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.

There is a redlined version of this master in Div Pending. Verify with Irene Ng which version should be used.

SECTION 095400 – SPECIALTY CEILINGS

1. GENERAL
	* + 1. DESCRIPTION
				1. This section describes strip, decorative, aluminum linear metal pans and suspension systems for ceilings.
			2. REFERENCES
				1. ASCE: American Society of Civil Engineers

ASCE 7-10: Minimum Design Loads for Buildings and Other Structures

* + - * 1. ASTM: American Society for Testing and Materials

ASTM A641/A641M: Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

ASTM C635: Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings

ASTM E1264: Standard Classification for Acoustical Ceiling Products

ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials

* + - * 1. CISCA: Ceilings and Interior Systems Construction Association

CISCA Ceiling Systems Handbook

* + - * 1. IBC: International Building Code
				2. NAAMM: National Association of Architectural Metal Manufacturers

NAAMM Metal Finishes Manual for Architectural and Metal Products

* + - 1. SUBMITTALS
				1. Product Data: For each type of product indicated.
				2. Performance Data: For installed products indicated to comply with design loads and other criteria, include structural analysis and other analytical data signed and sealed by the qualified professional engineer responsible for their preparation.
				3. Samples for Verification: For each component indicated and for each exposed finish required, prepared on samples of size indicated below.

Linear Metal Pan: Set of 12-inch-long samples of each type and color and a 12-inch-long spliced section.

Suspension System Members: 12-inch-long sample of each type.

Exposed Molding and Trim: Set of 12-inch-long samples of each type, finish, and color.

Filler Strips: Set of 12-inch-long samples of each type, finish, and color.

Sound Absorber: 12 inches long.

End Cap: Full size.

* + - 1. QUALITY ASSURANCE
				1. Source Limitations: Obtain each set of linear metal pans and suspension systems from one source with resources to provide products of consistent quality in appearance, physical properties, and performance.
				2. Fire-Test-Response Characteristics: Provide linear metal ceilings with surface-burning characteristics complying with ASTM E1264 for Class A materials, as determined by testing identical products per ASTM E84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
				3. Design and construct ceilings to resist lateral and wind forces according to structural general notes. Submit calculations, drawings and specifications to City of Portland Bureau of Development Services stamped and signed by registered professional structural engineer licensed in the state of Oregon. Comply with the IBC, as amended by the State of Oregon and as enforced by the City of Portland Bureau of Development Services, and install under permit in accordance with such design. Provide bracing above ceiling as required; compute and brace for each direction separately. At exterior, design to resist uplift.
				4. Mock-Up: Prior to installation of each type of metal ceiling system, install sample ceiling mock-up using materials and systems required for final work. Install mock-ups in locations at site as directed, each compromising an area of not less than 12' x 12', including at least one of each element required for the project, including air inlets and outlets, fire sprinklers, access doors and light fixtures. Unless otherwise indicated, mock-up may be incorporated into final metal ceiling systems.
			2. DELIVERY, STORAGE, AND HANDLING
				1. Deliver linear metal pans, suspension system components, and accessories to work site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
				2. Handle metal ceiling systems components carefully to avoid chipping edges or damaging units in any way.
				3. Comply with instructions and recommendation of manufacturer for special delivery, storage, and handling requirements.
			3. PROJECT CONDITIONS
				1. Environmental Limitations: Do not install linear metal ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for work when occupied for its intended use.
			4. COORDINATION
				1. Coordinate layout and installation of linear metal pans and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.
1. PRODUCTS
	* + 1. METAL SUSPENSION SYSTEMS
				1. Metal Suspension Systems Standard: Provide ceiling manufacturer's standard metal suspension systems of types and finishes indicated that comply with applicable ASTM C635 requirements.
				2. Suspension Systems: Provide systems complete with carriers, splice sections, connector clips, alignment clips, leveling clips, hangers, molding, trim, retention clips, load-resisting struts, fixture adapters, and other suspension components required to support ceiling units and other ceiling-supported construction.
				3. Attachment Devices: Size for five times the design load indicated in ASTM C635, Table 1, Direct Hung, unless otherwise indicated.
				4. Wire Hangers, Braces, and Ties: Provide wire complying with the following requirements:

Zinc-Coated Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.

Size: Select wire diameter so its stress at 3 times the hanger design load (ASTM C635, Table 1, Direct Hung) will be less than yield stress of wire, but provide not less than 0.106-inch- diameter wire.

* + - * 1. Carriers: Provide manufacturer’s standard system; complete with submembers, clips, accessories and trim; of the sizes and strength required to accommodate and support the ceiling units and other work supported by the ceiling system; with deflections limited to 1/360 x span (between support points of members). Provide the metal, finish hangers and other items as indicated or, if not otherwise indicated, provide manufacturer’s standard products recommended by the manufacturer for the indicated application.

Finish: Matte-black factory baked finish, if available as a standard manufacturer’s option.

Comply with the requirements of ASTM C635, as applicable to the suspended metal acoustical ceiling system material indicated.

Coordination of Components: Provide system which is coordinated with indicated limitations and requirements for hanging from structure and supporting light fixtures, HVAC components and similar work indicated to be supported by or located in suspended metal ceiling systems. Include the necessary components for a complete suspension system including (as applicable) inserts, anchors, hangers, carrying channels, main runners, cross runners, splines, edge molding, splices, clips, fasteners, springs, tie wires, hold-down devices and similar members, devices and accessories.

* + - * 1. Carrier Splices: Same metal, profile, and finish as indicated for carriers.
				2. Stabilizer Channels, Tees, and Bars: Manufacturer’s standard components for stabilizing main carriers at regular intervals and at light fixtures, air-distribution equipment, access doors, and other equipment; spaced as standard with manufacturer for use indicated; and factory finished with matte-black baked finish.
				3. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.
				4. Hold-Down Clips: Manufacturer's standard hold-down clips spaced as standard with manufacturer.
			1. ALUMINUM PANS AND SUSPENSION SYSTEM FOR LINEAR METAL CEILING LMC

Note: Concourse Corridor Connection ceiling was two-inch wide face.

* + - * 1. Ceiling Type “LC-1” (Corridor):

Acceptable Manufacturer and Product: Interfinish "Planar Macro" with 3 5/8-inch wide face, or pre-bid approved equal.

Color: Custom, matching Miller 5760W.

* + - * 1. Ceiling Type “LC-2” (Restrooms):

Acceptable Manufacturer and Product: Interfinish “Luvr-Grid” open cell ceiling system with 8" x 8" cells, 2' x 2' panels with each grid member having 1-inch face and 5-inch depth.

Other Acceptable Manufacturers: American Decorative, Hunter Douglas, or pre-bid approved equal.

Color: Custom, matching Ceramic Tile CT-1.

* + - * 1. Ceiling Type “LC-3” (Holdrooms, Ticket Lobby, Bag Claim and Terminal Circulation):

Acceptable Manufacturer and Product: Hunter Douglas “Luxolon” with 3-5/32-inch wide face, or pre-bid approved equal.

Color: Dover #0286.

Note: See Port drawing PDX 1998-500 detail 14/A 10.06.

* + - * 1. Ceiling Type “LC-4A” (North and South Concourse Lobby):

Acceptable Manufacturer and Product: Interfinish Custom hanging fin to match existing, or pre-bid approved equal.

Color: Custom, matching Miller 5760W.

Note: See Port drawing PDX 1998-500 detail 11/A 10.06.

* + - * 1. Ceiling Type “LC-4B” (North and South Concourse Lobby): Same as “LC-4A” except with larger section.

Acceptable Manufacturer and Product: Interfinish Custom hanging fin to match existing, or pre-bid approved equal.

Color: Custom, matching Miller 5760W.

* + - * 1. Ceiling Type “LC-5” (Bag Claim Fixture):

Acceptable Manufacturer and Product: Custom made by Hanset Sheet Metal, Portland, OR, or pre-bid approved equal.

Color and Material: Satin stainless steel 14 gage, with 1/8 inch round holes on 3/16 inch staggered centers, 40 percent open.

* + - * 1. Ceiling Type “LC-6” (South Concourse Lobby):

Acceptable Manufacturer: Ceilings Plus (800-822-3411) , or pre-bid approved equal.

Color and Material: White, 1/16 inch by 1 inch long oblong perforations staggered; with white SoundTex acoustical fabric glued to top surface (in addition to acoustical pads).

* + - * 1. Classification: Units complying with ASTM E1264 for Type XIII, aluminum strips with mineral- or glass-fiber-base backing; Form 2, nonperforated.
				2. Pan Edge Detail: Manufacturer’s standard edge detail.
				3. Linear Module Width and Pan Face Width: 4-inch module width and 1-inch face width.
				4. End Cap, Finish of Exposed Portions: Match pan and provide at all soffits, walls, and the like.
				5. Noise Reduction Coefficient: Not less than 0.7.
				6. Suspension-System Main-Carrier Material: Aluminum
				7. Acoustical Pads: Mineral fiber or glass fiber pads of manufacturer’s standard density and thickness (but not less than one inch thick); black color; with surfaces treated to prevent dusting, or encased in a paper or plastic cover to prevent dusting. Provide at all ceiling types.
			1. ACCESSORIES
				1. Access Panels: For access at locations indicated, provide door hinge assembly, retainer clip, and retainer bar, assembled with ceiling panels and carrier sections into access doors of required size, permitting upward or downward opening.
			2. FINISHES, GENERAL
				1. Comply with NAAMM's “Metal Finishes Manual for Architectural and Metal Products” for recommendations for applying and designating finishes.
				2. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved samples and are assembled or installed to minimize contrast.
			3. ALUMINUM FINISHES
				1. Color-Coated Finish: Manufacturer’s standard baked paint finish complying with coating manufacturer’s written instructions for surface preparation, pretreatment, application, baking, and minimum dry film thickness.
1. EXECUTION
	* + 1. EXAMINATION
				1. Examine substrates, areas, and conditions, including structural framing and substrates to which linear metal ceilings attach or abut, for compliance with requirements specified in this and other sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of linear metal ceilings.
				2. Proceed with installation only after unsatisfactory conditions have been corrected.
			2. PREPARATION
				1. Measure each ceiling area and establish layout of linear metal pans to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width pans at borders, and comply with layout shown on reflected ceiling plans.
			3. INSTALLATION, GENERAL
				1. General: Install linear metal ceilings to comply with the IBC, per manufacturer's written instructions, and CISCA’s “Ceiling Systems Handbook.”
				2. Suspend ceiling hangers from building’s structural members and as follows:

Install hangers plumb and free from contact with insulation or other objects within plenum that are not part of supporting structure or of ceiling suspension system.

Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

Where width of ducts and other construction within plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

Do not attach hangers to steel roof deck. Attach hangers to structural members.

Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated; and provide hangers not more than 8 inches from ends of each member.

* + - * 1. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building’s structural members as required for hangers but without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or post-installed anchors.
				2. PAFs with silencers are allowed for suspended ceiling applications, in accordance with ASCE 7-10, Chapter 13, and as described in Section 017000, Execution Requirements.
				3. Install edge moldings and trim of type indicated at perimeter of linear metal ceiling area and where necessary to conceal edges and ends of linear metal pans.

Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet . Miter corners accurately and connect securely.

Do not use exposed fasteners, including pop rivets, on moldings and trim.

* + - * 1. Install suspension system carriers so they are aligned and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
				2. Cut linear metal pans for accurate fit at borders and at interruptions and penetrations by other work through ceilings. Stiffen edges of cut units as required to eliminate evidence of buckling or variations in flatness exceeding referenced standards for stretcher-leveled metal sheet.
				3. Install linear metal pans in coordination with suspension system and exposed moldings and trim.

Align joints in adjacent courses to form uniform, straight joints parallel to room axis in both directions, unless otherwise indicated.

Fit adjoining units to form flush, tight joints. Scribe and cut units for accurate fit at borders and around construction penetrating ceiling.

Install pans with butt joints using internal pan splices and in the following joint configuration:

Staggered a minimum of 12 inches.

Where metal pan ends are visible, install end caps unless trim is indicated.

Install filler strips where indicated.

Install sound-absorbent pads at right angle to perforated metal pans so pads do not hang unsupported.

Provide access sections of sizes required below mechanical items (VAV boxes, controls, valves, and other items requiring service.)

* + - 1. CLEANING
				1. Clean exposed surfaces of linear metal ceilings, including trim and edge moldings after removing strippable, temporary protective covering if any. Comply with manufacturer’s written instructions for stripping of temporary protective covering, cleaning, and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage, including dented and bent units.

END OF SECTION 095400