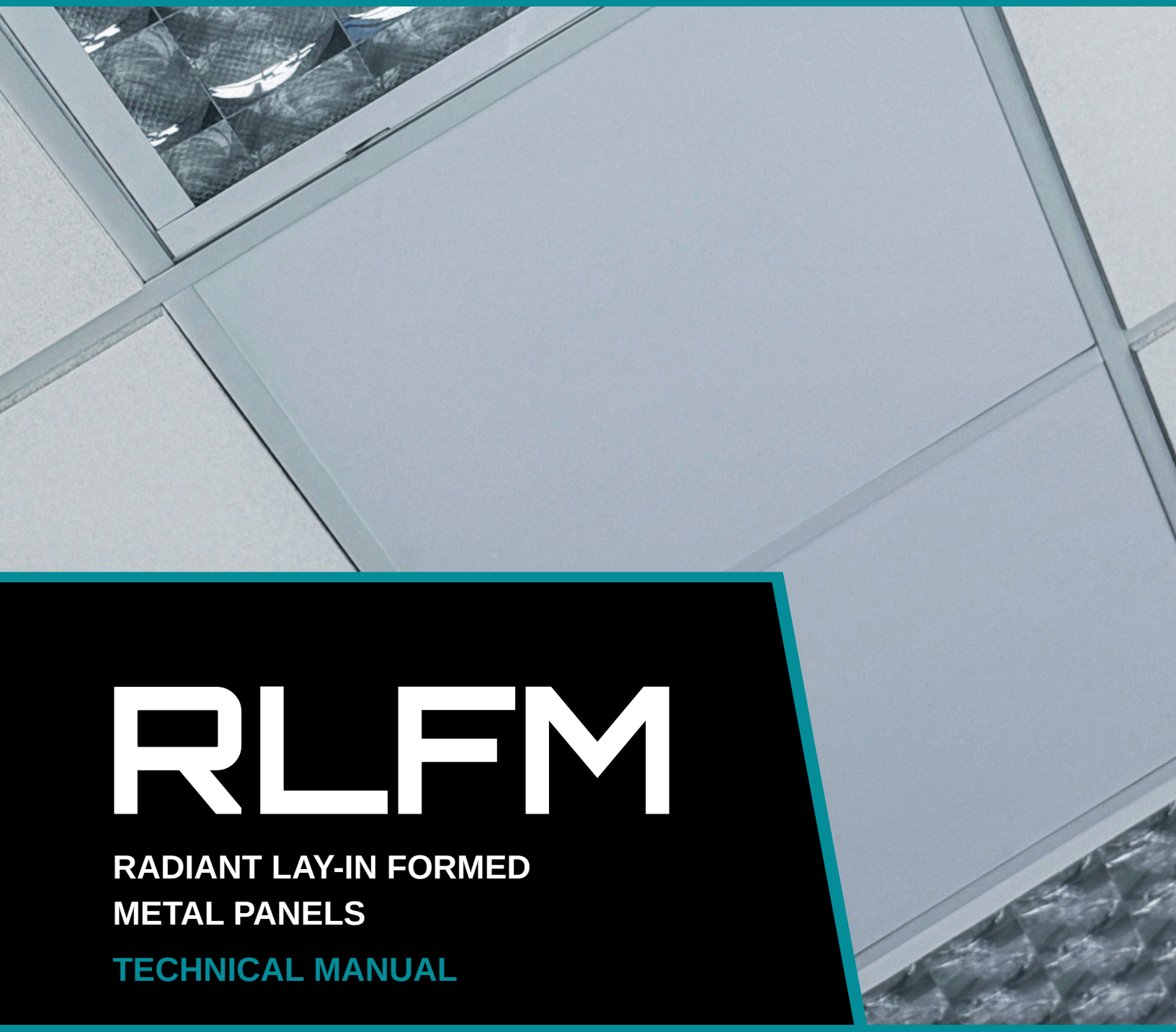
AERO TECH

CLEAN
QUIET
EFFICIENT



RLFM

RADIANT LAY-IN FORMED METAL PANELS

TECHNICAL MANUAL

INSTALLATION | OPERATION | MAINTENANCE | PERFORMANCE

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WATER PRESSURE DROP

Water Flow Rate (GPM)	Head Loss in Feet of Water Per 2' x 2' Pnl (.505 ID Tube)	Head Loss in Feet of Water Per 2' x 4' Pnl (.505 ID Tube)
2.1	2.78	
2.0	2.48	4.00
1.9	2.21	3.69
1.8	2.00	3.35
1.7	1.79	3.03
1.6	1.59	2.73
1.5	1.39	2.41
1.4	1.19	2.15
1.3	1.00	1.89
1.2	0.84	1.61
1.1	0.78	1.41
1.0	0.65	1.20
0.9	0.55	1.00
0.8	0.45	0.81
0.7	0.35	0.62
0.6	0.28	0.48
0.5	0.20	0.37

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

HEATING PERFORMANCE

MWT (Deg. F)	Interior Panels BTU/Hr Sq FT	Perimeter Panels BTU/Hr Sq FT
120	70	82
125	78	92
130	86	101
135	96	113
140	104	124
145	114	135
150	123	145
155	133	156
160	142	167
165	152	179
170	162	190
175	172	203
180	183	215
185	194	228
190	204	240
195	213	251
200	223	262
205	234	275
210	245	288
215	256	301
220	266	313
225	276	325
230	287	337

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.

RLFM PANEL CONSTRUCTION

RLFM ceiling panels are constructed of .040 thick aluminum sheet with six (6) passes of .505 I.D. copper tube metallurgically bonded to the aluminum sheet. Tube ends will accept a 3/8" Type "L" soft copper tube without additional fittings.

Standard panel nominal sizes are 2' x 2' and 2' x 4'.

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

Panels are factory finished, standard white or in a large variety of custom colors, textured options.

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 SQFT panel at _____ °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 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.

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, trim and all other details and materials (as required) to provide a fully operational system.

RADIANT PANELS

Radiant Panels shall be Aero Tech formed aluminum sheet with a continuous copper tube soldered to the back of the panel, providing continuous contact and eliminating the need for separate u-bends, retaining clips, or heat paste. Finish to be as specified.

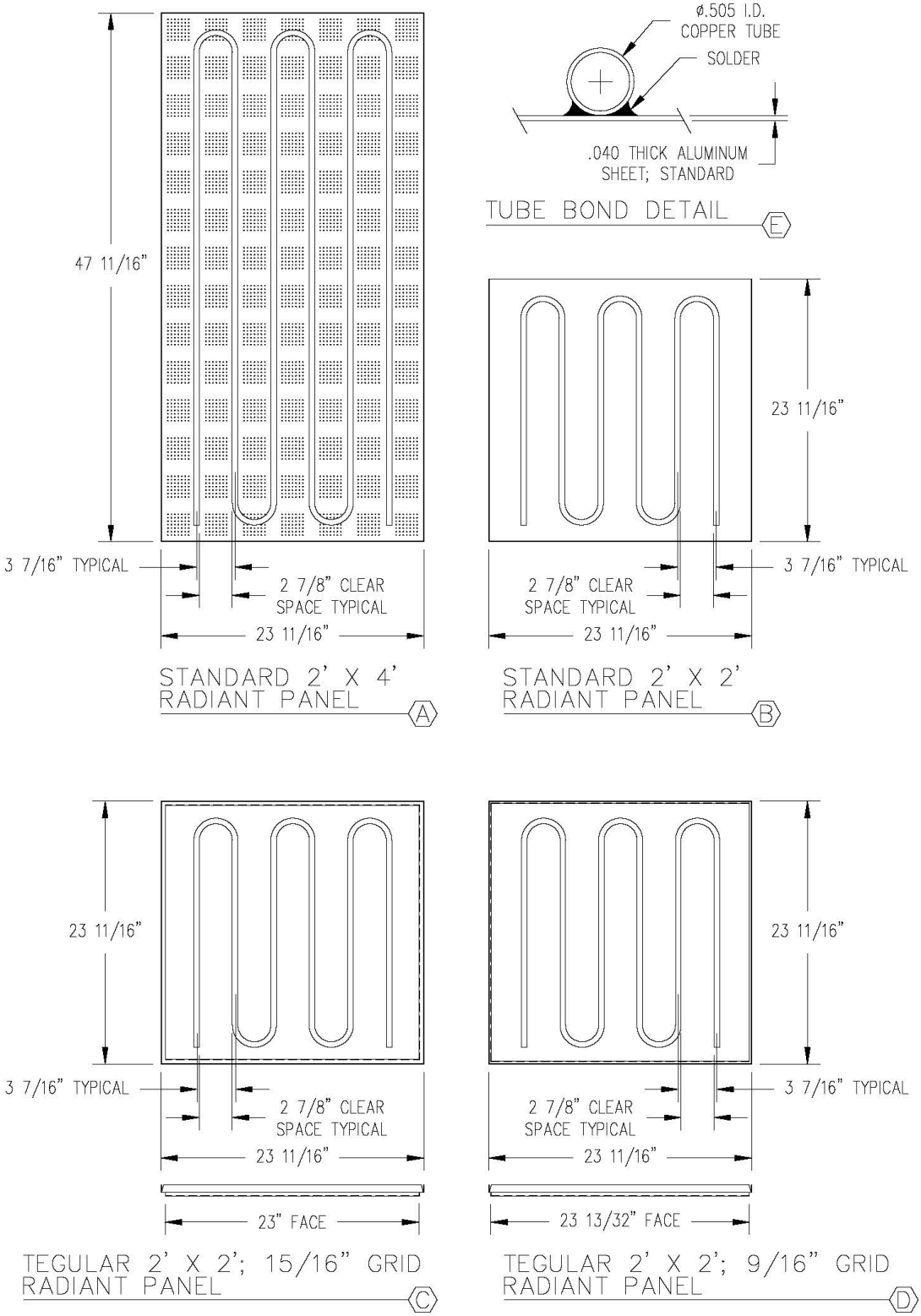
NON-RADIANT PANELS (AS REQUIRED)

Non-Radiant Panels shall be Aero Tech formed aluminum sheet, finished to match active radiant panels.

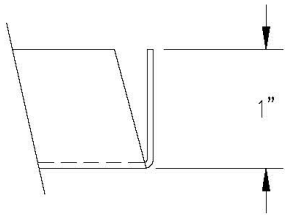
INSULATION

Insulation on top of panels should be minimum of 1" thick 3/4 pound/cubic foot, glass fiber pad. All Aero Tech extruded panels ship with 1.5" insulation unless otherwise specified.

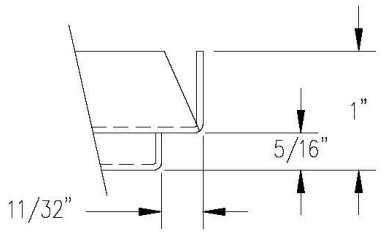
Radiant Lay-In Formed Metal Panel (RLFM) Options



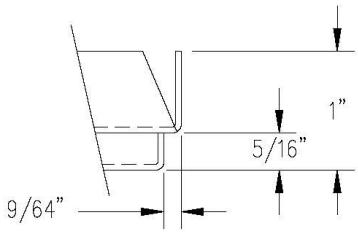
RLFM Corner Options



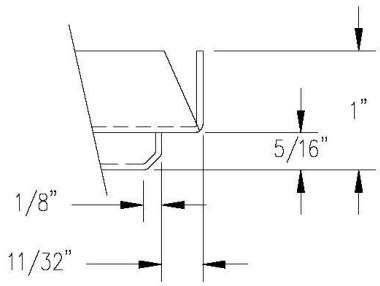
STANDARD CORNER DETAIL (A)



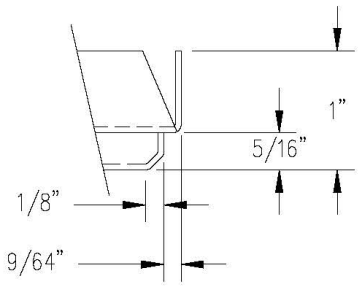
TEGULAR SQUARE CORNER
STANDARD 15/16” GRID (B)



TEGULAR SQUARE CORNER
NARROW 9/16” GRID (C)

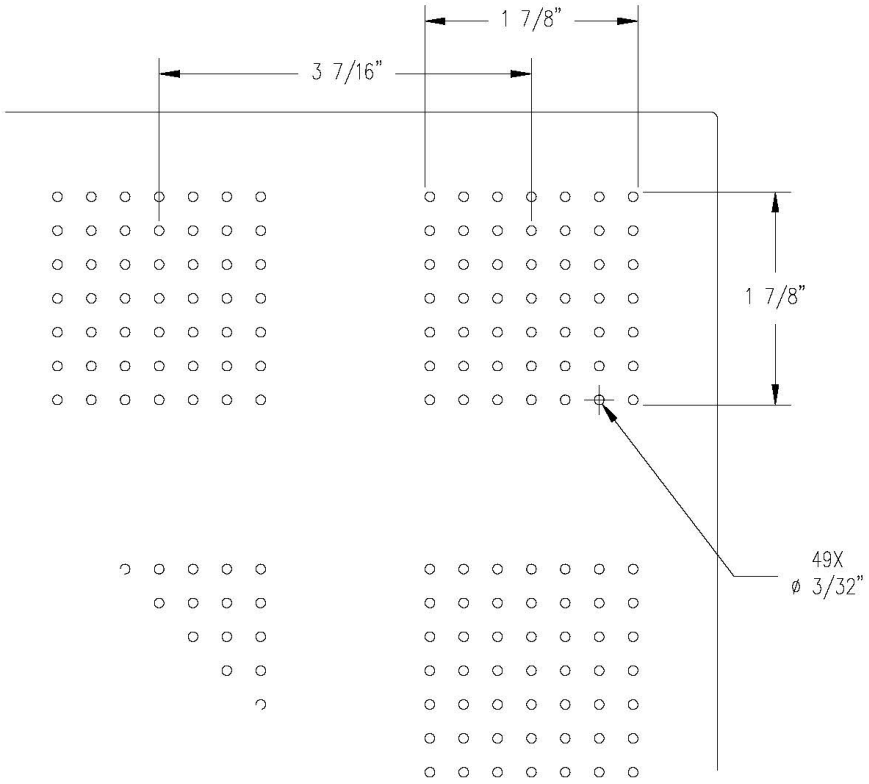


TEGULAR BEVELED CORNER
STANDARD 15/16” GRID (D)

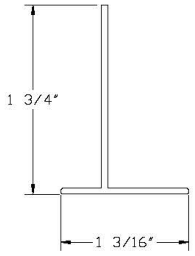


TEGULAR BEVELED CORNER
NARROW 9/16” GRID (E)

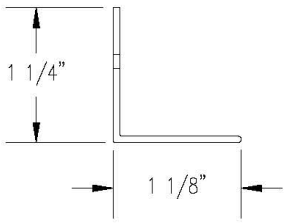
Optional Block Perforation Detail



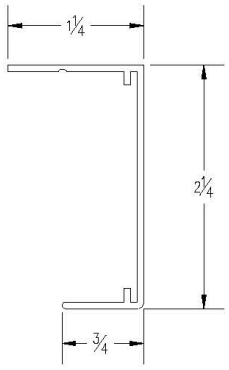
OPTIONAL BLOCK PERFORATION (A)



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

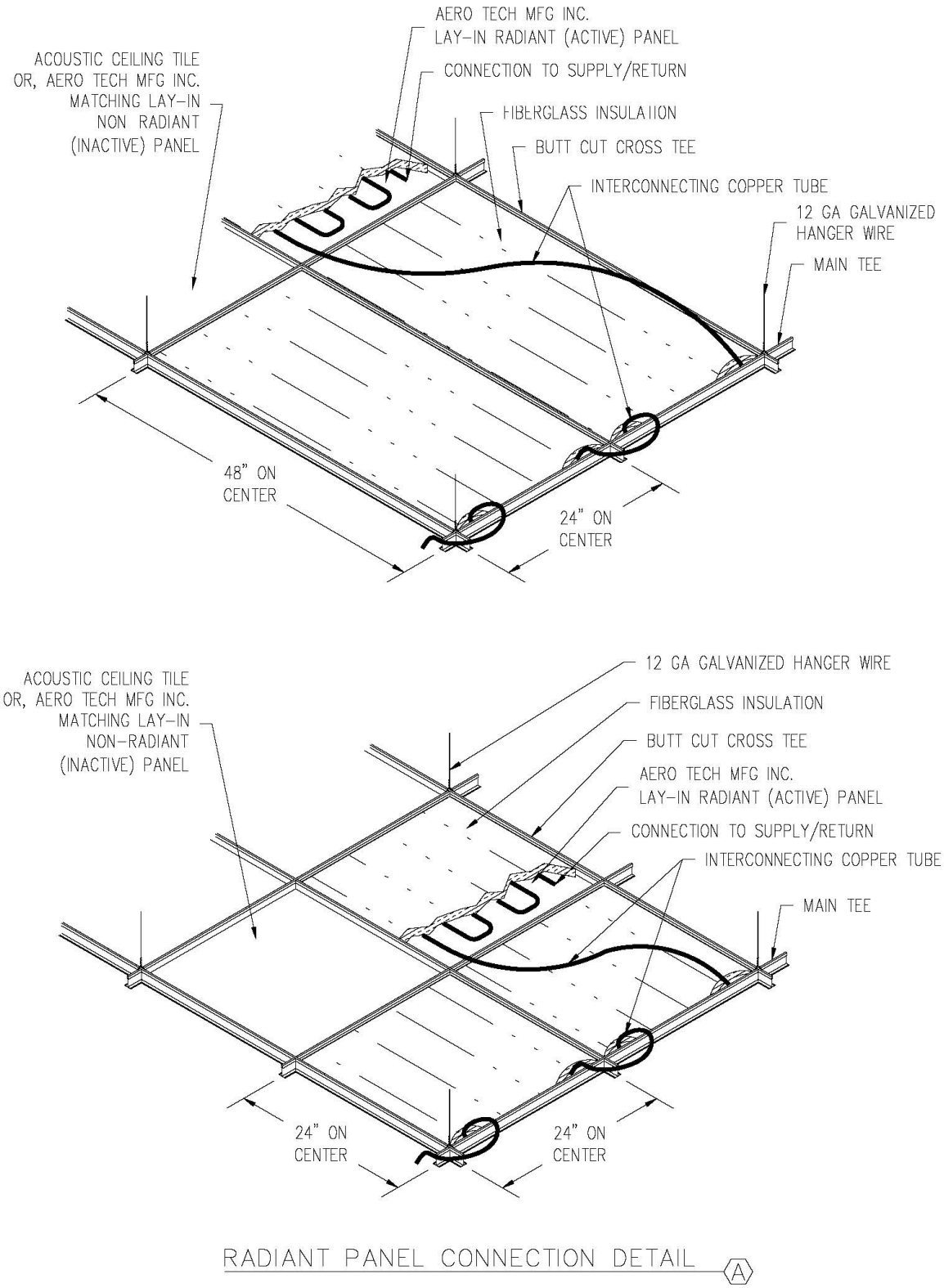


WALL ANGLE
CPEX–0006
10' LENGTHS (B)



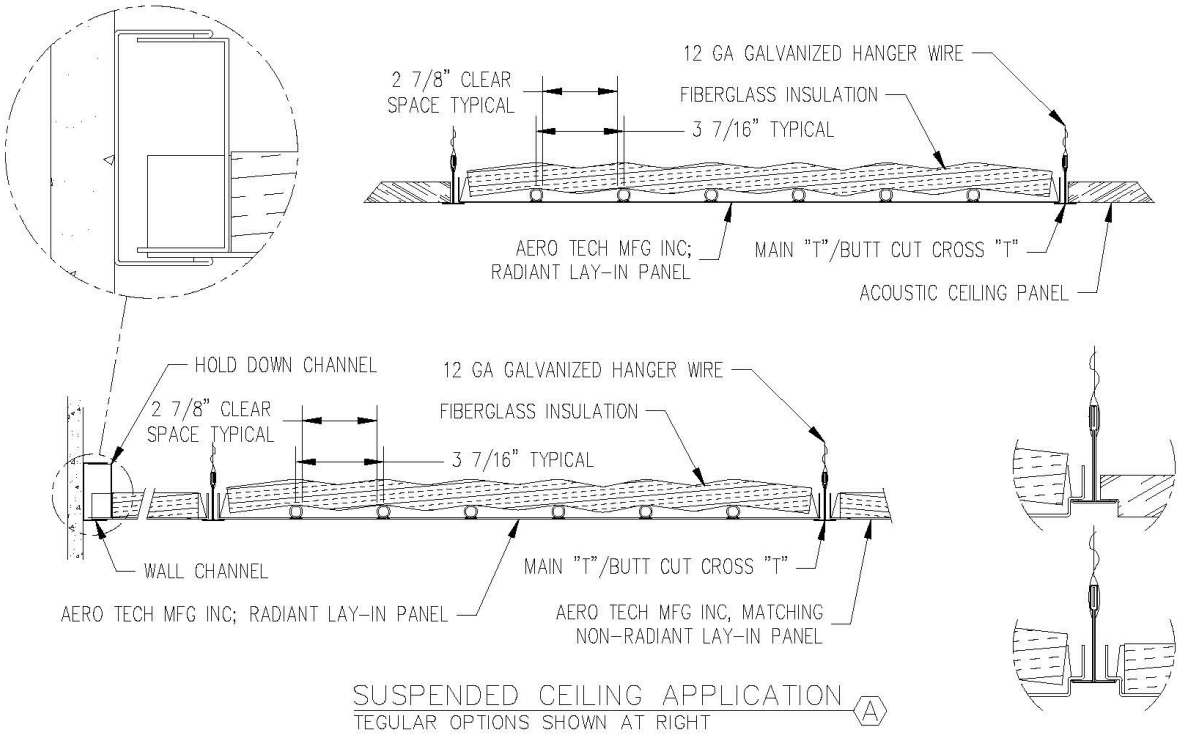
SURFACE MOUNT FRAME
CPEX–0001
10' LENGTHS (D)

RLFM Connection Details



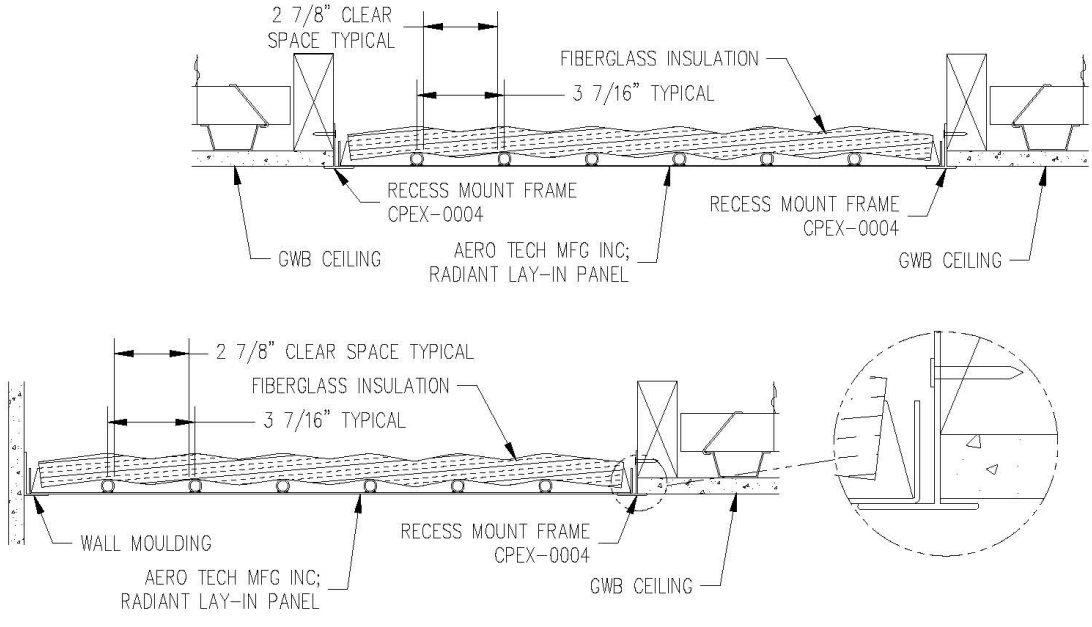
RADIANT PANEL CONNECTION DETAIL (A)

RLFM Mounting Options



SUSPENDED CEILING APPLICATION (A)

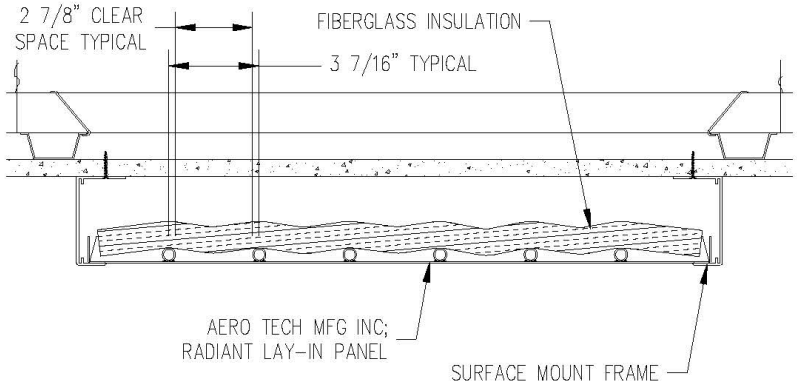
TEGULAR OPTIONS SHOWN AT RIGHT



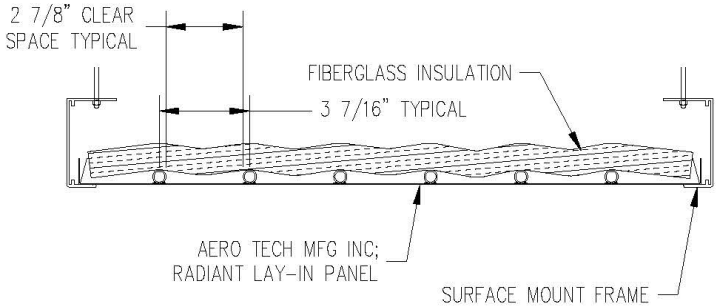
GWB CEILING APPLICATION (B)

– CEILING GRID; 24" O.C. WIDTH, 24" OR 48" O.C. LENGTH –

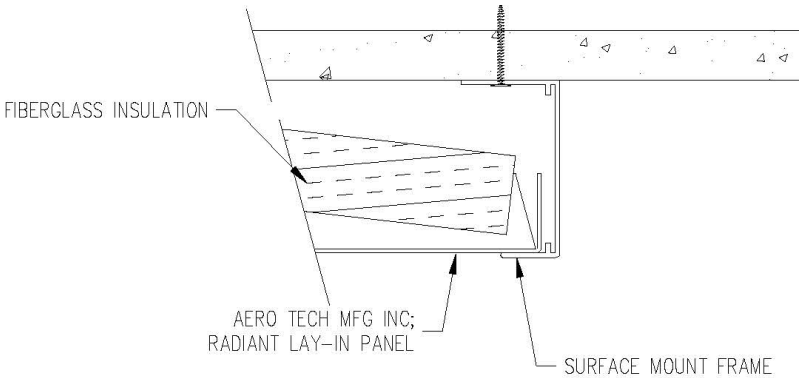
Surface Mount and Suspended Mount Applications



SURFACE MOUNT
APPLICATION (A)



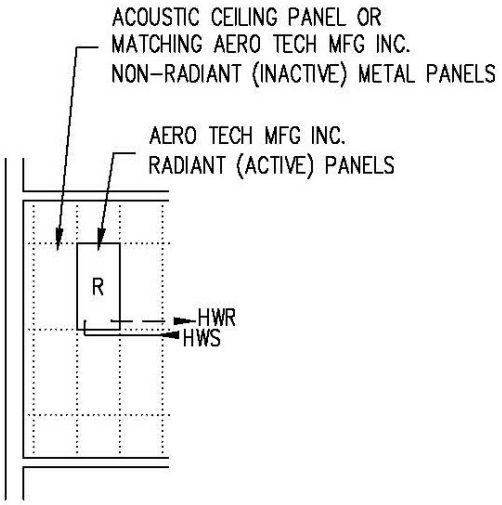
SUSPENDED MOUNT
APPLICATION (B)



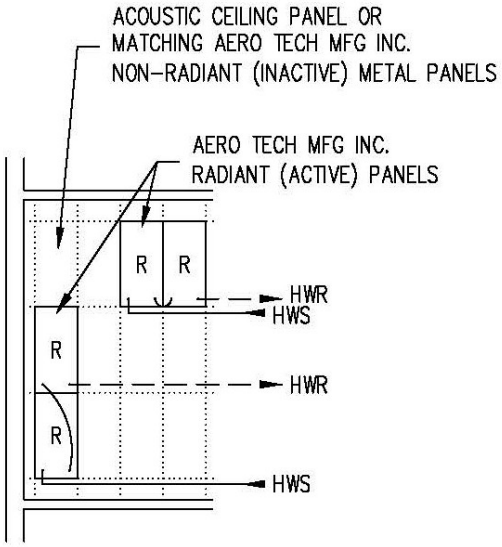
SURFACE FRAME DETAIL (C)

– CEILING GRID; 24" O.C. WIDTH, 24" OR 48" O.C. LENGTH –

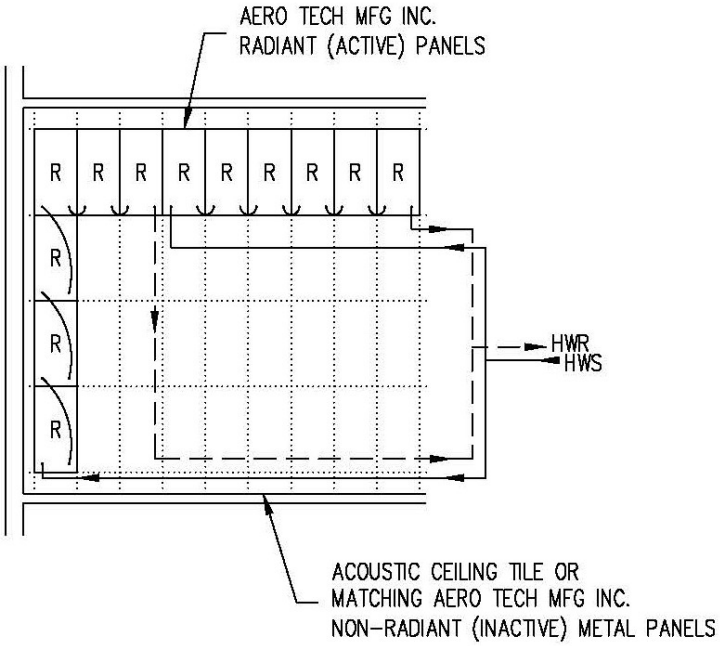
RLFM Circuit Examples



TYPICAL SINGLE PANEL CONNECTION (A)



TYPICAL DOUBLE PANEL CONNECTION (B)



TYPICAL MULTIPLE PANEL CONNECTION (C)

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, as required, may be used provided there is sufficient and uniform support around the periphery of the panel. The panel should lie on supports uniformly. Hold-downs channels are required at perimeter.

Ceiling grid should be laid out on 2'x4' or 2'x2', pattern as required, according to specifications and reflected ceiling plan.

Lift tube ends away from backside of panel, being careful not to kink tube, prior to placing panel in ceiling.

Install panel into grid from back. Panel face should contact grid on all four sides, and should have space on at least 2 perpendicular sides to allow for expansion.

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

Connect panel to supply and return run outs using 3/8" type "L" soft copper tubing. Because Aero Tech panels utilize a .505 ID panel tubing, the 3/8" type "L" tubing can be soldered directly inside without the need for fittings or flaring.

Panels connected in series are connected with 3/8" type "L" tubing. Make connection with interconnecting loop laying horizontally approximately 3" above panel face.

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

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.

Place a small sticker or other identification on the corner of any panel, which may provide regular access to the ceiling. This identification will minimize the time spent in removing the proper panel. If a panel is damaged, replace it only with the correct Aero Tech panel.

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 Lay-In Formed Metal (RLFM) 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 hangars, 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 ISO9001:2015 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 a test room 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°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%.

AERO TECH MANUFACTURING

RADIANT CEILING PANEL SYSTEMS

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