This master should be used by designers working on Port of Portland construction projects and by designers working for PDX tenants (“Tenants”). Usage notes highlight a few specific editing choices, however the entire section should be evaluated and edited to fit specific project needs.

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

1. GENERAL
	* + 1. DESCRIPTION
				1. This section describes supporting devices for electrical equipment, associated conduit, and cable.
			2. REFERENCES
				1. IBC: International Building Code

IBC Chapter 16: Structural Design

* + - * 1. SMACNA: Sheet Metal and Air Conditioning Contractors’ National Association

SMACNA Seismic Restraint Manual - Guidelines for Mechanical Systems, for Seismic Hazard Level (SHL)

* + - 1. SUBMITTALS
				1. Submit shop drawings and calculations for seismic anchorage and bracing for the vertical and lateral restraint of conduit, cable trays, bus ducts, and electrical equipment as required by IBC Chapter 16 and the SMACNA Seismic Restraint Manual – Guidelines for Mechanical Systems, for Seismic Hazard Level (SHL) A. Shop drawings and calculations shall bear the seal of a professional engineer registered in the state of Oregon.
1. PRODUCTS
	* + 1. PRODUCTS
				1. Hangers: Kindorf B‑905‑2A channel, H‑119‑D washer, C105 strap, minimum 1/2-inch rod with ceiling flange, or equal.
				2. Pipe Straps: Two-hole galvanized or malleable iron.
				3. Support of Open Cabling: NRTL labeled for support of Category 6 cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.

Support brackets with cable tie slots for fastening cable ties to brackets.

Lacing bars, spools, J-hooks, and D-rings.

Straps and other devices.

1. EXECUTION
	* + 1. INSTALLATION
				1. Provide all electrical equipment supports.
				2. Install vertical support members for equipment, straight and parallel to building walls.
				3. Provide independent supports to structural member for electrical fixtures, materials, or equipment installed in or on ceiling, walls, or in void spaces and/or over furred or suspended ceilings.
				4. Do not use other trades’ fastening devices to support electrical equipment materials or fixtures.
				5. Do not use supports and/or fastening devices to support other than one particular item.
				6. Support conduits within 18 inches of outlets, boxes, panels, cabinets, and deflections.
				7. Provide complete seismic anchorage and bracing for the vertical and lateral restraint of conduit, cable trays, bus ducts, and electrical equipment as required by IBC Chapter 16 and the SMACNA Seismic Restraint Manual - Guidelines for Mechanical Systems, for SHL A.
				8. Building Attachments:

Where possible, support all conduit, cable tray, and equipment from structural members, beams, and joists.

Provide structural steel angles, channels, or other members to support conduit, cable tray, and equipment where structural members do not occur as required for proper support.

Arrange supports to prevent eccentric loading of joists and joist girders. Locate supports at joist panel points or provide web reinforcing as required.

Do not fasten or attach to unfilled steel roof deck structure.

Attach to concrete-filled steel floor deck structure for loads up to 400 pounds. Loads larger than 400 pounds shall be designed per code. Submit structural calculations stamped and signed by a structural engineer licensed in the State of Oregon showing that the concrete-filled floor deck has sufficient capacity to support the load at the points of anchorage.

* + - 1. LUMINAIRES
				1. Light-Duty Ceiling Systems:

Attach No. 12 hanger wire from each corner of the luminaire to the structure above.

Positively and securely attach luminaire within 6 inches of each corner to the suspended ceiling framing member by mechanical means.

* + - * 1. Intermediate-Duty Ceiling Systems:

Positively and securely attach luminaire within 6 inches of each corner to the suspended ceiling framing member by mechanical means.

Attach No. 12 hanger wire within 3 inches of each corner of each luminaire.

Connect two 12-gauge slack wires from the luminaire housing to the structure above for luminaires weighing less than 56 pounds.

Support luminaries weighing 56 pounds or more directly from the structure above with approved hangers attached to each corner of the luminaire.

* + - * 1. Heavy-Duty Ceiling Systems:

Positively and securely attach luminaire within 6 inches of each corner to the suspended ceiling framing member by mechanical means.

Connect two 12-gauge slack wires from the luminaire housing to the structure above for luminaires weighing less than 56 pounds.

Support luminaries weighing 56 pounds or more directly from the structure above with approved hangers attached to each corner of the luminaire.

* + - 1. PULL AND JUNCTION BOXES
				1. Pull and junction boxes installed within the cavity of a suspended ceiling that is not a fire rated assembly may be attached to the suspended ceiling framing members, provided the following criteria are met:

Installation complies with the ceiling system manufacturer’s instructions.

Pull or junction box is not larger than 100 cubic inches.

The pull or junction box is supported to the main runner with two fastening devices that are designed for framing member application and positively attach or lock to the member.

The pull or junction box serves branch circuits and associated equipment in the area.

The pull or junction box is within 6 feet of the luminaires supplied.

The framing members are not rotated more than 2 degrees after installation.

* + - * 1. Pull and junction boxes installed within the cavity of a suspended ceiling may be attached to independent support wires, provided the following criteria are met:

Independent support wires are taut and connected at both ends, one end to the ceiling framing member and the other to the structure above.

Pull or junction box is not larger than 100 cubic inches.

The pull or junction box is secured to the independent support wires by two fastening devices that are designed for the application.

Independent support wires in a fire-rated ceiling are distinguishable by color, tagging or other effective means.

* + - 1. CABLES AND RACEWAY
				1. Cables and raceway installed within the cavity of a suspended ceiling may be attached to independent support wires provided the following criteria are met:

Independent support wires are taut and connected at both ends, one end to the ceiling framing member and the other to the structure above.

Raceways are not larger than one inch trade size and cables and bundled cables are not larger than one inch diameter including insulation.

Not more than three raceways or cables are supported by any independent support wire and are supported within the top or bottom 12 inches.

Cables for telecommunications, data processing, Class 2 power-limited signaling systems, fiber optics, and other power limited systems are securely fastened within 2 feet of each termination and at intervals not to exceed 5 feet or per the manufacturer’s installation instructions.

Raceways are secured at intervals required for the type of raceway installed.

Cables and raceway are secured to independent support wires by fastening devices and clips designed for the purpose.

Independent support wires are distinguishable by color, tagging, or other effective means.

* + - * 1. Cables and raceway installed within the cavity of a suspended ceiling may be supported with trapezes constructed of steel rods and channels provided the following criteria are met:

The size of the rods, channel, and fastening devices are suitable for the anticipated weight.

The spacing of the trapezes meets that required for the type of raceway installed.

Cables and raceway are secured to a trapeze by straps designed for the purpose.

Cables and raceway do not support other raceway or cables.

An appropriately sized seismic bracing system is installed.

END OF SECTION 260529