

2. Voltage Regulators

Equipment of 1000 V and below that provides a regulated or filtered AC output such as, but not limited to:

2.1. Active filters
2.2. Dynamic voltage restorers
2.3. Active power factor correction circuits

3. Battery Charger (Cycle Type) Voting Classification

Battery Chargers (cycle types) used in commercial and industrial battery powered applications such as, but not limited to:

3.1. Industrial truck
3.2. Electric vehicle (off-road and on-road)
3.3. Automatic guided vehicle

Excluded are:

- Motor Drives
- Arc welding power sources
- Solid state transfer switches
- Electronic tap changers
- Constant voltage (ferro-resonant) transformers
- Products covered in other NEMA Sections

Residential and Commercial Controls

(Also see *Industrial Automation Control Products and Systems Section* and *Health Care Facility Equipment Section)*

1. Residential and Commercial Controls Section
   - 1.1 Automatic controls and/or monitoring equipment, mechanically, electro-mechanically, electrically or electronically actuated, responsive to temperature, pressure, humidity, light, electrostatic effect, flow or liquid level, used in equipment or appliances for comfort heating, air-conditioning, refrigeration, clothes washing, drying or ironing, personal grooming, water heating or cooking.
   - 1.2 Panels for the control of air-conditioning and refrigeration.
   - 1.3 Panels for the control of electric comfort heating.
   - 1.4 Relays which control the starting windings of fractional horsepower split phase and capacitor motors used principally for the applications outlined in paragraph 1.
   - 1.5 Inherent overload protective devices for fractional and integral horsepower split phase and capacitor motors used principally, but not exclusively for the applications outlined in paragraph 1.
   - 1.6 Motor Driven and other types of programming sequencing devices used principally for the applications outlined in paragraph 1.
   - 1.7 Class 2 and 3 transformers designed primarily for use with applications outlined in paragraph 1.

The following are specifically excluded:

- Refrigeration expansion and pressure control valves.
- Manually operated nonelectric steam or hot water specialties such as radiator valves, vent valves, temperature and pressure relief valves, traps and steam regulating accessories.

- Relays, contactors, starters and overload devices which fall within the product scope of the *Industrial Automation Control Products and Systems Section*.
- Precision snap-acting switches which may fall within other NEMA product scopes.
- Constant level float valves for oil burners.
- Transformers included in the scopes of the *Transformers Products Section* and *Electrical Measuring Equipment Section*.

Wiring Devices

Current-Carrying Wiring Devices and Certain Non-Current-Carrying Wiring Devices and Supplies
(Also see *Industrial Automation Control Products and Systems Section, Fuse Section*, and *Switches Product Group*)

1. The product scope of the Wiring Device Section covers certain current-carrying wiring devices and certain non-current-carrying wiring devices and supplies. These are defined as follows:
   1.1. Current-Carrying Wiring Devices. A current-carrying wiring device is defined as an electrical or electronic product that serves primarily as a connection and/or control point for electrical circuits within a range of 0 to 400 amperes 0-600 volts AC, DC and AC-DC (660 watts, 1000 vac fluorescent) and which may possibly consume energy in the performance of its prime functions.
   1.1.1. Lampholders:
   1.1.1.1. Incandescent—Non-metallic outer shell, threaded, medium base only, key, keyless, push through and pull types (excluding outlet box type and socket interiors). Metal outer shell, threaded, medium base only, key, keyless, push through and pull types (Excluding outlet box type and socket interiors).
   1.1.1.2. Outlet box, threaded medium base only, pull and keyless types. Weatherproof, threaded, medium base only.
   1.1.1.3. All other incandescent (including but not limited to admedium, bayonet, candelabra, cleat, fixture, husk, intermediate, lumiline, medium, miniature, mogul, pin-type, sign, socket interiors sold separately, all bases).
   1.1.1.4. Fluorescent
   Bi-pin
   Slimline
   All other fluorescent (including but not limited to recessed contact, circline, panelescent and starter holders).
   1.1.1.5. All other lampholders (including but not limited to cold cathode, neon and quartz lamps).
1.1.2. Convenience and General use type Power Outlets, (except pin and sleeve, appliance and radio), including those with integral protection for GFCI, AFCI, or both; and other wiring devices that interrupt the circuit upon detecting out-of-parameter conditions including overload within utilization equipment; or over- or under-voltage, or both.
   1.1.2.1. 2-pole, 2-wire, (flush, all types, all amperages).
   1.1.2.2. 2-pole, 3-wire and up (flush).
   Locking, 15 amperes and under.
   Locking, 20 amperes and over.
   Non-locking, 15 amperes and under.
   Non-locking, 20 amperes and over.
   1.1.2.3. Other types, e.g., surface outlets.
1.1.3. Attachment Plug Caps and Flanged
Inlets (including motor bases). General use types, including fused, fuseless, switch and switchless including attachment plugs with integral GFCI, AFCI and LCDI protection. (Excluding pin and sleeve,

appliance and radio-television types).

1.1.3.1. 2-pole, 2-wire, all types, all amperages.

1.1.3.2. 2-pole, 3-wire and up.

Locking, 15 amperes and under.
Locking, 20 amperes and over.
Non-locking, 15 amperes and under.
Non-locking, 20 amperes and over.

1.1.4. Connector Bodies and Flanged Outlets

General use including fused, fuseless, switch and switchless. (Excluding pin and sleeve, appliance and radio-television types).

1.1.4.1. 2-pole, 2-wire, all types, all amperages.

1.1.4.2. 2-pole, 3-wire and up.

Locking, 15 amperes and under.
Locking, 20 amperes and over.
Non-locking, 15 amperes and under.
Non-Locking, 20 amperes and over.

1.1.5. Switches, General Use

1.1.5.1. AC flush mounted (except mercury)

Single pole—15 amperes and under.
Single pole—over 15 amperes.
Other than single pole (including but not limited to double pole 3-way, 4-way— all amperages).

1.1.5.2. AC-DC flush mounted (except mercury) Single pole - all amperages. Other than single pole (Including but not limited to double pole 3-way, 4-way).

1.1.5.3. All others (including but not limited to surface mounted).

1.1.5.4. Dimmers Switches

Incandescent
Infinitely variable—600 watts or less.
Infinitely variable—over 600 watts.
All others (including but not limited to high-low switches and software driven).
Fluorescent, All types, All ratings.
High Intensity Discharge—All types, All ratings.

1.1.5.5. Touch Switches—All types, All ratings.

1.1.5.6. Remote Control Switches—All types, all ratings, of remote-control switches for the purpose of remotely performing such functions as turning equipment on and off, speed control, volume control, intensity control, or programming. They may be hand-held, plug-in or suitable for outlet box installation. Such switches include, but are not limited to the following types:

Radio frequency Power line carrier Infrared
Sound Activated-Voice
—Random Noise
—Specific whistle
Specifically excluded are remote control switches of the type included in the scope of the *Industrial Automation Control Products and Systems Section.*

1.1.5.7. Motion Sensing Switches—All types, all ratings of motion sensing switches primarily intended for use in controlling lighting circuits or convenience outlets in residential and commercial occupancies. These devices may be surface mounted or mounted in an outlet box. Sensing means may include, but are not limited to:

Photocell

Passive Infrared
Ultrasonic
Microwave

1.1.5.8. Timer Switches—Branch circuit types, all ratings, primarily intended for controlling lighting and/or convenience outlets in residential and commercial occupancies. These devices may be surface-mounted or mounted in an outlet box. Timing means include, but are not limited to:

Fixed
Mechanical Clock Operated
Solid State Programmable
Software Driven

1.1.5.9. Ceiling Fan Speed Control Switches—All types, all ratings.

1.1.6. Multiple Outlet Assemblies, Surface Extensions and Power Distribution Poles, including relocatable power taps without surge protection including those with integral GFCI, AFCI or LCDI protection, and other wiring devices that interrupt the circuit upon detecting out-of-parameter conditions including overload within utilization equipment; or over- or under-voltage, or both.

1.1.7. Certain Miscellaneous Current Carrying Wiring Devices including those with integral GFCI or AFCI protection, and other wiring devices that interrupt the circuit upon detecting out-of-parameter conditions including overload within utilization equipment; or over- or under-voltage, or both.

1.1.7.1. Combination devices.
1.1.7.2. Fluorescent starters.
1.1.7.3. Adapters, current taps and cube taps.
1.1.7.4. Pilot lights (flush mounted outlet box type).

<u>Non-Current Carrying Wiring Devices and Supplies</u>

Non-current carrying wiring devices and supplies are those products utilized in conjunction with the installation and operation of current carrying wiring devices.

1. Switch, Outlet, FM/TV, Blank and Telephone Plates
    a. Metallic.
    b. Non-metallic.
2. Certain Miscellaneous Non-Current Carrying Wiring Devices
   (Including but not limited to chain, connectors and end bells, elastomer covers for plugs and connectors, insulating links, pilot jewels, plate screws, pull cords, yokes, and child safety caps).

<u>Excluded:</u>

- Appliance switches.
- Cutouts designed for bus bar assembly only.
- Enclosing cabinets.
- Fuses, circuit breakers, and safety switches.
- Products of the type principally used in automobiles and aircraft.
- Knife, time, solenoid, and automotive switches.
- Pin and sleeve type or pin and socket type devices.
- Products of the type principally designed for use in hazardous areas, i.e., explosion-proof, dust-ignition- proof.
- Products of the type principally used in radio and television equipment.
- Terminal blocks. (Industrial Automation Control Products and Systems Section).
- Precision snap-acting switches.
- Photo electric relays.
- Cord sets, power-supply cords, seasonal-use cord sets, and marine shore power cable sets

- Products within the scope of other NEMA sections

Undercarpet Premise Wiring Systems

Undercarpet premise wiring systems for power distribution, telecommunications, and data communications for applications of 600 volts or less. These systems normally include such items as flat conductor power cable, undercarpet telephone and data cable, associated shielding, connectors, terminators, adapters, boxes and devices.

Grid Sector

Capacitor

(Also see *Surge Arrester Section*)
Includes Power Capacitors only of the following types:

1. Shunt Capacitors
    1.1 Capacitor units of 1/2 kvar and larger for power factor improvement and other low frequency AC applications or DC applications.
    1.2 Assemblies of capacitor units with accessories and control to form complete capacitor installations.
2. Series Capacitors
    2.1 Capacitor units of 1/2 kvar and larger for series connection in low frequency AC circuits or DC circuits.
    2.2 Assemblies of capacitor units with accessories and control to form complete capacitor installations.

Distribution Automation

The Distribution Automation Section includes components, systems and information and communication technology (ICT) networks used to measure, monitor and control electrical loads on Distribution Systems and at Distribution Substations. Included in the scope are:

1. Distribution Optimization
    1.1 Integrated Volt/VAR Control Systems and Components
    1.2 Fault Location/Isolation/Service Restoration Control Systems and Components
    1.3 Distribution Substation Automation
    1.4 Distribution Management Systems (SCADA Systems for Distribution)
    1.5 Protective Relays not covered in the *Switchgear Section* Scope
    1.6 Monitor and Control Systems for Distributed Generation, Demand Response, Energy Storage, etc., but excluding the specific power source such as batteries, flywheels, diesel generators, etc.
2. Asset Optimization
    2.1 Transformer Monitoring Systems and Components
    2.2 Breaker Monitoring Systems and Components
3. Demand Optimization
    3.1 Utility Demand Response Systems (excluding homeowner devices)
4. Test Equipment and Systems for Product Certification and Conformity Acceptance for the systems and components listed above.
5. Utility ICT networks including field and wide area networks

Specifically excluded from the scope of this section are:

- Advanced Metering Infrastructure (AMI), smart meters and meter test equipment covered in *Electrical Measuring Equipment Section*.
- Special protection systems covered in *Transformer Section*.
- Power switchgear assemblies, power circuit breakers, reclosers, sectionalizers, load interrupter switches and other equipment covered in *Switchgear Section*.
- Products already covered in the *Industrial Automation Control Products and Systems Section*.
- Systems and components covered in other NEMA product section scopes

Energy Storage

The scope of the Energy Storage Section includes the storage device or medium and any power conversion systems, control systems, and management systems up to the point of common coupling with a grid or premise. The energy storage systems covered by the scope of this committee must be stationary. The energy storage systems may be grid-connected or operate independent of the grid, may be on the operator (utility) or consumer side of the electric power system, and may be delivered as a full product or integrated on-site.

Technologies of interest to this group include grid-connected secondary batteries, EV batteries, dispatchable thermal storage, containerized compressed air, and flywheels.

Control systems in this scope include, but are not limited to the following types:

- Machine logic control and systems—hardware and associated software used in the supervision, monitoring, and/or control of stationary energy storage systems.
- Man-machine interface—devices that require human intervention and are used to control or communicate the status of stationary energy storage systems.
- Systems integration—services to plan, develop, implement, and manage integrated stationary energy storage systems.
- Communications and software for stationary energy storage systems and the services they provide.

Products and systems specifically excluded from this scope are:

- Electric vehicle batteries
- Primary batteries and associated systems
- Pumped hydro energy storage systems
- Underground compressed air energy storage systems
- Products included in the scope of Power Electronics Section
- Products included in the scope of the Industrial Automation Control Products and Systems Section
- Products included in the scope of the Lighting Systems Division
- Products included in the scope of the Electric Vehicle Equipment/Systems Section
- Products included in the scope of other NEMA sections

High-Voltage Insulator

(Also see *Outdoor High-Voltage Switches Voting Classification*)

1. Insulators or insulating parts of wet-process porcelain or toughened glass, or non-ceramic composites, whether or not assembled with metal parts, used in the transmission or distribution of electrical energy or for use as a part of a large electrical machine or piece of equipment (excluding assembled bushings and tubes used in secondary wiring at voltages not in excess of 440 volts).
2. Clamps, fittings and accessory hardware used directly with such insulators or insulating parts and/or affecting their functioning, except crossarm pins, bus clamps and pillar insulator spacers.

Meter Mounting Equipment

1. Equipment of the type generally used for mounting and/or testing watthour or demand meters such as sockets and socket adapters, boxes, enclosures, test blocks, test tables, and test kits. Excluded here from is equipment incorporating such devices, but performing, in addition, any other function than mounting and/or testing. Also excluded is laboratory and field measuring equipment such as meters and instruments.

2. Current and Voltage Transformers, including renewal parts thereof, covering the general requirements, metering accuracy, thermal ratings and dimensions applicable to current and inductively coupled voltage transformers for revenue metering intended for use by, or under the direction and control of an electrical utility. An instrument transformer is a current or potential (voltage) transformer suitable for use with measuring devices; that is, one in which the conditions of phase and of current or voltage in the primary circuit are represented with acceptable accuracy in the secondary circuit. Current and voltage transformers in this scope include and are limited to the following products:

- Current Transformers in the following classes
    - Indoor and Outdoor Current Transformers, 10 kV Basic Insulation Level (BIL) (0.6 kV Nominal System Voltage (NSV));
    - Indoor and Outdoor Current Transformers, 60 kV BIL through 110 kV BIL (4.8 kV NSV through 14.4 kV NSV);
    - Small-Size Outdoor Current Transformers, 125 kV BIL through 200kV BIL (25 kV NSV through 34.5 kV NSV); and
    - Large-Size Outdoor Current Transformers, 150 kV BIL through 350 kV BIL (25 kV NSV through 69 kV NSV)
- Voltage Transformers in the following classes
    - Indoor and Outdoor Voltage Transformers, 10 kV and 30 kV BIL;
    - Indoor and Outdoor Voltage Transformers, 60 kV through 110 kV BIL;
    - Small-Size Outdoor Voltage Transformers, with One or Two Bushings, 125 kV through 200 kV BIL; and
    - Large-Size Outdoor Voltage Transformers, with One or Two Bushings, 150 kV BIL through 350 kV BIL

Excluded are current transformers and other current and energy sensing devices for use with submeters as included in the product scope of the *Electrical Submeters Section*.

Metering

Electro-mechanical and solid-state equipment and systems for measurement, display, recording, processing and telemetry for electricity metering and associated information. Such equipment and systems to include electricity meters for measurement of real and reactive energy and demand; time-of-use meters; demand recording and translating systems; load management and data acquisition components intended for use, by or under the direction and control of an electrical utility, for the measurement, telemetry, and/or control of electricity consumed by utility customers; as well as renewal parts thereof, and such other devices as are used exclusively for the measurement and/or control of electricity.

Excluded are products and systems in the product scope of other NEMA sections where such products and systems differ in primary function.

1. Electromechanical Electricity Metering Voting Classification
    1.1 Electromechanical watthour meters, combined electromechanical watthour and demand meters, combined electro-mechanical watthour meters and control devices, electromechanical time-of-use watthour meters, electromechanical demand meters, and magnetic tape pulse recorders, as well as renewal parts thereof, and such other electromechanical or compound technology devices as are used exclusively for the measurement and control of energy and/or demand.
    1.2 The products to be covered by the above scope are:

Induction Watthour Meters
Mechanical Demand Registers
Thermal Demand Registers
Mechanical Pulse Initiators
Magnetic Tape Pulse Recorders
Multiple Rate Mechanical Registers

2. Solid-State Electricity Metering Voting Classification
   2.1 Solid-state watthour meters, combined solid-state watthour and demand meters, combined solid-state time-of-use watthour and demand meters, solid-state time-of use watthour meters, combined solid-state watthour meters and control devices, and solid- state pulse recorders/processors, as well as renewal parts thereof, and such other solid-state devices as are used exclusively for the measurement and control of energy and/or demand.

The products to be covered by the above scope are:

- Solid-State Watthour Meters
- Solid-State Pulse Recorders
- Solid-State Registers
- Demand Registers or combination
- Electronic Sensing Pulse Initiators
- Solid-State Load Management
- Terminals

Power Conversion (Inverters)

1. Power Conversion Equipment used in Energy Producing Systems
   Power conversion equipment used in energy producing systems, including, but not limited to, the following energy producing systems:
   1.1. Microturbines
   1.2. Fuel cells equal to or larger than 1 kVA
   1.3. Photovoltaics
   1.4. Wind turbines
   1.5. Other power sources

2. Flexible Alternating Current Transmission Systems
   and other voltage regulation devices including, but not limited to, the following:
   2.1. Static Var Compensators
   2.2. Static Synchronous Compensators
   2.3. Static Synchronous Generators
   2.4. Voltage Source Converters
   2.5. Thyristor controlled devices and systems

3. *Excluded are:*
   - Motor Drives
   - Arc welding power sources
   - Solid state transfer switches
   - Electronic tap changers
   - Constant voltage (ferro-resonant) transformers
   - Products covered in other NEMA sections

Renewable Energy Generation

The scope of the Renewable Energy Generation Technologies Section encompasses a wide array of technologies and products specifically designed for generating, integrating, and controlling electricity from renewable sources. This section focuses on equipment used in the North American market across residential, commercial, industrial, and utility-scale applications. The scope of this Section includes technologies such as control systems, components, and final product assemblies, that produce electricity from solar, wind, geothermal, hydro, and biomass sources.

The product scope includes, but is not limited to:

1. Solar Energy Systems: Photovoltaic panels, modules, and related control systems;
2. Wind Energy Systems: Wind turbines, rotor blades, tower systems, and related control systems;
3. Geothermal Energy Systems: Geothermal heat pumps, turbines, generators, and related control systems;
4. Hydroelectric Systems: Hydro turbines, generators, control systems, micro-hydro, and related control systems; and
5. Biomass Energy Systems: Thermal/electrical biomass conversion technologies and related control systems.

The Renewable Energy Generation Technologies Section will coordinate closely with other NEMA Sections to promote the advancement and adoption of energy integration and control systems, as well as ancillary equipment and technologies such as inverters, cables, connectors, transformers, switchgear, metering, protection devices, and interoperability with technologies such as lighting systems.

Excluded from the scope of this Section are other products and materials included in the scope of other NEMA Sections.

Surge Arresters

(Also see *Capacitor Section)*

1. High Voltage Surge Arresters Voting Classification and Dues Center
   - 1.1. For medium- and high-voltage power ac systems, valve-type
     - 1.1.1. Station class
     - 1.1.2. Intermediate (line) class
     - 1.1.3. Distribution class
     - 1.1.4. Secondary class
   - 1.2. For Medium- and High- Voltage power DC systems
     - 1.2.1. For railway cars, trolley busses and feeder circuits
     - 1.2.2. For secondary circuits
     - 1.2.3. For power systems
   - 1.3. Gaps not inherently self-clearing, used for purpose of voltage limitation
   - 1.4. Capacitors of the type generally used for protection against lightning
   - 1.5. Resistors designed for the purpose of affording protection from lightning or other abnormal voltages to circuits or equipment associated therewith.

Switchgear

1. High Voltage Fuse Voting Classification (8-SG-II)

High Voltage fuses, single-pole air switches, fuse disconnecting switches, and accessories (all rated above 1000 volts) for ac distribution systems as follows:

Note: All types of fuses rated 601 to 1000 volts designed and tested prior to 1985 are covered by this scope. Future standards developed should consider this fact.

1.1. Enclosed, open and open link types of distribution cutouts, fuses, and fuse disconnecting switches
1.2. Distribution and power type current limiting fuses.
1.3. Power fuses.
1.4. Distribution single pole air switches.
1.5. Distribution oil cutouts.
1.6. Capacitor fuses.
1.7. Oil immersed fuses, including current limiting type.
1.8. Fuse supports, fuse mountings, fuse hooks, fuse tongs, fuse links, removable switch blades and accessories, used exclusively with the products listed above.

2. Outdoor High Voltage Power Circuit Breaker Voting Classification (8-SG-IV)

2.1. Oil Circuit Breakers rated above 1000 Volts for ac service.

Note: Excluded from this scope are automatic circuit reclosers.

2.1.1. Attachments for these circuit breakers, such as bushing current transformers, bushing potential devices, interlocks, under voltage devices, shunt trips, over-current trips, etc., and auxiliaries sold with the breakers such as closing relays, structural steel supports, etc.
2.1.2. Renewal and spare parts designed exclusively for use in these circuit breakers and not included in the scope of some other section.
2.2. Oil less and Low Oil Content Circuit breakers rated above 1000 Volts for AC service.
2.2.1. Attachments for these circuit breakers such as bushing current transformers, bushing potential devices, interlocks, undervoltage devices, shunt trips, over-current trips, etc., air or gas supply and storage equipment.
2.2.2. Renewal and spare parts designed exclusively for use in these circuit breakers and not included in the scope of some other section.

3. Power Switchgear Assemblies, Low and Medium Voltage Power Circuit Breakers, Medium Voltage Load Interrupter Switches Voting Classification (8-SG-V)

3.1. Power switchgear assemblies including, but not specifically limited to, equipment for the control and protection of apparatus used for power generation, conversion, transmission, and distribution.
3.1.1. Low voltage metal enclosed power ac circuit breaker switchgear assemblies, indoor and outdoor, rated 600 volts AC or less, either drawout or stationary.
3.1.2. Low voltage metal enclosed power DC circuit breaker switchgear assemblies, indoor or outdoor, rated 3000 volts DC or less, either drawout or stationary.
3.1.3. Metal-clad switchgear assemblies, indoor or outdoor, rated above 1000 volts AC, including drawout medium voltage power circuit breakers and/or load interrupter switches.
3.1.4. Metal enclosed/interrupter switchgear assemblies, indoor or outdoor, rated above 1000 volts AC, including drawout or stationary medium voltage load interrupter switches.
3.1.5. Station type cubicle switchgear, indoor or outdoor, rated above 1000 volts AC, including stationary medium voltage power circuit breakers.
3.1.6. Metal enclosed power bus and connections when furnished external to the metal enclosed switchgear assemblies.
3.1.7. Control switchboards, indoor or outdoor, rated 600 volts ac or 250 volts DC or less consisting of the following types:

3.1.7.1. Vertical switchboards, open or enclosed
3.1.7.2. Dual switchboards
3.1.7.3. Duplex switchboards
3.1.7.4. Control desks (console)
3.1.7.5. Benchboards
3.1.7.6. Dual and duplex benchboards
3.1.7.7. Fixed rack cabinets
3.1.7.8. Swing back cabinets

3.1.8. Renewal and spare parts designed exclusively for any switchgear assemblies enumerated in this section and not included in the scope of some other section.

3.2. Low Voltage Power Circuit Breakers rated 1000 volts AC or less
3.2.1. Low Voltage AC power circuit breakers
3.2.2. Low Voltage AC integrally fused power circuit breakers
3.2.3. Low Voltage AC power circuit protectors
3.2.4. Functional components for circuit breakers listed in 3.2 above for remote closing, remote opening, automatic opening, auxiliary contacts, attachments, etc.
3.2.5. Renewal and spare parts designed exclusively for use in the products enumerated in 3.2 above and not included in the scope of some other section.

3.3. Low Voltage Power Circuit Breakers rated 3200 Volts DC or less
3.3.1. General purpose DC power circuit breakers
3.3.2. General purpose DC power circuit breakers for mining applications
3.3.3. Semi-high-speed DC circuit breakers
3.3.4. High-speed DC circuit breakers
3.3.5. Rectifier circuit breakers
3.3.6. Field discharge circuit breakers
3.3.7. Functional components for circuit breakers listed in 3.3 above for remote losing, remote opening, automatic opening, auxiliary contacts, attachments, etc.
3.3.8. Renewal and spare parts designed exclusively for use in the products enumerated in 3.2 above and not included in the scope of some other section.

3.4. Medium Voltage Indoor Oil less Drawout Power Circuit Breakers rated above 1000 Volts for AC service
3.4.1. Functional components for these circuit breakers for remote closing, remote opening, auxiliary switches, interlocks, etc.
3.4.2. Renewal and spare parts designed exclusively for use in these circuit breakers and not included in the scope of some other section.

3.5. Medium Voltage Load Interrupter Switches rated above 1000 Volts for AC service.
3.5.1. Functional components for load interrupter switches for remote closing, remote opening, auxiliary switches, interlocks, etc.
3.5.2. Renewal and spare parts designed exclusively for use in these switches and not included in the scope of some other section.

4. Outdoor High-Voltage Switches Voting Classification (8-SG-VI)
4.1. Power Switching Equipment rated above 1000 Volts AC and/or 3200 Volts DC
4.1.1. Grounding Switches
4.1.2. Group-Operated Multiple Horn-Gap and Disconnecting Switches
4.1.3. Hook-Operated Disconnecting Switches
4.1.4. Excluded from this scope: Porcelain-housed hook operated disconnecting switches
4.1.5. Insulator Unit Adapters and Fittings for Equipment in this Scope

4.1.6. Interrupter Switches
4.1.7. Oil-Immersed Disconnecting Switches
4.1.8. Switch Hooks or Sticks
4.1.9. Indoor Insulator Units and Accessories
4.1.10. Interlocks, Auxiliary Switches, and Accessories designed with or for equipment in this scope
4.2. Crossarms, Buck Arms and Pole-Top Frames used as Switch Mountings, either steel or aluminum
4.3. Outdoor Stations structures of steel, aluminum or wood
4.4. Renewal and spare parts designed exclusively for use in the products enumerated above and not included in the scope of some other section.

Note: Excluded from this scope are outdoor insulator units when sold separately, since they come within the scope of the *High Voltage Insulator Section*.

5. Reclosers, Sectionalizers and Padmounted Switching Equipment Voting Classification (8-SG-XIII)
5.1. Reclosers, sectionalizers and padmounted switching equipment rated above 1000 volts for AC service.
5.1.1. Overhead, padmounted and submersible self-contained automatic circuit reclosers and fault interrupters.
5.1.2. Overhead, padmounted and submersible automatic line sectionalizers and fault interrupters.
5.1.3. Overhead, padmounted and submersible distribution switches with no fault current interrupting rating, encapsulated or tank contained, not having an air interrupting medium, for switching capacitors or line sectionalizing. All for alternating current distribution systems.
5.2. Renewal and spare parts designed exclusively for use in the products enumerated above and not included in the scope of some other section.

Transformers
(Also see Electrical Measuring Equipment Section)

1. Specialty Transformers
1.1. Luminous Tube Transformers
1.2. Ignition Transformers
1.3. Series Circuit Lighting Transformers
1.4. Miscellaneous Transformers (All Other Dry Transformers classified as Specialty Transformers and Reactors not specifically excluded or included in the Scope of the *Residential and Commercial Controls Section*).
2. Dry-Type Transformer (Except Pad-Mounted Distribution Transformers, Secondary Unit Substation Transformers, and URT Units) 500 kVa and below
2.1. Control Transformers (250 kVa and under)
2.2. Industrial Control Transformers
2.3. Single- and Three-Phase, 3 kVa and below, All Voltages.
2.4. Single- and Three-Phase, 3.01 kVa thru 15 kVa, 600 Volts and Below.
2.5. Single- and Three-Phase, 3.01 kVa thru 15 kVa, 601 Volts and Above.
2.6. Single-Phase 15.01 kVa thru 100 kVa, 600 Volts and Below
2.7. Single-Phase 15.01 kVa thru 100 kVa, 601 Volts thru 5,000 Volts.
2.8. Single-Phase 15.01 kVa thru 100 kVa, 5,001 Volts and Above
2.9. Three-Phase 15.01 kVa thru 100 kVa, 600 Volts and Below
2.10. Three-Phase 15.01 kVa thru 100 kVa, 601 Volts thru 5,000 Volts

2.11. Three-Phase 15.01 kVa thru 100 kVa, 5,001 Volts and Above
2.12. Single-Phase 100.01 kVa and Above, 600 Volts and Below
2.13. Single-Phase 100.01 kVa thru 500 kVa, 601 volts thru 5,000 Volts.
2.14. Single-Phase 100.01 kVa thru 500 kVa, 5,001 Volts and Above
2.15. Three-Phase 100.01 kVa and Above, 600 Volts and Below
2.16. Three-Phase 100.01 kVa thru 500 kVa, 601 Volts thru 5,000 Volts
2.17. Three-Phase 100.01 kVa thru 500 kVa, 5,001 Volts and Above
2.18. Saturable Reactors
2.19. Miscellaneous Transformers

4. Dry-Type Transformer Above 500 kVa and All kVa Rating of: Dry-Type Pad Mounted Distribution Transformers, Dry-Type Secondary Unit Substation Transformers, and Dry-Type URT Units
   4.1. Dry-Type Pad-Mounted Distribution Transformers (Including Integral Accessories) and URT Units All Voltages-Single-Phase, 50 kVa and Smaller
   4.2. Dry-Type Pad-Mounted Distribution Transformers (Including Integral Accessories) and URT Units All Voltages-Single-Phase, 51 to 500 kVa
   4.3. Dry-Type Pad-Mounted Distribution Transformers (Including Integral Accessories) and URT Units All Voltages-Three-Phase, 500 kVa and Smaller
   4.4. Dry-Type Pad-Mounted Distribution Transformers (Including Integral Accessories) and URT Units All Voltages-Three-Phase, 501 kVa and Larger
   4.5. Dry-Type Small Power Transformers, self-cooled equivalent ratings of 501-10,000 kVa, single-and three-phase, high voltage 601 volts and above, and all low voltages. Conventional transformers and autotransformers; primary unit substation transformers; and core and coil units.
   4.6. Dry-Type Secondary Unit Substation Transformers, all kVa ratings (based on self-cooled nameplate ratings), single-and three-phase, all high voltages, and low voltages below 1000 volts. (Includes core and coil units for ultimate use in secondary unit substation, all units with secondary switching equipment, and units without secondary switching equipment with a secondary flange or throat for connection to such equipment.
   4.7. Excluded are: Military, industrial and consumer electronic transformers and instrument transformers.
5. Distribution Transformer
   5.1. Transformers, liquid-immersed, single and three phase 167-kVa and smaller, 18-kVa and below, including subway transformers. All other transformers, liquid-immersed, single and three phase, 500-kVa and smaller, all voltages.
6. Small Power Transformer
   6.1. Transformers, liquid-immersed, single and three phase, 501 to 10,000 kVa inclusive, all voltages. Transformers, for Primary Unit Substations, 10,000 kVa and smaller. Based on self-cooled nameplate rating.
   6.2. Secondary Unit Substation Transformers, liquid-immersed, all kVa's, all high-voltage ratings, low-voltage ratings 600 volts and below.
7. Large Power Transformer
   7.1. Transformers (including Primary Unit Substation Transformers) liquid-immersed, single and three-phase, all voltages, 10,001 kVa and larger (based on self-cooled nameplate rating for OA/FA or OA/FA/FA or OA/FOA/FOA) and all ratings of regulating transformers.
8. Network Transformer
   8.1. Network Transformers, liquid-immersed, all ratings, less Network Protectors.
9. Transmission and Distribution Voltage Regulator
   9.1. Transmission and Distribution Voltage Regulators, including:
      9.1.1. Induction Voltage Regulators of all kVa ratings, 1201 volts and above.

9.1.2. Step Voltage Regulators 1201 through 69,000 volts, single-phase, 416-kVa and smaller, three-phase 2500-kVA and smaller.

10. Reactor and Special Purpose Transformer

10.1. Reactors and Special Purpose Transformers, liquid-immersed single and three-phase, all kVa's all voltages, including: Reactors, Furnace Transformers, Rectifier Transformers, Locomotive Transformers Grounding Transformers, Ground Fault Neutralizers, Mobile Transformers, Mobil Unit Substations, and Integral Single-Circuit Unit Substations.

11. Repair and renewal parts, spare parts and accessories, including bushings, are included in the product scope.

Excluded from the product scope are:

- Instrument transformers.
- The following of the type generally used for street and aviation ground lighting service.
  - Regulating or constant current transformers.
  - Individual lamp and ground lamp transformers (dry type or liquid).
- Also excluded are industrial control transformers and reactors used in motor power circuit applications.
- Systems and components covered in other NEMA product section scopes.

Industrial/Core Sector

Arc Welding

The products included within the jurisdiction of this Section have been detailed and are included in the scopes of its constituent Voting Classifications as follows:

Welding Power Sources Voting Classification and Dues Center

1. Electrical equipment, including all associated control devices, applying to the following:
    a. Engine driven welding power supplies
    b. Utility-powered welding power supplies
    c. Plasma cutting and plasma welding power supplies
    d. Associated electrical attachments such as water coolers, chillers.
2. Automatic and manual devices to feed continuous electrode wire including:
    a. Combination welding products containing a power supply, wire feeder and/or torch
    b. Stand-alone wire feeding devices.
3. Resistance welding equipment including:
    a. AC transformers
    b. Other resistance welding power supplies
    c. Controls
4. MIG gun, plasma welding and cutting torches and stick electrode holders.

Cable Bus

1. This Section applies to indoor and outdoor metal-enclosed cable bus systems for voltages from 600 v to 46 kv, 800A to 7000A inclusive, AC or DC, intended to be used as a power distribution system. It is constructed with single conductor cable with maintained spacing and ventilation throughout the system.
2. This Section includes straight bus sections, elbows, tees, adapter boxes, wall flanges, isolating links, and expansion joints. Also included are all necessary fittings, tap boxes, enclosure connectors, entrance fittings, insulated conductors, electrical connectors, terminating kits, and other accessories as required.
3. This Section does not apply to isolated phase constructions, rigid systems, and forced air applications.

Cable Cleat

Products covered by the Cable Cleat Section provide mechanical cable protection by securing cables, limiting cable movement, and/or maintaining cable spacing during static and dynamic loading conditions. These products can be metallic, non-metallic, or composite assemblies. The protective functions of cable cleats and intermediate restraints, where used, include providing resistance to dynamic electromechanical forces encountered during short circuit conditions. This Product Section specifies requirements and tests for cable cleats and intermediate restraints used in electrical installations.

Product configurations include, but are not limited to the following:

1. Single or multiple cable securing units
2. Multiple cable units providing cable spacing, but not securement

Excluded from the Section scope are products that do not address use under short-circuit conditions, such as:

- Cable Glands
- Cable Ties

- Wire Management clips, clamps and mounts without fault current withstand ratings
- Products within the scope of other NEMA Sections

Cable Tie

1. Metallic, nonmetallic, and composite cable ties, integral cable ties, and associated fixing devices used for cable management in electrical installations, (including bundling, positioning and securing) or supporting cable, wire, conduit or tubing of a wiring system in an electrical installation.
2. Metallic, nonmetallic, and composite devices used for positioning such as, but not limited to, cable clamps, cable and conduit clips, and non-raceway wiring ducts.
3. Cable tie installation tools used to install cable ties.

Products excluded from the scope of the NEMA Cable Ties Section include:

1. Coated electrical sleeving, extruded insulating tubing, metallic or nonmetallic raceways or woven flexible nonmetallic tubing (fiber loom) employed as mechanical protection for insulated wires.
2. Equipment covered by the scopes of other NEMA Sections.

Note: Products covered by the NEMA Cable Ties Section are covered under the scope of and tested and classified using IEC/EN/UL 62275 cable management systems-cable ties for electrical installations (global harmonized cable tie standard) and UL 1565 for “positioning devices”.

Cable Tray

Metal cable trays are mechanical support systems for cables, raceways, and insulated conductors and are classified as follows:

1. Ladder type
2. Trough-type
3. Channel-type
4. Single rail type
5. Wire mesh/basket type
6. Other cable tray systems

Non-metallic cable trays are mechanical support systems for cables, raceways, and insulated conductors and are classified as follows:

1. Ladder Type A—ladder-type nonmetallic cable tray is a prefabricated nonmetallic structure consisting of two longitudinal side rails.
2. Trough Type A—trough-type nonmetallic cable tray is a prefabricated nonmetallic structure with ventilated or solid bottom within integral or separate longitudinal side rails.
3. Other cable tray systems.

Carbon/Manufactured Graphite

Firms that have primary material manufacturing facilities for at least one of the following products, which fall within the Carbon/Manufactured Graphite Section.

1. Electrode Group: Graphite electrodes, cathodes, open arc electrodes, gouging and welding rods, plates and parts, EDM, electrochemical anodes, electrolytic anodes, grounding anodes, heating rods, powdered graphite, and spectroscopic materials.
   Excluded: Metal welding rods, metal (but not metal impregnated) EDM electrodes, metal electrolytic anodes, heating rods or elements and spectroscopic materials that are not carbon, graphite and its compounds.
2. Electrical Components Group: Brushes and contacts; plates for electrical use. Rectifier anodes,

rheostat discs, telephone parts, lighting arresters, pantograph parts and brush holders.
Excluded: Any of the above not made of carbon, graphite and its compounds, except for brush holders.

3. Mechanical Group: Bearings, seals, rings, valve parts, valve seats, friction parts (brakes), rupture discs, piston rings, turbine packing rings, pistons, check parts, pipe slides, dash pots, compressor vanes and rotors, end plates, graphite lubricants, refractory coated graphite for mechanical uses including mechanical applications made from carbon and graphite fibers and their composite structures.
Excluded: Metal parts or rings, ceramic or plastic parts or rings.
4. Graphene Group: Graphene and other 2-dimensional elemental compounds, such as graphane, graphone, graphyne, graphdiyne, and fluorographene.
Excluded: all graphite materials

Conduit Fittings

1. Fittings and accessories for use with rigid metallic conduit, intermediate metal conduit, electrical metallic tubing, nonmetallic sheathed cables, portable cords, service entrance cables, flexible metallic conduit, liquid-tight flexible metallic conduit, liquid-tight nonmetallic flexible conduit, armored and metal clad cables; including the following types:
   - Angle adapters; benders; bending hickeys; bushings (including insulating and cap); bushing nipples; conduit and cable straps; clamps; hangers and staples; conduit unions; cast conduit bodies, covers and cover gaskets; connectors; couplings; enlargers, entrance caps, elbows and fittings (including gooseneck plate); fish wire, fixture hickeys and extensions; grounding and bonding fittings; insulated end fittings; locknuts; panel extensions; reducers.
2. Cast outlet boxes, covers and gaskets. Cast junction and pull boxes, covers and gaskets and FS and FD boxes and accessories. The Conduit Fittings Section shall engage in code and standard issues associated with products within its scope and in the promotion of outlet box hoods and assemblies that are associated with "Switch, Outlet, FM/TV, Blank and Telephone Plates" in the Wiring Device Section's product scope. Both Conduit Fittings and Wiring Devices shall, through the sharing of minutes, keep each other fully apprised of any codes, standards, and regulatory positions involving these products that are proposed or advocated.
3. Excludes all products within the scope of the Pin and Sleeve Plug, Receptacle, and Connector Section.
4. Excluded also are conduit elbows, threaded conduit couplings, conduit nipples, and electrical metallic tubing elbows, as included in the product scope of the Steel Conduit and Electrical Metallic Tubing Section.
5. Hazardous Location Boxes and Fittings include cast outlet boxes, conduit fittings, and cable sealing fittings for hazardous (classified) locations. (Note: UL Listing Categories include: EBNV, QBCR and/or CYMX.)

Dry Battery

1. Primary dry cell batteries such as dry cell primary leclanche, alkaline primary (manganese dioxide, silver, zinc air, mercury), and lithium type batteries. Reserve cells are excluded.
2. Portable rechargeable batteries including but not limited to sealed nickel cadmium, nickel metal hydride, lithium, and zinc air. Lead acid cells are excluded.
3. Portable electric lighting devices designed to be hand-carried or worn on the person and utilizing a self- contained or attached power source. This includes general purpose, industrial, penlight and novelty, and military types.

Electrical Connector

1. Electric Power Connector Voting Classification

All connectors whether bolted, welded, or expansion fittings of the type generally used in the construction of indoor and outdoor substations.
Specifically excluded from the scope are:

- Connectors generally used for indoor wiring of industrial, commercial, or residential buildings.
- Components of equipment which are to be reported as part of the ultimate product in its appropriate group.
- Those connectors in which the pressure to fix the connector to the electrical conductor is applied externally, changing the size and/or shape of the connector.
- Those products which are included in the product scopes of other Voting Classifications or other NEMA Sections.

2. Pressure Connector Voting Classification
   Pressure Connectors of the kind generally used in installations conforming to the National Electrical Code, for terminating or joining No. 8 AWG and larger electrical conductors.
   2.1. Pressure Connectors are of the following types:
      2.1.1. Those in which the pressure to fix the connector to the electrical conductor is applied by integral screw, cone, or other mechanical means.
      2.1.2. Those in which the pressure to fix the connector to the electrical conductor is applied externally, changing the size and/or shape of the connector.
   2.2. Insulation piercing copper and aluminum
      2.2.1. Mechanical tool applied
      2.2.2. Other installation means (e.g. new technology)

Specifically excluded from this product scope are the following:

- Those products which are included in the product scopes of other NEMA Sections.
- Fixture or pig-tail connectors such as, but not limited to, wire nuts.
- Strips of connectors suitable for automatic installation.
- Insulated connectors of the type described in paragraph 2 above.

3. Overhead Lines Connector Voting Classification
   Connectors for outdoor overhead lines, as described in the following categories:
   3.1. Split bolt and vise type connectors, with and without washers or spacers. Includes copper split bolts and vise type connectors, aluminum split bolt and vise type connectors, and plated split bolt and vise type connectors, unfilled or filled with compound. Service entrance connectors, bolted and mechanical type, copper or aluminum, with or without washers or spacers.
   3.2. Bolted clamps and U-bolt parallel connectors and/or clamps, clamps with one or more bolts, copper or aluminum, plated or un-plated, with or without spacers, including center bolt type, with or without liners, unfilled or filled with inhibitor or contact paste.
   3.3. Compression splices, dead-ends and repair sleeves, tool installed, full or partial tension for connecting overhead line conductors. Full tension sleeves for ACSR may be of the double or single- sleeve type.
   3.4. Compression parallel tap connectors, tool installed, copper or aluminum, plated or unplated, filled or unfilled with inhibitor contact paste, with or without tabs, one-piece assemblies.
   3.5. Hot line or hot tap clamps, either “V” type main and eye bolt tap or parallel groove main and tap types, designed to be manually installed on overhead conductors with conventional “shotgun” hot sticks.
   3.6. Wedge connectors, copper and aluminum
      3.6.1. Fired-on using a pyrotechnic charge

3.6.2. Mechanical tool applied
3.6.3. Other installation means
3.7. Insulation piercing copper and aluminum
3.7.1. Mechanical tool applied
3.7.2. Other installation means

4. Underground Distribution Type Cable Connectors and Accessories Voting Classification
Insulated or uninsulated separable and non-separable, cable connectors, splices, joints and accessories involving the connecting of cable to cable, or cable to equipment at voltages from 125 volts up through and including 69 kV. Applications include non-utility as well as utility electrical distribution systems, and cover all conductor sizes commonly employed in commercial, industrial, urban, residential and street lighting systems.
4.1. Included are:
4.1.1. Low Voltage Connectors, insulated or uninsulated mechanical or compression, for application in residential and medium density underground distribution circuits operating at 600 volts or below. Typical product descriptions are:
4.1.1.1. Junction bars; associated terminals or plug connectors.
4.1.1.2. Multi-conductor terminals for joining cable to transformer spades or studs.
4.1.1.3. Insulated splices or splice kits, consisting of both bare connector and insulating materials.

Excluded:
- Low Voltage, insulated or uninsulated, connectors, junctions, cable limiters, and limiter assemblies recommended for, and expressly designed to meet performance and application requirements of underground distribution network systems.
- High Voltage cable terminating devices performing the functions of pothead terminators, or stress cones in cable riser or equipment terminal applications.
- Tapes, insulation kits, or insulation materials that are not part of kits that include connectors for the cable conductor.
- Lead Wiping Sleeves, stuffing boxes, or other devices used to terminate paper, cloth, or liquid impregnated cable insulation system.
- Voltage Insulated Connectors, separable and non-separable, functioning as connectors, splices, cable joints, terminations, or circuit element housings, in shielded cable systems operating at voltages above 600 volts.

5. Grounding Products Voting Classification
Includes:
5.1. Copper-clad, zinc-plated, hot-dip galvanized and stainless steel ground rods.
5.2. Couplers for copper-clad, zinc-plated, hot-dip galvanized and stainless steel ground rods.
5.3. Chemical rods and other technologies
5.4. Connectors
5.4.1. Mechanical, including ground clamps for station construction.
5.4.2. Hydraulic installed.
5.4.3. Fired-on installation.
5.4.4. Installed by other means (e.g. exothermic, et.al.).

6. Installation Tooling Classification
Includes:

6.1. Mechanical
6.2. Hydraulic
  6.2.1. Low pressure, <3000 lb/in2.
  6.2.2. High pressure, >3000 lb/in2.
6.3. Battery powered tools.
6.4. Pyrotechnic (firing-on).
6.5. Other means (new technology).

7. Lightning Protection System Components and Accessories Voting Classification
Lightning protection system components and accessories used for lightning protection systems for structure protection.
Included are:
7.1. Conductors, aluminum or copper wire type for main and secondary use.
7.2. Strike terminations devices including air terminals, air terminal extensions, air terminal supports, air terminal bases and air terminal tips for use in the lightning protection system.
7.3. Through-roof connectors, accessories and assemblies used for conducting lightning energy through a structure roof.
7.4. Cable connectors, cable clamps, and accessories including adhesive and mechanical style fasteners, clips, splices, hardware sealants, tapes, and conductor guards used to install and secure the lightning protection system to the structure.
7.5. Grounding and bonding components including main and secondary bonding lugs, bonding clamps and plates, and pipe clamps used for the lightning protection system and its connection to ground.

Excluded:
- Grounding components covered in Section 5. above
- Ground enhancing material
- Test wells
- Ground rod accessories such as receptacles and protective covers
- Ground bars
- Surge suppression

Enclosures

Products covered by the NEMA Enclosures Section include metallic and non-metallic enclosures intended for use with electrical equipment, and associated products used with these enclosures that meet the environmental requirements. Products include, but are not limited to, enclosures without other equipment installed, enclosures that form part of another product, enclosures that are intended for use in specific applications, and associated products that provide a part of the environmental protection when used with these enclosures. Also included are:

1. Wireway, Telephone Cabinets, Auxiliary gutter and Auxiliary Enclosures: Wireway, auxiliary gutter, telephone cabinets and auxiliary enclosures intended to house electrical circuits and components:
  1.1. Wireway
    Troughs with hinged or removable covers for housing and protecting electrical wires and cable in which conductors are laid in place after the wireway(s) have been installed as a complete system.
  1.2. Auxiliary Gutters
    Gutters which are intended to supplement wiring spaces at meter centers, distribution centers, switchboards, and similar points of wiring systems and which may enclose conductors or busbars, but which shall not be used to enclose switches, over-current devices, appliances, or

other similar equipment.

1.3. Telephone Cabinets
Cabinets with door(s) and lock(s) intended to house telephone connections.

1.4. Auxiliary Enclosures
Auxiliary enclosures which are miscellaneous enclosures having hinged or screw covers intended to house electrical circuits and components.

These enclosures are intended to meet the environmental conditions described in NEMA Standards Publication 250—Enclosures for Electrical Equipment (1000 volts Maximum), and include the following applications:

Non-Hazardous Locations— Types 1, 2, 3, 3R, 3S, 4, 4X, 5, 6, 6P, 12, 12K and 13.

Hazardous Locations— Types 7, 8, 9, and 10. Hazardous locations (other than mines) are classified according to the flammability or combustibility of the materials that may be present and also according to the likelihood that a flammable or combustible concentration is present.

Fuse

(Also see Wiring Device Section)

1. Non-renewable plug fuses.
2. Non-renewable cartridge fuses, not exceeding 1000 volts AC 1200 volts DC or less.
3. Renewable cartridge fuses and renewal links or elements, 600 volts or less.
4. Fuse holders and fuse blocks.
5. Excluded are all other types, such as miscellaneous and special purpose fuses.

Industrial Automation

The scope of the Industrial Automation Control Products and Systems Section comprises products primarily used in industrial applications to monitor, control, or actuate power utilization apparatus, including motors. Such equipment is rated not more than 750 volts DC nor 15,000 volts AC. This includes, but is not limited to:

1. Motor controls and accessories—used to start, stop, protect, accelerate, decelerate, reverse, and/or control the speed of motors. This includes devices such as, but not limited to: Adjustable Speed Drives, Variable Frequency Drives and Motor Controllers.
2. Machine logic control and systems—hardware and associated software used in the supervision, monitoring, and/or control of industrial processes. This includes devices such as, but not limited to Programmable Logic Controllers, Process Controllers, and Distributed Control Systems.
3. Man/machine interface—devices that require human intervention and are used to control/communicate the status of machines or manufacturing processes.
4. Position control and monitoring—devices that do not require human intervention and are used to control/communicate the status of machines or manufacturing processes.
5. Systems integration—services to plan, develop, implement, and manage integrated manufacturing and/or process control systems.
6. Communications and software for industrial automation control products and systems.
7. Transfer Switches.
8. Fire Pump Controllers.
9. General-purpose industrial control relays and contactors.
10. Servo and stepper motors

Excluded from the product scope are:

- Automatic and manual temperature and humidity controls and panels that are in the scope of the Residential and Commercial Controls Section of the types principally used for comfort heating, air-conditioning, refrigeration, clothes washing, drying or ironing, personal grooming, water heating or cooking;
- Motors, generators, and motor-generators covered by Motor and Generator Section, which function as control when constituting part of adjustable speed drives;
- Relays used for lighting control;
- Relays used for premise control; and
- Specific components and systems covered by the product scopes of other NEMA Sections.

Insulating Materials

1. Flexible Insulation and Mica Voting Classification

All flexible sheet and tape materials used for electrical insulation, and all forms of built-up electrical insulation comprising mica splittings and/or mica paper in combination with suitable binders, and with or without re-enforcing materials and products made there from. Excluded are fish paper and those products falling within the scope of the Industrial Laminate Voting Classification.

2. Industrial Laminate Voting Classification

The basic product scope of this voting classification consists of laminated plastics in any form (but excluding fabricated parts) using papers, fibers (woven or other) or other materials as a reinforcement with thermosetting or thermoplastic resins as binder.

2.1 Electromechanical Laminates Voting Classification

Unclad laminates primarily used for electrical insulation (excluding unclad laminates used as base in additive circuitry processes).

2.2 Electronics Laminates Voting Classification

All metal-clad laminates and unclad materials used as a base in additive circuitry processes. Also, included are B-stage prepregs (semi-cured materials) for use as an adhesive and/or encapsulating layer of multi-layer circuitry.

3. Electrical Insulating Resins Voting Classification

The product scope of this voting classification comprises the product scopes of its constituent Groups. Excluded from both Groups: Resins and compounds used in products of the *Industrial Products and Systems Division and Building Systems Division* as defined in the NEMA Product Scopes, and compounds containing more than 50% silicone in the resin portion, all molding and coating powders, and core-plate enamels.

3.1. Synthetic Organic Resin Group

Synthetic organic resins/polymers and hardeners used as thermoset or thermoplastic electrical or electronic insulation, except for sales to manufacturers of compounded products described in the *Resin Combinations Group*.

3.2. Resin Combinations Group

Products in the Synthetic Organic Resin Group in combination with solvents, additives, fillers, reinforcing materials, and curing agents.

4. Electrical Tubing and Sleeving Voting Classification

The product scope of this voting classification includes flexible and semi-rigid electrical insulating tubular products, but not limited to: Fabric-based plastic and rubber, including heat-shrinkable and spiral wound products.

Low-Voltage Surge Protection

The scope of the Low-Voltage Surge Protective Devices Section comprises equipment primarily used to mitigate the damaging effects of transient overvoltages and surge events that occur within low voltage electrical distribution systems, control systems, and communications systems having nominal supply voltages of not more than 1,000V AC (on 50 or 60 Hz power circuits) or 1,500V DC. These surge protective devices (SPDs) include finished goods, components, modules, assemblies, or hybrid circuits consisting of active or passive elements (linear or non-linear) or any combination of these elements, intended to divert, clamp, filter or in any other way limit surge energy.

This Section addresses the construction, evaluation, markings, applications, marketing, and definitions for surge protective devices (SPDs) and engages in codes and standards topics associated with SPD products and with the SPD portion of multi-purpose products that are sold or marketed as having SPD functionality.

Excluded from the Section scope are:

- Medium- and high-voltage surge arrestors included in the product scope of the Surge Arrestor Section (US-LA)
- Equipment that incorporates surge suppression components (e.g., printed wiring board-type components) designed to mitigate transient voltages exclusively for circuits internal to that equipment.
- The non-SPD aspects of multi-purpose products that are sold or marketed as having SPD functionality (e.g., surge protective receptacle, surge protective relocatable power tap, surge protective circuit breaker, etc.), but fall within the product scopes of other NEMA Product Sections.

Magnet Wire

1. **Insulated Conductors Voting Classification**
   All insulated conductors manufactured in accordance with NEMA MW 1000, used in the creation of an electromagnetic field.

2. **Extruded Insulated Conductors Voting Classification**
   All extruded insulated winding conductors intended to create an electromagnetic field.

Excluded from both Groups are bare electrical conductors of all shapes and other magnet wire types covered within the scope of other NEMA Sections.

Motor and Generator

The product scope of the Motor and Generator Section comprises all alternating-current and direct-current motors, generators, and motor-generator sets not excluded specifically from the scope of this Section. The types of machines include, but are not limited to, induction machines, commutator machines, wound field synchronous machines, permanent magnet machines, and switched reluctance machines.

Specifically excluded from the scope of this Section are:

- Servo and stepper motors used for motion/position control.
- Welding type motors and generators.
- Engine type motors and generators.
- Booster, dynamic braking and absorption type of machine.

- Isolated electric farm lighting plant.
- Variable speed generator equipment for railway passenger cars.
- Main propulsion motors, generators and motor generator sets mounted on railroad and transit locomotives and cars.
- Automotive accessory and toy motors, generators and motor-generator sets.
- Motors, generators, exciters and motor generators or exciter sets mounted on airborne craft.
- Aviation ground support generators
- Alternating-current generators for hydraulic turbine drive above 10,000 kVA.
- Synchronous condensers.
- Frequency changers and phase converters.
- Motors and generators used for Hybrid Electric Vehicles (HEV), Plug-in Electric Vehicles (PEV) and Electrical Vehicle (EV) propulsion.

Outlet and Switch Box

General: Metallic, nonmetallic, and composite electrical boxes of the type described in NEMA Outlet and Switch Box Standards (e.g., NEMA OS 1 and NEMA OS 2), for use in applications of 1000 volts AC and 1200 volts DC or less.
Included are:

1. 100 cubic inches (1640 cm3) or less in volume, including flush and surface mounted device boxes, outlet boxes, multiple gang boxes, utility boxes, and boxes with provision for supporting of fixtures or ceiling suspended fans, and conduit bodies having volume markings.
2. Multiple gang device boxes greater than 100 cubic inches (1639 cm3).
3. Floor boxes, concrete rings/boxes.
4. Specialty boxes including but not limited to swimming pool junction boxes, multiple gang types used to separate electric light, power, Class 1, and non-power limited fire alarm circuits from Class 2 and Class 3 circuits, and boxes specifically to house Class 2 and Class 3 circuits.
5. Box accessories including but not limited to extension rings, bar hangers, box extenders and covers, except flush device cover plates.

Excluded:

- Boxes and cabinets which have interior pre-assembled wiring.
- Hinged cover and pre-assembled screw cover metal cabinets.
- Junction boxes and fittings for under floor duct systems.
- Fittings and accessories manufactured as part of surface raceway systems.
- Combination and parts of such excluded products.
- Products within the scope of other NEMA Sections.
- FS and FD boxes.

Pin and Sleeve

Field wireable current-carrying plugs, receptacles and connectors of the pin and sleeve type which serve as connections for power, control or signaling for use on both AC and DC circuits. Also, included are field mechanically and electrically interlocking types.

Polymer Raceway

1. Polymer raceway products. Polymer raceways, fittings and accessories systems intended for electrical and selected communication and signaling applications. For purposes of this scope, polymer raceway systems are enclosed channels designed expressly for holding wires, cables, or busbars as covered by the following categories:

1.1 Thermoplastic Raceway Voting Classification
    1.1.1 Thermoplastic raceway
    1.1.2 Thermoplastic elbows, conduit bodies, and fittings
    1.1.3 Thermoplastic boxes
    1.1.4 Accessories for use with thermoplastic raceways
1.2 Thermoset Raceway Voting Classification
    1.2.1 Thermoset raceway
    1.2.2 Thermoset elbows, conduit bodies, and fittings
    1.2.3 Thermoset boxes
    1.2.4 Accessories for use with thermoset raceways

2. Specifically included are rigid nonmetallic conduit, flexible nonmetallic conduit and liquid-tight extra flexible nonmetallic conduit, polyethylene and polyolefin conduit, polymer guards (anti-climbing, guy, pole hub, ground wire, riser cables, tree and u-cable), nonmetallic wire duct, and, polymer underfloor and surface nonmetallic raceways. Specifically excluded are wireways, auxiliary gutters, and enclosures, as well as those products covered within the scopes of the *Outlet and Switchbox Section*, *Conduit Fittings Section, Panelboards (Including Loadcenters) and Distribution Boards Product Group, and Busway Product Group.*
3. Surface metal raceway and strut-type channel raceway.

Steel Conduit

1. Rigid steel conduit, including elbows, threaded couplings, and nipples customarily furnished on or with rigid steel conduit.
2. Steel electrical metallic tubing, including elbows customarily furnished with steel electrical metallic tubing.
3. Steel intermediate metal conduit including elbows, threaded coupling, and nipples customarily furnished on or with steel intermediate metal conduit.

Wire and Cable

The scope of the Wire and Cable Section is comprised of the following Product Groups:

- Building Wire and Cable and Flexible Metal Conduit
- Power and Control Cable
- Flexible Cords
- Advanced Technology Wire and Cable

Products falling within a Product Group are specifically excluded from other Product Groups. The products are in four distinct groups as shown below and include but are not limited to:

Building Wire and Cable

The following products shall be within the scope of this Group:

1. All types of building wires and cables permanently installed as identified in relevant codes and standards including but not limited to:
    - Armored Cables (excluded from power and control applications)
    - Thermoset-Insulated Wires and Cables
    - Thermoplastic Insulated Wires and Cables
    - Thermoplastic Insulated Underground Feeder and Branch Circuit Cables
    - Service Entrance Cables
    - Nonmetallic Sheathed Cables
    - Metal Clad Cables

- Other building wire and cables

Specifically excluded are wire and cable products used primarily in utility stations or industrial power wiring systems.

- All types of flexible metal conduit and all types of liquid tight flexible metal conduit as identified in relevant codes and standards.

Flexible Cords

The following products shall be within the scope of this Group:

1. Fixture Wires, Appliance Wires and Flexible Cords. All fixture wires, appliance wires and flexible cords as identified in relevant codes and standards including but not limited to:
    - Power Supply Cord and Cord Sets:
        - Cord sets,
        - power-supply cords,
        - seasonal-use cord sets and
        - marine shore power cable sets
    - Industrial Portable Power Cable:
        - Portable power cables and electric vehicle cables including the following types:
        - Portable power cable types
        - Flexible stage and lighting power cable types
        - Electric vehicle charging cable types
    - Plug Blades (blades, pins, and female contacts for 125 and 250-volt power cords)

High-Performance Wire and Cable

The following products shall be within the scope of this Group:

1. Wires and cables, produced to both domestic and international standards and specifications, which are used primarily with devices which produce, transmit, receive, detect, distribute, control, record, or modify electrical signals and power.
2. Specifically included are insulated signal and communications wire and cable, including:
    - voice and data types used for internal premises wiring
    - coaxial cable
    - microphone cable
    - hookup wire
    - appliance wiring material
    - multiconductor electronic cable
    - flat cable
    - motor lead wire
    - power-limited circuit cable
    - CATV drop and trunk lines
    - thermocouple wire
    - thermostat cable
    - other types of low energy circuit control cable
    - shipboard wire and cable
    - aerospace wire and cable
    - defense application wire and cable
    - automotive wire and cable
    - transit wire and cable (not including Locomotive Cable)

3. Fabricated conductors – uninsulated electrical conductors, solid or composite-strands, fabricated of copper alloys, bare or metal clad.
4. Excluded are communication (distribution) cables.

Power and Control Cable

The following products shall be within the scope of this Group:

1. All types of solid dielectric insulated wires and cables including thermosetting (XLPE and rubber) and thermoplastic, single and multiconductor, jacketed, sheathed, or armored for power and control applications.
2. Welding Cable (All Types)
3. Paper Power Cable. Paper insulated cable of the types used for the transmission and distribution of electrical energy, except dry paper apparatus leads, and excluding pipe, oil, accessories and supervision.
4. Low energy circuit control cable.
5. Mining infrastructure and earth moving machinery cable involving insulated cable used in power supply applications with mining and dredging machinery, as follows:
   5.1. Bore hole and dredge cable, armored and unarmored (all voltages).
   5.2. Mining and earth moving machine cable (all voltages) including:
        - Mine locomotive reel cable
        - Mine shuttle car cable
        - Mine drill cable
        - Earth moving machine cable
        - Mine cable, flat, round, single or multiconductor Type W, G, G-GC, etc., shovel cable, Types SHD and SHD-GC, etc.
        - Mine power feeder cable, (all voltages);
6. Specifically included are the following cables:
   - Airport Lighting Cable
   - Bus Drop Cable
   - Cables multiplexed or paralleled, with or without concentric neutrals
   - Cathodic Protection Cable
   - Control Cable
   - Fire Alarm Cable
   - Fire-Protective Signaling Cable, non-power limited
   - Type FCC Flat Conductor Cable
   - Gas Tube Sign and Ignition Cable
   - Type ITC Instrumentation Tray Cable
   - Irrigation Cable
   - Locomotive Cable
   - Type MC Metal Clad Cable
   - Network Cable
   - Oil Well Cable
   - Pole and Bracket Cable
   - Power Cable
   - Primary Underground Distribution Cable
   - Secondary Underground Distribution Cable
   - Series Lighting Cable
   - Service Drop and Secondary Cable

- Service Entrance Cable including single, paralleled, or cabled conductors, with rubber with rubber insulation, with or without an overall covering, which are NRTL Listed as Type USE or USE-2 combined with another NRTL Type on the same wire or cable.
- Spacer Cable and Primary Aerial Cable
- Street Lighting Cable
- Submarine Cable
- Submarine Power Cable
- Type TC Power and Control Tray Cable
- Type MV Power Cable
- Type MV/MC Metal Clad Cable
- Traffic Control and Signal Cable
- Transmission Cable
- Water Well Pump Cable, Armored and Unarmored

7. Specifically excluded are:
   7.1. Similar constructions with XLP insulation which are reported in the scope of the Building Wire and Cable Group.
   7.2. Wires and Cables suitable for applications of 135°C and over reported in the scope of the Advanced Technology Wire and Cable Section.
   7.3. Rubber sheathed portable cords and cables reported in the scopes of the Industrial Portable Power Cable Group and the Flexible Cords Group.
   7.4. Type MC cable 1000V or less utilized as a building wire, shall be within the scope of the Building Wire and Cable Product Group.

Mobility Sector

Electric and Autonomous Vehicles

The scope of the NEMA Electric and Autonomous Vehicles Section encompasses the electrical components and software associated with electric and autonomous vehicles, including, but not limited to:

- Batteries
- Battery management software
- Inverters
- Converters
- On-board chargers
- Charging ports
- Ultracapacitors
- Electrical connectors
- Integrated power control units (except for those that specifically control traction motors)
- Integrated power electronics and electronic systems
- High-voltage wire and cable
- Fasteners
- Cable ties
- Insulating materials
- Sensors
- Integrated software

The Electric and Autonomous Vehicles Section will coordinate closely with other NEMA Sections to promote the advancement and adoption of electric and connected vehicles and ancillary equipment.

Excluded from the scope of this Section are other products and materials included in the scope of other NEMA Sections.

EV Supply Equipment

The scope of the Electric Vehicle Supply Equipment/Systems (EVSE) Section comprises products used in supplying power to electric vehicles for use in the North American market for residential and commercial applications.

Electric Vehicle Supply Equipment includes the electrical conductors and equipment external to the electric vehicle that provide a connection for an electric vehicle to a power source to provide electric vehicle charging.

Products include:

- Level 1 EVSE
- Level 2 EVSE
- DC Fast Charging EVSE
- Conductors and connectors specifically designed for use with Electric Vehicle Supply and charging equipment (including wireless) systems that connect the electric vehicle to the Level 2 and DC Fast Charging EVSE and other modes like the overhead trolleys used for busses and other commercial EVs.
- Equipment that is specific to EVSE mounting

The Section Scope includes communications and software for EVSE and DC charging systems.

The product scope excludes electrical conductors and components that have applications other than for use with EVSE.

Traction Motors

The scope of the Traction Motor Section comprises all alternating-current and direct-current motors and associated control technologies specifically designed or utilized for the propulsion of vehicles. These motors can either be integrated with drive systems or operate independently from them.

The types of traction motors include, but are not limited to:

- DC Series Motor
- AC Series Motor
- Linear Induction Motors

Specifically included in the scope are:

- Motor controllers
- Regenerative braking systems
- Thermal management systems
- Power management systems

Transportation Management

The scope of the Transportation Management Systems and Associated Control Devices Section (TMSACD) includes, but is not limited to products, subsystems, equipment, components, and services principally used to design, install, operate, and maintain vehicular transportation systems and related elements. The items included in the scope provide the means to realize integrated transport information management and control systems that are compatible with the intermodal operation of Intelligent Transportation Systems. These items fall under the following general categories:

1. Signal Display and Signal Elements

   Elements used to display and control the flow of vehicular and pedestrian traffic consisting of, but not limited to mechanical, electromechanical, and/or solid-state devices and components. These elements are primarily used (a) for reporting of vehicular and pedestrian traffic conditions and flows, and (b) for providing real-time information on traffic conditions to the motorist or pedestrian.

   1.1. Annunciation devices, such as, signal heads, pedestrian displays, etc.
   1.2. Changeable message signs (CMS) and variable message signs (VMS)

2. Fixed, Configurable and Programmable Traffic Controllers and Subassemblies Elements used to execute traffic control algorithms and coordinate other associated traffic control devices.

   2.1. TS1 traffic controllers
   2.2. TS2 traffic controller assemblies
   2.3. Model 170, 179, 2070 controllers
   2.4. Open advanced traffic controllers (OATC)
   2.5. Conflict monitors
   2.6. Malfunction management units
   2.7. Auxiliary devices
   2.8. Ramp meters
   2.9. Arterial masters
   2.10. Field processors and controllers

2.11. Variable geometry flow control units, such as, reversible lane controllers, etc.
2.12. VMS controller unit
2.13. Traffic controller cabinet assemblies
2.14. Connected Vehicle roadside equipment

3. Communications Interface Devices and Systems
Elements used to support the exchange of signals, data, and information between the elements of a transportation management system.
3.1. Bus interface units
3.2. NTCIP interface units
3.3. Radio interface units
3.4. Telecommunications interface units, such as, modems, circuit switches, bridges, etc.

4. Software and Firmware Modules
Software for *Fixed, Configurable and Programmable Traffic Controllers and Subassemblies* elements, including, but not limited to the following:
4.1. Operating system software
4.2. Program generation and management software
4.3. Network management software for NTCIP units, etc.
4.4. Communications network system software
4.5. Transportation management center software

5. Mounting, Protection, Power Supply, and Fastening Equipment
Elements used to mount, contain, protect, or fasten the device and components associated with the transportation management system. All mechanical, electromechanical, electric and electronic equipment used to provide power, housing, and physical support for *Signal Display and Signal Elements*, *Fixed, Configurable and Programmable Traffic Controllers and Subassemblies* and *Communications Interface Devices and Systems* elements, including, but not limited to the following:
5.1. Terminals and facilities
5.2. Cabinets and enclosures for signal, signal and traffic control elements
5.3. Traffic poles
5.4. Load switches

6. Computing Assemblies for Transportation Management Systems
Elements used to supervise, coordinate, and program the elements of a transportation management system. Computers and high-level controllers used in a traffic management center to monitor, control and supervise transportation management systems for vehicular and pedestrian traffic within a single or multiple jurisdiction(s), including, but not limited to the following:
6.1. Stationary and mobile traffic management center computers
6.2. Pollution monitoring computers
6.3. Incident monitoring and reporting stations
6.4. Toll collection and management station

7. Associated Devices for Transportation System Management Control Devices
Devices used to support intermodal operation, such as, dedicated platform controllers, displays, sensors, and actuators used in equipment to monitor, start, stop, and control the movement of pedestrian and vehicles across intermodal areas and to monitor the operating environment, including, but not limited to the following:

7.1. Air, water, weather, and pollution sensors dedicated for monitoring transportation infrastructure
7.2. Automatic Vehicle Location devices used in traffic management systems
7.3. Data Collection and Monitoring devices used to measure characteristics of road usage (e.g. weight- in-motion)
7.4. Detection devices such as, inductive loop detectors, traffic cameras, ultrasonic, sensors, etc.

Excluded from the Section scope are products, subsystems, equipment, components, and services covered within the scope of other NEMA sections.