

# Overview of AHJ Review Process with respect to F280-12

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## WHY

The use of the CSA F280-12 standard to determine the Heating and Cooling Capacity of appliances installed for that purpose in all new Canadian Part 9 dwelling units is mandatory. There are no alternatives.

The requirements are similar and repeated below for the NBC 2015, NBC 2020 and BCBC 2024. The OBC 2024 will adopt the current NBC sentences 9.33.51.1) but not sentences 9.36.2.2. 1) or 9.36.5.15.5)

### **NBC 2015 & NBC 2020**

The 2015 NBC as well as the 2020 NBC require that the Capacity of Heating appliances<sup>1</sup> be determined in accordance with the CSA 280-12 Standard as per sentence 9.33.5.1.(1).

#### **9.33.5.1. Capacity of Heating Appliances**

1) The required capacity of heating appliances located in a dwelling unit and serving only that dwelling unit, shall be determined in accordance with *CSA F280, "Determining the Required Capacity of Residential Space Heating and Cooling Appliances,"* except that the design temperatures shall conform to Subsection 9.33.3.

The need for Appliance Capacity Determination (a.k.a. "sizing") is also stated in the sentences 9.36.3.2.(1) and 9.36.5.15.(5), and the reference to CSA F280 is made in their respective appendix notes.

#### **9.36.3.2. Equipment and Ducts**

1) HVAC systems shall be sized in accordance with good practice as described in Sections 9.32. and 9.33. (See Note A-9.36.3.2.(1).)

A-9.36.3.2.(1) Load Calculations. Subsection 9.33.5. requires that heating systems serving single dwelling units be sized in accordance with *CSA F280, "Determining the Required Capacity of Residential Space Heating and Cooling Appliances."* The HRAI Digest is also a useful source of information on the sizing of HVAC systems for residential buildings

#### **9.36.5.15. Modeling HVAC System of Reference House**

5) The heating system and, where installed, the cooling system shall be sized in accordance with Article 9.33.5.1. with regard to total heat output capacity and nominal cooling capacity. (See Note A-9.36.5.15.(5).)

A-9.36.5.15.(5) The intent of Sentence 9.36.5.15.(5) is that the cooling system be sized only for the portion of the house that is cooled. Article 9.33.5.1. references *CSA F280, "Determining the Required Capacity of Residential Space Heating and Cooling Appliances,"* which contains a number of different methods for determining the capacity of heating appliances. The intent of Sentence 9.36.5.15.(5) is that the equipment be sized according to the methods for total heat output capacity and nominal cooling capacity without being oversized.

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<sup>1</sup> Heat Loss & gain Calculations are the method by which the capacity of heating & cooling appliances is determined. Determining appliances capacity is also referred to as 'sizing?'\.

## **BCBC 2024**

The 2024 BCBC requires that the Capacity of Heating and Cooling appliances<sup>2</sup> be determined in accordance with the CSA 280-12 Standard as per sentence 9.33.5.1.1)

### **9.33.5.1. Capacity of Heating Appliances**

1) The required capacity of heating and cooling appliances located in a dwelling unit and serving only that dwelling unit, shall be determined in accordance with CSA F280, “Determining the Required Capacity of Residential Space Heating and Cooling Appliances,” except that the design temperatures shall conform to Subsection 9.33.3.

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<sup>2</sup> Heat Loss & gain Calculations are the method by which the capacity of heating & cooling appliances is determined. Determining appliances capacity is also referred to as ‘sizing?’.

## THE PROCESS

- 1) A submittal package is delivered by the permit applicant consisting of:
  - a. CSA F280-12 Formset which includes
    - Compliance Page
    - Input Summary
    - Room by Room results (if appropriate)
  - b. Reference plans for home
  
- 2) The submittal is received by the AHJ and “intake check” consists of:
  - a. Are documents complete (i.e. a & b. above
  - b. Is designer accredited?  
(Note: Accreditation information is shown on the *F280-12 Compliance page*)
  
- 3) The submittal is received in conjunction with other submittals for the same project such as:
  - a. Architectural plans & specifications
  - b. Energy Submittal
  
- 4) The review is based on the “Checklist” (a.k.a. cheat sheet) which
  - a. Is cross-referenced to the standard *F280 Formset*
  - b. Suggests which values should be cross-referenced with the architectural and energy submittals


The process is supported by a guide on how to use the checklist which contains:

- a. Where each of the checklist items can be found in the forms
- b. Explanation of the original and content of the checklist items
- c. Recommendations as to how to verify the item

## F280-12 COMPLIANCE PAGES


The attestation form contains the following elements:

- 1) Project Information
- 2) Key results of the F280 Calculations, i.e. permitted heating & Cooling Appliance Capacities)
- 3) Description of Work contained in submittal (usually list of documents)
- 4) Individual who Reviews & takes responsibility for the design. (Designer)
- 5) Scope of Accreditation for Designer
- 6) Declarations of Designer

CSA STANDARD F280-12 COMPLIANCE		CSA F280-12 Form Set Ver 24.07
NBC 2015: 9.33.5.1.; 9.36.3.2. & 9.36.5.15; NBC 2020: 9.33.5.1.; 9.36.3.2.; 9.36.5.15 (5); 9.36.8.9. (1);		PROJECT #
These documents issued for the use of _____ and may not be used by any other persons without authorization. Documents for permit and/or construction are signed in red.		1
BUILDING LOCATION		
Model:	Site:	
Address:	Lot:	
City & Province:	Postal Code:	
COMPLIANCE <span style="float: right; font-size: x-small;">(See page 2 for input summary and page 3 for room by room values)</span>		
Submittal is for: <input type="checkbox"/> Whole house <input type="checkbox"/> Room by Room		Units: <input checked="" type="checkbox"/> Imperial <input type="checkbox"/> Metric
HEATING		
Minimum Heating Capacity: <input style="width: 100px;" type="text"/> btuh (total building heat loss as per 5.2.7)		
5.3.1 The total heat output capacity of all heating systems installed in a building shall not be less than 100% of the total building heat loss as determined in Clause 5.2.7.		
5.3.2 The combined heating delivery of the heating systems that serve a room or space shall not be less than 100% of the space heat loss, as determined in Clause 5.2.6.. (If room by room submittal, see page 2 for individual space heating requirements)		
COOLING		
Nominal Cooling Capacity: <input style="width: 100px;" type="text"/> btuh (Nominal Cooling Capacity as per 6.3.1)		
Minimum Cooling Capacity: <input style="width: 80px;" type="text"/> btuh      Maximum Cooling Capacity: <input style="width: 80px;" type="text"/> btuh		
6.3.2 Except as provided in Clause 6.3.3., the cooling system capacity shall not be less than 80% of the nominal cooling capacity for the building, as determined in Clause 6.3.1.. In no case shall it be less than the nominal cooling capacity of the building minus 1800 W (0.51 tons)		
6.3.3 Where the cooling system is added to an existing heating system, it's capacity in Watts shall not exceed 18 times the capacity of the air-handling capacity of the existing system in L/s. (Cooling capacity in Tons not more than 1.0 per 400 CFM of air handling capacity)		
6.3.4 Except for ground-source and water source heat pumps used for cooling, and as permitted in Clause 6.3.5, the installed cooling capacity shall not exceed 125% of the nominal cooling capacity for the building, as determined in Clause 6.3.1.		
6.3.5 If the nominal cooling system capacity for the building, as determined in Clause 6.3.1. is less than 6,000 W (1.7 tons), the installed cooling system capacity may exceed the nominal cooling system capacity for the building by up to 1750 W (0.49 tons).		
ATTACHED DOCUMENTS		
<input checked="" type="checkbox"/> Design Summary <input type="checkbox"/> Room by Room Results		Other
Other: _____		
Notes: _____		
CALCULATIONS PERFORMED BY		
Name: _____	Designers Signature Stamp Imprint or other certification mark	I, _____
Company: _____		have reviewed and take responsibility for the design work described in this document & I am qualified in the appropriate categories.
Address: _____		Accreditation Reference 1
City & Prov.: _____		Accreditation Reference 2
Postal Code: _____		Issued for: _____
Phone: _____		(date) _____
Fax: _____		Issued for: _____
E-mail: _____		(date) _____
Area for Software vendors information, logo, contact info, version number etc		Page: 1 of
		 <b>HVAC DESIGNERS OF CANADA VERIFIED F280 SOFTWARE</b>

# F280-12 INPUT SUMMARY

Following is the current form (version 24.07) it is based on the form found in the Standard, (Annex D), which is a mandatory part of the standard, however some upgrades have been made to reflect changes to the standard and enhance usability.

CSA F280-12 INPUT SUMMARY				CSA F280-12 Form Set Ver 24.07	
These documents issued for the use of _____				PROJECT # _____	
and may not be used by any other persons without authorization. Documents for permit and/or construction are signed in red.					
BUILDING LOCATION					
Model: _____		Site: _____		Lot: _____	
Address: _____		City/Prov: _____		Post Code: _____	
CALCULATION BASED ON (See Following Page For Results)					
Dimensional Info Based On: _____					
Attachment: _____		Front Facing: _____		Assumed? _____	
# of Stories: _____		Air Tightness: _____		Assumed? _____	
Weather Location: _____		Internal Shading: _____		Assumed? _____	
Wind Exposure, Site: _____		Occupants: _____		Assumed? _____	
Wind Sheltering, Building: _____		Ventilated? Yes/No _____		HRV/ERV? Yes/No _____	
Units: <input checked="" type="checkbox"/> Imperial <input type="checkbox"/> Metric		ASE %: _____		ATRE %: _____	
HEATING DESIGN CONDITIONS			COOLING DESIGN CONDITIONS		
Outdoor Temp: _____		Indoor Temp: _____	Mean Soil Temp: _____	Outdoor Temp: _____	Range: _____
Soil Conductivity _____		Water Table Depth: _____	Slab Fluid Temp: _____	Indoor Temp: _____	Latitude: _____
ABOVE GRADE WALLS			BELOW GRADE WALLS		
Style A: _____			Style A: _____		
Style B: _____			Style B: _____		
Style C: _____			Style C: _____		
CEILINGS			FLOORS ON SOIL		
Style A: _____			Style A: _____		
Style B: _____			Style B: _____		
Style C: _____			Style C: _____		
WINDOWS			EXPOSED FLOORS		
Style A: _____			Style A: _____		
Style B: _____			Style B: _____		
Style C: _____			Style C: _____		
SKYLIGHTS			DOORS		
Style A: _____			Style A: _____		
Style B: _____			Style B: _____		
Style C: _____			Style C: _____		
				Page: 2 of _____	
Area for Software vendors information, logo, contact info, version number etc				 <b>HVAC DESIGNERS OF CANADA</b> <b>VERIFIED F280 SOFTWARE</b>	

# F280 -12 ROOM by ROOM OUTPUT FORM

This form is only required if the F280 Calculation is Room by Room and presents the results as per the standard.

ROOM by ROOM CALCULATION RESULTS			CSA F280-12 Form Set Ver 24.07
These documents issued for the use of _____ and may not be used by any other persons without authorization. Documents for permit and/or construction are signed in red.		PROJECT # _____	
BUILDING LOCATION			
Model: _____	Site: _____	Lot: _____	
Address: _____	City/Prov: _____	Post: _____	Code: _____
CALCULATION RESULTS - ROOM by ROOM			
#	Room Name	Heating (Btu/h)	Cooling (Btu/h)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
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26			
27			
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29			
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38			
39			
<b>Ventilation Loss (if separate)<sup>74</sup> &amp; Latent Gain (if separate, value or multiplier)<sup>75</sup></b>		<b>Btu/h</b>	<b>Btu/h</b>
<b>Total Building Loss (5.2.7) &amp; Nominal Cooling Capacity (6.3.1.)</b>		<b>Btu/h</b>	<b>Btu/h</b>
See page 1 for heating & Cooling System Capacity Limits		issued: _____	Page: 2 of 3
Area for Software vendors information, logo, contact info, version number etc			