Residential Space Conditioning Systems Selection Guide
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Systems Selection Guide

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Guide Content and Selection Tool
– HVAC&R Center
  Madison, WI
Layout and Programming
  Bellevue, WA
Program Objective

To develop a computer based tool for providing specific guidance on selecting residential space conditioning systems that can deliver a quality indoor environment at an affordable price.
Program Objective

- Provides basic information on space conditioning
- Details important aspects of space conditioning
- Describes various systems available
- Selection tools allows users to compare the attributes of the various systems
Intended Audience

- Utility Marketing Representative
- Utility Hotline Operators
- Self Guided Training Tool
- Garden and Home Show Presenters
- HVAC Sales Personnel
- Organizations Interested in Energy Use
- Homeowners
The main menu offers four options:

- Overview
- Online Reference
- System Selector
- Exit
The Overview provides instructions on the purpose of the software and how to use it.
Online Reference

Navigation through the program is primarily Point-&-Click.

Click on the icon to go to the Online Reference.
Online Reference

6 chapters in this section
– Overview of HVAC
– Thermal Comfort/IAQ
– Principles of Operation
– Application Considerations
– Safety Concerns
– System Maintenance

FAQ’s
Glossary
Online Reference

This is the basic format for all of the slides

Graphic

Current Chapter

Menus

Text
Navigation In the Chapter

Use the arrows in the menu bar to step through the slides in an orderly fashion.

Use these arrows.
Navigation In the Chapter

Or use the drop down menu to skip ahead in the same chapter

Then click to jump to your selected slide

Click Here for Menu
Pop-up Information

Clicking on highlighted text within a page will pop up a glossary definition or additional information.

Click here for subpage
Pop-up Information

This shows a pop-up sub page with additional information:

The most common method of providing air conditioning is by a vapor compression system. This system alternately vaporizes and compresses a working fluid (a refrigerant such as CFC-12, HCFC-22 or R-410a) to transfer heat out of the house. The refrigerant vapor is compressed by the compressor to a higher pressure and temperature. Heat is rejected to the outdoors through a condenser. The refrigerant is then sent through an expansion valve, which lowers its pressure and temperature. The refrigerant is passed through the evaporator, removing heat from the air inside the house, and returned to the compressor.
Pop-up Information

This shows a pop-up definition within a sub page.
This shows a pop-up Glossary definition.
The Glossary can also be accessed under the "TOOLS" menu.
Navigation to Other Chapters

You can choose a new chapter from the “CONTENTS” Menu.

Jump to the new chapter.

Click Here for Menu
Overview of HVAC

This chapter provides basic information on HVAC

- What is Heating
- What is Ventilation
- What is Air Conditioning
- HVAC Refrigerants and the Ozone layer
- Typical Devices that heat and cool
This chapter describes what conditions need to be met to keep a person comfortable

- Optimal space and skin temperature
- Optimal humidity levels
- Basic heat transfer
- Ventilation
- Indoor Air Quality
- Standard 55 & 62
Principles of Operation

This chapter provides an in-depth description of heating and cooling systems

- How they operate
- Typical efficiencies
- Advantages and disadvantages

The guidebook is fuel-neutral
Application Considerations

This chapter lists several items that must be considered when selecting and installing a space conditioning system:

- Unit location
- Unit configuration
- Unit sizing
- Thermostat placement
- Filtration
- Thermal distribution
Safety Concerns

This chapter provides basic, common sense safety information for the homeowner

– Electrical safety
– Gas leaks
– Safe practices for performing maintenance

This section also explains the “why” of the advice
System Maintenance

This chapter describes the basic maintenance that should be performed by homeowners and by professional technicians

- Outdoor condenser coils
- Indoor evaporator coils
- Filters
- Furnaces
Search Engine

Search current chapter or Search entire deskbook
System Selection Tool

Users input basic information about the conditioned space and a ranking of their desired system characteristics.

The system selector generates a list of systems that meet the needs with estimated installation and operating costs.
Introduction

Allows the user to specify the type of system to be examined.

Also allows the user to open a previously saved profile.
Location

Allows the user to choose their location from a pull down menu.

Currently, only locations in funder’s territory are included.
Construction

Allows the users to describe their home. These parameters are used to calculate the energy use.
Construction

House Type
- Ranch
- Two Story Split
- Manufactured

Square Footage
- 500 to 5500 ft²
Construction

Quality of Construction
- Below average
- Average
- Above average

Foundation
- Slab on grade
- Crawl space
## Construction

<table>
<thead>
<tr>
<th></th>
<th>Wall</th>
<th>Roof</th>
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<tbody>
<tr>
<td><strong>Ranch/Two Story slab</strong></td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Manufactured</td>
<td>7</td>
<td>11</td>
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<td>19</td>
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<td></td>
<td>14</td>
<td>23</td>
</tr>
<tr>
<td>Manufactured</td>
<td>13</td>
<td>23</td>
</tr>
</tbody>
</table>

### Temperature Levels
- **LOW**
- **MEDIUM**
- **HIGH**

**LOW**
- Wall: 9
- Roof: 22

**MEDIUM**
- Wall: 15
- Roof: 23

**HIGH**
- Wall: 24
- Roof: 27

**HOT**
- Wall: 14
- Roof: 23

**COLD**
- Wall: 13
- Roof: 23
Allows user to input their utility rates

Electricity

Fuels
- Natural gas
- Propane
- Fuel Oil
Criteria

Allows user to specify four system selection criteria.

Users picks minimum levels of cost or quality.
Criteria

Environmental Factors
(Poor Satisfactory, Good, Excellent)

- Aesthetics
- Reliability
- Acoustics
- Comfort Level
- Maintenance Ease
- Environmental
- IAQ
Criteria

Economic Factors *(Low, Medium, High)*

- First Cost
- Operations Cost
- Maintenance Cost
- Life Cycle Cost
Criteria

Based on the criteria, the system selector will sort through the various systems to deliver a list.
Search Results

On the left, summary of the inputs and a list of results

On the right, detailed information about the selected systems
Search Results

For each selection, the tool provides estimated energy costs and life cycle costs.

### Dual Fuel Heat Pump, SEER 12, HSPF 9

<p>| | |</p>
<table>
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<tbody>
<tr>
<td>First Cost</td>
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<tr>
<td>Operation Cost</td>
<td>$794</td>
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<tr>
<td>Comfort Level</td>
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<td>Cooling Cost</td>
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<tr>
<td>First Cost</td>
<td>$4,719</td>
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<tr>
<td>Life Cycle Cost</td>
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</tbody>
</table>

Click Here to See Manufacturers of This System
Manufacturer List

List includes those who manufacturer the chosen system

The entire database can also be searched

Manufacturers

American Standard Inc. (Unitary Products Group)
6200 Troup Hwy.
Tyler, TX 75707
Tel: 903-581-3300
Web: http://www.amstd-comfort.com
Email: mailbox@amstd-comfort.com

Carrier Corp. North American Operations
Carrier Pkwy., P.O. Box 4803
Syracuse, NY 13221
Tel: 315-432-6000
Web: http://www.carrier.com
Email: contact.carrier@carrier.utc.com

Century by Heat Controller
1900 Wellworth Ave
Jackson, MI 48203
Tel: 517-787-2100
Availability

The Space Conditioning Selection Guidebook is currently available through the Electric Power Software Center. For a copy contact:

EPRI Software
(925) 934-4212

Any other questions:
EPRI HVAC&R Center
(800) 858-3774