TRI-COUNTY REGIONAL ENERGY NETWORK

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Using Wrightsoft for Residential Load Calculations

*Judy Rachel—Home Performance Pro*

November 18, 2025

Before We Begin

Here are some quick reminders:

- Did you call in? Please **share** full name to confirm attendance

- To receive AIA LUs, you **must attend** at least 80% of the training. Attendance will be verified

- Use the "**Chat**" to share questions or comments.

- Session is being **recorded** and posted to 3C-REN's on-demand page

- 3C-REN does **not** allow **AI notetakers**, unless used to accommodate a disability
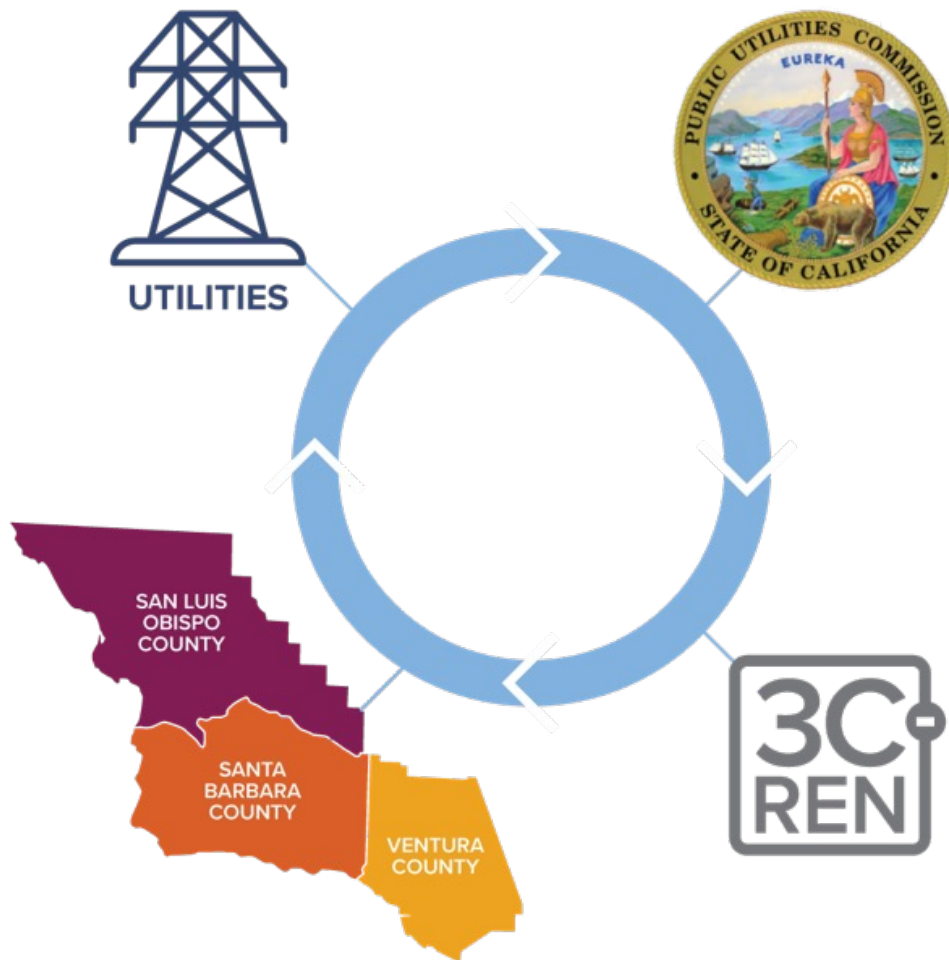
Tri-County Regional Energy Network

3C-REN is a collaboration between the tri-counties

Our programs reduce energy use for a more sustainable, equitable and economically vibrant Central Coast

Our free services are funded via the CPUC, bringing ratepayer dollars back to the region

Our Services

Incentives

HOME ENERGY SAVINGS

3c-ren.org/for-residents
3c-ren.org/multifamily

COMMERCIAL ENERGY SAVINGS

3c-ren.org/commercial

Contractors can enroll at
3c-ren.org/contractors

Training

BUILDING PERFORMANCE TRAINING

3c-ren.org/events
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View past trainings at
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Technical Assistance

AGRICULTURE ENERGY SOLUTIONS

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Using Wrightsoft Right-Suite Universal to do ACCA Manual J Residential Load Calculations

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TODAY'S OVERRIDING GOAL IS TO BEGIN LEARNING ACCA MANUAL J RESIDENTIAL LOAD CALCULATION PROCEDURES BY USING THE RIGHT-SUITE UNIVERSAL SOFTWARE PROGRAM.

We will not be able to cover every aspect of Manual J or Right-Suite. We will not be covering system selection, design or air distribution.

AGENDA

- ❑ *What a Load Calculation is*
- ❑ ACCA Manual J
- ❑ Load Calculation Software
- ❑ Data Collection / Site Survey
- ❑ Live Demonstration using Right-Suite Universal
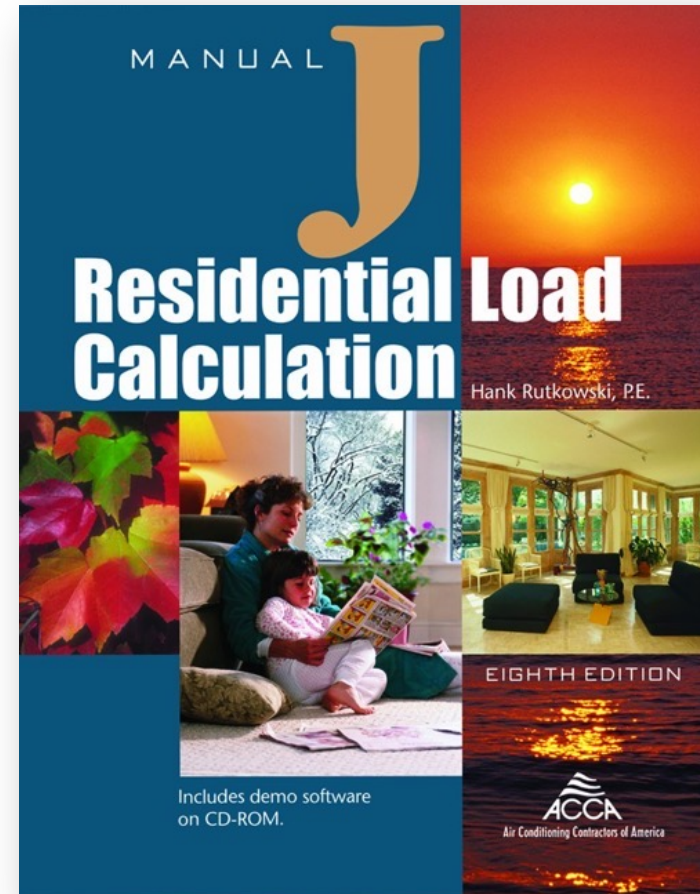
LOAD CALCULATION - DEFINITION

The measure of energy the heating and / or cooling system needs to add or remove from a space to provide the desired level of comfort.

GOAL OF THE LOAD CALCULATION

Provides the information necessary to select appropriately sized space conditioning equipment.
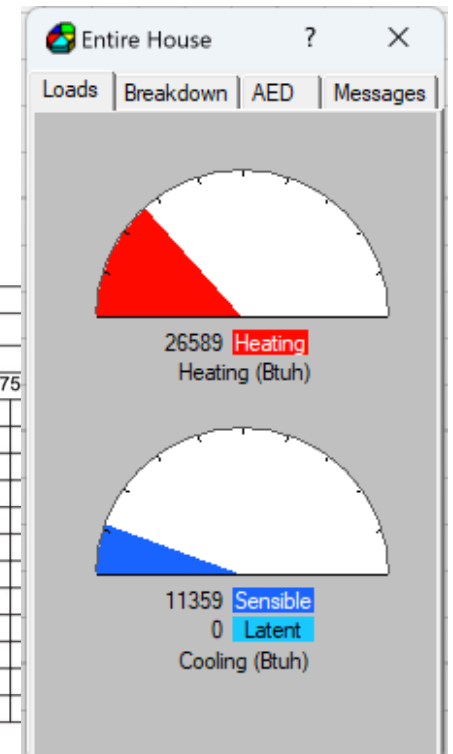
4-2. Heating capacity

NOTE: Values mentioned in the table are calculated based on the maximum capacity.

■ Model: AMUG24LMAS

AFR			CFM				800

	°FDB		Indoor temperature								
			60		65		70		72		75
°FDB	°FWB		TC kBtu/h	IP kW	TC kBtu/h	IP kW	TC kBtu/h	IP kW	TC kBtu/h	IP kW	TC kBtu/h
-5	-7		21.24	3.84	20.64	3.90	20.50	3.49	20.08	4.01	20.34
5	3		24.03	3.29	22.91	3.37	23.00	3.47	23.38	3.51	24.33
14	12		25.97	3.31	24.64	3.40	24.93	3.40	25.46	3.56	26.67
17	15		26.69	3.25	25.34	3.34	25.60	3.38	26.13	3.50	27.36
23	19		28.07	3.18	26.76	3.26	26.86	3.33	27.31	3.40	28.42
32	28		30.13	3.14	29.06	3.19	28.80	3.26	28.81	3.29	29.50
41	37		32.20	3.16	31.51	3.18	30.73	3.20	30.09	3.21	30.12
47	43		33.59	3.21	32.81	3.20	32.00	3.15	31.20	3.18	30.39
50	47		34.42	3.28	34.22	3.25	32.82	3.16	31.37	3.20	30.59
59	50		34.72	3.39	35.05	3.30	33.09	3.04	30.85	3.15	29.27

(Outdoor temperature — row labels)

29.23 @34F OAT / 70F IDT

Entire House ? ✕

Loads | Breakdown | AED | Messages

26589 **Heating**
Heating (Btuh)

11359 **Sensible**
0 **Latent**
Cooling (Btuh)

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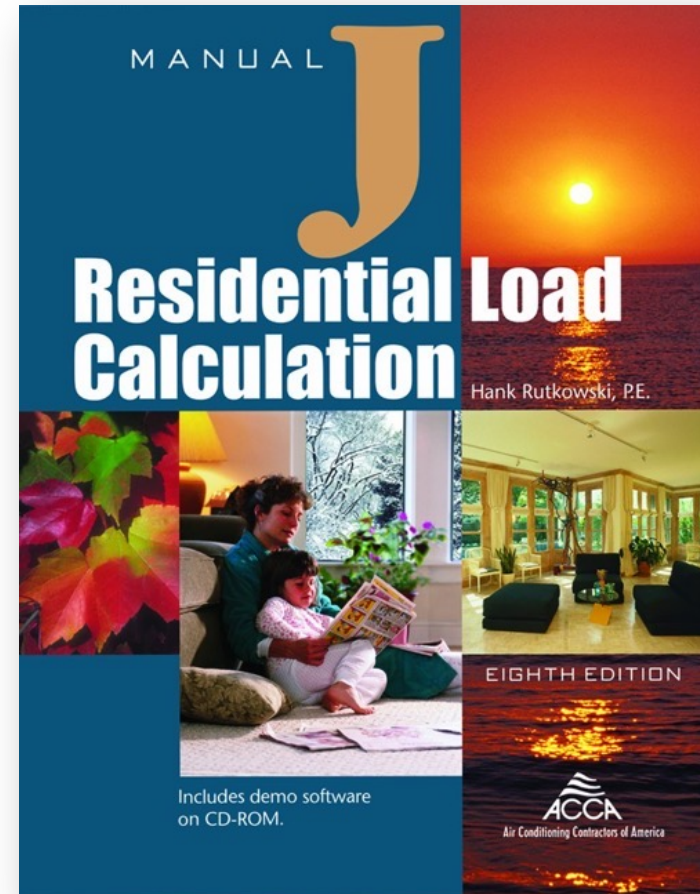
ANSI Recognized Standard

Manual J 8th Edition Version Two is the ANSI-recognized standard for producing HVAC equipment sizing loads for:

- Single-family detached homes
- Small multi-unit structures
- Condominiums
- Town houses
- Manufactured homes
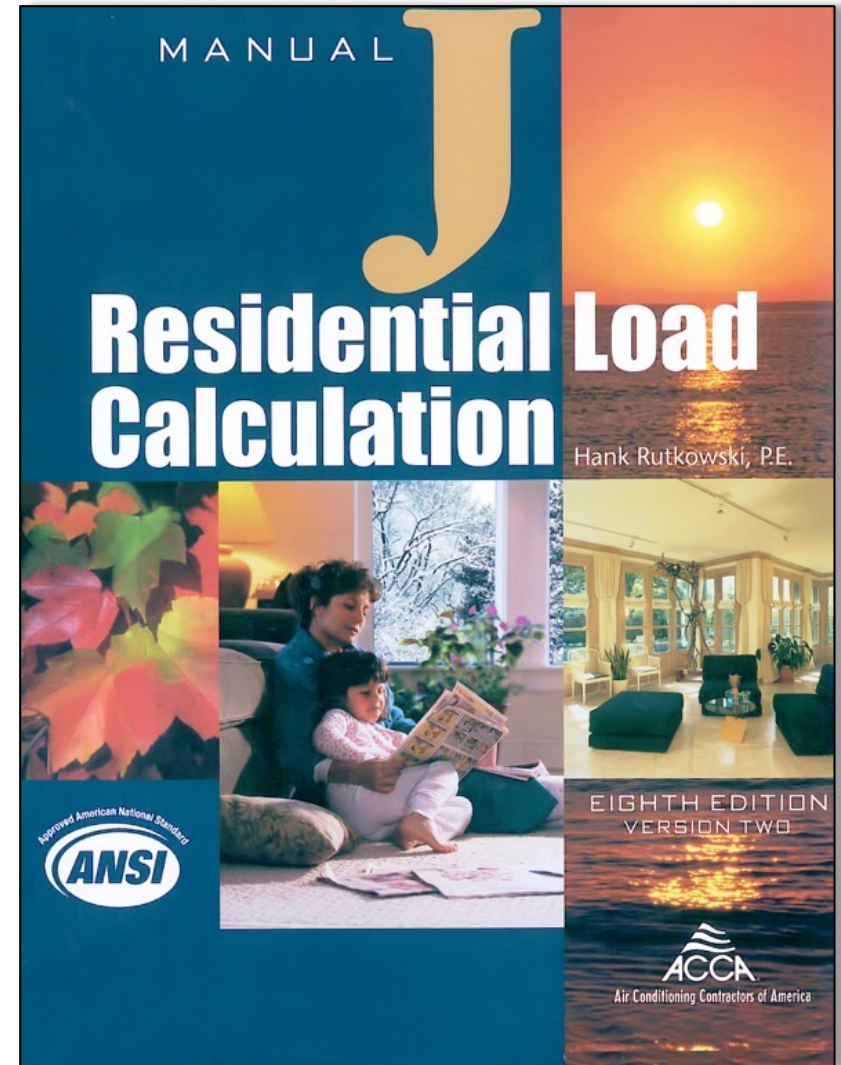
Manual J is not to be used for the following types of buildings

Manual J has no sensitivity to structural attributes of:

- Earth berm or earth covered dwellings
- Homes with passive solar features
- Unconventional constructions techniques – straw bale, rammed earth, bottles, cans, etc.

Manual J is not to be used for the following types of buildings

Any type of commercial activity conducted in a space that was designed and built for residential use.
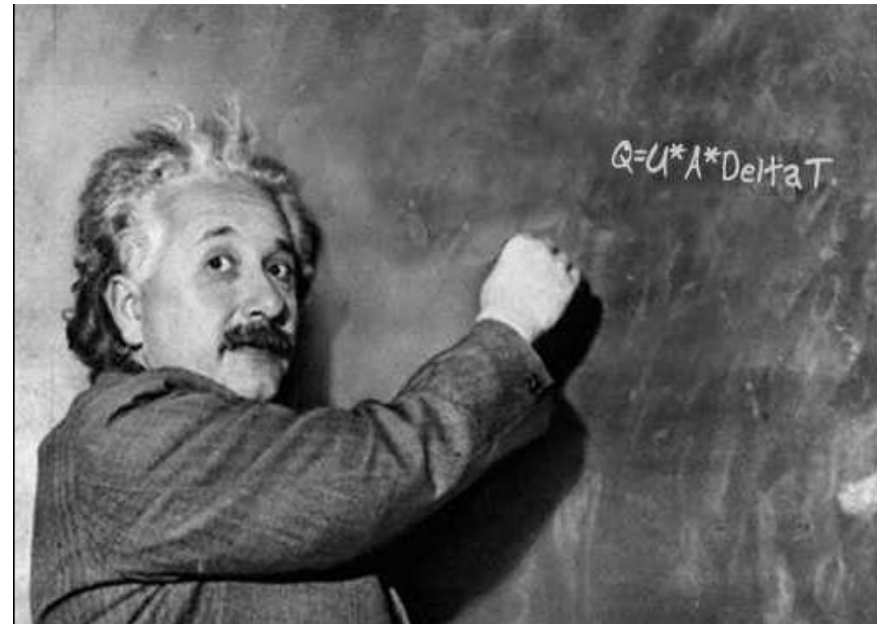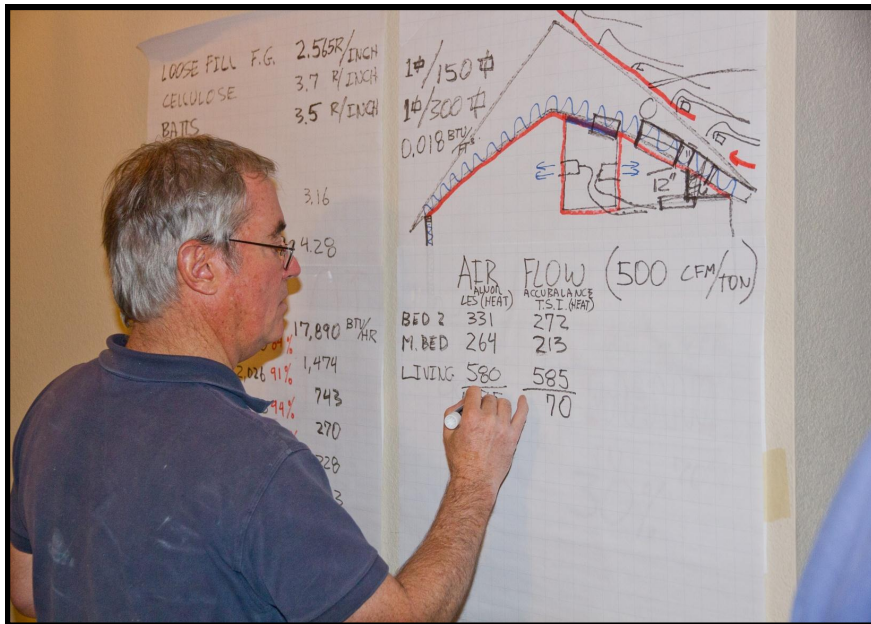
Spaces that contain a swimming pool and / or spa.

HEAT TRANSFER IS COMPLICATED

The load calculation procedure is a gross simplification of the physics and mathematics necessary to determine the amount of energy needed in a space to provide comfort.

Manual J v2.5 pg 13

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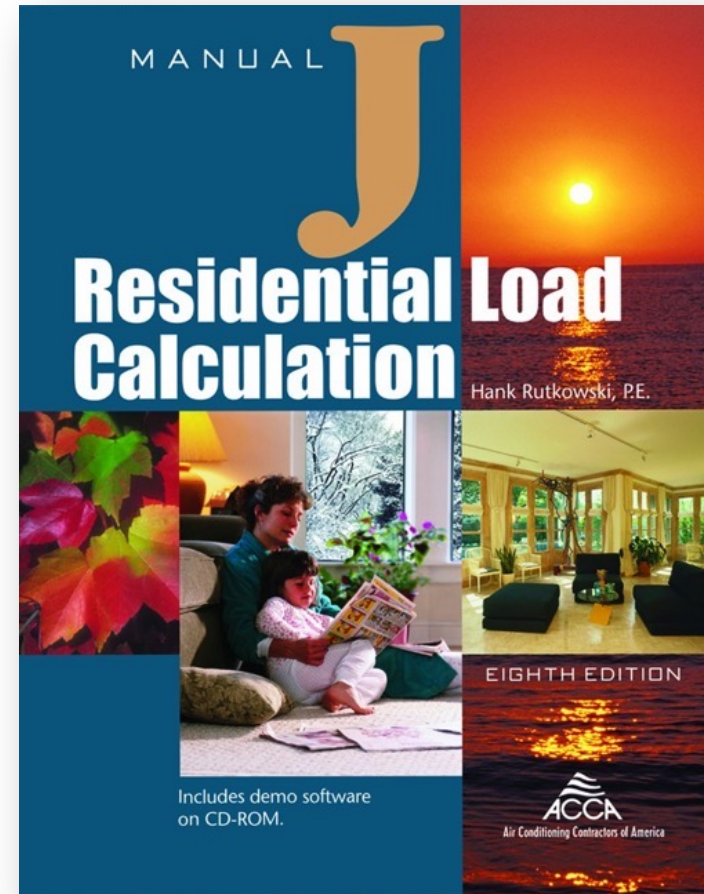
POWERED BY ACCA MANUAL J SOFTWARES

Current ACCA approved software:
https://www.acca.org/standards/approved-software

If *Manual J* software is not used correctly it will produce an inaccurate and misleading answer, and those that have not studied *Manual J* will not know the difference.

SOFTWARE IS A POWERFUL AND USEFUL TOOL, BUT IT IS NOT MAGIC

Manual J Software

Software that displays the "Powered by *Manual J*" logo has demonstrated reasonable compatibility with the standard, but ACCA neither certifies, or warranties, that such products are free of errors and omissions; or that such products do not use data and procedures that are not in the standard.

POWERED BY ACCA MANUAL J

Wrightsoft Right-J8

Windows platform

Adtek Acculoads

Windows platform

Elite RHVAC

Windows platform

Florida Solar Energy Center's EnergyGauge

Windows platform

POWERED BY ACCA MANUAL J

Carmelsoft HVAC ResLoad-J

iPad

Avenir MJ8 Editions of HeatCAD

Windows platform

POWERED BY ACCA MANUAL J

Cool Calc Manual J

Browser based

Amply Energy

LIDAR capable devices

Conduit Tech

LIDAR capable devices

Zero Homes

Apple & Android

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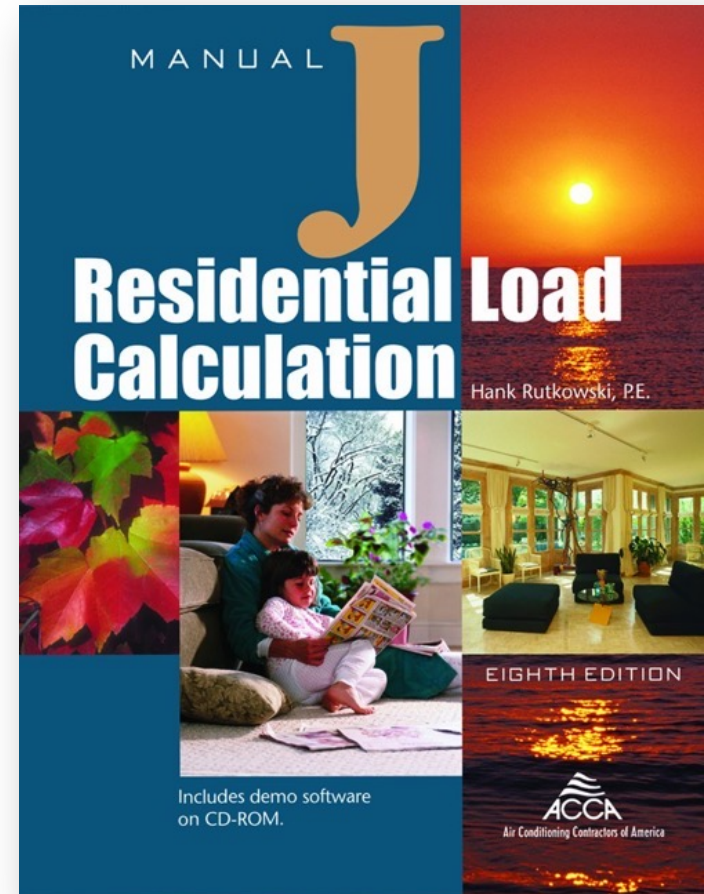
Protocols for Estimating Heating and Cooling Loads

Be honest and aggressive. *Manual J* is an engineering tool that has an inherent and appropriate factor of safety. Any attempt to add other safety factors or to manipulate the procedure may result in unacceptable performance (especially at part load).

Manual J8 v2 pg 7

Consequences of not Making a Detailed and Accurate Load Estimate

Errors (accidental, or an effort to manipulate output) in the load estimate filter through the entire design and cause the installation to miss the mark.

Manual J v2.5 pg xvi

The Site Survey Provides the Input Data

The accuracy of the load estimating procedure is only as good as the input, and the input is only as good as the survey.
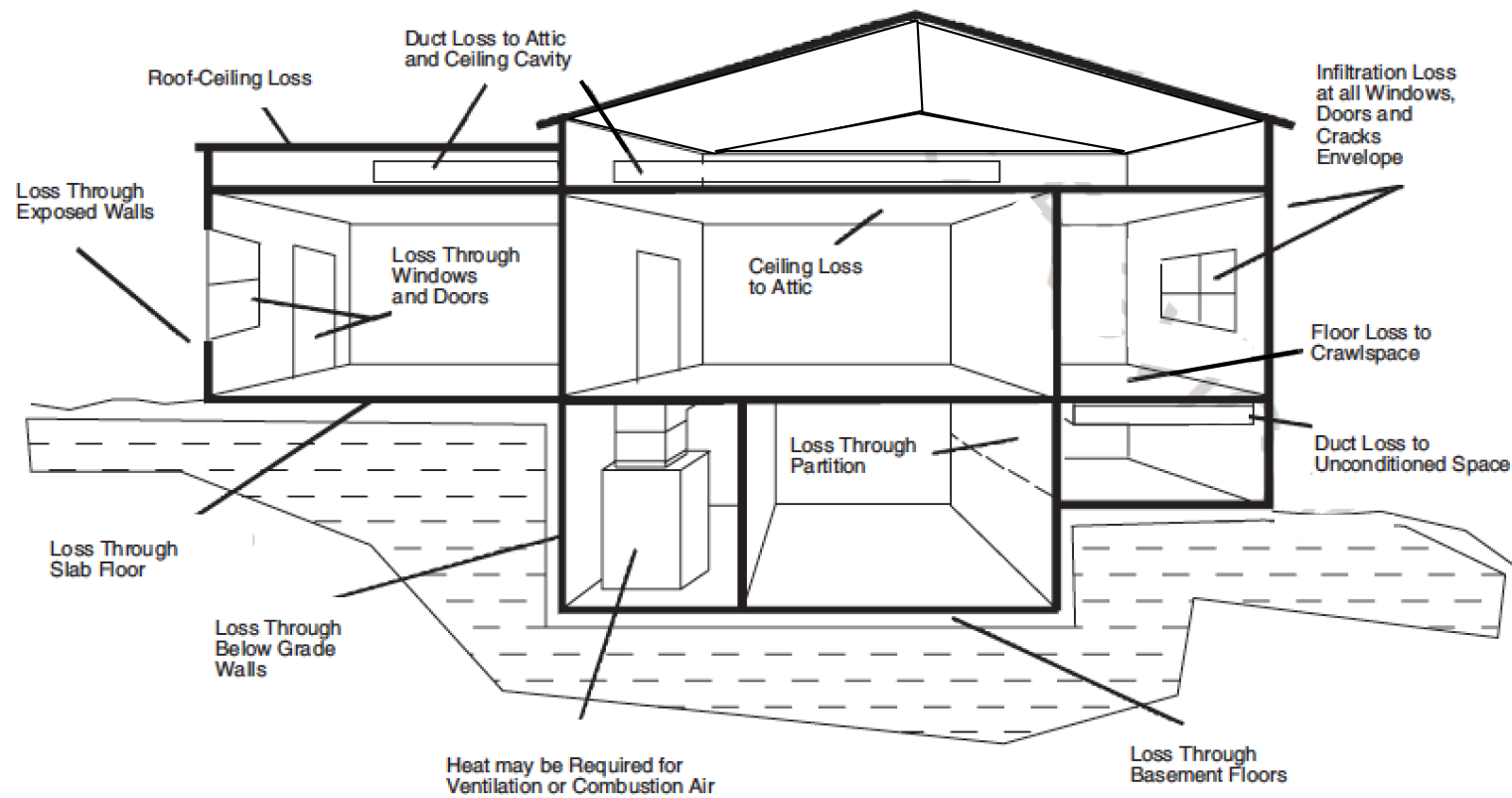
Manual J 8 v2 pg 73

TYPES OF HEATING AND COOLING LOADS

Each dwelling has a unique set of enclosure loads determined by:

1) Local weather

2) Architectural features of the dwelling

3) Materials and techniques used to build the structure,

4) Type of appliances

5) Number of full-time occupants

Duct Loss to Attic
and Ceiling Cavity

Roof-Ceiling Loss

Infiltration Loss
at all Windows,
Doors and
Cracks
Envelope

Loss Through
Exposed Walls

Loss Through
Windows
and Doors

Ceiling Loss
to Attic

Floor Loss to
Crawlspace

Loss Through
Partition

Duct Loss to
Unconditioned Space

Loss Through
Slab Floor

Loss Through
Below Grade
Walls

Heat may be Required for
Ventilation or Combustion Air

Loss Through
Basement Floors

TYPES OF HEATING LOADS

The envelope load is the sum of the component loads, which may include a ceiling load, a wall load, a fenestration (window, glass door or skylight) load, a door (wood or metal) load, a floor load and an infiltration load.

Outdoor Temperature 80°F to Over 100°F

Surface Temperatures of Roof and Walls Exposed to Sun — 100°F to 140°F

Duct Gains from Attic and Ceiling Cavity

Sensible and Latent Infiltration Gain at all Windows, Doors and Cracks

Roofs and Walls not Exposed to Sun Close to Outdoor Temperature

Roof-Ceiling Gain

Hot Attic

Ceiling Gain

Gain Through Exposed Walls

Conduction Through Doors and Windows

Sensible and Latent Gains for Lights, Equipment and People

External Shade Same as North Glass

Solar Gain at Glass

Duct Gain

Sensible and Latent Appliance Loads

No Gain for Slab Floor, Below Grade Walls or Basement Floor

Gain Through Walls and Floor from Unconditioned Space

Cooling may be Required for Ventilation

TYPES OF COOLING LOADS

For cooling, an internal (occupant and appliance) load is added to the envelope loads based upon what would commonly be in use during the late afternoon on a summer design day.

SYSTEM LOADS

o Ducts in unconditioned space

o Engineered Ventilation

o Blower motor heat

o Hot water pipe in unheated space

ACCA *Manual J* Do's
Excerpts Mandatory Requirements

❑ Take credit for overhangs.

❑ Take credit for internal shade (the default is a medium color, blinds with slats at 45 degrees, or use the actual device).

❑ Take credit for insect screens when installed or specified.

❑ Take full credit for rated performance of construction materials, insulation and construction features.

❑ Take full credit for tightness of the envelope construction. Blower door test with ducts taped off.

Manual J v2 pg 7

ACCA *Manual J Don'ts* Excerpts

- ❑ Do not make worst case "everything is going full blast" assumptions about internal loads.
- ❑ Do not add extra occupancy loads for "entertaining groups of people."
- ❑ Do not add internal loads for special events.
- ❑ Do not apply "safety factors" during any stage of the load calculation process.
- ❑ Do not apply a "safety factor" to the final answer or to the equipment selection procedure.

Manual J v2 pg 9

AGENDA

- ✓ What a Load Calculation is
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- ❏ *Live Demonstration using Right-Suite Universal*

What This Training Will Not Cover

We will not be covering every screen and input in the software, only the ones relevant to an accurate load calculation.

We will not manage to cover every complicated scenario.

We will not be choosing equipment or sizing ducts.

Questions about Title 24?
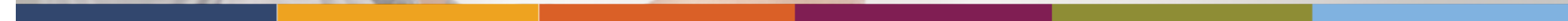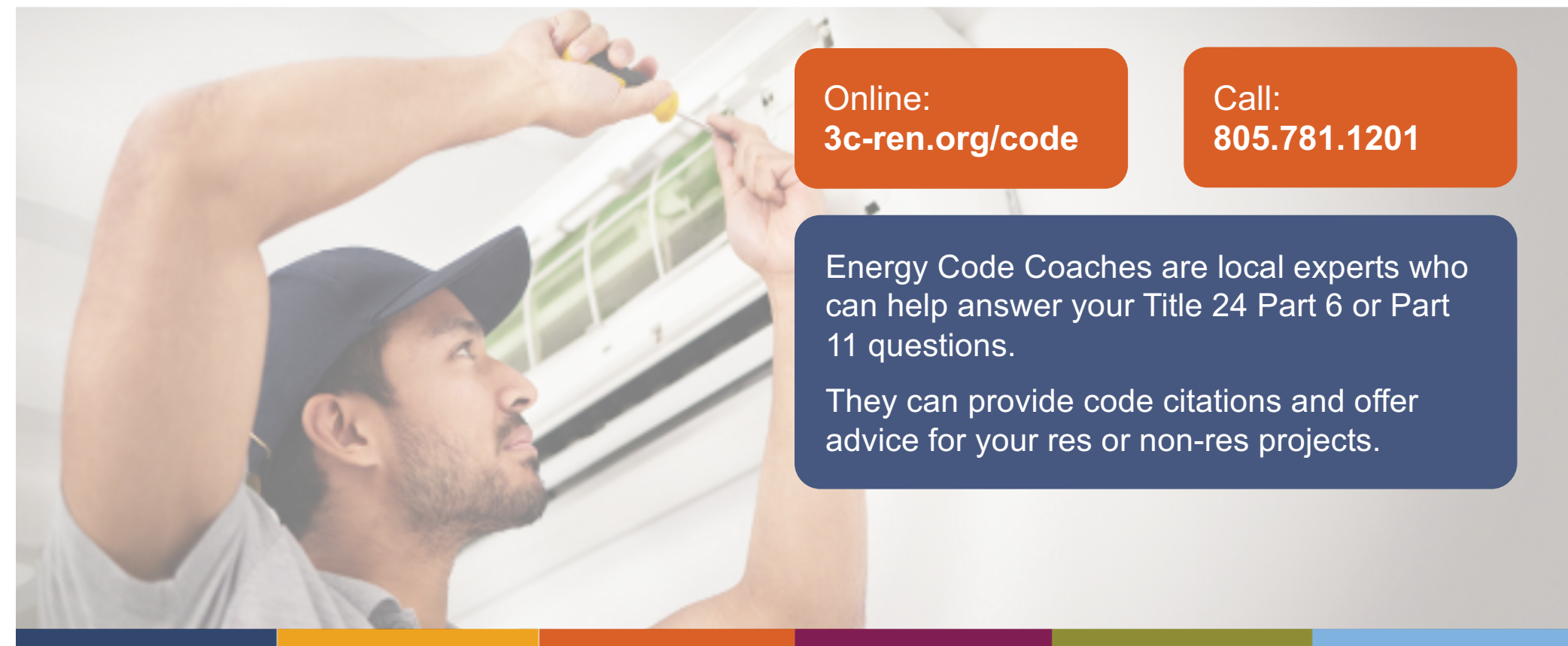**3C-REN offers a *free* Code Coach Service**

3C-REN

BALANCE *Green Consulting*

Online:
3c-ren.org/code

Call:
805.781.1201

Energy Code Coaches are local experts who can help answer your Title 24 Part 6 or Part 11 questions.

They can provide code citations and offer advice for your res or non-res projects.

Closing

3C REN

Continuing Education Units Available

- Contact Chloe.Swick@VenturaCounty.gov for AIA and ICC LUs

Coming to Your Inbox Soon!

- Slides & Recording

Upcoming Courses:

- HRV and ERV in Existing Multi-Family Buildings (11/19)

- Heat Pump Water Heater Trainings

  - Westlake Village (12/9)

  - Santa Maria (12/10)

  - San Luis Obispo (12/11)

- See you in 2026!

Thank you!

- More info: **3c-ren.org**

- Questions: **info@3c-ren.org**

- Email updates: **3c-ren.org/newsletter**

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