STATE OF OKLAHOMA

RESIDENTIAL MANUAL J LOAD CALCULATION DESIGN CRITERIA[n]

DATA from ACCA, ASHRAE Fundamentals (2002 19 pts) (2009 15 pts) (2013 13 pts) (2017 41 pts) (2021 41 pts)

Elevation[1]	Latitude[2]	Winter heating[3]	Summer cooling[4]	Altitude correction factor[5]	Indoor design temperature[6] (winter)	Design temperature cooling[6]	Heating temperature difference[6]
451 ft – 3266 ft	33.909 N – 36.605 N	11.8° – 25°F	95° – 101.8°F	.99 – .89	68° – 70°F	72° – 75°F	58.2° – 45°F
Cooling Temperature difference[6]	**Wind velocity heating[7]**	**Wind velocity cooling[7]**	**Coincident wet bulb[8]**	**Daily range[9]**	**Winter humidity[6]**	**Summer humidity[6]**	
23°F – 26.8°F	15 mph	7.5 mph	67.5° – 77.4°F	M	30%	50% – 65%	

n. The jurisdiction shall fill in these sections of the table to establish the design criteria using Table 1A or 1b from ACCA Manual J or established criteria determined by the jurisdiction.

Recommendation is to use range of values noted above for Oklahoma Residential Manual J® 8th Edition calculations.

Residential Manual J® 8th Edition written in 2002 utilized 17 weather data points in Oklahoma. ASHRAE 2021 utilized 41 weather data points in Oklahoma. **Interesting note MJ8 winter heating (DB) in 2002 was 9° in Ponca City. In 2021 ASHRAE winter heating DB for data (1994-2019) is 15.7°.**
Summer cooling max Manual J® 8th Edition 2002 was 100° in Altus AFB. In 2021 ASHRAE cooling maximum (period 1994-1999) is 101.8. Data shows Oklahoma increasing in temperature design values for winter and summer. This chart should be updated every 3 years for accurate values.

1. Poteau, OK Lowest
   Goodwell 2 E., OK Highest (Panhandle)
2. Latitude is used to adjust fenestration Heat Transfer Multipliers values for both generic glass with and without internal shades.
   McCurtain County AP, OK
   (S. Border) Lowest
   Grove, OK Highest
3. Values are 99% Dry Bulb (DB)
   Goodwell 2 E. OK Lowest
   Ardmore, OK Highest
4. Values are 1% Dry Bulb
   Claremore, OK Lowest
   Altus AFB Highest
5. The altitude correction factor is used to adjust sensible/latent/total heat transfer equations value range. From 1.0 - .63
6. Manual J® 8th Edition – Heating 70° with no humidification
   Cooling 75°F and 50% RH
   ASHRAE 2021 – Heating 68°F and 30% RH
   Cooling 75°F and 65% RH
   72° cooling typical in Oklahoma.
   Heating/cooling difference = indoor design temp minus Winter/Summer design temperatures
7. Values used for infiltration driving force
   Manual J® 8th Edition/ASHRAE - SAME
   Heating 15 mph Cooling 7.5 mph
8. Manual J® 8th Edition - 73° - 76° (Oklahoma)
   Wet bulb values are used to determine the design grains value
   ASHRAE – 67.5 Guymon, OK (Oklahoma specific)
   77.4 Poteau, OK
9. Daily range is equal to average difference between hottest daily high and low. Dry Bulb temperatures at a specific location used to estimate cooling load factor.
   Manual J® 8th Edition – Medium for Oklahoma
   ASHRAE – Specific average values – per month per location

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NOTES

OKLAHOMA UNIFORM BUILDING CODE COMMISSION (OUBCC) (ADDED AT 39 OK REG 2364, EFF 9-14-22)

748:20-6-19.IRC 2018 Chapter 14 Heating and Cooling Equipment and Appliances

Chapter 14 of the 2018 IRC is adopted with the following modifications:

(1) Section M1401.3 Equipment and appliance sizing. This section has been modified to add a requirement for all new residential one- and two-family dwellings and townhouses to provide documentation showing compliance with this section to the authority having jurisdiction at the time a mechanical permit is required. This section has been modified to read: **M1401.3 Equipment and appliance sizing. Heating and cooling equipment and appliances shall be sized in accordance with ACCA Manual S or other approved sizing methodologies based on building loads calculated in accordance with ACCA Manual J or other approved heating and cooling calculation methodologies. Documentation demonstrating compliance with this section is to be provided to the authority having jurisdiction at the time a mechanical permit is required on new one- and two-family dwellings and townhouses.** Exception: Heating and cooling equipment and appliance sizing shall not be limited to the capacities determined in accordance with Manual S where either of the following conditions applies:
   (A) Item I: The specified equipment or appliance utilizes multistage technology or variable refrigerant flow technology and the loads calculated in accordance with the approved heating and cooling calculation methodology are within the range of the manufacturer's published capacities for that equipment or appliance.
   (B) Item 2: The specified equipment or appliance manufacturer's published capacities cannot satisfy both the total and sensible heat gains calculated methodology and the next larger standards size unit is specified.

(2) Section M1402. I General. This section has been modified to add another referenced standard "UL/CSA 60335-2-40" as an option for conformity for electrical furnaces. This section has been modified to read: M1402.1 General. Oil-fired central furnaces shall conform to ANSI/UL 727. Electric furnaces shall conform to UL 1995 or UL/CSA 60335-2-40.

(3) Section 1403.1 Heat pumps. This section has been modified to update a referenced standard by removing the ANCE sponsorship of the standard. This section has been modified to read: M1403.1 Heat pumps. Electric heat pumps shall be listed and labeled in accordance with UL 1995 or UL/CSA 60335-2-40.

(4) Section M1411.8 Locking access port caps. This section has been modified to specify the section will apply to new and retrofit outdoor condensers only. This section has been modified to read: M1411.8 Locking access port caps. Refrigerant circuit access ports located outdoors shall be fitted with locking-type tamper-resistant caps or shall be otherwise secured to prevent unauthorized access. Shall apply to new and retrofit outdoor condensers only.

(5) Section M1412.1 Approval of equipment. This section has been modified to update a referenced standard by removing the ANCE sponsorship of the standard. This section has been modified to read: M1412.1 Approval of equipment. Absorption systems shall be installed in accordance with the manufacturer's instructions. Absorption equipment shall comply with UL 1995 or UL/CSA 60335-2-40.

(6) Section M1413.1 General. This section has been modified to update a referenced standard by removing the ANCE sponsorship of the standard. This section has been modified to read: M14013.1 General. Evaporative cooling equipment and appliances shall comply with UL 1995 or UL/CSA 60335-2-40 and shall be installed:
   (A) Item 1: In accordance with the manufacturer's instructions.
   (B) Item 2: On level platforms in accordance with Section M1305.1.3.1.
   (C) Item 3: So that openings in exterior walls are flashed in accordance with Section R703.4.
   (D) Item 4: So as to protect the potable water supply in accordance with Section P2902.
   (E) Item 5: So that the air intake opening locations are in accordance with Section R303.5.1.

Safety Factors/ACCA Manual J®/ Manual J® 8th Edition

Manual J calculations should be aggressive, which means that the designer should take full advantage of legitimate opportunities to maximize the size of the estimated loads. In this regard, the practice of manipulating the outdoor design temperature, lowering cooling indoor setpoints below 72°, not taking full credit for efficient construction features, ignoring internal and external window shading devices and then applying an arbitrary "safety factor" is indefensible. Use of extreme maximum/minimum Dry Bulb temperatures is not recommended except for special cases where indoor temperatures cannot exceed design temperature at any point i.e. museum or other temperature sensitive applications. Procedures in Manual J® 8th Edition are not to be used for any type of commercial building (see Manual N). Assumptions - these procedures do not apply to rooms with hot tubs/pools/earth berms/solar rooms with passive/active features. ACCA produces Manual J® 8th Edition in abridged edition (Manual JAE) not recommended for full load calculations. Manual J® 8th Edition provides for both average load (late in afternoon mid-summer) and peak load procedures (i.e. mid-summer specific time of day – i.e. large amount of glass on south side) which depends on zoning and exposure diversity. Most if not all HVAC Manufacturers produce proprietary expanded ratings of equipment. It is imperative when using Manual J® and Manual S® procedures you utilize specific manufacturer's **expanded ratings** data for your specific outdoor design temperatures to size the HVAC equipment.

ACCA Manual S® - this manual documents the procedures that should be used to select and size residential cooling equipment, furnaces and heat pumps. These procedures emphasize the importance of using performance data that documents the sensible, latent or heating capacity for a wide variety of operating conditions. This manual also suggests sizing strategies for all types of cooling and heating equipment, and it discusses the nuances of the presentation formats that are used by equipment manufacturers.

NOTE: As of January 2023, DOE has mandated SEER2 EER2 and HSPF2. The 2023 efficiency standards represent a 7%-8% increase from current minimums. New test conditions mandated new standards which are specified by the Air Conditioning and Refrigeration Institute Standard 210/240 2023.