

*Slant/Fin*  
**Hydronic Explorer**  
**for**  
**iPad/iPhone**  
**User Manual**

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# Introduction

Slant/Fin's Hydronic Explorer performs fast and accurate heat loss calculations for hot water systems and helps you select the right boiler and baseboard for each job. It is easy to use, and, whether the job is to provide heating for a single room or for a multilevel structure, the procedure is always the same: you simply enter the required data for each room, and Hydronic Explorer does the rest.

**Caution: This app is for use with hot water systems only. Do not use to size steam systems.**

To further help you in selecting the right equipment, Hydronic Explorer provides links to Slant/Fin's website to view additional product information on boilers and baseboard by simply tapping the screen on your iPad or iPhone.

*Note: This manual provides instructions and illustrations as they appear on the iPad. The procedures are the same when using the iPhone, but the illustrations may vary slightly.*

## Using Hydronic Explorer

Hydronic Explorer requires little computer experience. If you already know how to use your iPad or iPhone, you are well on your way. If necessary, refer to your iPad or iPhone literature for operation instructions.

## Downloading Hydronic Explorer

Hydronic Explorer is intended for use on an iPad (version **TBD** or later) and an iPhone (version **TBD** or later). To download the Hydronic Explorer app, go to the iTunes app store and search for Hydronic Explorer.

After you have downloaded the app, the Slant/Fin icon will appear on your screen.



Slant/Fin Icon





# Starting Hydronic Explorer

## Opening Hydronic Explorer

Tap on the Slant/Fin icon to open the Hydronic Explorer app.

The app opens displaying two frames: *Heat Calculator* and *Instructions*, which provides a link to the app's manual by tapping the pdf icon in the upper right corner. Below are the title bars for *Boiler Selector*, *Baseboard Selector*, and *Contact Us*. The bottom of the screen provides links to: Facebook, YouTube, and SlantFin.com.

*Note: An internet connection is required to access the above links and the online pdf manual.*

The three main sections allow you to do the following:

- *Heat Calculator* – allows you calculate the heat loss of individual rooms, floors, and the entire structure, and it makes baseboard recommendations.
- *Boiler Selector* – allows you to select a boiler based on the heat loss. It provides information for each boiler and allows you to access Slant/Fin's website for additional details.
- *Baseboard Selector* – takes into consideration the heat loss and your length requirements for each room and identifies baseboards that meet your requirements. It provides information for each of the baseboards and allows you to access Slant/Fin's website for additional details.

Each of these three selections is discussed in this manual.



Opening Screen



# Heat Calculator

## Purpose

The primary objective of Hydronic Explorer is to help you design a heating system that will provide the required heating comfort for a specific job. The first step towards this goal is to determine the heat loss (Btu/hour) using *Heat Calculator*. Construction, outside temperature, and indoor temperature are significant factors in this calculation.

## Heat Calculator

The *Heat Calculator* is your main work area where you use the following procedure:

1. Create a job by giving it a name.
2. Identify each floor by giving it a name.
3. Identify the rooms on each floor by naming each of them.
4. Select the rooms, one at a time, and enter the required data in each cell.

Repeat the above procedure if you want to enter more jobs.

*Note: It is not necessary to identify all floors and rooms before you start entering data. You may identify a room, enter its data and then identify another room and so on.*

You can use the Hydronic Explorer app to store multiple jobs. All data that you enter is automatically saved. You can also view and email each job summary. This procedure is discussed in *Section View Summary for this Job* in this manual.

## Adding a New Job

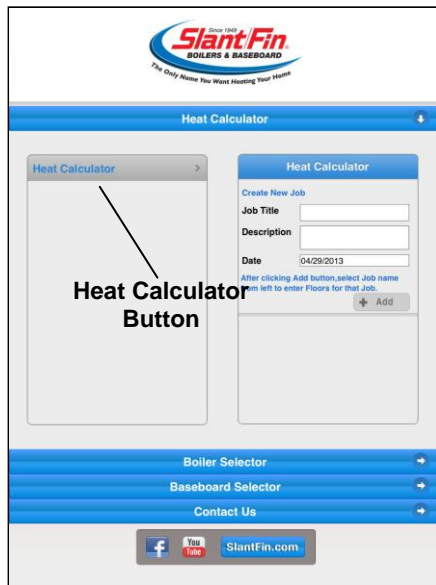
To create a new job, do the following:

1. Tap the **Heat Calculator** button. The *Create New Job* frame is displayed with **Heat Calculator** as its title.

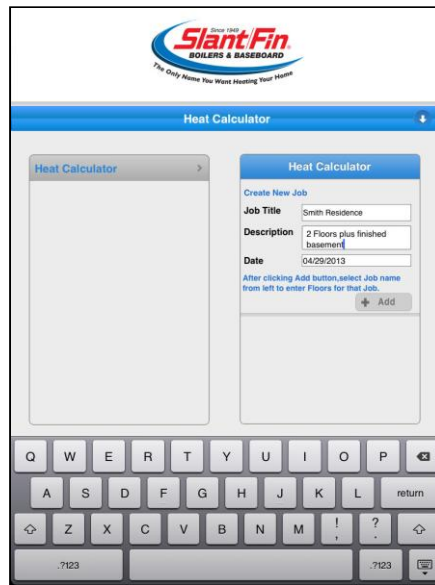
*Note: To re-display the Instructions frame, touch one of the corners of the Heat Calculator frame and swipe diagonally downward.*

2. Tap the **Job Title** cell. A keyboard is displayed. Key in the name of the job.

- You may choose to provide additional information in the **Description** cell. Tap the cell and key in the information. This is optional, and you are not required to make any entries into this cell.



Create New Job



Enter Data into Cell(s)

- The current date is displayed in the **Date** cell. Tap the **Date** cell and use the keyboard to change the date, if necessary.
- Tap the **Add** button, below the **Description** cell. The job will be displayed in the *Heat Calculator* frame. If you left the **Description** cell blank, the *Missing Field* screen will be displayed. Tap **Ok** to continue or **Cancel** to return to *Create New Job*.
- Below the job title in the *Heat Calculator* frame, **View Summary for this Job** is displayed. This is created for each job. Tap on it to display a summary of the data that you entered for a specific job.



Missing Field

Repeat the above procedure for each new job that you wish to add.

## Adding a Floor

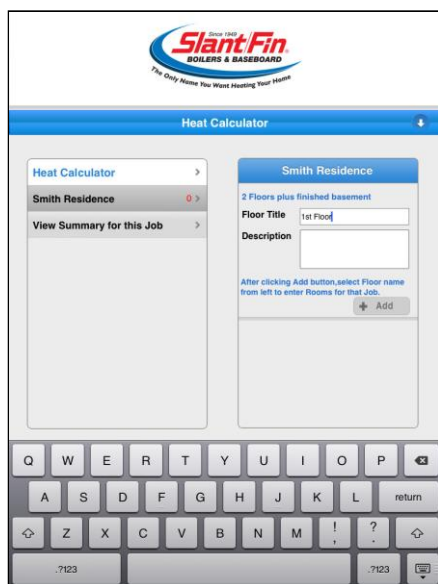
For each job, you must enter one or more floors as follows:

- Tap the job name you created in the *Heat Calculator* frame. The *Floor* frame is displayed with the job name as its title.

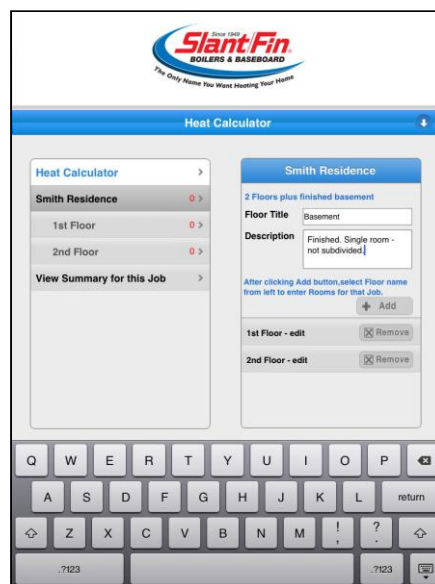
*Note: To re-display the Instructions frame, touch one of the upper corners of the Floor frame and swipe diagonally downward.*

- Tap the **Floor Title** cell. Key in the floor name using the displayed keyboard.

- You may choose to provide additional information in the **Description** cell. Tap the cell and key in the information. This is optional, and you are not required to make any entries into this cell.



Name a Floor



Multiple Floors

- Tap the **Add** button, below the **Description** cell. The floor will be displayed in the *Heat Calculator* frame under the job name. If you left the **Description** cell blank, the *Missing Field* screen will be displayed. Tap **Ok** to continue or **Cancel** to return to the *Floor* frame.

Repeat the above procedure to add more floors. Note that you can edit or delete any floor. The procedures are discussed in *Section Deleting/Editing Jobs, Floors and Rooms* in this manual.

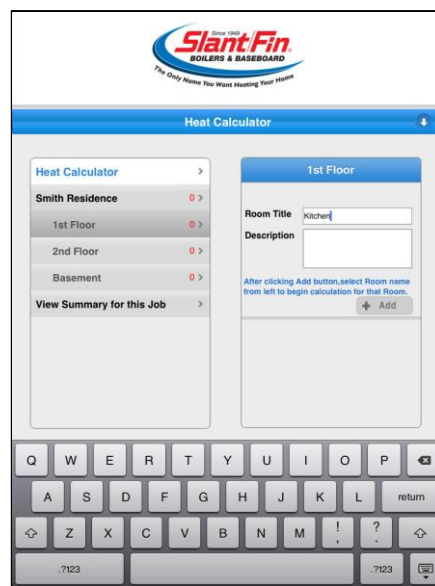
## Adding a Room

For each floor, you must enter one or more rooms as follows:

- Tap a floor name that you created in the *Heat Calculator* frame. The *Room* frame is displayed with the floor name as its title.

*Note: To re-display the Instructions frame, touch one of the upper corners of the Room frame and swipe diagonally downward.*

- Tap the **Room Title** cell. Key in the room name using the displayed keyboard.
- You may choose to provide additional information in the **Description** cell. Tap the cell and key in the information. This

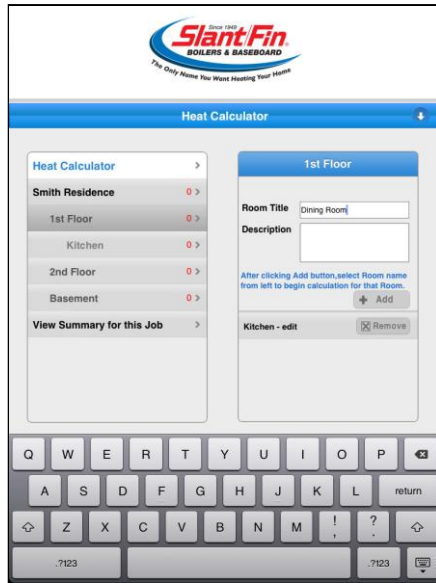


Name a Room

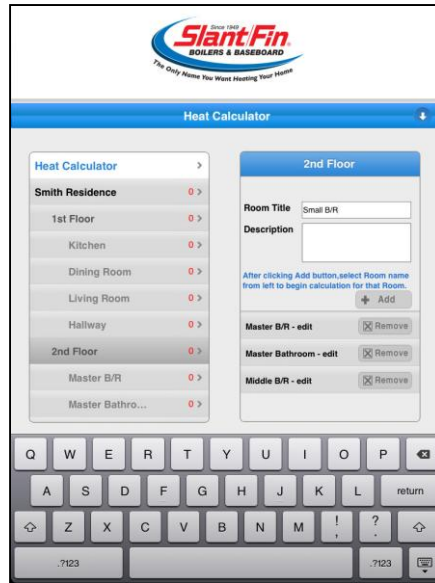
is optional, and you are not required to make any entries into this cell.

4. Tap the **Add** button, below the **Description** cell. The room will be displayed in the *Heat Calculator* frame under the floor name. If you left the **Description** cell blank, the *Missing Field* screen will be displayed. Click **Ok** to continue or **Cancel** to return to the *Room* frame.

Repeat the above procedure to add more rooms to the floor or select another floor to add rooms.



More Rooms



Multiple Rooms

## Deleting/Editing Jobs, Floors and Rooms

You can delete jobs, floors and rooms or edit them such as changing names, correcting typos or adding information in the **Description** cell.

### To delete a job:

1. Tap on the **Heat Calculator** button to delete a job. All jobs will be displayed in the frame to the right.
2. Tap the **Remove** button of the job to be deleted.

### To delete a floor:

1. Tap on a job name to delete a floor. All floors will be displayed in the frame to the right.
2. Tap the **Remove** button of the floor to be deleted.

### To delete a room:

1. Tap on a floor name to delete a room. All rooms on that floor will be displayed in the frame to the right.
2. Tap the **Remove** button of the room to be deleted.

**To edit a job:**

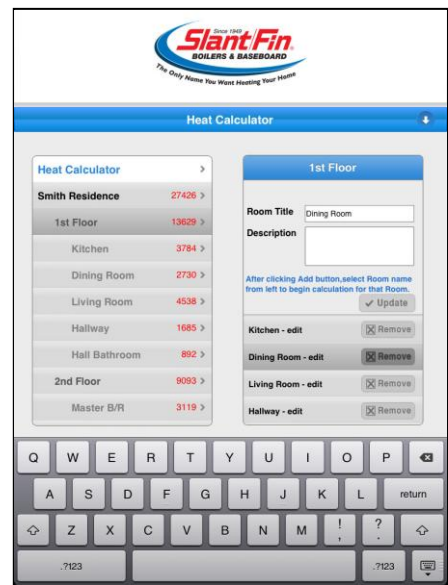
1. Tap on the **Heat Calculator** button to edit a job. All jobs will be displayed in the frame to the right.
2. In the right frame, tap the bar containing the job name and the word **edit**. The **Add** button is replaced with an **Update** button.
3. Tap the title or description cell and use the keypad to make changes or enter data.
4. Tap the **Update** button.

**To edit a floor:**

1. Tap on a job name to edit a floor. All floors will be displayed in the frame to the right.
2. In the right frame, tap the bar containing the floor name and the word **edit**. The **Add** button is replaced with an **Update** button.
3. Tap the title or description cell and use the keypad to make changes or enter data.
4. Tap the **Update** button.

**To edit a room:**

1. Tap on a floor name to edit a room. All rooms on that floor will be displayed in the frame to the right.
2. In the right frame, tap the bar containing the room name and the word **edit**. The **Add** button is replaced with an **Update** button.
3. Tap the title or description cell and use the keypad to make changes or enter data.
4. Tap the **Update** button.



Update a Room

**Heat Loss Calculations**

The Hydronic Explorer app calculates heat loss for each room using data that you enter into each cell within the *Heat Loss* frame. Tapping on a cell will permit you to enter values using the displayed keyboard, or you may be presented with additional options. The top of the *Heat Loss* frame displays the room's heat loss in BTU/HR. The bottom of the frame displays recommended baseboards and required lengths.

*Note: Drag the Heat Loss frame upward or downward to scroll.*

As you enter data for additional rooms, the app will update the heat loss for the floor and for the entire job.

## Data Entry

Enter room data as follows:

1. Tap on a room in the *Heat Calculator* frame. The *Heat Calculator* frame will be replaced with the *Heat Loss* frame where you will enter values into cells. The two figures, below provide examples of entered values for a specific room.

*Note: Tapping certain cells will cause the Instructions frame to be replaced with another frame. To re-display the Instructions frame, tap the top cell in the Heat Loss frame.*

2. Tap on each cell and provide the required values.

**Heat Calculator**  
Smith Residence > 1st Floor > Kitchen

**Heat Loss (BTU/HR)** 3784

Room Height (ft)	8
Room Length (ft)	16
Room Width (ft)	14
Doors & Glass (sq ft)	64
Doors & Glass Factor	0.65
Exposed Wall Length (ft)	16
Exposed Wall Factor	0.10
Cold Partition Length (ft)	0
Cold Partition Factor	0

**Instructions**

Enter variable requirements for each room to determine your heat loss. Once all variables are entered, calculated heat loss will appear in top "Heat Loss (BTU/HR)" field. Scroll to the bottom of each room to see how many feet of each residential Slant/Fin baseboard product are needed to meet your requirements. Click the (+) sign to the left of the baseboard product(s) you'd like to add to the Job Summary.

*Note: App suggests actual "finned length" required. Actual output of element is 4" less (finned length) than actual tube length per piece of baseboard. This should be taken into account when deciding on final requirements of baseboard per room.*

To see baseboard product detail or more baseboard options, click Baseboard Selector. After clicking each item you will see product detail. Click "Learn More" to be directed to the

Boiler Selector  
Baseboard Selector  
Contact Us

SlantFin.com

Heat Loss Frame (Scroll to Top)

**Heat Calculator**  
Smith Residence > 1st Floor > Kitchen

**Instructions**

Enter variable requirements for each room to determine your heat loss. Once all variables are entered, calculated heat loss will appear in top "Heat Loss (BTU/HR)" field. Scroll to the bottom of each room to see how many feet of each residential Slant/Fin baseboard product are needed to meet your requirements. Click the (+) sign to the left of the baseboard product(s) you'd like to add to the Job Summary.

*Note: App suggests actual "finned length" required. Actual output of element is 4" less (finned length) than actual tube length per piece of baseboard. This should be taken into account when deciding on final requirements of baseboard per room.*

To see baseboard product detail or more baseboard options, click Baseboard Selector. After clicking each item you will see product detail. Click "Learn More" to be directed to the

**Suggested Baseboard Products**  
Click (+) to add to Summary.

— FineLine 30 (ft)	6.52
— BaseLine 2000 (ft)	6.64
— MultiPak 80 H-3 (ft)	5.18

Boiler Selector  
Baseboard Selector  
Contact Us

SlantFin.com

Heat Loss Frame (Scroll to Bottom)

## Cell Descriptions

The following describes the cells in the *Heat Loss* frame.

### Room Height, Room Length, and Room Width

Tap each cell and enter the values. All dimensions are in feet.

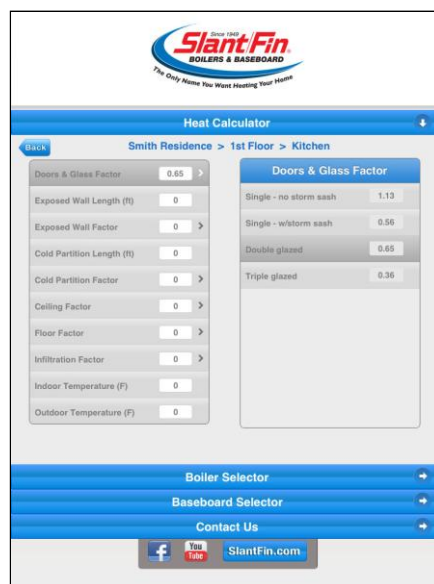


## Glass and Door (sq ft)

Tap the Glass (sq ft) or Door (sq ft) cells, click “Add Glass”/”Add Door” button and modify the title if desired. Then, enter the dimensions in inches then click Add. (If you want to delete a door or glass pane, after clicking the “Add Glass” or “Add Door” button, click the “Remove” button for the glass pane or door you want to remove.)

## Door & Glass Factors

If you know the value, tap the white area in the cell and enter the value using the keyboard. Alternatively, tap the cell. The *Door & Glass Factor* frame is displayed. Tap on one of the items. The value is automatically inserted.



Door & Glass Factor

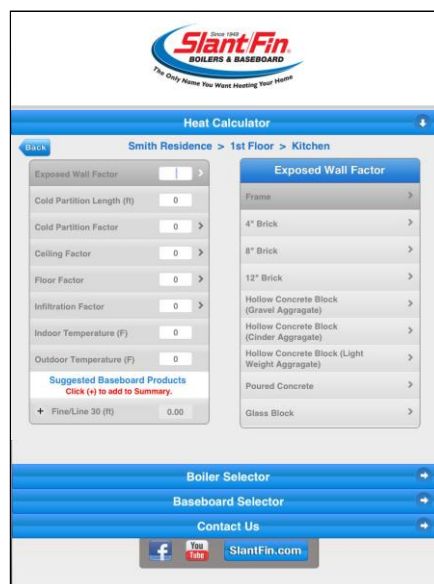
## Exposed Wall Length

Determine the length of each wall in the room that is exposed to the outdoors and enter the total (in feet).

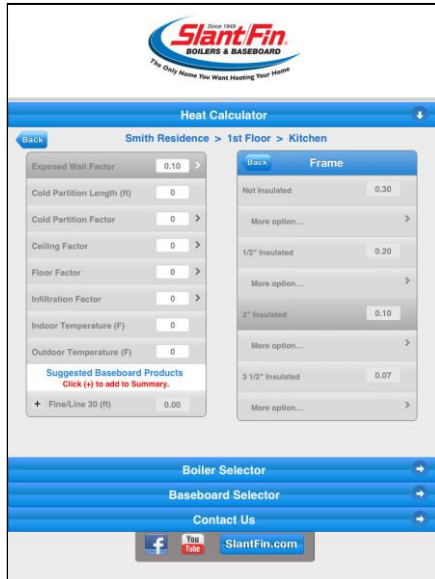
## Exposed Wall Factor

If you know the value, tap the white area in the cell and enter the value using the keyboard. Alternatively, do the following:

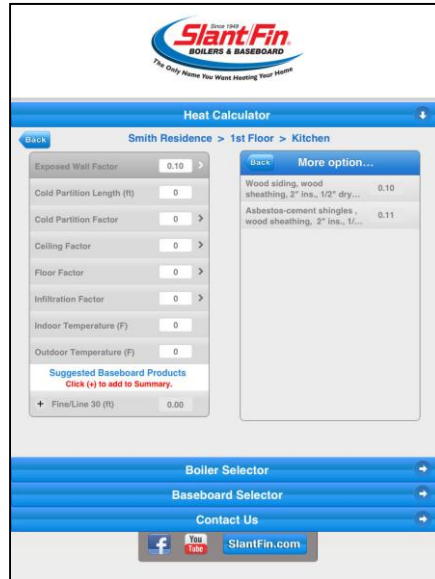
1. Tap on the cell. The *Exposed Wall Factor* frame is displayed.
2. Tap on the cell that describes the wall’s construction. In our example, we chose **Frame**. A new frame representing the selected construction will be displayed.
3. Tap on a cell to select an option, or tap on **More options...** for more choices. The value will automatically be inserted.



Exposed Wall Factor



Wall Factor - Frame



Wall Factor - More Options

### Cold Partition Length

Determine the length of each wall in the room that is exposed to adjoining unheated areas of the building and enter the total (in feet).

*Note: This differs from **Exposed Wall Length**, above where the wall is exposed to the outside.*

### Cold Partition Factor

If you know the value, tap the white area in the cell and enter the value using the keyboard. Alternatively, tap the cell then tap on one of the options in the *Cold Partition Factor* frame. The proper value is automatically inserted.



Cold Partition Factor

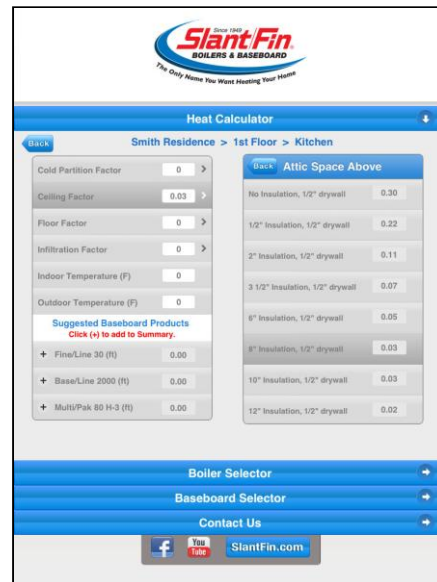
## Ceiling Factor

If you know the value, tap the white area in the cell and enter the value using the keyboard. Alternatively, do the following:

1. Tap on the cell. The *Ceiling Factor* frame is displayed.
2. Tap on a cell that describes the ceiling. In our example we chose **Attic Space Above**, which displayed a new frame with insulation options.
3. Tap on one of the options. The proper value is automatically inserted.



Ceiling Factor



Ceiling Factor – Attic Space Above

## Floor Factor

If you know the value, tap the white area in the cell and enter the value using the keyboard. Alternatively, do the following:

1. Tap on the cell. The *Floor Factor* frame is displayed.
2. Tap on a cell that describes the floor. In our example, we chose **Wood Over Enclosed UNHEATED Space**.
3. If you select one of the other options, another frame is displayed. Tap on one of the options. The proper value is automatically inserted.



Floor Factor



Floor Factor – Wood Over ENCLOSED

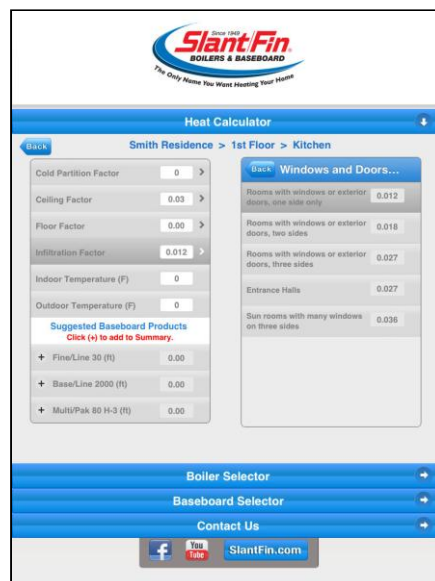
## Infiltration Factor

If you know the value, tap the white area in the cell and enter the value using the keyboard. Alternatively, do the following:

1. Tap on the cell. The *Infiltration Factor* frame is displayed.
2. Tap on the cell that best describes the room. In our example we chose **Windows and Doors Weather-stripped OR With....** A new frame is displayed.
3. Tap on one of the options. In our example, we chose **Rooms with windows or exterior doors, one side only**. The proper value is automatically inserted.



Infiltration Factor



Infiltration Factor – Windows and Doors

## Indoor Temperature

Tap the white area in the cell and enter the minimum indoor temperature (°F) to be maintained by the heating system.

## Outdoor Temperature

Tap the white area in the cell and enter the outdoor temperature (°F). See *Section Outdoor Design Temperatures for Cities* in this manual.

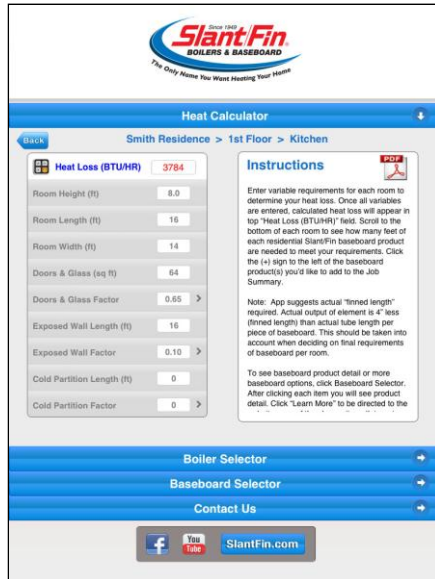
## Room Heat Loss and Baseboard Recommendations

At this point you have entered all of the necessary data for a specific room. Scroll to the top of the *Heat Loss* frame to read the heat loss in BTU/HR for the room. Scroll to the bottom of the *Heat Loss* frame to view recommended baseboard products and required lengths that will meet the room's heat requirements.

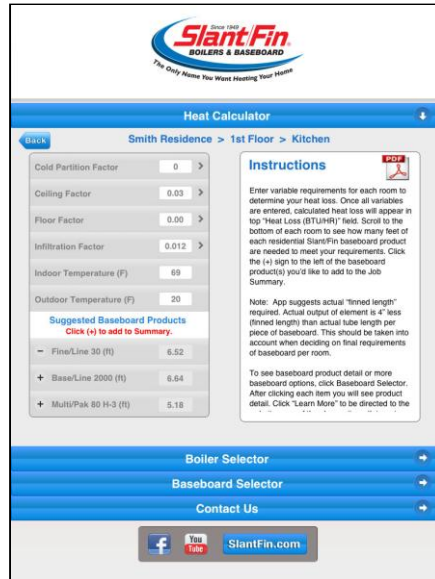
*Note: For baseboard lengths, the app suggests actual "finned length" required. Actual output of element is 4 inches less (finned length) than actual tube length per piece of baseboard. This should be taken into account when deciding on final requirements of baseboard per room.*

If you want to include any of the suggested baseboard products in the job summary, tap the adjacent (+). To remove them, tap the (-). To view the job summary, return to the *Heat Calculator* frame (tap the **Back** button on top of the screen) and select **View Summary for this Job**.

Viewing and selecting additional baseboard products and boilers are discussed in the following sections.

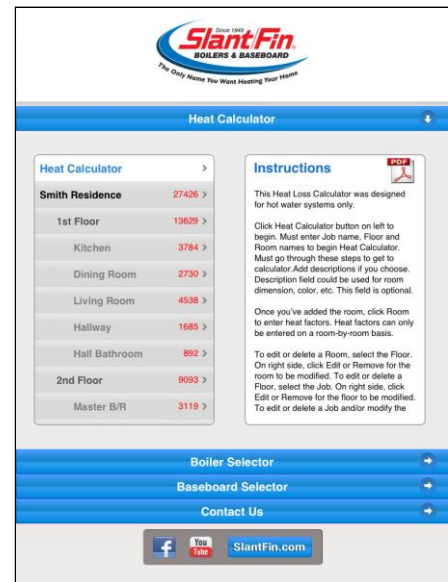


Room Heat Loss (BTU/HR)



Recommended Baseboard Products

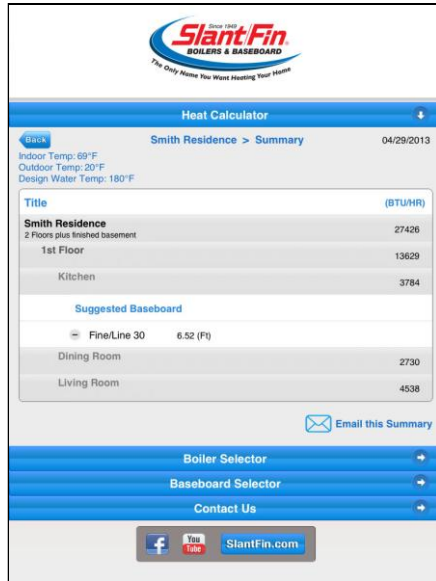
As you enter data for additional rooms, you can view the heat loss for each room, floor, and the entire job in the *Heat Calculator* frame. Tap the **Back** button above the *Heat Loss* frame to return to the *Heat Calculator* frame.



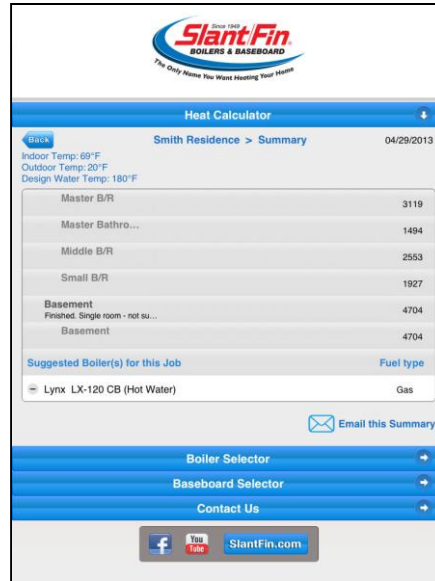
View Heat Loss

## View Summary for this Job

A summary is automatically created for each job and is continuously updated as you enter or modify data. You can access the summary by tapping **View Summary for this Job** in the *Heat Calculator* frame.



Job Summary- Top



Job Summary- Bottom

## Emailing the Summary

The app allows you to email the summary to anyone you choose including to your own computer for backing up your data. Tap the email icon in the lower right and enter the required information. An internet connection and email account are required.





# Baseboard Selector

## Purpose

As you determine the heat loss for each room, you can select baseboard that will provide the necessary heat for that room. This section will help you make that selection.

## Heat Loss per Foot Calculation

For each room, you need to calculate the heat loss per foot (BTU/HR/FT). Do the following:

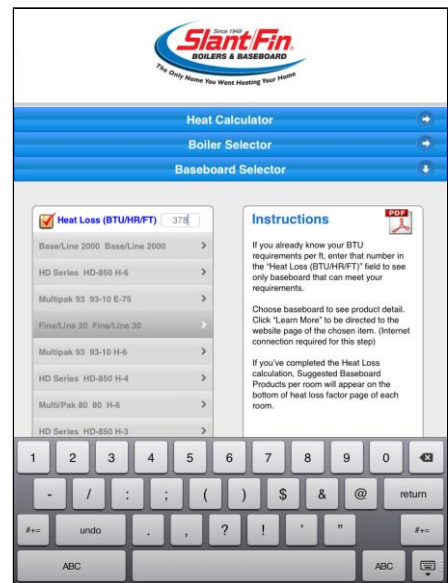
1. Determine the heat loss for a specific room. You can find this value on top of the *Heat Loss* frame for that room or in the *Heat Calculator* frame.
2. Divide the heat loss by the length of baseboard that you plan to install in that room. This is the heat loss per foot.

*Note: For baseboard lengths, the app suggests actual “finned length” required. Actual output of element is 4 inches less (finned length) than actual tube length per piece of baseboard. This should be taken into account when deciding on final requirements of baseboard per room.*

## Selecting Baseboard

Do the following:

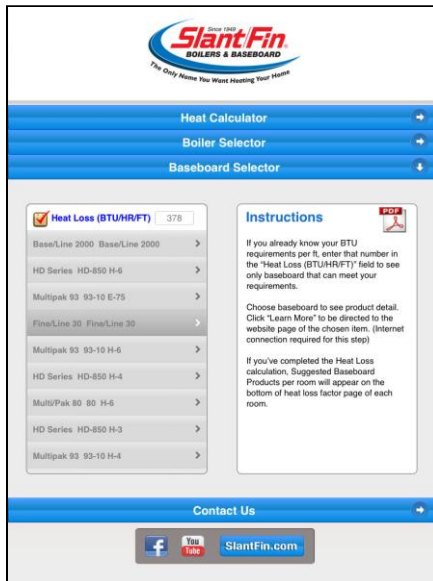
1. Tap on **Baseboard Selector**.
2. Tap on the **Heat Loss (BTU/HR/FT)** cell. The keyboard is displayed.
3. Enter the heat loss per foot that you calculated in the above procedure then tap **return**. A list of baseboard products that meet your requirements is displayed.
4. Tap on a baseboard product. In our example, we selected *Fine/Line 30 FL-30*. The *Fine/Line 30* screen is displayed. Some of the information provided includes:
  - Application (residential hot water heating)
  - Output



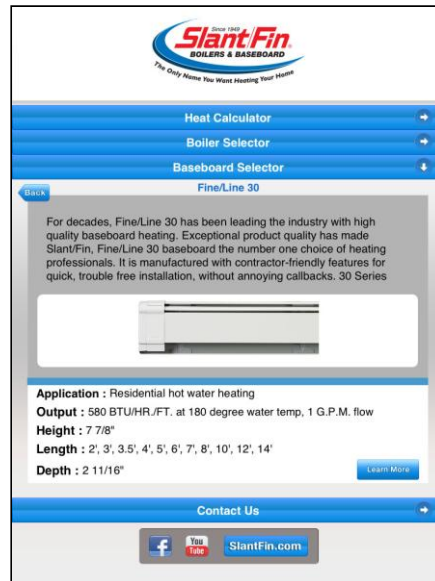
Heat Loss per Foot

- Height
- Available Lengths
- Depth

You can also tap the **Learn More** button to access additional information online.



Baseboard Selections



Fine/Line 30 Baseboard

# Boiler Selector

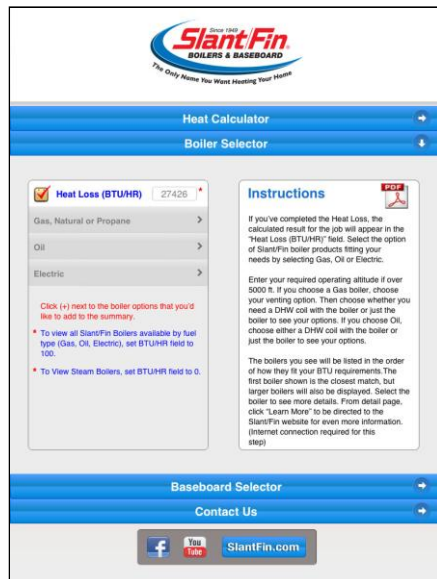
## Selecting the Right Boiler

This section will help you select the right boiler for your job. You can use the heat loss in BTU/HR that is automatically obtained from the *Heat Loss Calculator*, or, if you already know the heat loss, you can enter the value manually.

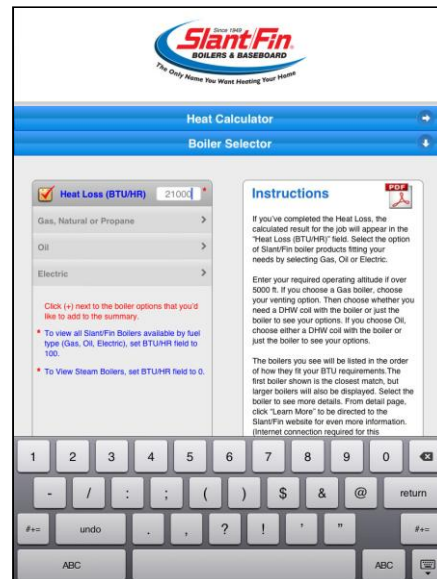
Do the following:

1. Tap on **Boiler Selector**. The *Boiler Selector* frame is displayed showing the heat loss. If that cell is empty and you know the heat loss, you can enter it yourself as follows:
  - a. Tap on the empty cell next to **Heat Loss (BTU/HR)**. The keyboard is displayed.
  - b. Enter the heat loss value then tap **return**. To view steam boilers, enter zero (0). To view all available Slant/Finn Boilers by fuel type, enter 100.

*Note: You can tap the top of the Boiler Selector frame at any time to display the Instructions frame.*



Calculated Heat Loss

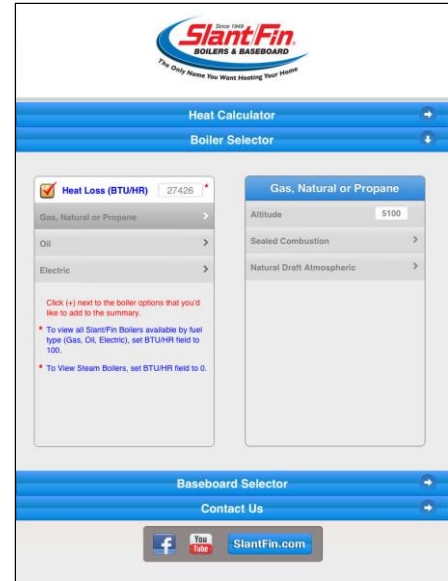


Heat Loss - Manual Entry

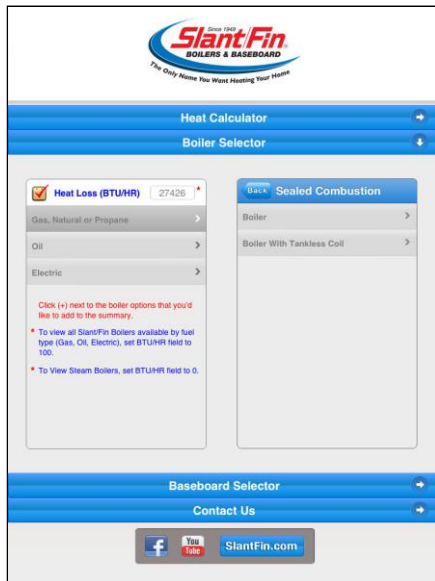
2. Tap on a cell to select the desired fuel type: Gas (Natural or Propane), Oil, or Electric.

Each selection provides a series of screens where you provide additional information by tapping on the appropriate cells. You will then be provided with a list of boilers that meet your requirements.

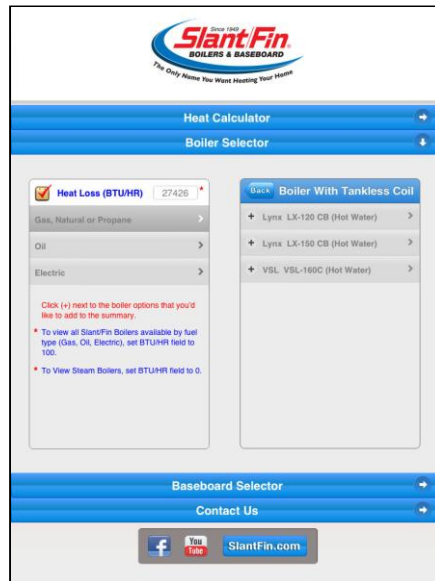
3. In our example, we chose Gas, Natural or Propane. The *Gas, Natural or Propane* frame is displayed.
4. This selection requires that we enter the altitude. Tap on the empty cell. The keyboard is displayed. Enter a value (in feet) and tap **return**.
5. Tap on a cell to choose the type of combustion. In our example, we chose **Sealed Combustion**. The *Sealed Combustion* frame is displayed.
6. We are presented with a choice of **Boiler** or **Boiler With Tankless Coil**. In our example, we chose the latter and tapped on **Boiler With Tankless Coil**. The next frame provides a choice of three boilers.



Enter Altitude



Select Boiler Type



Select Boiler

7. Tap on any of the selections to learn about the individual boilers. In our example, we chose Lynx LX-120 CB (Hot Water). The *Lynx LX-120 CB (Hot Water)* frame is displayed providing the following information:

- Fuel type (Gas)
- System: Hot Water
- Combustion type
- Capacity
- Efficiency

You can also tap the **Learn More** button to access additional information online.

8. Tap **Back** to return to the previous screen. If you want to include a boiler in the job summary, tap the adjacent (+). To remove it, tap (-). To view the job summary, return to the *Heat Calculator* and tap **View Summary for this Job**. You may select up to three boilers to be included in the job summary.

*Note: If you exceed this number, the app will randomly include just three of the selected boilers in the job summary.*



**Boiler Information**



# Quick Answers

## **Purpose**

This section serves as handy reference allowing you to find quick answers to specific questions.

## **How do I create, edit, or delete a job?**

### **Creating a job:**

1. Tap the **Heat Calculator** button in the *Heat Calculator* frame.
2. Enter all of the required data in the *Create New Job* frame and tap **Add**.

### **Editing a job:**

1. In the *Create New Job* frame, select the job by tapping the bar with the job name and the word **edit**.
2. Make changes and tap **Update**.

### **Deleting a job:**

In the *Create New Job* frame, tap **Remove** on the same bar as the job name.

## **How do I add, edit, or delete a floor?**

### **Adding a floor:**

1. Tap the job name in the *Heat Calculator* frame.
2. Enter all of the required data in the *Floor* frame and tap **Add**.

### **Editing a floor:**

1. In the *Floor* frame, select the floor by tapping the bar with the floor name and the word **edit**.
2. Make changes and tap **Update**.

### **Deleting a floor:**

In the *Floor* frame, tap **Remove** on the same bar as the floor name.

## How do I add, edit, or delete a room?

### Adding a room:

1. Tap the floor name in the *Heat Calculator* frame.
2. Enter all of the required data in the *Room* frame and tap **Add**.

### Editing a room:

1. In the *Room* frame, select the room by tapping the bar with the room name and the word **edit**.
2. Make changes and tap **Update**.

### Deleting a room:

In the *Room* frame, tap **Remove** on the same bar as the room name.

## One of my entries for heat loss calculations is incorrect. How do I change it?

Tap on the cell and enter the correct data.

## How do I save my work?

There is no need for you to save your work. The system saves it automatically. However, in the unlikely event that the app crashes, your data will be lost. For this reason, you should email the job summary to yourself at another computer; see *Section View Summary for this Job* in this manual.

## How do I email a job summary?

In the *Heat Calculator* frame, tap on **View Summary for this Job** below the job. Tap the email icon in the lower right and enter the required information. An internet connection and email account are required.

## How do I select the right boiler for a job?

1. Tap on **Boiler Selector**.
2. Enter the heat loss (BTU/HR) in the empty cell. This will be entered automatically if you used the app to calculate the heat loss; otherwise, you can use the keyboard to enter it yourself.
3. Tap on the desired fuel type. As additional frames are presented, tap on the appropriate cells. The app will then provide a list of boilers that meet your requirements. Tap on a boiler to learn more.

*Note: To view steam boilers, enter zero (0). To view all available Slant/Finn Boilers by fuel type, enter 100.*



### **How do I select baseboard?**

1. The bottom of the *Heat Loss* frame will display recommended baseboard products and recommended lengths for the room. For more information, tap **Baseboard Selector**.
2. Determine the desired baseboard length and divide that into the room's heat loss. Enter that value into the Heat Loss (BTU/HR/FT) cell.
3. Tap **return**. A list of baseboards meeting your requirements will be displayed. Tap on a baseboard to learn more.



# Outdoor Design

## Temperature for Cities

Table 1  
Outdoor Design Temperatures for Cities  
Hydronics Institute H-21 Manual

<b>Alabama</b>		<b>Georgia</b>		<b>Michigan</b>	
Anniston	19	Atlanta	23	Battle Creek	5
Birmingham	22	Augusta	23	Detroit	8
Mobile	29	Macon	27	Flint	3
Montgomery	26	Savannah	27	Grant Rapids	6
				Lansing	6
				Sault St. Marie	-8
<b>Alaska</b>		<b>Idaho</b>		<b>Minnesota</b>	
Anchorage	-20	Boise	10	Duluth	-15
Fairbanks	-50	Coeur D'Alene	7	Minneapolis	-10
Juneau	-4	Lewiston	12	St. Paul	-10
Nome	-28	Pocatello	-2		
				<b>Mississippi</b>	
<b>Arizona</b>		<b>Illinois</b>		Meridian	24
Flagstaff	5	Chicago	0	Vicksburg	26
Phoenix	34	Moline	-3		
Tucson	32	Peoria	2	<b>Missouri</b>	
Winslow	13	Springfield	4	Columbia	6
Yuma	40	Urbana	4	Kansas City	8
				St. Louis	11
<b>Arkansas</b>		<b>Indiana</b>		<b>Montana</b>	
Fort Smith	19	Fort Wayne	5	Billings	-6
Little Rock	23	Indianapolis	4	Butte	-16
				Helena	-13
<b>California</b>		<b>Iowa</b>		Kalispell	-3
Bakersfield	33	Davenport	-3	Miles City	-15
Eureka	35	Des Moines	-3		
Fresno	31	Dubuque	-7	<b>Nebraska</b>	
Los Angeles	44	Mason City	-9	Lincoln	0
Oakland	37	Sioux City	-6	North Platte	-2
Sacramento	35			Omaha	-1
San Diego	44	<b>Kansas</b>			
San Francisco	44	Dodge City	7	<b>Nevada</b>	
San Jose	36	Topeka	6		
		Wichita	9		
<b>Colorado</b>					

**Table 1**  
**Outdoor Design Temperatures for Cities**  
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Denver	3	<b>Kentucky</b>		Las Vegas	26
Grand Junction	11	Louisville	12	Reno	8
Pueblo	-1			Winnemucca	5
<b>Connecticut</b>		<b>Louisiana</b>		<b>New Hampshire</b>	
Hartford	5	New Orleans	35	Concord	-7
New Haven	9	Shreveport	26	Manchester	1
<b>Delaware</b>		<b>Maine</b>		<b>New Jersey</b>	
Dover	15	Augusta	-3	Atlantic City	18
Wilmington	15	Bangor	-4	Newark	15
		Caribou	-14	Trenton	16
		Portland	0		
<b>District Of Columbia</b>		<b>Maryland</b>		<b>New Mexico</b>	
Washington	19	Baltimore	15	Albuquerque	17
<b>Florida</b>				Roswell	19
Jacksonville	32	<b>Massachusetts</b>		<b>New York</b>	
Miami	47	Boston	10	Albany	0
Pensacola	32	Nantucket	0	Binghamton	2
Tampa	39	Springfield	2	Buffalo	6
		Worcester	1	Massena	-12
				New York	15
				Rochester	5
				Syracuse	2
				<b>Canada</b>	
<b>North Carolina</b>		<b>Tennessee</b>		<b>Alberta</b>	-25
Asheville	17	Chattanooga	19	Calgary	-26
Charlotte	22	Knoxville	17	Edmonton	
Greensboro	17	Memphis	21	<b>British Columbia</b>	
Raleigh	20	Nashville	16	Vancouver	19
Wilmington	27			Victoria	23
<b>North Dakota</b>		<b>Texas</b>		<b>Manitoba</b>	
Bismarck	-19	Abilene	21	Churchill	-38
Fargo	-17	Amarillo	12	Winnipeg	-25
		Austin	29		
<b>Ohio</b>		Brownsville	40	<b>New Brunswick</b>	
Akron	6	Corpus Christi	36	Fredericton	-10
Cincinnati	12	Dallas	24	St. John	-7
Cleveland	7	Del Rio	31		
Columbus	7	El Paso	25		
		Fort Worth	24		

**Table 1**  
**Outdoor Design Temperatures for Cities**  
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Dayton	6	Galveston	36	<b>New Foundland</b>	
Sandusky	8	Houston	32	St. Johns	6
Toledo	5	Port Arthur	33		
		San Antonio	30	<b>Nova Scotia</b>	
<b>Oklahoma</b>				Halifax	4
Oklahoma City	15	<b>Utah</b>		Yarmouth	9
Tulsa	16	Vernal	-6		
		Salt Lake City	9	<b>Ontario</b>	
<b>Oregon</b>				Hamilton	3
Baker	1	<b>Vermont</b>		London	3
Eugene	26	Burlington	-7	Ottawa	-13
Medford	23			Toronto	1
Portland	24	<b>Virginia</b>			
Salem	25	Lynchburg	19	<b>Prince Edward Island</b>	
		Norfolk	23	Charlottetown	-3
<b>Pennsylvania</b>		Richmond	18		
Erie	11	Roanoke	18	<b>Quebec</b>	
Harrisburg	13			Montreal	-10
Philadelphia	15	<b>Washington</b>		Quebec	-13
Pittsburgh	11	Seattle	32		
Scranton	6	Spokane	4	<b>Saskatchewan</b>	
		Yakima	10	Prince Albert	-35
<b>Rhode Island</b>				Saskatoon	-30
Providence	10	<b>West Virginia</b>			
		Elkins	5	<b>Yukon</b>	
<b>South Carolina</b>		Parkersburg	12	Whitehorse	-42
Charleston	27				
Columbia	23	<b>Wisconsin</b>			
Greenville	23	Green Bay	-7		
		LaCrosse	-8		
<b>South Dakota</b>		Madison	-5		
Huron	-12	Milwaukee	-2		
Pierre	-9				
Rapid City	-6	<b>Wyoming</b>			
		Cheyenne	-2		
		Lander	-12		
		Sheridan	-7		