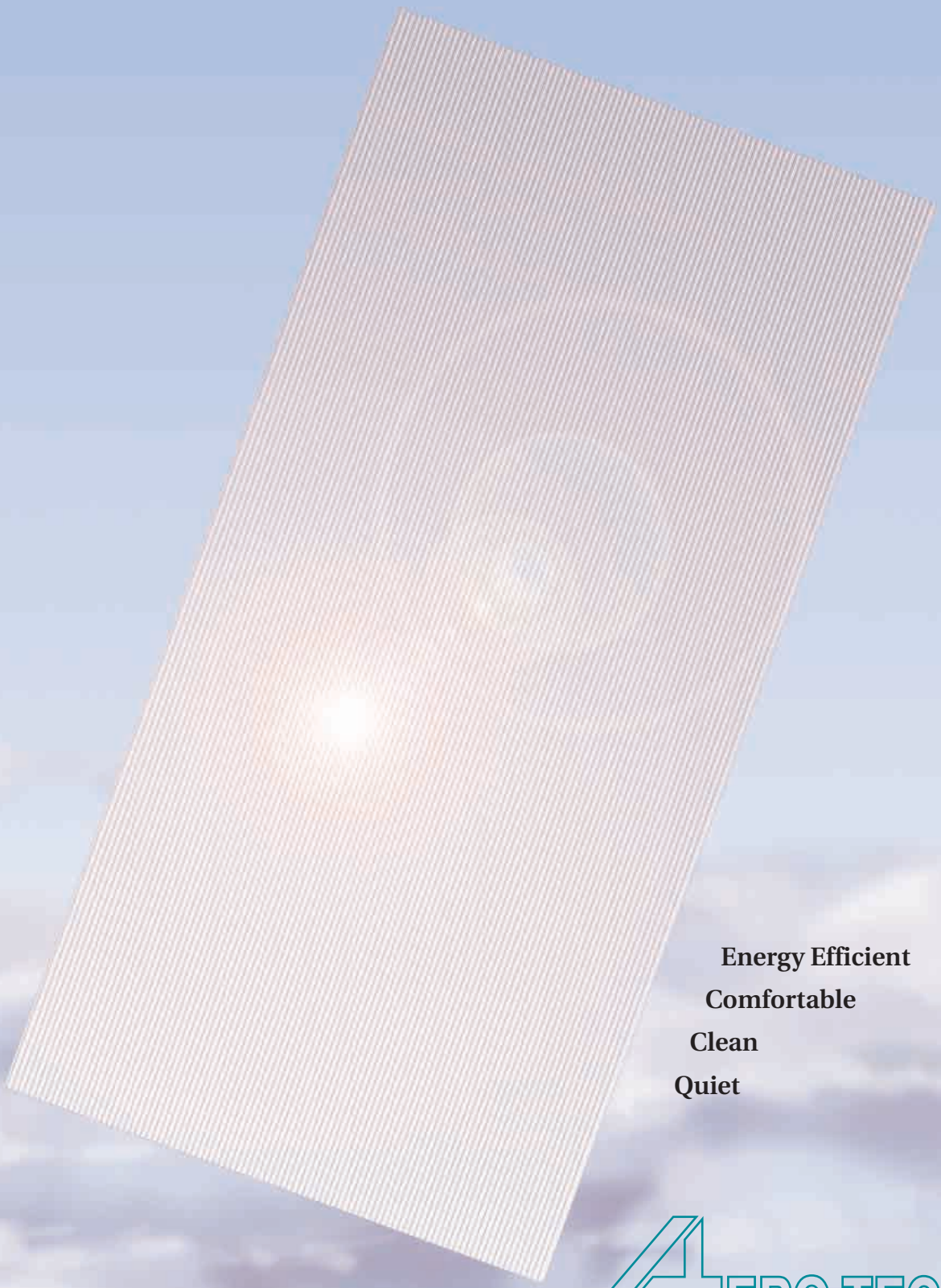
Radiant Linear Extruded Panels—Low Pressure Drop



Energy Efficient

Comfortable

Clean

Quiet

AERO TECH

395 West 1100 North • North Salt Lake, Utah 84054 • TEL (801) 292-0493 • FAX (801) 292-9908

WATER PRESSURE DROP FOR RADIANT LINEAR EXTRUDED PANELS

Water Flow Rate (GPM)	Head Loss in Feet of Water Per 100 Feet of *.578 ID Tube*
3.0	12.00
2.9	11.50
2.8	10.90
2.7	10.30
2.6	9.50
2.5	9.00
2.4	8.50
2.3	7.80
2.2	7.30
2.1	6.60
2.0	6.20
1.9	5.70
1.8	5.30
1.7	4.80
1.6	4.40
1.5	4.00
1.4	3.60
1.3	3.20
1.2	2.90
1.1	2.50
1.0	2.10
0.9	1.90
0.8	1.50
0.7	1.30
0.6	0.90
0.5	0.70

To ensure proper system performance, design flow rates below 0.5 US gallons per minute are not recommended

HEATING PERFORMANCE FOR RADIANT LINEAR EXTRUDED PANELS

MWT (Deg. F)	Perimeter BTU/Hr Lineal Foot								Interior BTU/Hr Square Foot
	6" Wd 1 Tube	8" Wd 2 Tube	12" Wd 2 Tube	16" Wd 4 Tube	18" Wd 3 Tube	24" Wd 4 Tube	30" Wd 5 Tube	36" Wd 6 Tube	
120	47	62	90	117	129	164	195	231	70
125	53	70	102	131	145	183	219	258	78
130	60	78	113	145	161	202	243	285	86
135	66	86	125	161	178	225	269	318	96
140	72	94	137	177	196	248	295	351	105
145	78	103	149	192	213	269	320	378	114
150	84	111	161	207	229	290	345	405	123
155	91	120	174	224	247	312	369	437	133
160	98	129	187	240	265	334	393	468	142
165	104	137	199	256	283	357	421	500	152
170	111	145	211	272	301	380	450	531	162
175	118	155	225	290	321	405	479	561	172
180	126	165	239	308	341	430	508	591	183
185	133	175	253	326	361	455	538	624	193
190	141	184	267	344	381	480	568	657	204
195	148	194	280	361	399	502	591	685	213
200	155	203	294	377	417	524	615	713	223
205	162	213	308	396	437	550	645	748	234
210	170	223	323	415	458	576	675	783	245
215	177	232	337	433	478	601	706	819	255
220	185	242	351	451	498	626	738	855	266
225	192	251	364	468	517	650	766	888	276
230	199	261	378	485	536	674	795	921	286

Use these performance values directly in standard ASHRAE heat loss calculations. Performance values are from certified data based on 70 degree AUST (Average Unheated Surface Temperature), natural convection, and 1 inch, 3/4 Pounds/Cubic Foot insulation on top of panel

CONCEPT OF RADIANT HEATING

Radiant heat transfer works much like sunlight: heat moves from the warm panel to the cooler objects in the room being heated until a temperature equilibrium is reached. Aero Tech Radiant Ceiling Systems function on the basis of providing a comfortable environment by controlling surface temperature and minimizing excess air motion and temperature within the conditioned space.

Like the light energy from a lighting fixture illuminates the room, a radiant ceiling panel emits thermal energy, which is absorbed and re-radiated by all elements in the room.

Radiant heat transfer results in an energy-efficient, cost-effective way to heat almost any kind of building

LPD PANEL CONSTRUCTION

LPD ceiling panels are constructed of 6" or 8" wide extruded aluminum strips of approximately .080" overall thickness. Active strips have a .578 ID (16mm-5/8" OD) copper tube inserted into a "U" shaped channel on the back of the extrusion. This channel is formed more than halfway around the copper tube for increased thermal conduction and to eliminate any separation of the copper tube and the aluminum strip. Tube ends are swaged to accept a 1/2" (5/8" OD) Type "L" soft copper tube without the need for fittings.

Standard panel maximum length is 12' (lengths up to 16' can be fabricated on *special request only,* and after review for additional cost due to handling the extended lengths). Panels can be constructed in any width utilizing any combination of 6", and 8" wide extruded aluminum strips

Matching, non-radiant (inactive) panel can be provided on request.

LPD Panels are factory assembled and finished, in a large variety of standard or custom option. Including the ability to curve the panel along the length (Please contact Aero Tech regarding curving guide lines).

SPECIFICATION FOR AERO TECH RADIANT PANELS

MANUFACTURER QUALIFICATIONS

This specification is based on the Radiant Ceiling employing Radiant Panels, and matching Non-Radiant Panels (as required) manufactured by AERO TECH MANUFACTURING INC. 395 West 1100 North, North Salt Lake, Utah 84054

Published performance data and dimensional specifications are included in this booklet, provided by the manufacturer. Performance and capacity data is to be based on testing performed by the manufacturer or confirmed by a testing laboratory recognized in the industry.

The manufacturer shall demonstrate his capability in engineering, manufacturing and financial resources to the satisfaction of the Architect and Engineer, and shall have continuously been in the business of manufacturing radiant panels for a minimum of five (5) years

RADIANT PANEL PERFORMANCE REQUIREMENTS

The Radiant Panel will have a minimum heating output of _____ BTU/HR LN FT for _____" wide panel at _____ degree F mean water temperature when the room temperature is 70 degrees F, the roof is of medium insulation value and natural convection prevails in the room.

CONTRACTORS QUALIFICATIONS

Installation of the Radiant and Non-Radiant Panels will be performed by a qualified contractor, and installed as recommended by the manufacturer. The contractor must be experienced in the installation of radiant ceilings and is to provide all labor, materials, tools, service and supervision for a complete functional system as shown on the mechanical and architectural plans. Materials furnished by the contractor shall include all components required for the ceiling as specified on the room finish schedule.

CONTRACTOR RESPONSIBILITIES

Install the Radiant and Non-Radiant Panels complete in accordance with the manufacturer's recommendations and to the satisfaction of the Architect and Engineer. Approximate wet weight of panels is 2.8 pounds per square foot.

Contractor shall abide by the architectural and mechanical drawings, room finish schedule and architectural details for correct placement of all panels. Shop drawings at 1/8" scale may be submitted by the contractor showing layouts and details of all areas where Radiant and Non-Radiant Panels are indicated. Aero Tech will create shop drawings that include the Mechanical plan and Architectural Reflected Ceiling plan. Please contact our local Sales Rep for cost involved. In order to create the most accurate shop drawings, Aero Tech needs high quality PDFs (no scans), or CAD files showing the mechanical piping and reflected ceiling plans.

Radiant Panel shop drawings should show a complete pre-engineered, designed and tested system, including Aero Tech Radiant and Non-Radiant Panels, suspension components, interconnecting piping, edge moldings, soffits, fascia, trim and all other details and materials (as required).

Radiant Panels
Radiant Panels shall be Aero Tech extruded aluminum with copper tube inserted into "U" shaped channel on back of extrusion. Finished as specified.

Non-Radiant Panels (as required)
Non-Radiant Panels shall be Aero Tech extruded aluminum. Finish to match Radiant Panels.

Insulation
Insulation on top of panels should be minimum of 1" thick 3/4 Pound/Cubic Foot, glass fiber pad

Chart 1; Width Opening Between Panel Supports	
Panel Width [1]	**Opening Dimension**
Panels Utilizing Any Combination Of Stock Extrusion	See Chart Below

1.) Panel widths can be fabricated from 6” or 8”; or any combination of 6” or 8” strip (see extrusion drawings for types and styles available)

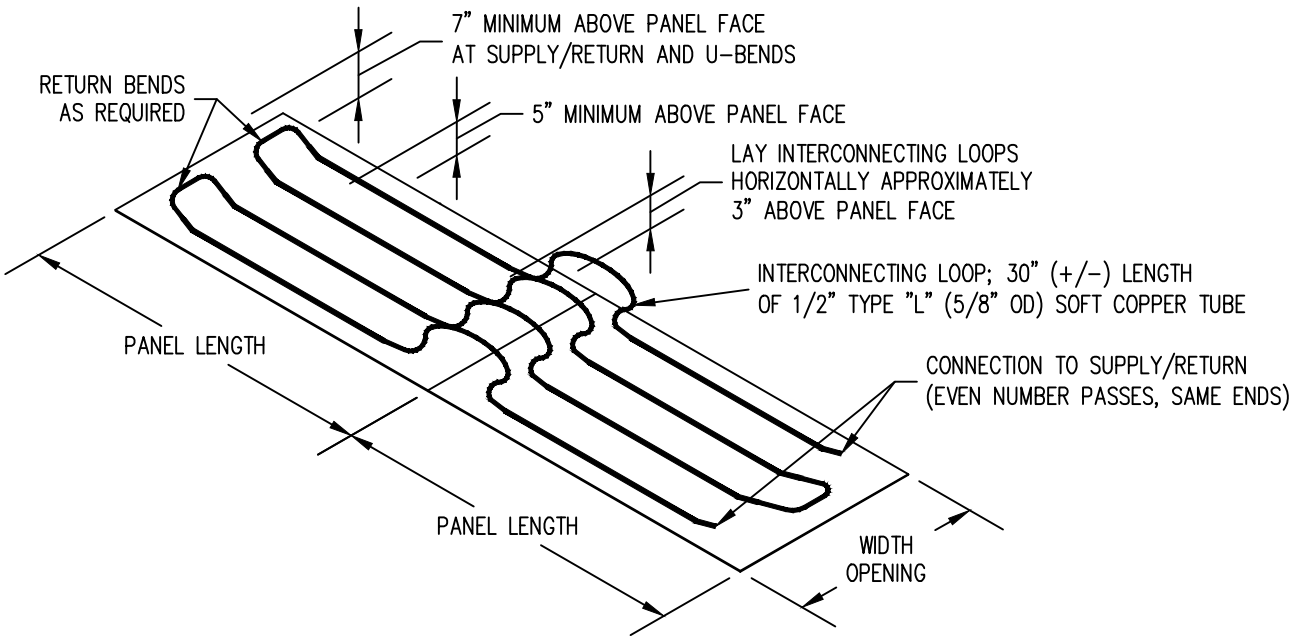
Chart 2; Panel Length [2]	
Scheduled Length	Panel Finished Length
1’-0” to 8’-0” Scheduled Lgt	Minus 1/4" From Scheduled Lgt
8’-1” to 12’-0” Scheduled Lgt [3]	Minus 3/8" From Scheduled Lgt
12’-1” to 16’-0” Scheduled Lgt	Minus 1/2" From Scheduled Lgt

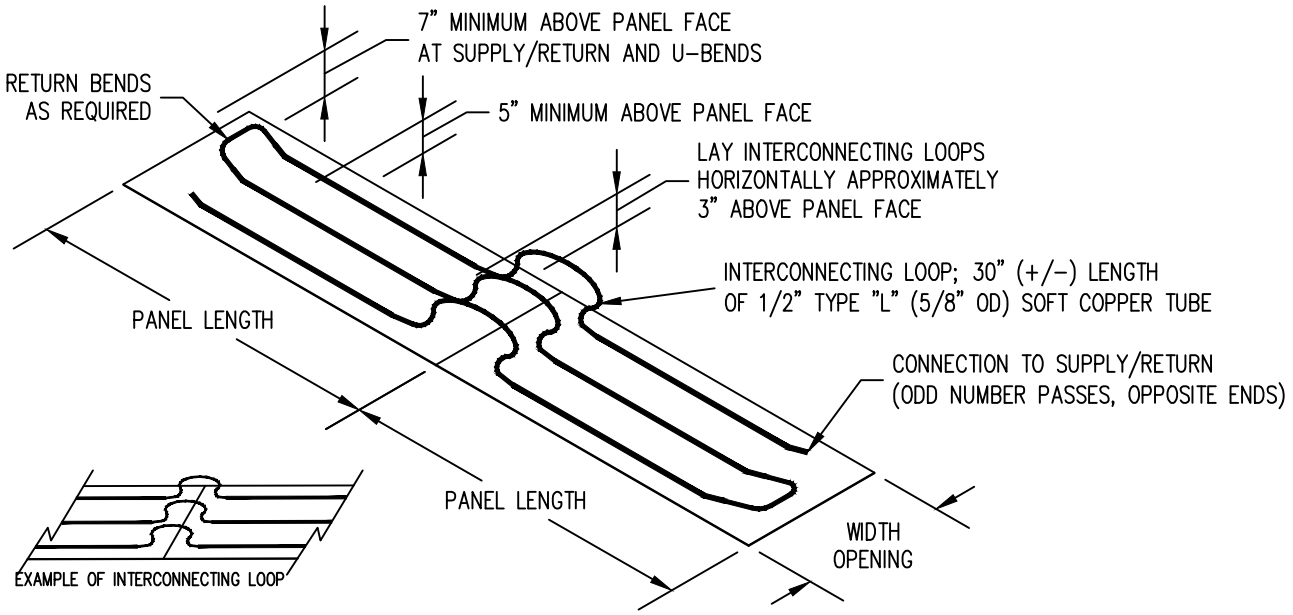
2.) Panels are fabricated to a standard length rounded up to the nearest 6” or 12” as appropriate. *Upon request* panels will be fabricated to an actual length of scheduled length minus the appropriate expansion allowance indicated in the “Panel Finished Length” column above.

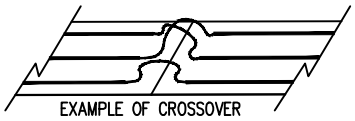
3.) Standard panel maximum length is 12’-0”. Panel runs longer than 12’-0” will be split into multiple panels (lengths up to 16’-0” can be fabricated on *special request only*, and after review for additional cost due to handling the extended lengths).

Panel	Clear Opening Width
6"	6-1/4"
8"	8-5/16"
12"	12-1/8"
16"	16-1/4"
18"	18-1/8"
20"	20-1/8"
24"	24-1/8"
30"	30-1/16"
36"	36"

RADIANT LINEAR EXTRUDED, LOW PRESSURE DROP PANEL (LPD)







CLEARANCE AND SIZES (A)

– FOR WIDTH OPENING, SEE CHART 1 FOR PANEL LENGTH, SEE CHART 2 –
– STANDARD MAXIMUM SINGLE PANEL LENGTH 12'–0" (UP TO 16'–0" ON SPECIAL REQUEST) –
– ALL MITERS, NOTCHES AND CUTS TO BE PERFORMED IN FIELD BY INSTALLER –
– GROOVED EDGE OF PANEL ASSEMBLY TO BE TOWARD WALL –

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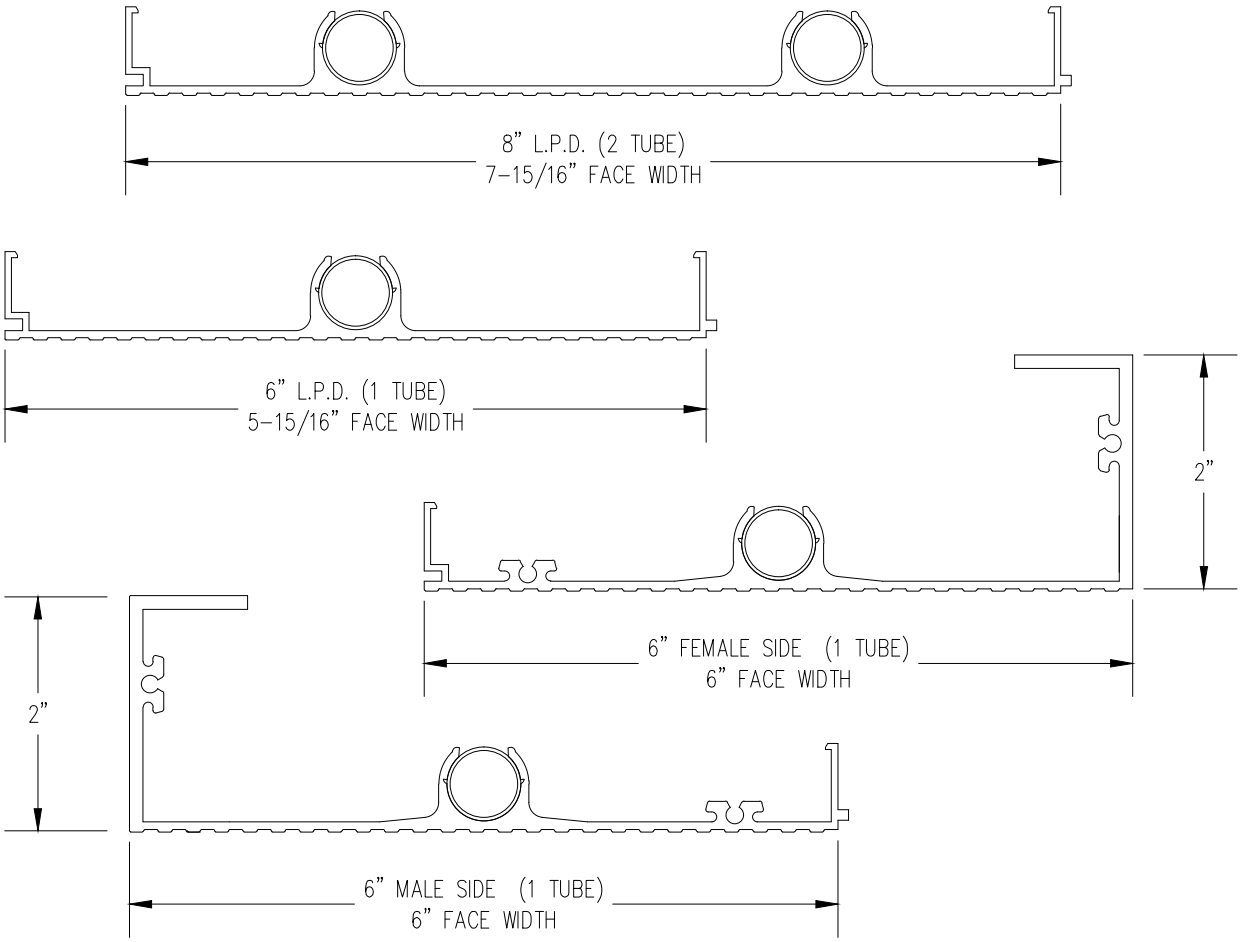
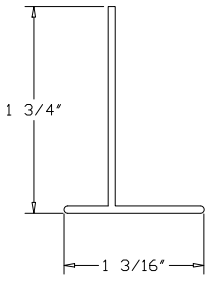
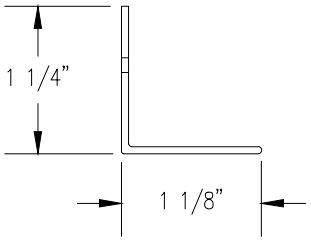
RADIANT LINEAR EXTRUDED, LOW PRESSURE DROP PANEL (LPD)

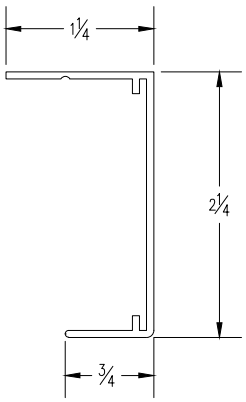


LOW PRESSURE DROP EXTRUSIONS (A)





WALL ANGLE (B)
CPEX-0006
10' LENGTHS



RECESS MOUNT FRAME (C)
CPEX-0004
10' LENGTHS

SURFACE MOUNT FRAME (D)
CPEX-0001
12' LENGTHS

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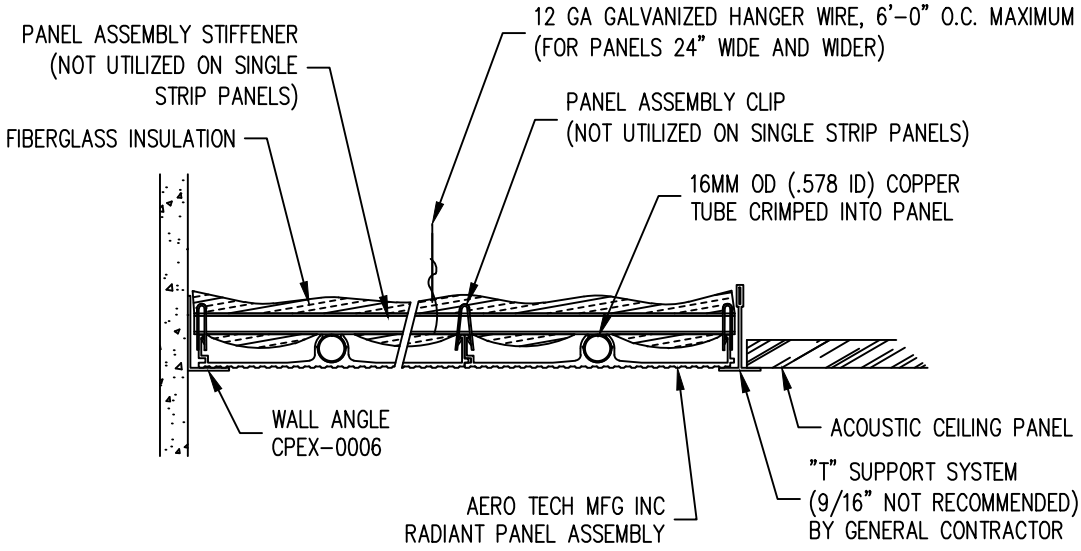
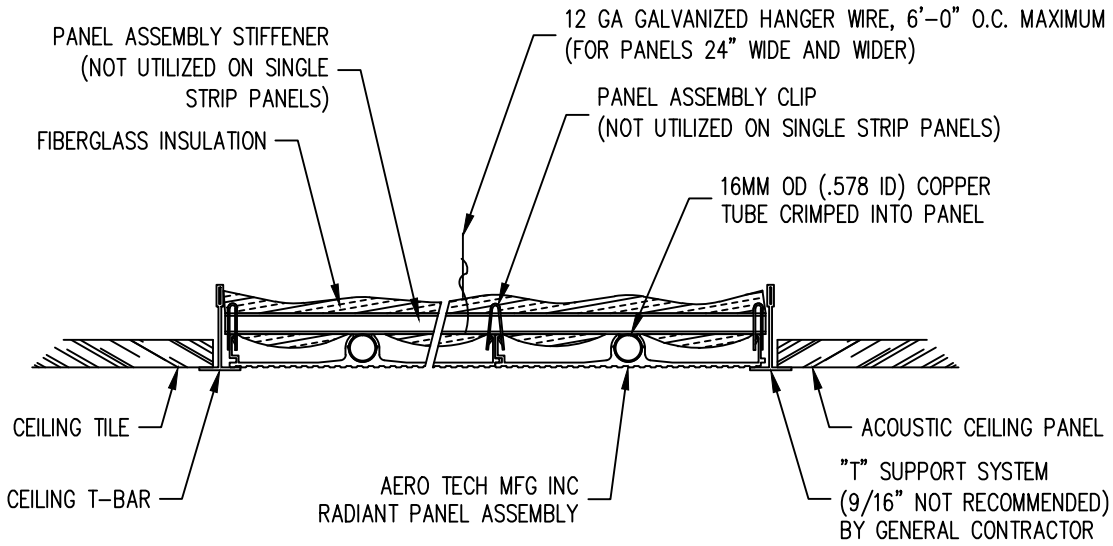
RADIANT LINEAR EXTRUDED, LOW PRESSURE DROP PANEL (LPD)

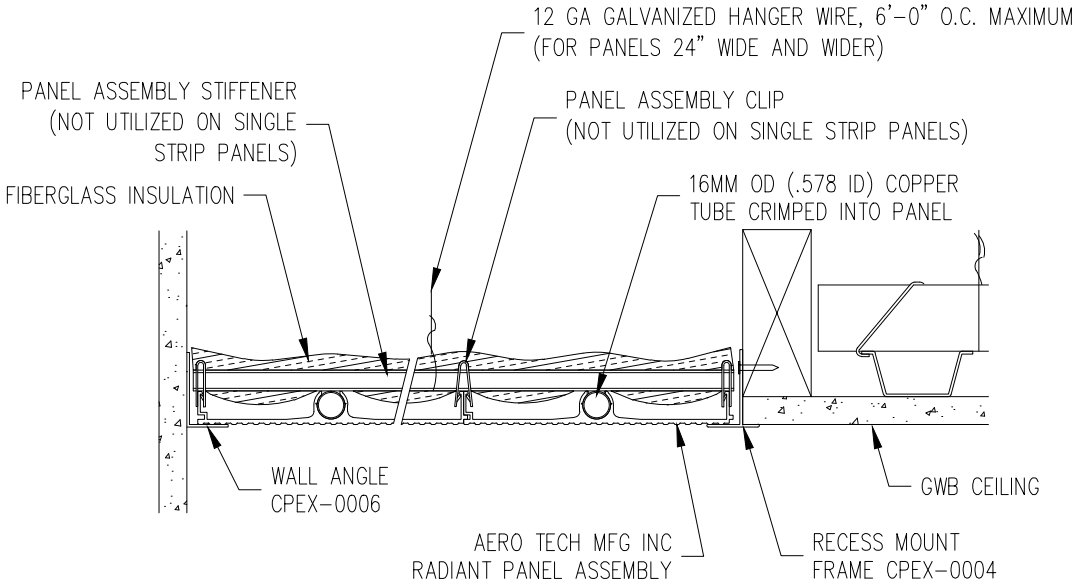


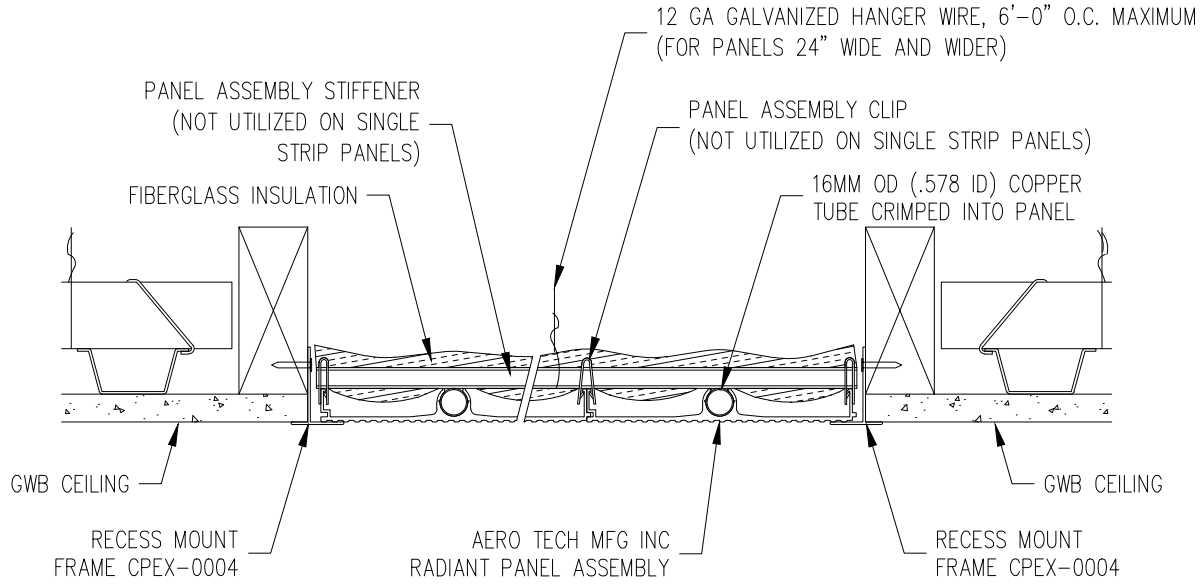


SUSPENDED ACOUSTIC
CEILING APPLICATION Ⓐ

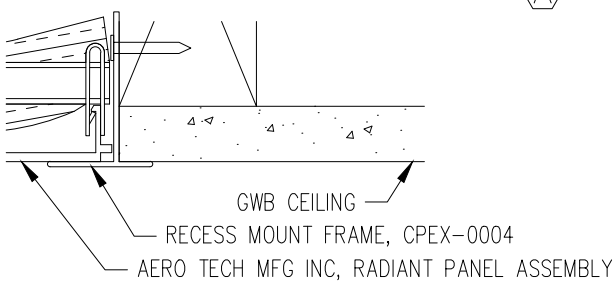
– FOR WIDTH OPENING, SEE CHART 1 – FOR PANEL LENGTH, SEE CHART 2 –

RADIANT LINEAR EXTRUDED, LOW PRESSURE DROP PANEL (LPD)





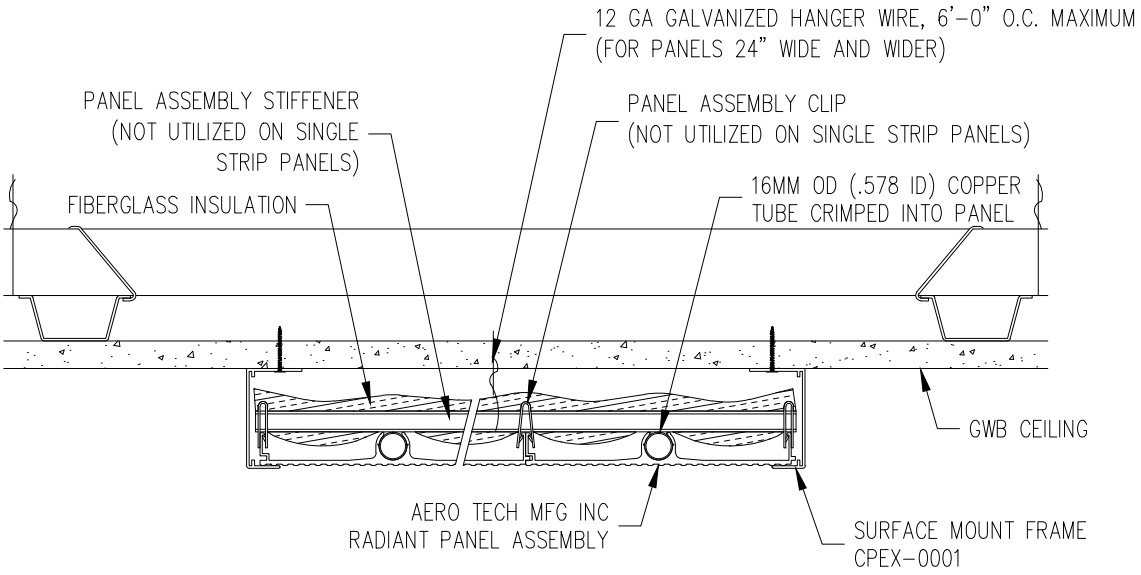
GWB CEILING APPLICATION (A)



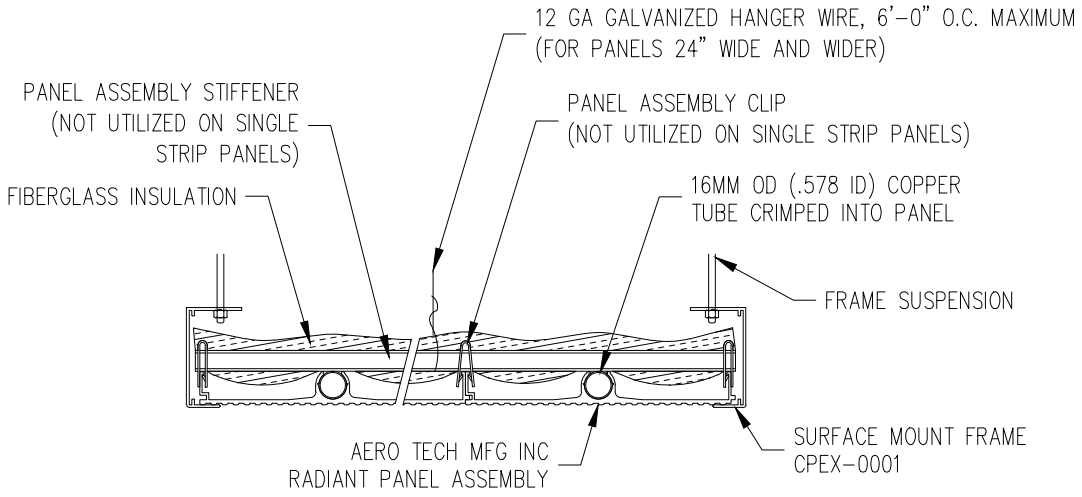
RECESS FRAME DETAIL (B)

– FOR WIDTH OPENING, SEE CHART 1 – FOR PANEL LENGTH, SEE CHART 2 –

RADIANT LINEAR EXTRUDED, LOW PRESSURE DROP PANEL (LPD)



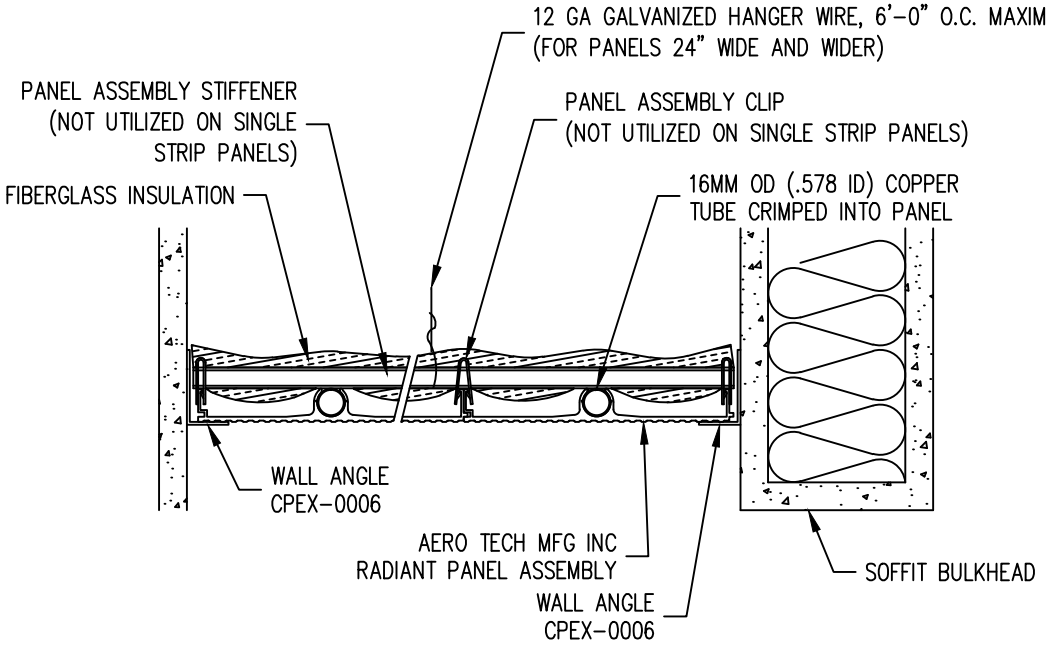
SURFACE MOUNT APPLICATION (A)



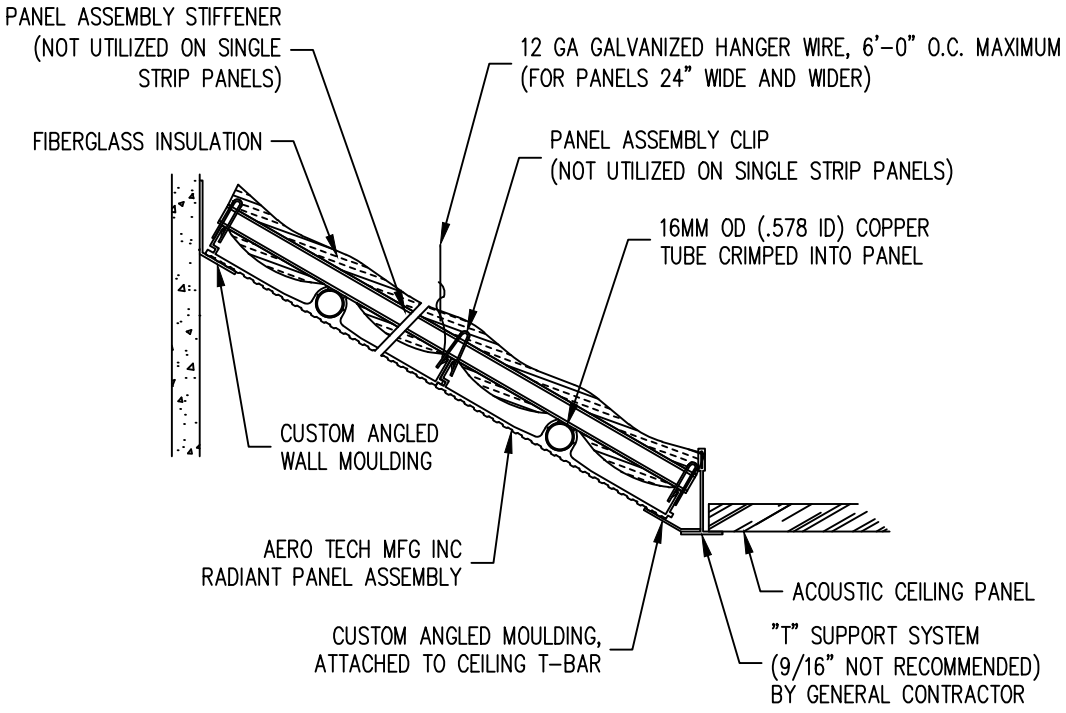
SUSPENDED MOUNT APPLICATION (B)

– FOR WIDTH OPENING, SEE CHART 1 – FOR PANEL LENGTH, SEE CHART 2 –

RADIANT LINEAR EXTRUDED, LOW PRESSURE DROP PANEL (LPD)



SOFFIT APPLICATION (A)

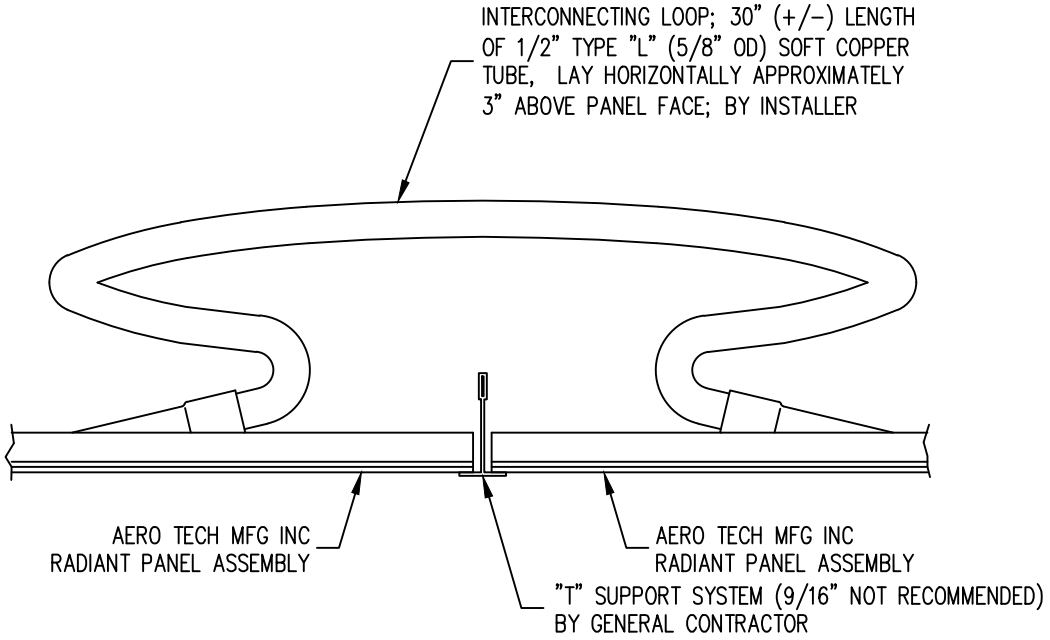


ANGLED MOUNT AND CUSTOM APPLICATION (B)

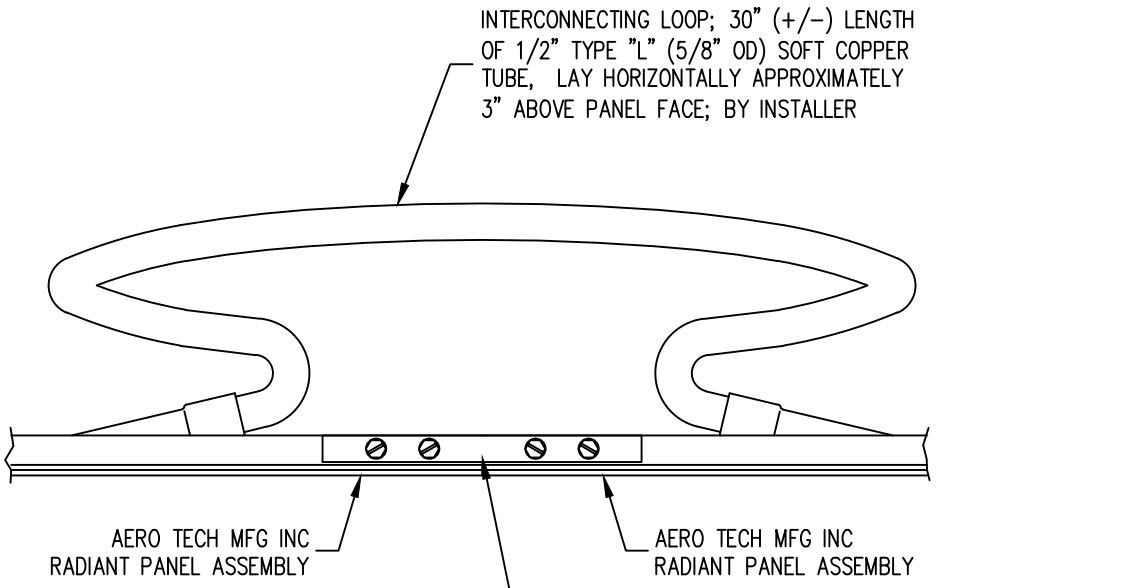
PANEL CAN BE MOUNTED IN A VARIETY OF CUSTOM WAYS INCLUDING, VERTICAL WALL MOUNTED AND INVERTED MOUNTING

– FOR WIDTH OPENING, SEE CHART 1 – FOR PANEL LENGTH, SEE CHART 2 –

RADIANT LINEAR EXTRUDED, LOW PRESSURE DROP PANEL (LPD)



STANDARD JOINT DETAIL (A)



SPECIAL BUTT JOINT DETAIL (B)

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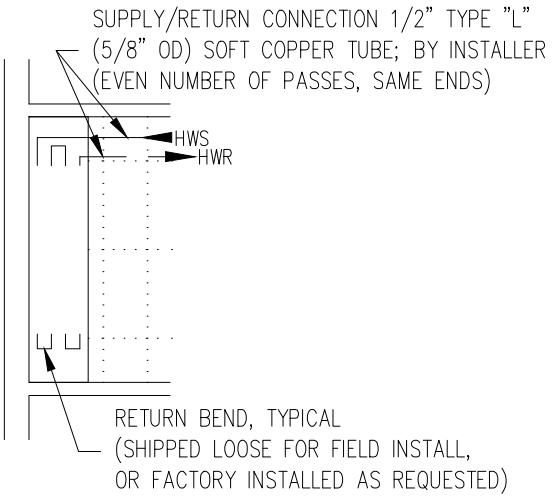
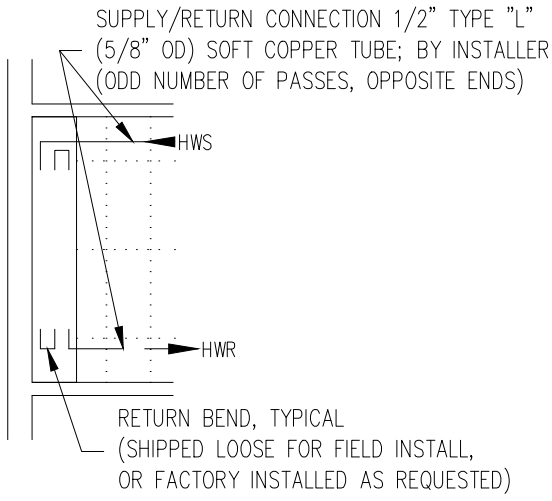
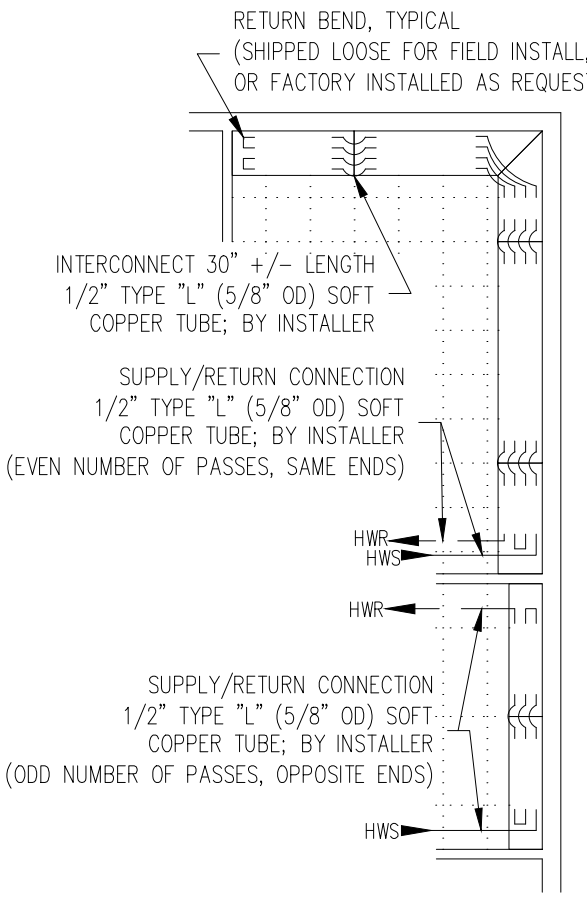
RADIANT LINEAR EXTRUDED, LOW PRESSURE DROP PANEL (LPD)

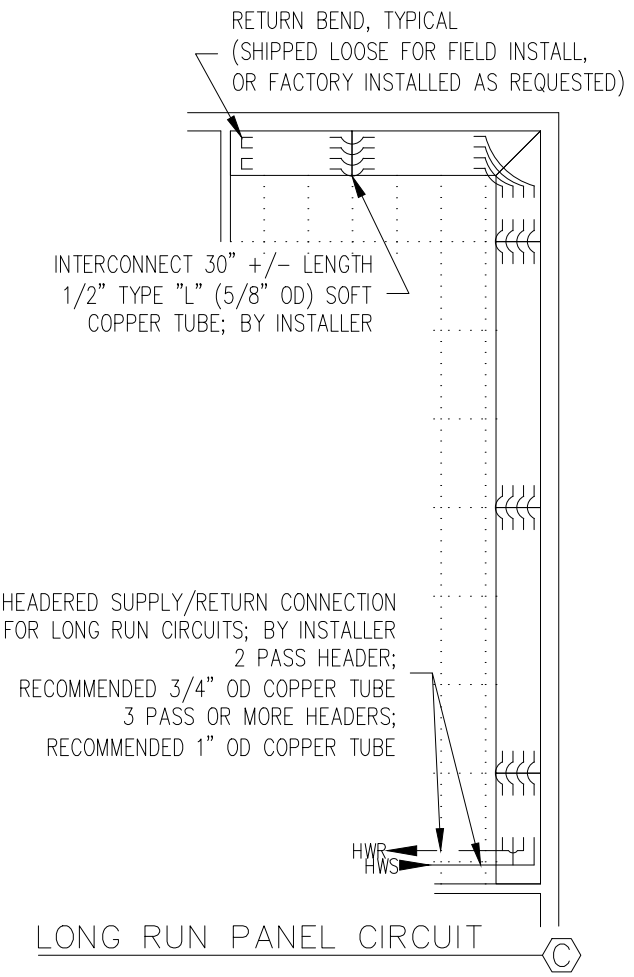




SINGLE PANEL CIRCUIT (A)



MULTIPLE PANEL CIRCUIT (B)



LONG RUN PANEL CIRCUIT (C)

– STANDARD MAXIMUM SINGLE PANEL LENGTH 12'–0" (UP TO 16'–0" ON SPECIAL REQUEST) –
– ALL MITERS, NOTCHES AND CUTS TO BE PERFORMED IN FIELD BY INSTALLER –
– GROOVED EDGE OF PANEL ASSEMBLY TO BE TOWARD WALL –

AERO TECH

INSTALLATION

In a typical installation, the suspension system should consist of 3/4" wide wall molding and 15/16" wide main tees and butt cut cross tees. Other suspension systems may be used provided there is sufficient and uniform support around the periphery of the panel. The panel should lie on supports uniformly.

Cut panel to required length (panel standard maximum length is 12'-0", however lengths up to 16'-0" are provided upon special request), using a blade designed for non-ferrous metals (recommended, for circular saw use carbide tip blade with approximately 40 teeth on 7 1/4" diameter, for reciprocating saws use blade with 8 to 12 teeth per inch). Cut panels from face side, *protecting the face from damage in all cases*. Cut lengths allowing for expansion; panels up to 8'-0" should be 1/4" shorter than opening, panels 8'-1" to 12'-0" should be 3/8" shorter than opening (12'-1" to 16'-0" should be 1/2" shorter than opening).

Mark and cut any other features, miters, notches, etc. as required. Tubes that may be cut through can be lifted free from channel by carefully prying back the channel around the tube approximately 4 to 6 inches (do not puncture tubing).

Panels are supplied completely assembled, return bends shipped loose (unless specified otherwise) fabricated from 1/2" type "L" soft copper tubing.

Lift tube ends from channel, being careful not to kink tube, prior to placing panel in position

Place panel in ceiling suspension system with grooved edge toward wall.

For all panel assemblies opening should be panel face width plus 3/8" (for example: an 18" wide panel made from three, 6" strips = opening of 18-1/8").

Aero Tech recommends the use of soft cotton gloves when handling panels.

A 12 gauge, hanger wire should be attached to stiffeners on the back of panels 24 inches in width or wider at 6'-0" O.C. maximum or every other stiffener (minimum two per panel). Panels over 40 inches in width should have two hanger wires on stiffeners at each end of the panel.

Connect panel to supply and return run outs using 1/2" type "L" soft copper tubing. Because Aero Tech panels are swaged to 5/8" ID, the 1/2" type "L" tubing can be soldered directly inside without the need for fittings or flaring.

Panels connected in series are connected with approximately 30" of 1/2" type "L" tubing formed into and over bent horseshoe configuration. Make connection with interconnecting loop laying horizontally approximately 3" above panel face. Install a ceiling Tee at panel joints to allow for expansion and cover cut edges. Make any other connection as required again using 1/2" type "L" soft copper tubing.

With panel in installed; place insulation on back of panel, as specified.

OPERATION

Start-up
Once boilers are operating and circulators are functioning, set control valves to the full flow position and gradually allow the system to come up to design temperature. Design temperature drop will only be achieved at the design load.

Balancing
Balancing for heating is most effectively done on a cloudy winter day.

Start at the farthest panel from the zone supply and establish the mean water temperature with a surface pyrometer. Adjust all other radiant panels to the same mean water temperature by adjusting the balancing valves.

Place automatic control valves in operation, calibrate room thermostat and set at design point. Check function of all valves.

Note: If any panel must be removed or repositioned during balancing, this should be done only by a qualified individual to prevent damage to panels and connections.

MAINTENANCE

Since there are no moving parts to the Aero Tech Radiant Ceiling System, there is normally no maintenance other than periodic cleaning. Aero Tech Panels have a wear-resistant, long-lasting baked enamel finish, which can be easily cleaned. They may be washed with a mild detergent cleaner applied with a sponge or other soft object. Avoid excessive moisture that can be trapped in joints. If dusty, a soft brush or vacuum should first be used. Rinse with a damp sponge using clean water. DO NOT use abrasives of any kind on the baked enamel finish.

Note: All Aero Tech products are packaged for interior storage only. Aero Tech ceiling products have an interior finish. Exercise care to protect panels from moisture and extremes in environmental conditions.

Benefits of Radiant Linear Extruded Aluminum Low Pressure Drop (LPD) Panel

Since 1982 Aero Tech has developed and manufactured more than a million square feet of ceiling panels, which have been successfully installed in schools, universities, hospitals, laboratories, aircraft hangers, athletic facilities, office buildings and many other sites throughout the country.

Whether in original construction or modernization/remodeling, there are good reasons to choose Aero Tech radiant ceiling panels:

Compatibility
Aero Tech panels are available in a variety of combinations, allowing them to blend beautifully into virtually any architectural style.

Cost-Effective
Centrally located equipment simplifies and reduces maintenance and operating costs. Minimized air requirements for ventilation and dehumidification reduce costs for ductwork, fans and filters.

Ease of Construction
Mechanical equipment is not required at the outside walls. Mechanical equipment need not be located within the occupied space.

Permanence
Metal ceiling panels will last for the life of the building in which they are installed There is no need to replace panels over the years.

Easy Maintenance
Aero Tech ceiling panels retain their original beauty with just an occasional cleaning.

Appearance
Aero Tech's top quality, baked-on finishes resist fading and discoloration.

Incombustibility
Aero Tech's aluminum panels are non-combustible.

- **All Aero Tech Radiant Ceiling Panels are manufactured in a certified ISO9001:2008 facility.**
- **All Aero Tech Radiant Ceiling Panels are made and assembled in North Salt Lake, Utah, USA.**
- **All raw components are of US or NAFTA origin.**
- **All panel components are 100% recyclable.**

Hydronic Radiant Panel Performance Certification

Aero Tech certifies that its Radiant Panels will perform equivalent to or exceed that of other hydronic radiant panels, under identical conditions.

Aero Tech has performed extensive testing of competitive panels in it's permanent on site test room (1 of 2 in the country and the only one with temperature control of walls and floors to provide a constant average unheated surface temperature [AUST]). All panels were tested under identical conditions with regards to room, insulation, temperature control and instrumentation.

Performance values are intended for use directly in standard heat loss calculations and are from certified data based on 70 degrees F. AUST, natural convection and 1", 3/4 PCF insulation on top of panel. Due to actual conditions, stated performance values can vary plus or minus 3%.