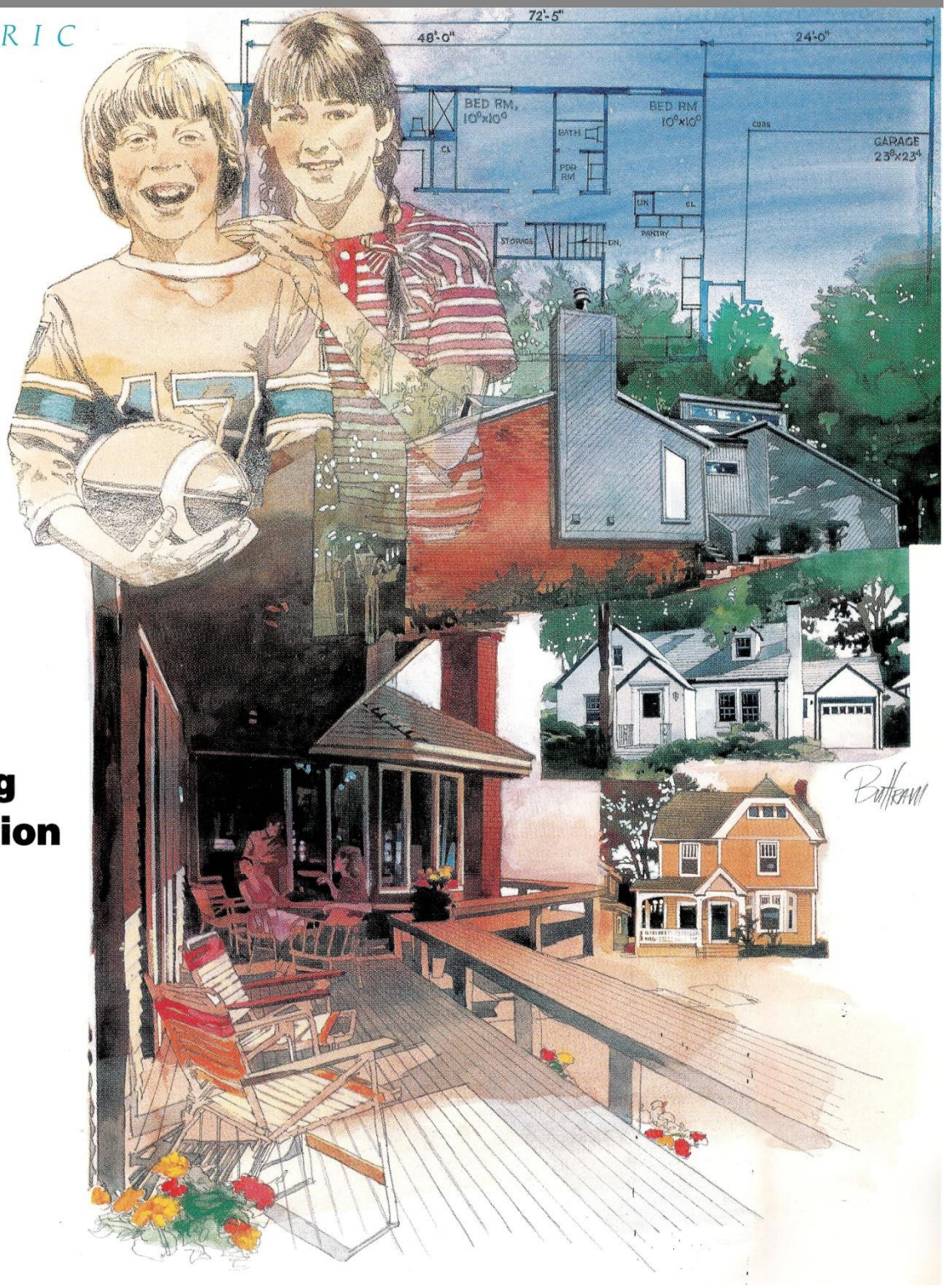
2010

PANELECTRIC



Panelectric® Home Planning and Construction Guide 8052

Introduction

HEAT DOES NOT RISE.

IT'S HOT AIR THAT RISES.

This simple fact is hard for many people to accept because it conflict with ideas and attitudes about heating that date back centuries.

- ## *Your New Heating System*

Panelectric is a beautifully simple, complete home heating system that is installed as an integral part of the drywall ceiling in your home. The builder simply installs Panelectric ceiling panels instead of conventional 5/8" drywall for 40% to 60% of the ceiling area. The remainder is hung with regular drywall. Each panel comes with an eighteen foot power supply wire for easy direct thermostat connection. That's it. It's ready to operate and you can use any kind of paint, texture, or even wall paper that fits your decor.

Panelectric panels meet all the requirements of the National Electrical Code and are listed by Underwriters' Laboratories (Test NO. E-39570)

- ## *Here's How It Works*

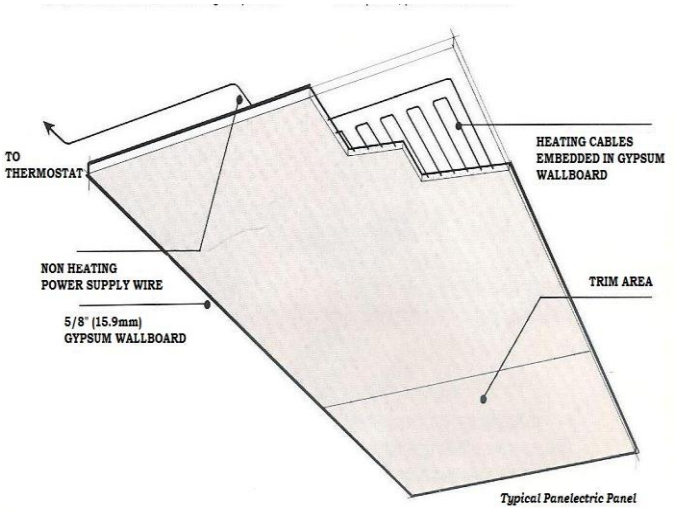
Within each panel is an insulated heating cable that is completely embedded in non-combustible gypsum. Even when the panels are on, they are only about three degrees warmer than body temperature. This uniform gentle heat warms your home much like an electric blanket warms your bed.

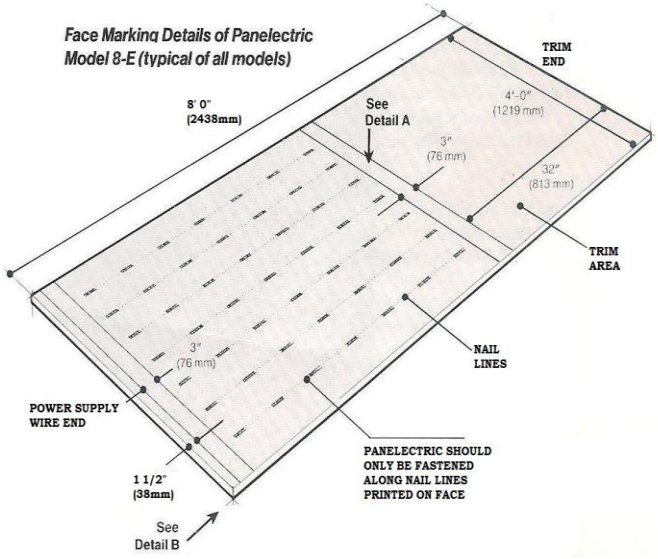
There are eight different panel models featuring variations in overall size, cabled area and cable free or trim area. This enables Panelectric to fit perfectly into virtually any architectural design.

- ## *Getting Started*

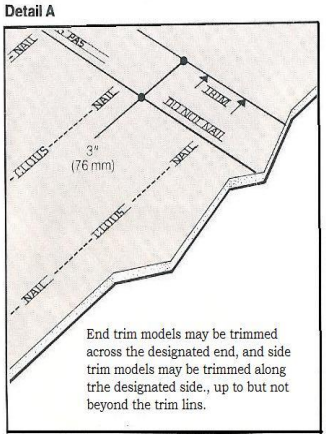
Making Panelectric part of your new home involves two phases: planning and installation. The planning phase involves selection of insulation, heat loss calculations, house plan layout, and panel selection. Installation includes electrical preparation, insulating, panel installation, electrical connection and finishing.

All phases of Panelectric installation must be handled in a competent, professional manner

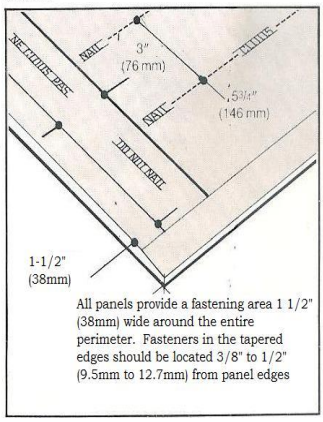




Detail A



Detail B



Planning

STEP 1 *Selection of Insulation*

Adequate insulation is the key to the efficient operation of any heating system. Although climatic conditions may vary in different areas of the country, the requirements shown on the chart represent generally acceptable minimums. Your local public utility company should be contacted for specific requirement in your area. Insulating glass or storm windows, storm doors, weather stripping, and vapor barrier all play an important role in reducing heat loss and should be used in addition to the specified insulation.

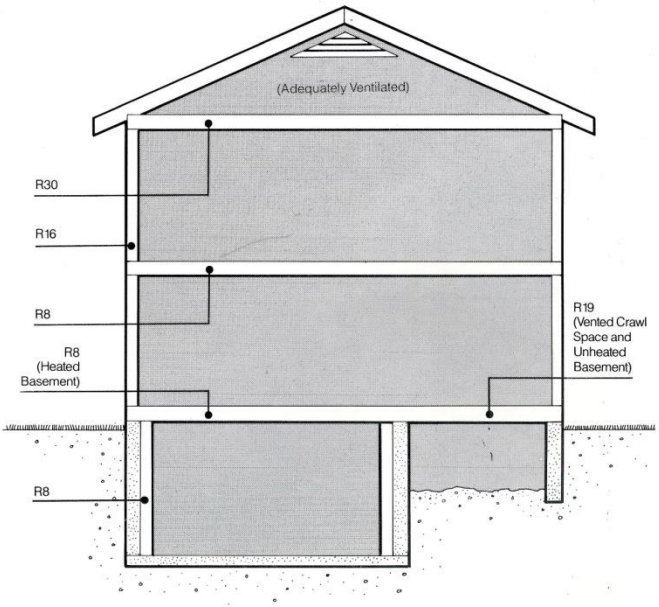
- **Insulation Chart**

Exterior Ceilings	**R30**
Interior Ceilings	**R8**
Exterior Walls	**R16**
Basement Walls (sub-grade)	**R8**
Floors (Over heated basement)	**R8**
Floors (Over unheated basement or crawl space)	**R19**
Slab Perimeter	**R8**

STEP 2 *Heat Loss Calculations*

The heat loss of a building is determined by climate and building construction. Your local electric utility company can provide you with the proper Design Temperature Differential (DTD) needed to determine heat loss in your area and in many cases will do the heat loss calculations for you free of charge. If you wish to do your own calculations you will need a complete set of plans, as well as specifications for insulation, roofing, siding, windows, and doors, all of which effect the heat loss of your home.

Instructions for calculating heat loss are provided in the Panelectric Heat Loss Calculation Guide. Assistance provided by Panelectric representatives in determining heating requirements is an accommodation. Panelectric does not warrant or guarantee the accuracy of these calculations. To insure the accuracy of all heat loss and wattage requirements calculations should be reviewed and approved by the specifying architect/engineer or local electric utility company.



STEP 3 *Panel Selections*

After determining heat loss calculations for each room, it's time to select heating panels. This selection is based on heating requirements, room size, and ceiling fixtures. 10% should be added to your calculations to provide a safety margin for offsetting construction variations and climate extremes. If someone other than yourself has provided your heat loss calculations, be sure to find out if the 10% has already been added.

***Eight models of Panelectric panels are available as shown in the table. Each has its own particular combination of size, heat output and trim area. When selecting panel models, use the largest possible panel with the least amount of trim area. This will help you minimize cost.**

Panelectric Panel Selection Chart

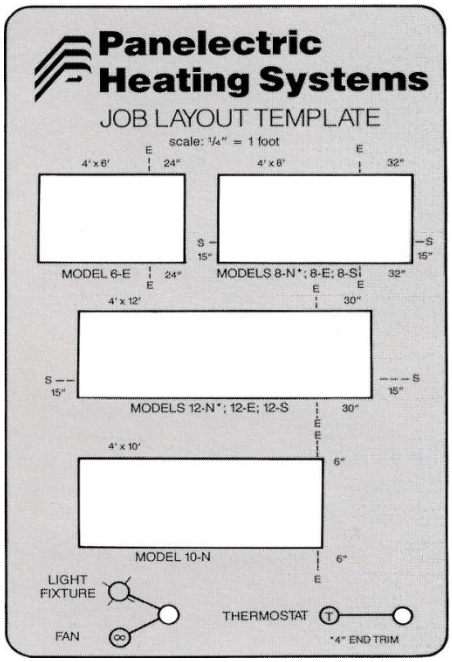
Model	Size	Trim Area	Watts	BTU	Volts
6-E	4'x6'	24" one end	200	682	240
8-N	4'x8'	4" one end	380	1296	240
8-E	4'x8'	32" one end	265	904	240
8-S	4'x8'	15" one side	265	904	240
10-N	4'x10'	6" one end	475	1621	240
12-N	4'x12'	4" one end	580	1979	240
12-E	4'x12'	30" one end	475	1621	240
12-S	4'x12'	15" one side	360	1228	240

*208 volt panels are also available in all sizes with the same BTU values as the 240 volt panels.

Fiberglass joint tape is not adequate for use with Panelectric.

• Using A Panelectric Layout Template

The Quick and easy way to layout your Panelectric heating system is with a Panelectric Job Layout Template. Panel size and location can be easily marked on any 1/4" scale floor plan that shows ceiling joist direction and lighting fixture locations. These templates are available from your local Panelectric dealer.



• Layout Considerations

1. Panels must be run perpendicular to ceiling joist or furring channels.

2. All butt (end) joints must be staggered.

3. All ceiling fixtures must be located either in trim areas or drywall filler panels.

4. Openings for light or electrical boxes must be at least 8" from the nearest heating cable.

5. All non-electrical openings, such as those for air ducts or vents, must be at least 2" from the nearest heating cable.

6. Place panels first in areas where the heat loss is greatest such as; adjacent to outside walls, near entrances, and over windows.

7. Never place Panelectric in closets or other confined spaces. These areas are heated from adjacent rooms.

8. The heating or electrical portion of Panelectric panels should never be located above partitions, hanging cabinets, soffits, drop ceilings or any other detail which may come in contact or close proximity to the ceiling.

Note: White areas indicate non-heating 5/8" (15.9 mm) gypsum wallboard filler panels.

STEP 1 *Electrical Preparation*

When roughing-in the electrical boxes for your new heating system use care when choosing thermostat locations. Thermostats must be located on interior walls away from temperature influences that can affect performance accuracy such as: drafty windows and doors, direct sun, appliances, light fixtures, and fire places.

Each Panelectric panel comes with an eighteen foot non-heating power supply wire that can be run directly to the thermostat rough-in boxes as the panels are hung. If necessary, holes for the power supply wires should be drilled through the ceiling joist before installing the panels. If your job requires more than eighteen feet of supply wire between a panel and its corresponding thermostat, you will have to use an interim junction box. Junction boxes should be installed in closets or attic spaces so that they can be concealed while remaining accessible. If there is no suitable place for a junction box, a custom panel with a longer supply wire can be ordered from Panelectric.

If you are using metal furring channels on your ceilings, they should be grounded to protect against possible electrical leakage.

And finally each panel should be checked for electrical continuity before installation.

STEP 2 *Insulation*

When installing your insulation, craftsman-like workmanship is critical to the successful operation of your new heating system and the comfort of your new home. Carefully follow the recommendations of your local utility company and local building codes.

Installation

All insulating materials should first be installed without gaps and then all exterior walls, floors, and ceiling should be carefully covered with an airtight vapor barrier. In multi-story buildings, interior ceilings should be insulated to prevent heat buildup between ceiling joists. Place insulation between joists low enough to insure contact with the back of all Panelectric panels.

***CAUTION** excessive humidity caused during construction by drying lumber, wet concrete, drywall joining compound, etc. must be controlled. Failure to do so can create condensation on vapor barriers that may result in severe damage to all drywall materials including Panelectric panels.*

STEP 3 Installing Panelectric

Panelectric panels are simple to install. You can cut them with a utility knife or saw, and fasten them with screws or nails just like conventional drywall.

Install panels perpendicular to joists, strapping, or furring channels, being careful to follow the convenient nailing and trim instructions printed on the face of every panel. Cut only in the designated trim areas and screw or nail only along the designated nailing pattern lines. Use 1-5/8" drywall screws or 1-3/8" annular ringed drywall nails when applying panels to wood framing, and 1" drywall screws when applying panels to metal furring channels. Screw or nail butt ends every 7", 3/8" to 1/2" from the edge and fasten long sides at each foist. Screw or nail the remaining nailing pattern lines wherever they cross a joist, strap, or furring channel. Take care to avoid pinching the electrical supply wire between the panel and joists during installation.

In an occasional Panelectric installation, ceiling joists may make a popping sound as they are warmed by panels during normal operation. These instances are rare but due to the great variation of framing materials used in residential construction; you may choose to minimize this potential by gluing panels to ceiling joists with construction adhesive.

STEP 4 *Connecting the Panels*

Each Panelectric panel comes with an eighteen foot power supply wire for easy direct thermostat connection. As panels are hung, these wires must be carefully threaded up through the ceiling insulation and supported by the ceiling joists. This can be accomplished by stapling supply wires to the sides of joists with insulated electrical staples, running wires through holes drilled in joists or stapling wires to the tops of joists when there is an attic space directly above the panels. Under no circumstances should supply wires be allowed to lay directly on the Panelectric panels during operation.

In most installations, all the panels in a single room are connected in parallel to one thermostat. Extremely large rooms of more than 600 sq. ft. or rooms with unusual heating requirements may need more power than one thermostat can supply. In these cases simply use two thermostats located in different areas of the room.

If your job requires more than eighteen feet between a panel and its corresponding thermostat, you will have to use an interim junction box as discussed in Installation Step 1, Electrical Preparation. Power supply wires from several panels can be connected in parallel in one junction box and then connected to the thermostat with a single branch power supply line.

All electrical connections should be made by a competent licensed electrician in compliance with the National Electrical Code and any local electrical code or regulations. After the electrician connects your new heating system to the power source, it should be turned on and checked to make sure that each panel is operating properly.

Even before the drywall is finished or decorated, your Panelectric Heating System can be put into operation to provide you with heat during construction but take caution. *Never operate your Panelectric Heating System without a thermostat.*

Since thermostats are the brain of your new heating system, it's important to insure maximum performance efficiency by using Panelectric Thermostats that have been engineered specifically for use with your new Panelectric Heating System.

STEP 5 Joint Finishing and Decorating

If you have been using your heating system during construction, you will have to turn it off while finishing and decorating your ceilings. The direct heat from Panelectric panels can cause some finishing materials to dry so quickly that it can affect their strength and appearance. So make sure that all finishing and decorating materials are completely dry before turning your heating system back on.

Panelectric panels can be finished with tape and joining compound, painted, textured, and even wall papered just like conventional drywall. Ceilings to be papered should first be sealed with a primer to make it possible to remove the paper at a later date. Textures and spray materials can be applied to a thickness of 3/16" without adversely effecting heating efficiency.

Acoustical tile, insulating materials, paneling, or additional drywall should never be applied over a Panelectric Heating System ceiling.

Architectural Specifications

• Notes to Specifier

Panelectric should be installed in accordance with the general specifications contained in the Panelectric Home Planning and Construction Guide 8052 except as modified by the following specifications.

Other sections of the Specifications must reflect the special requirements for mechanical and electrical work necessitated by radiant heating systems. Proper types of insulation, caulking, weather stripping, glazing, storm doors and windows, vapor barrier and ventilation should conform to recommendations of the local electric utility company or regulatory body.

Board cutouts must be made in trim areas or in non-heating filler panels. Cutouts for electrical fixtures must be at least 8" from heating cables. Cutouts for air vents or similar non-electrical openings, must be at least 2" from heating cables.

Framing members shall be spaced (12") (16") or (24")o.c. Wood framing members shall be thoroughly dried.

Calculations for heat loss should be made in accordance with accepted practice such as outlined in the "Manual for Electrical Comfort Heating" published by the National Electrical Manufacturer's Association or in the ASHRAE Guide. In all cases, heat loss estimated should be endorsed by the utility. An exhaust fan of adequate capacity shall be installed in the kitchen. It is recommended that the bathrooms and laundry room (if any) also be equipped with exhaust fans. All exhaust fans and clothes dryers shall be vented to the outside and not into attic spaces or into crawl spaces beneath the structure.

• Scope

The contractor shall furnish all labor and materials to complete installation of the Panelectric Heating System in accordance with the specifications outlined herein. The contractor shall also affix Warning Sticker, Form 8511, to the electrical circuit box upon completion of the job.

• Materials

A. DRYWALL PANEL COMPONENTS

1. **5/8" Panelectric Heating System Panel of model designations for 208 or 240 volt system as shown in the Panelectric Panel Selection Chart.**
2. **in Panelectric Technical Bulletin in number 107. 5/8" Fire-Rated Panelectric Heating System Panel of model designation for 208 or 240 volt system, meeting all the requirements of Factory Mutual (Design FC5-1 hr.) as shown.**
3. **5/8" regular gypsum wallboard.**
4. **5/8" Fire-Rated gypsum wallboard.**

B. FASTENERS

1. **Nails: 1-3/8" GWB-54 or 6d cooler nails.**
2. **Screws: 1: Type S for use with metal furring channel and 1-1/4" Type W or 1-5/8" Type S for use with wood framing.**

C. ADHESIVE

1. **Wallboard/Panel Adhesive or other drywall stud adhesive complying with ASTM C-557.**

D. JOINT TREATMENT

1. **Joint tape.**
2. **Joint compound: powdered or ready-mixed.**

• Installation

A. PREPARATION FOR INSTALLING PANELS

The ceiling layout drawing of each room, based upon heat loss calculations, shall show by model number and outline the location of each Panelectric panel. All outlet and junction boxes shall be installed and power supply lines routed by a licensed electrician before Panelectric panels are installed.

B. *CUTTING PANELS*

Panelectric panels may be trimmed or cut only in areas designated as trim area on the face of each panel.

C. *PANEL INSTALLATION*

Panelectric panels shall be installed with lengths at right angles to the framing members and located in strict accordance with the layout drawings.

Fasteners at ends of panels shall be spaced 7" o.c. Long edges shall be fastened at each support. Fasteners shall be spaced 3/8" to 1/2" from the edge. Intermediate fasteners in the field of the panel shall be used everywhere a designated nailing line crosses a framing member.

In fire-rated assemblies, Fire-Rated Panelectric Heating Panels, fasteners and all test details shall be adhered to without deviation. Ceiling areas not requiring 5/8" Fire-Rated Panelectric Heating Panels shall be covered with 5/8" Fire-Rated wallboard.

• Finishing and Decorating

Panelectric makes an excellent source of heat during winter construction but must be turned off while finishing and decorating ceilings to allow all finishing materials to dry at normal temperatures.