F.A.Q.

Question:
Should the Software used for F280-12 Calculations be Verified?

Quick Answer:
Yes. Canadian Building Codes require the use of CSA F280-12 to determine heating and cooling equipment capacity. The current CSA F280-12 standard contains the following sentence:

> ***8.1.2.(a) Software systems that claim to conform to the CSA F280 calculation procedure shall be verified according to the procedure set out in Clause 8.***
> (Clause 8 is the verification section of the Standard).

Detailed Answer:
The use of CSA F280-12 is required to determine the cacpacity of residential heating and cooling equipment by:

    Ontario Building Code-2024: 9.33.4.1.(1) & 9.33.5.1.(3)
    National Building Code-2020: 9.33.5.1, 9.36.3.2., 9.36.5.15(5) & 9.36.8.9.(1)
    National Building Code-2015: 9.33.5.1, 9.36.3.2. & 9.36.5.15
    British Columbia Building Code: 9.33.5.1.(1)
    Quebec Building Code: 9.33.5.1.(1)

All of the Codes refer to the F280-12 version of the standard.

The CSA F280-12 Standard was updated in 2023 to include a verification section. There were no technical changes to the standard, that is to say, there were no changes to the calculation procedure and reference tables contained in the standard.

CSA decided to include the verification section after a study was carried out testing many of the Software Systems in use in Canada which claimed to conform to the F280-12 Standard. The results of the study were published in a peer-reviewed conference paper[1] which showed that even when software claimed to align with the F280-12 standard there were significant differences in results when input data was the same. For heat loss, whole house differences of up to 30% were recorded with individual rooms showing up to 50% difference between software and another. For cooling, the differences between software were sufficiently large as to result in the selection of incorrectly sized equipment and individual room differences in excess of 100% were noted.

The use of unverified software can result in designers unintentionally producing results which will result in improperly sized equipment and unacceptable differences in room loads.

Verified software conforms to the allowable whole-house and room by room tolerances set out in the standard. The verification process is extensive, using four archetype homes in two geographic locations and four vintages. At the date of this FAQ, seven software systems have been verified in accordance with CSA F280-12 and they are listed at www.HVACDC.ca/Software .

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[1] A testing procedure for software calculating heat gain and heat loss using CSA F280-12: J. Léger, D. Bowser, A, Parekh; eSim 2022, IBPSA-Canada