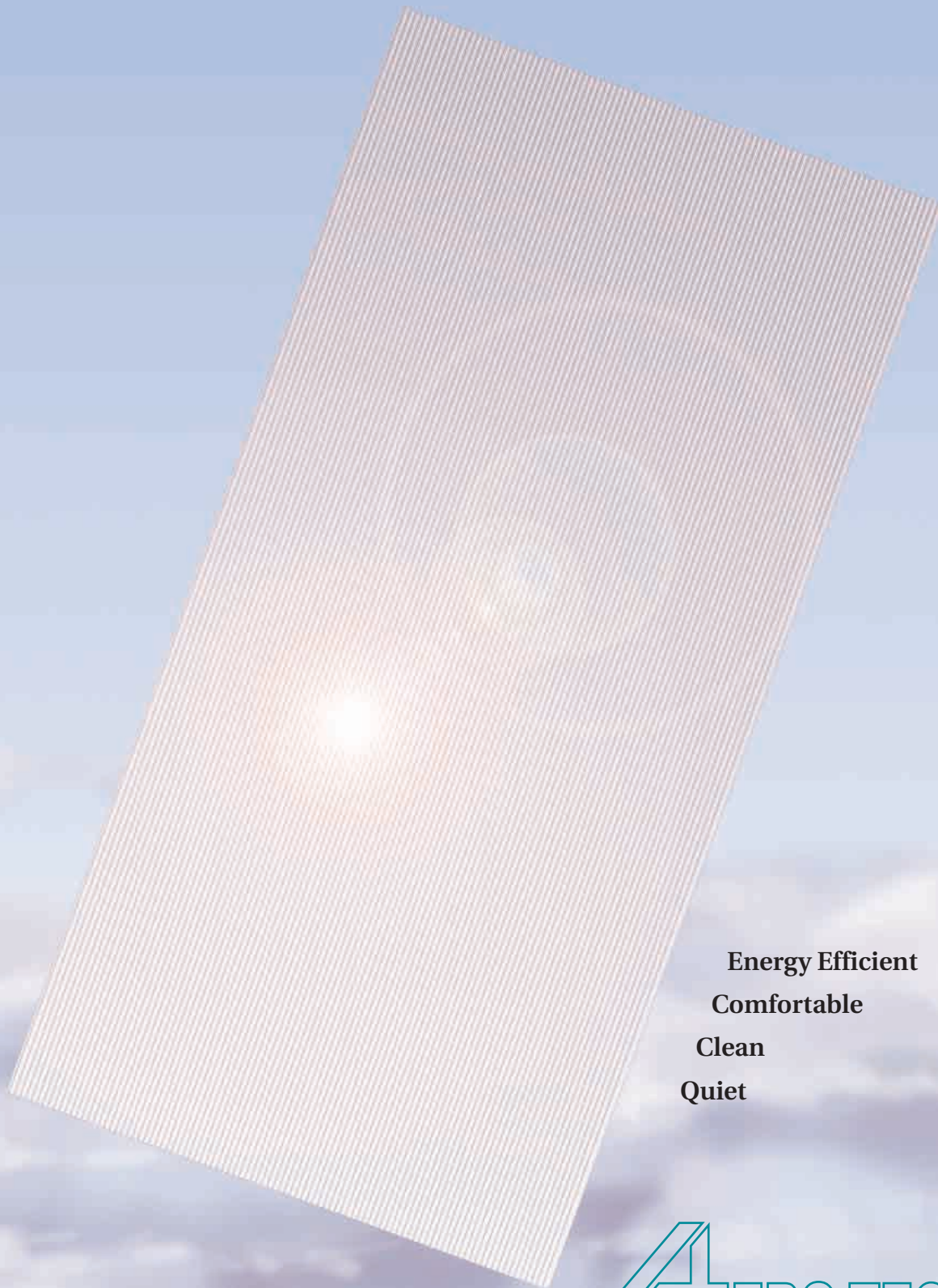


Radiant Linear Extruded Panels—Low Pressure Drop



Energy Efficient
Comfortable
Clean
Quiet

AERO TECH

Radiant Linear Extruded Panels—Low Pressure Drop

HEATING PERFORMANCE

MWT (Deg. F)	Perimeter BTU/Hr Lineal Foot									Interior BTU/Hr Square Foot
	6"Wd 1 Tube	8"Wd 2 Tubes	10"Wd 2 Tubes	12"Wd 2 Tubes	16"Wd 4 Tubes	18"Wd 3 Tubes	24"Wd 4 Tubes	30"Wd 5 Tubes	36"Wd 6 Tubes	
120	47	62	76	90	117	129	164	195	231	70
125	53	70	86	102	131	145	183	219	258	78
130	60	78	96	113	145	161	202	243	285	86
135	66	86	106	125	161	178	225	269	318	96
140	72	94	116	137	177	196	248	295	351	105
145	78	103	126	149	192	213	269	320	378	114
150	84	111	136	161	207	229	290	345	405	123
155	91	120	147	174	224	247	312	369	437	133
160	98	129	158	187	240	265	334	393	468	142
165	104	137	168	199	256	283	357	421	500	152
170	111	145	179	211	272	301	380	450	531	162
175	118	155	191	225	290	321	405	479	561	172
180	126	165	203	239	308	341	430	508	591	183
185	133	175	215	253	326	361	455	538	624	193
190	141	184	227	267	344	381	480	568	657	204
195	148	194	238	280	361	399	502	591	685	213
200	155	203	249	294	377	417	524	615	713	223
205	162	213	261	308	396	437	550	645	748	234
210	170	223	274	323	415	458	576	675	783	245
215	177	232	285	337	433	478	601	706	819	255
220	185	242	297	351	451	498	626	738	855	266
225	192	251	309	364	468	517	650	766	888	276
230	199	261	320	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° F AUST (Average Unheated Surface Temperature), natural convection and 1" thick, 3/4 Pound/Cubic Foot insulation on top of panel. Due to actual conditions, stated performance values can vary plus or minus 3%.

Note: Refer to Radiant Panel Engineering Manual for cooling performance.

Radiant Linear Extruded Panels—Low Pressure Drop

WATER PRESSURE DROP

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 U.S. gallons per minute are not recommended.

Radiant Linear Extruded Panels—Low Pressure Drop

CONCEPT OF RADIANT HEATING

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

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

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

LPD PANEL CONSTRUCTION

Low Pressure Drop (LPD) ceiling panels are constructed of 5", 6" or 8" wide extruded aluminum strips of approximately .115" 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 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 feet (lengths up to 16 feet can be fabricated on special request). Panel can be constructed in any width utilizing any combination of 5", 6" and 8" wide extruded aluminum strips.

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

LPD Panels are factory assembled and can be finished in a large variety of standard or custom ways including curving panels along the length. (Please contact Aero Tech regarding curving guidelines.)

Specifications For Aero Tech Radiant Panels

MANUFACTURER QUALIFICATIONS

These specifications are based on ceilings 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 are based on testing performed by the manufacturer or confirmed by a testing laboratory recognized in the industry.

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

RADIANT PANEL PERFORMANCE REQUIREMENTS

Radiant Panels will have a minimum heating output of _____ BTU/Hr Ln Ft for _____" wide panel at _____ degrees F mean water temperature when the room temperature is 70°F, the roof is of medium insulation value and natural convection prevails in the room.

CONTRACTOR'S QUALIFICATIONS

Installation of 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 completely 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'S RESPONSIBILITIES

Completely install the Radiant and Non-Radiant Panels in accordance with the manufacturer's recommendations and to the satisfaction of the Architect and Engineer.

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.

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) to provide a fully operational system.

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.

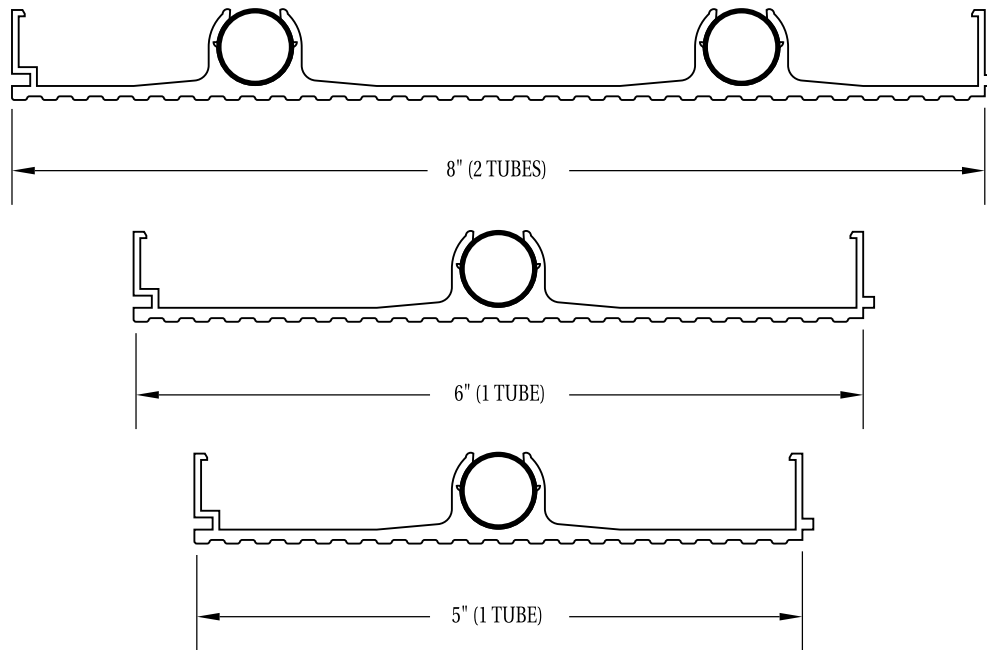
Non-Radiant Panels (as required)

Non-Radiant Panels shall be Aero Tech extruded aluminum. Finished to match Radiant Panels.

Insulation

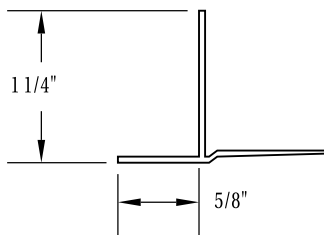
Insulation on top of panels should be a minimum of 1" thick, 3/4 Pound/Cubic Foot, glass fiber pad.

Radiant Linear Extruded Panels—Low Pressure Drop

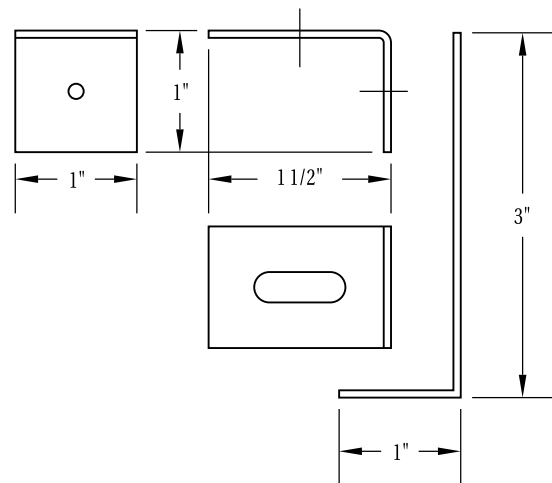


LOW PRESSURE DROP EXTRUSIONS

5/8 OD COPPER TUBE



RECESS MOUNT FRAME



SURFACE MOUNT FRAME WITH HANGER BRACKET



Radiant Linear Extruded Panels—Low Pressure Drop

Chart 1 Width Opening Between Panel Supports	
Panel Width ¹	Opening Dimension ²
Panels utilizing any combination of Low Pressure Drop Extrusions	Panel Nominal Width plus 3/8"

Chart 2 Panel Length ³	
Scheduled Length	Panel Finished Length
1'-0" to 8'-0"	Minus 1/4" from Scheduled Lgt
8'-1" to 12'-0"	Minus 3/8" from Scheduled Lgt
12'-0" to 16'-0"	Minus 1/2" from Scheduled Lgt

Notes

¹Panel widths can be fabricated from any combination of 5", 6" or 8" Low Pressure Drop strips.

²Example: 18" wide panel made from 3, 6" strips = opening size of 18-3/8" (nominal width plus 3/8").

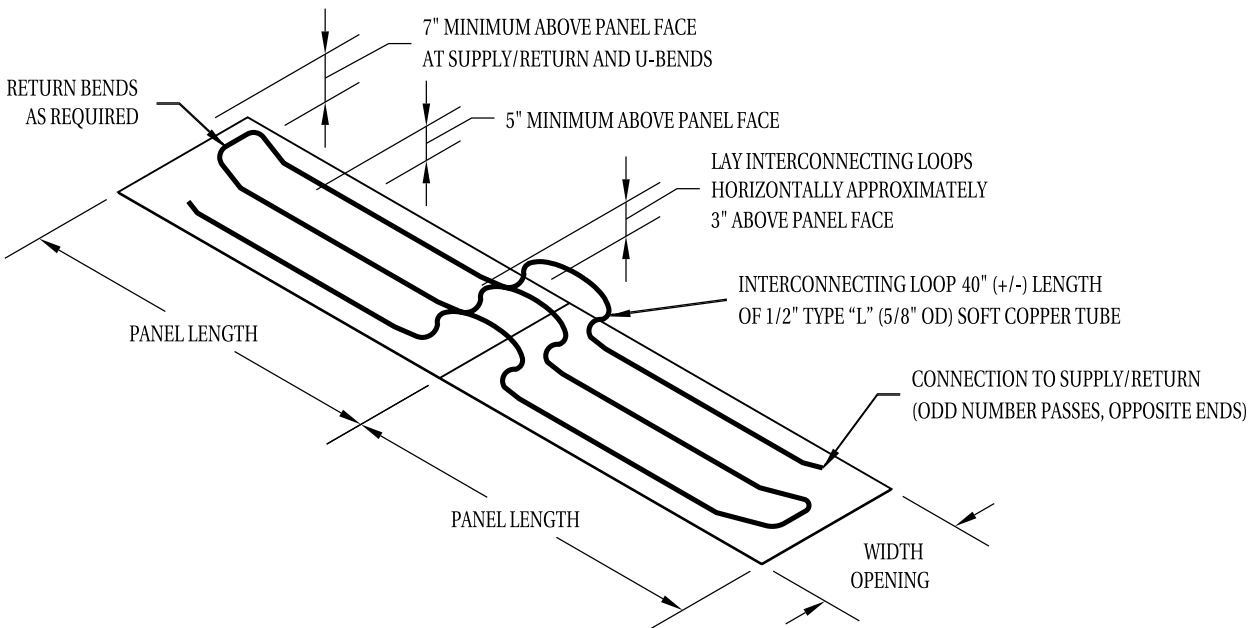
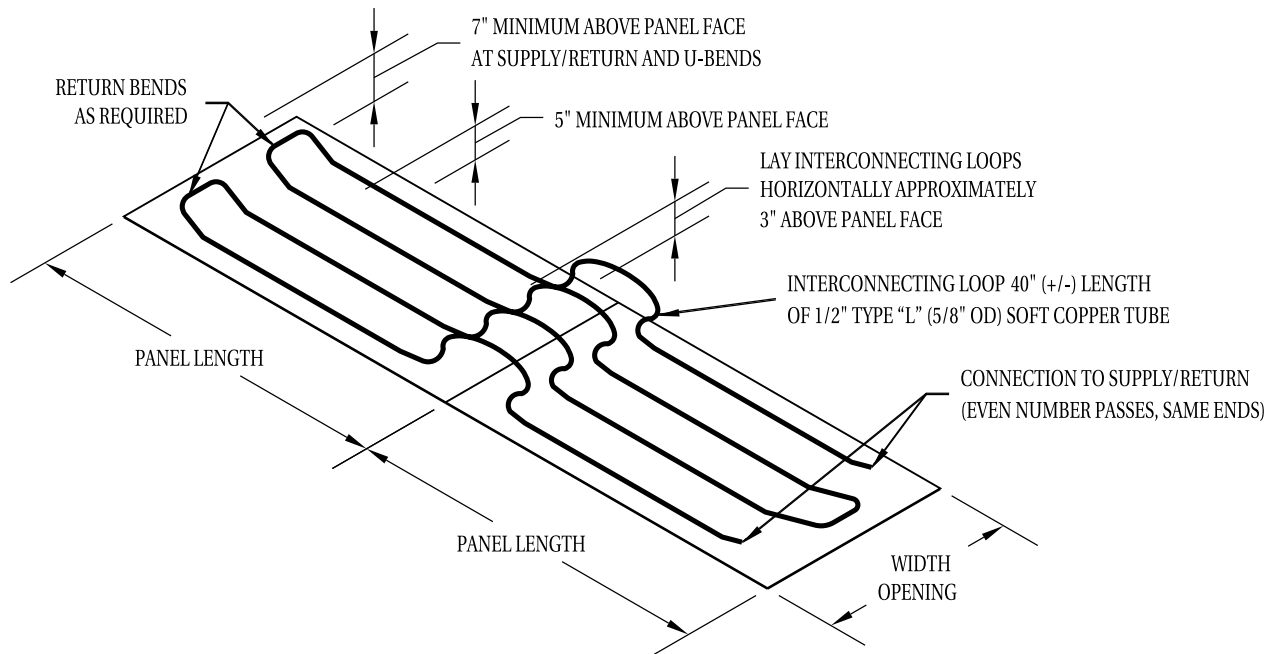
³Panels are fabricated to a standard length of scheduled length plus 2", allowing for field cut and fit.

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.

⁴Standard panel maximum length is 12'-0". Panels longer than 12'-0" will be split into multiple panels. (Lengths up to 16'-0" can be fabricated on *special request only*.)

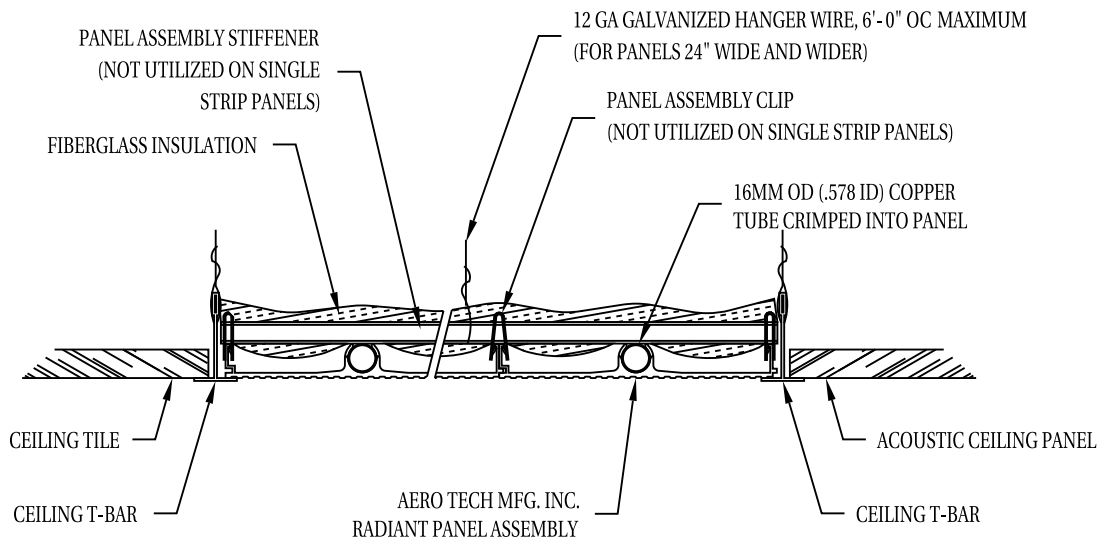
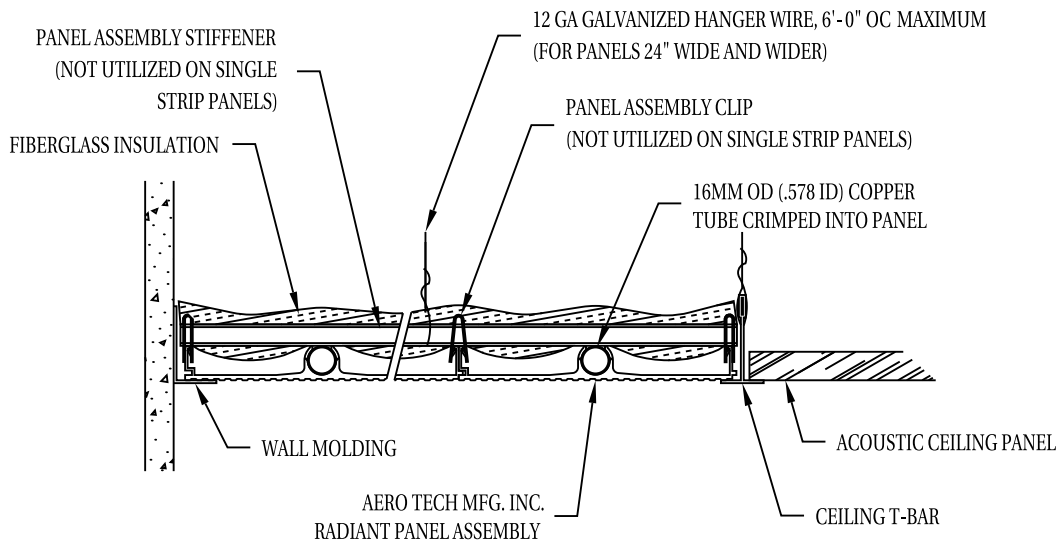
Radiant Linear Extruded Panels—Low Pressure Drop



CLEARANCE AND SIZES

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

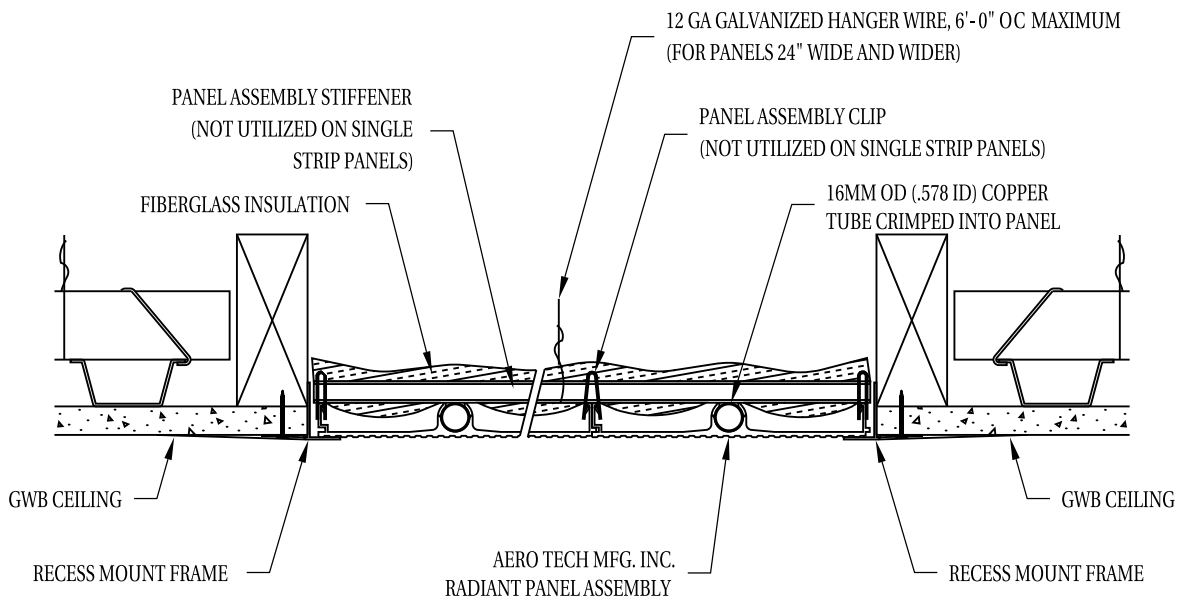
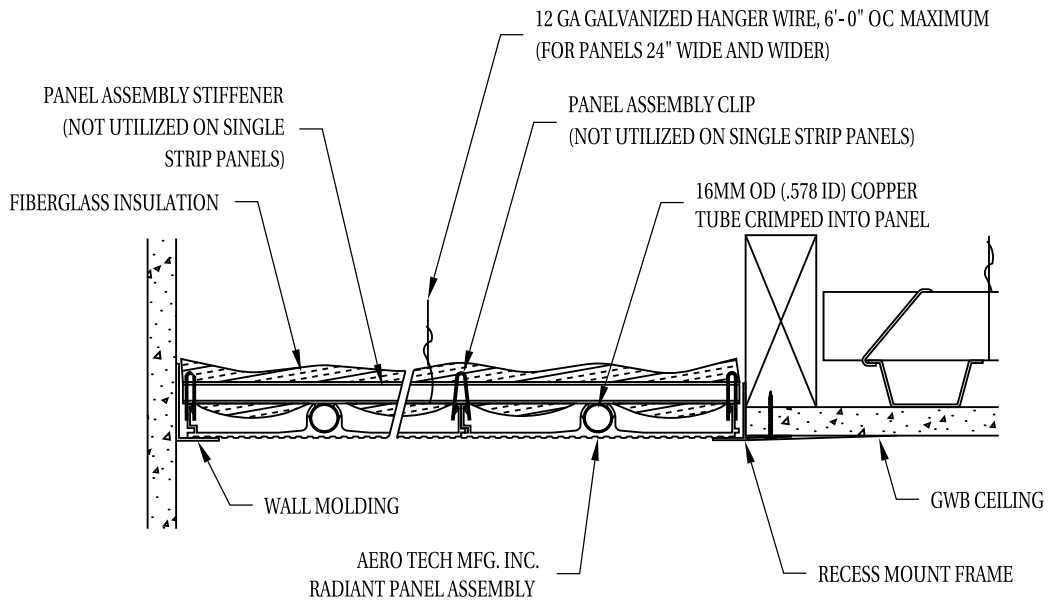
Radiant Linear Extruded Panels—Low Pressure Drop



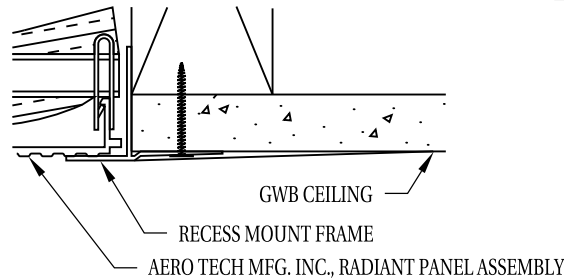
SUSPENDED ACOUSTIC CEILING APPLICATION

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

Radiant Linear Extruded Panels—Low Pressure Drop



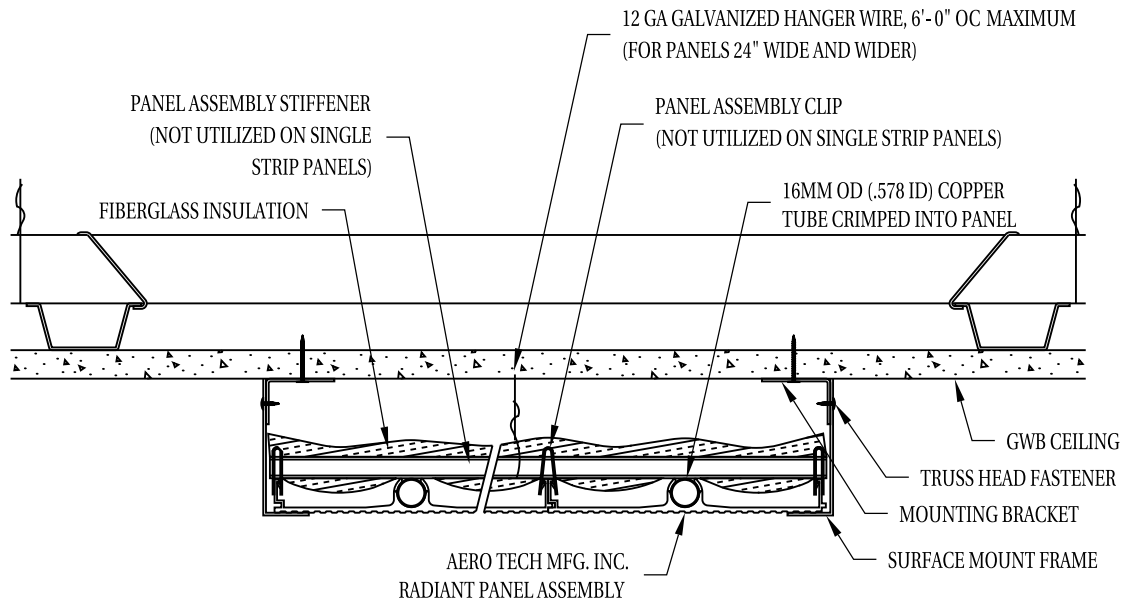
GWB CEILING APPLICATION



RECESS FRAME DETAIL

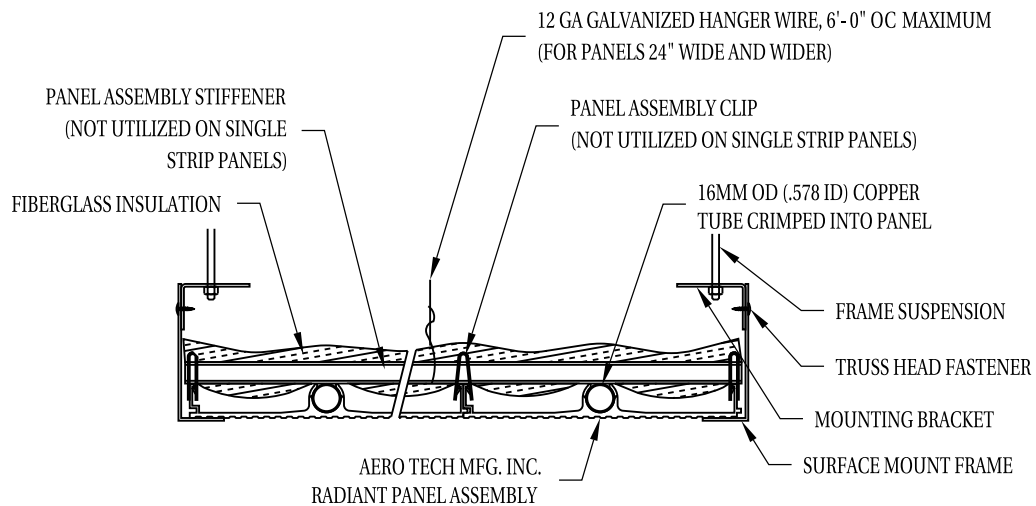
FOR WIDTH OPENING, SEE CHART 1 - FOR PANEL LENGTH, SEE CHART 2

Radiant Linear Extruded Panels—Low Pressure Drop



SURFACE MOUNT APPLICATION

A

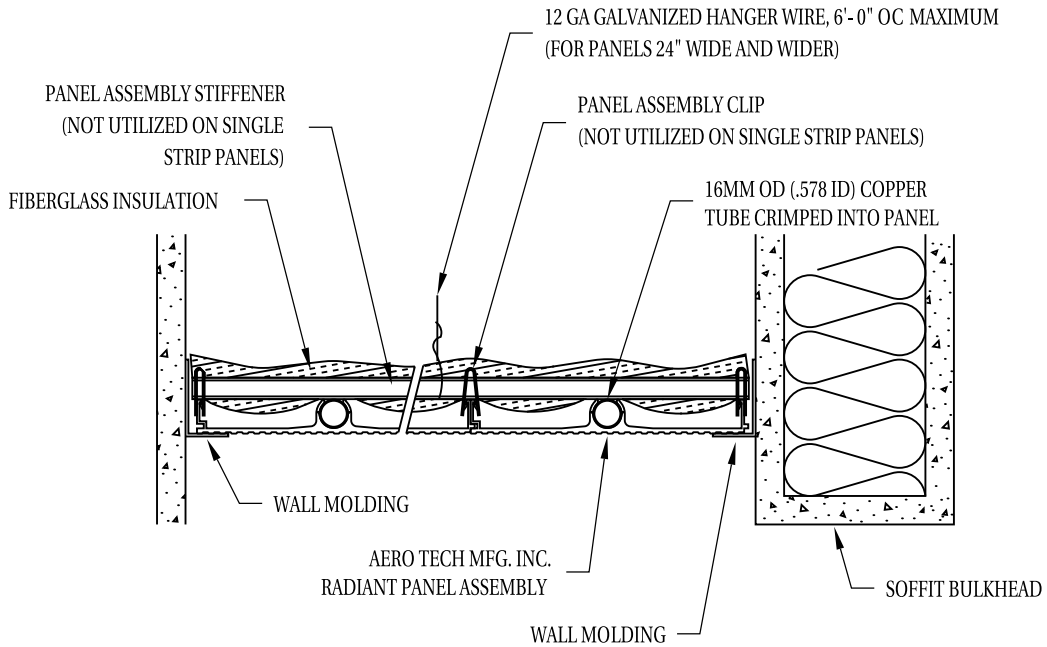


SUSPENDED MOUNT APPLICATION

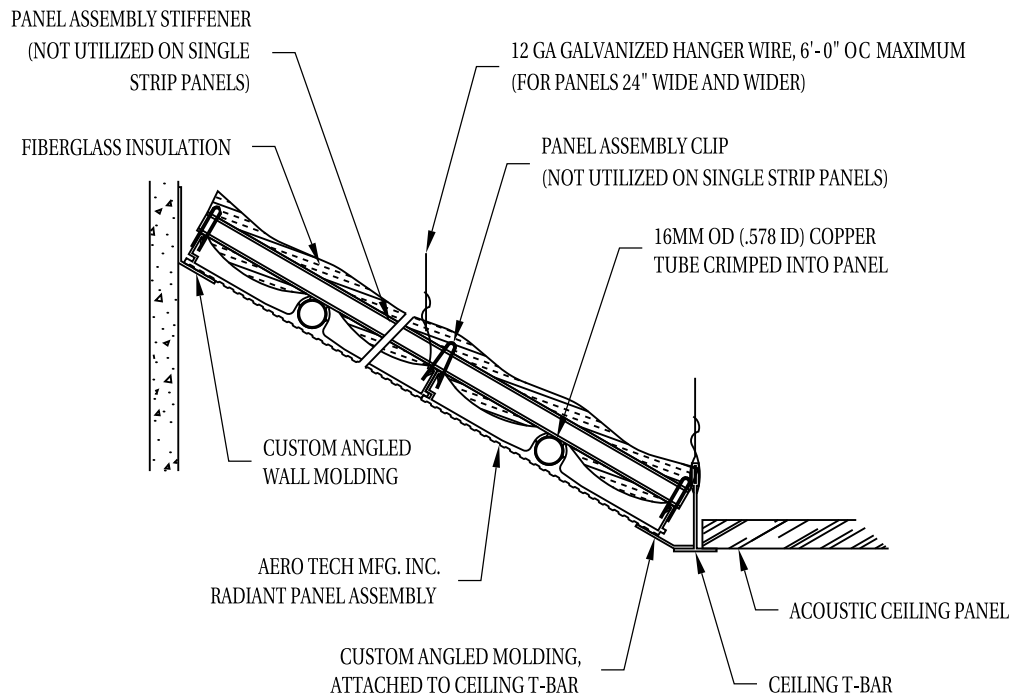
B

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

Radiant Linear Extruded Panels—Low Pressure Drop



SOFFIT APPLICATION



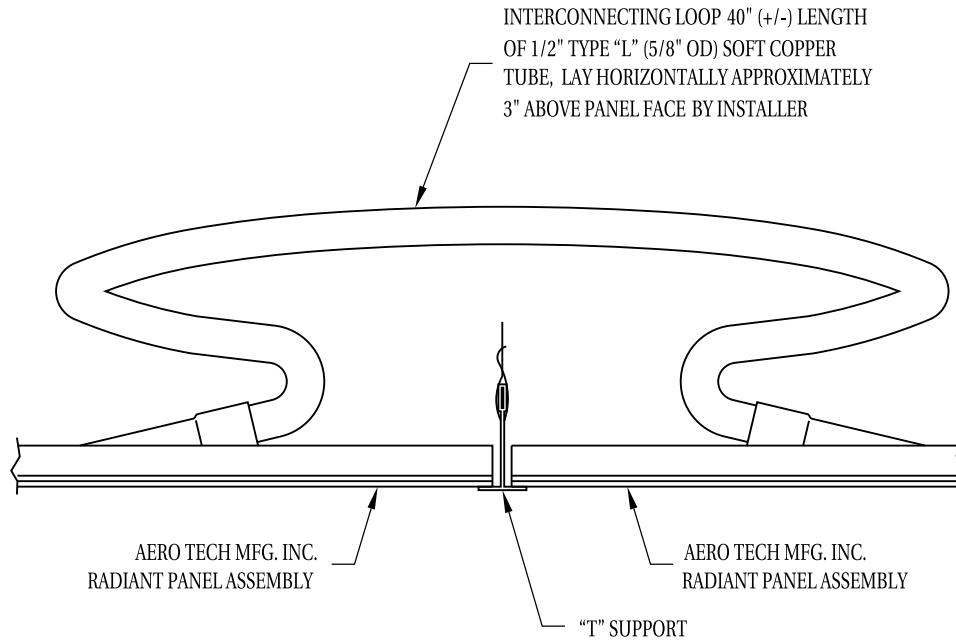
ANGLED MOUNT AND CUSTOM APPLICATION



PANELS CAN BE CUSTOM MOUNTED IN A VARIETY OF WAYS INCLUDING VERTICAL WALL AND INVERTED

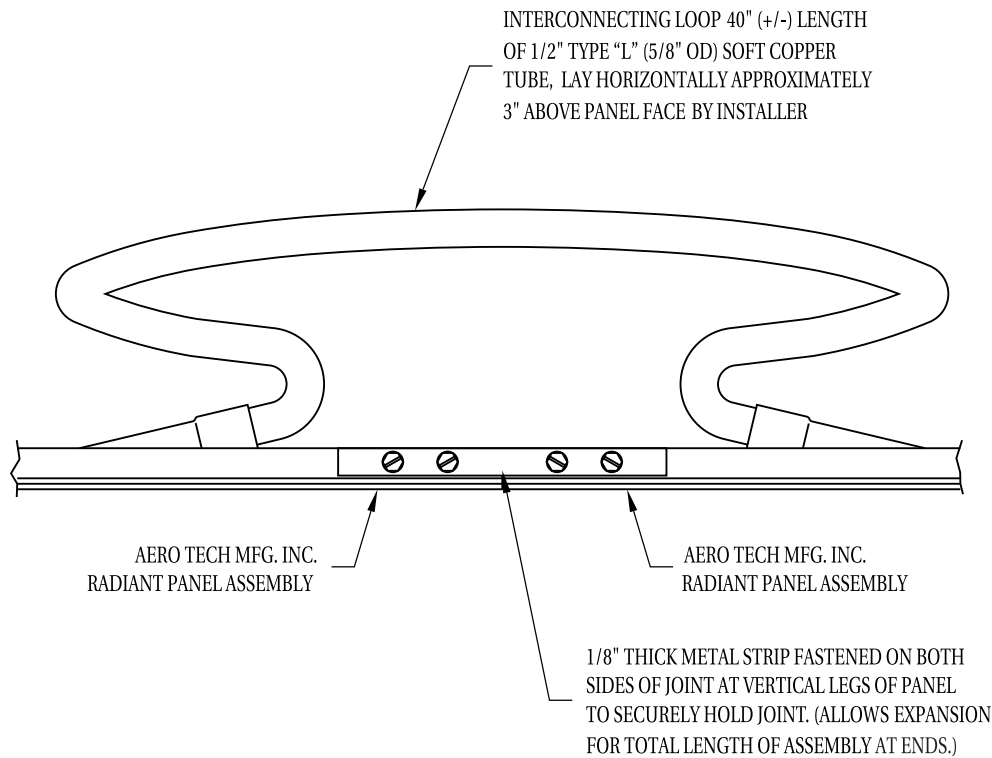
FOR WIDTH OPENING, SEE CHART 1 - FOR PANEL LENGTH, SEE CHART 2

Radiant Linear Extruded Panels—Low Pressure Drop



STANDARD JOINT DETAIL

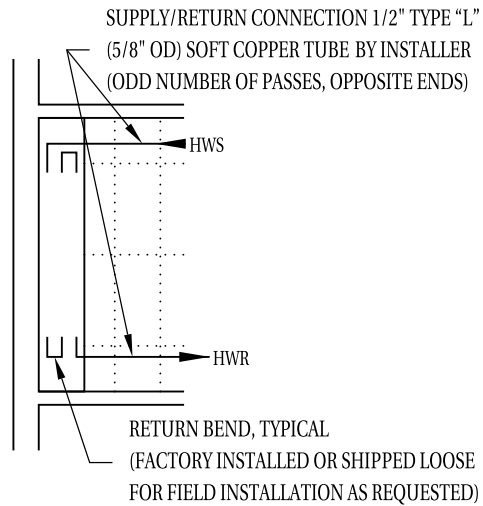
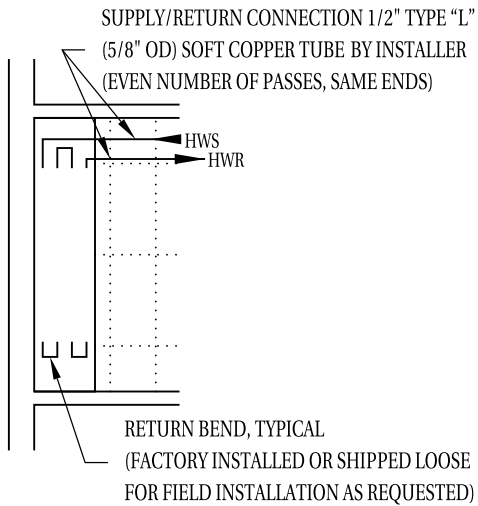
A



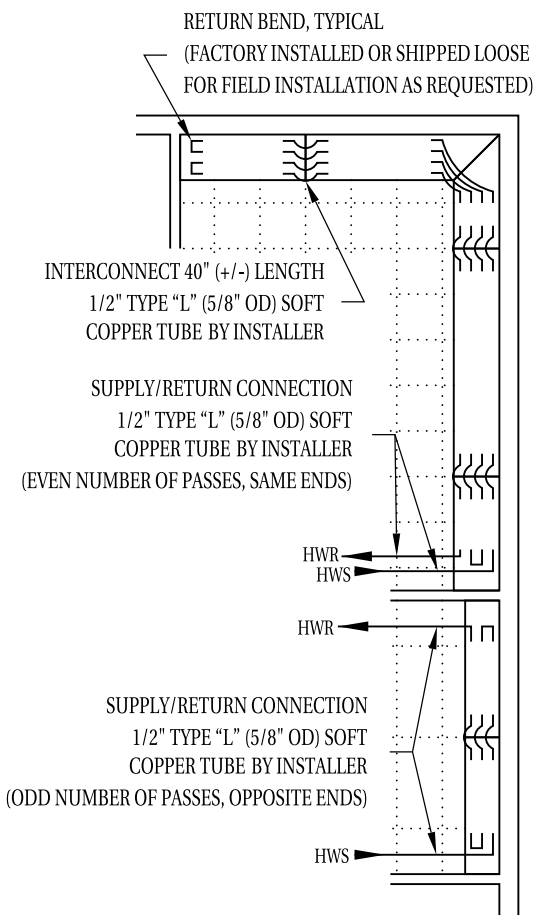
SPECIAL BUTT JOINT DETAIL

B

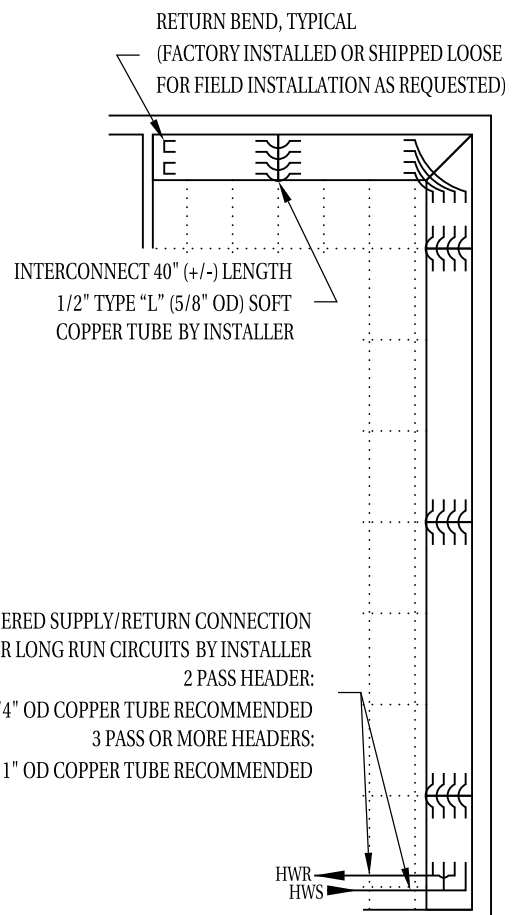
Radiant Linear Extruded Panels—Low Pressure Drop



SINGLE PANEL CIRCUIT



MULTIPLE PANEL CIRCUIT



LONG RUN PANEL CIRCUIT

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

Radiant Linear Extruded Panels—Low Pressure Drop

INSTALLATION

In a typical installation, the suspension system should consist of 3/4" wide wall molding and 15/16" wide main tees and 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 uniformly on supports.

Cut panel to required length (panel standard maximum length is 12'-0", however, lengths up to 16'-0" can be provided upon special request), using a blade designed for non-ferrous metals (for circular saws we recommend using a carbide tip blade with approximately 40 teeth on 7-1/4" diameter, for reciprocating saws use a blade with 8 to 12 teeth per inch). Cut panels from face side and *protect the face from damage*. Cut lengths to allow 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. (Panels 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 the channel by carefully prying back the channel around the tube approximately 4 to 6 inches (do not puncture tubing).

Unless specified otherwise, panels are supplied completely assembled, including return bends fabricated from 1/2" type "L" soft copper tubing.

Prior to placing panel into position, lift tube ends from channel being careful not to kink tube.

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

Panel assembly opening should be panel nominal width plus 3/8". (For example: an 18" wide panel made from 3, 6" strips = opening of 18-3/8".)

Aero Tech recommends using soft cotton gloves when handling panels.

A 12 gauge hanger wire should be attached to stiffeners on the back of panels 24 inches wide or wider at 6'-0" OC maximum or every other stiffener (minimum two per panel). Panels over 40 inches wide 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 fittings or flaring.

Panels connected in series are joined with approximately 40" of 1/2" type "L" tubing formed into a horseshoe configuration. Make connection with interconnecting loop laying horizontally approximately 3" above the panel face. Install a ceiling tee at panel joints to allow for expansion and to cover cut edges. Make any other connections as required using 1/2" type "L" soft copper tubing.

With panel installed place insulation on back of panel as specified.

OPERATION

Start-up

When 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 done most effectively 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: To prevent damage to panels and connections only a qualified individual should remove or reposition panels during balancing.

MAINTENANCE

There are no moving parts to the Aero Tech Radiant Ceiling System, so 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 mild detergent applied with a sponge or other soft material. Avoid excessive moisture that can be trapped in joints. If dusty, use a soft brush or vacuum first, then wipe 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 interior finishes. Exercise care to protect panels from moisture and extreme environmental conditions.

Radiant Linear Extruded Panels—Low Pressure Drop

Benefits of Radiant Linear Extruded (LPD) Panels

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

There are good reasons to choose Aero Tech Radiant Ceiling Panels for original construction or modernization/remodeling.

COMPATIBILITY

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

COST-EFFECTIVE

Centrally located equipment simplifies maintenance and reduces 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 and 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.

EASY MAINTENANCE

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

APPEARANCE

Aero Tech's top quality, baked enamel finishes resist fading and discoloration.

INCOMBUSTIBILITY

Aero Tech's aluminum panels are non-combustible.

Hydronic Radiant Panel Performance Certification

Aero Tech certifies that under identical conditions its Radiant Panels will perform equal to or better than other hydronic radiant panels.

Aero Tech has performed extensive testing of competitor's panels at its permanent on site test room (one of two in the country and the only one with temperature controlled walls and floors that provide a constant Average Unheated Surface Temperature [AUST]). All panels were tested under

identical conditions with regard to room size, 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° F AUST, natural convection and 1" thick, 3/4 Pound/Cubic Foot insulation on top of panel. Due to actual conditions, stated performance values can vary plus or minus 3%.

Radiant Linear Extruded Panels—Low Pressure Drop

