

MECHANICAL CODE DISCUSSION

Design Conditions — Outdoor Design Temperatures



BRENT URSEBACH

SALT LAKE COUNTY PLANNING AND DEVELOPMENT

bursenbach@slco.org
385-468-6694

IN THE LAST ISSUE OF THE PIPELINE, we started a discussion on load calculation, duct design and equipment selection. In this issue, we'll discuss design conditions, and the limited number of locations listed in *ACCA/ANSI Manual J, Residential Load Calculations*; however, a discussion on the values listed in *ACCA Manual J* is in order.

Winter: 99% design temperature. This is the outdoor temperature that your locations stay above for 99% of all the hours in the year, based on a 30-year average. Turning it around, the outdoor air in the location you're considering, is going to be colder than this temperature for only 1% of the hours in an average year. That happens to be about 88 hours per year. In Salt Lake City, at the International Airport, the 99% winter design temperature is 14° F.

Summer: 1% design temperature. The location will go above this temperature only 1% of the hours in a year, again, based on a 30-year average. In Salt Lake City, at the IAP, that

number is 95° F, so we go above that temperature for only about 88 hours in

City or Town	Heating 99% OD Dry Bulb	Cooling 1% OD Dry Bulb
Cedar City MAP	9	91
Hill AFB	12	91
Logan-Cache AP	0	91
Milford MAP	3	93
Moab	11	98
Price, Carbon AP	8	90
Provo MAP	13	91
Richfield	5	91
St. George AWOS	28	104
Salt Lake City IAP	14	95
Vernal	5	91
Wendover, USAF	12	93

an average year. The table above, a fraction of the data in *Manual J -Table 1A*, includes the locations and the Outdoor Design Temperatures for each location. Obviously, this table is lacking, providing only general direction. It's up to you, your system designer, and the Building Official for the jurisdiction/city where the home will be built, to determine the design conditions for your specific project. Common

sense should apply. . . . Consider the Salt Lake Valley; where, as I'm writing this, we just experienced our first frost, according to the weather reports from the Airport. That night of the first frost at the airport, was the 8th frost at my home in South Jordan. The Airport is probably the poorest representative location for the Valley, as the Great Salt Lake moderates both the summer highs and winter lows. I consider 98° F summer and 10°F winter, reasonable design temperatures for South Jordan.

Consider the following when selecting design temperature:

- After completing a Load, we don't order a furnace or AC which is exactly the size for the load. We select the next larger size, which gives an oversize factor, often as much as 20-25%, sometimes more.
- Selecting design temperatures at record highs and lows results in gross oversizing.
- Don't be completely ridiculous — an HVAC contractor submitted a