

## **Background**

Amendment 17 to the Energy Efficiency Regulations resulted in the adoption of the U.S. test procedure for single-phase residential air conditioners and heat pumps with a cooling or heating capacity of less than 19 kW (65,000 Btu/h): Appendix M1 to Subpart B of Part 430 of the United States Code of Federal Regulations, entitled Uniform Test Method for Measuring the Energy Consumption of Central Air Conditioners and Heat Pumps (“M1”). M1 and the Regulations prescribe new performance metrics for heating and cooling, namely HSPF2 and SEER2. Amendment 17 requires that all heat pumps manufactured on or after January 1, 2023, and imported into Canada or shipped between provinces for the purpose of sale, must be tested to M1 with HSPF2 calculated and reported for Climate Region V.

As the industry transitions to the new M1 test procedure, testing of equipment at the very low temperature point (-15°C) will be optional until January 1, 2025. After then, it will become mandatory to test and report equipment performance at the very low temperature point.

Given the demand for this type of equipment, it is expected that existing stock rated under the old test procedure (CSA C656-14 for seasonal energy efficiency ratio and heating seasonal performance factor) will be depleted quickly meaning that minimum performance requirements stated in HSPF, EER and SEER will soon become obsolete.

## **Issue**

Canada’s Energy Efficiency Regulations are updated outside of the Model Code development cycle. This leads to off-cycle changes which can impact the availability of equipment and the ability to enforce minimum code requirements.

In the prescriptive tables of the NECB 2020 and Section 9.36 of the NBC 2020, the minimum performance requirements for heating and cooling equipment subject to the new M1 test procedure are stated in the old performance rating metrics. As of January 2023, equipment subject to the regulation will no longer be tested to the Standard referenced in the prescriptive tables nor will it receive a performance rating stated in the current metric. This creates a gap for Authorities Having Jurisdiction when it comes to enforcing minimum code requirements in a context where the performance rating of certain pieces of equipment is incompatible with code requirements.

Since the test procedure has evolved significantly and limited data is available for comparative purposes, NRCan is working to better understand the relationship between the new and old performance rating metrics in order to provide guidance on the issue. The transition period which makes testing and reporting of performance at the very low temperature point optional until January 1, 2025 obscures our ability to establish equivalencies appropriate for the Canadian context.

## **Solution**

NRCan is proposing a change to the Model Codes that will introduce minimum performance requirements stated in the new performance rating metrics as determined by the M1 test procedure (in addition to the existing minimum requirements stated in the old performance rating metrics). To facilitate enforcement, the new minimum performance requirements of the Code will be aligned with those of the Regulation.

Below is an excerpt from Proposed Change Forms 1832 & 1833 which show the addition of SEER2 and HSPF2 ratings to the minimum requirements for systems subject to the Regulation.

**Table 9.36.3.10.**  
**HVAC Equipment Performance Requirements**  
 Forming Part of Sentences 9.36.3.9.(2) and [9.36.3.10.] 9.36.3.10.([1] 1)

Component or Equipment	Heating or Cooling Capacity, kW	Standard	Minimum Performance
<b>Air-Cooled Unitary Air Conditioners and Heat Pumps – Electrically Operated</b>			
Split system	< 19	CSA C656	SEER = 14.5 EER = 11.5 HSPF V = 7.1
		DOE 10 C.F.R. Appendix M1	SEER2 = 14.3 HSPF2 V = 6.0
Single-package system	< 19	CSA C656	SEER = 14 EER = 11 HSPF V = 7.0
		DOE 10 C.F.R. Appendix M1	SEER2 = 13.4 HSPF2 V = 5.4

**Table 5.2.12.1. -A**  
**Performance Requirements for Air-Cooled Unitary Air Conditioners and Heat Pumps**  
 Forming Part of Sentences 5.2.12.1.(1), 6.2.2.4.(2), 6.2.2.5.(1) and 8.4.4.18.(6)

Component or Equipment	Heating or Cooling Capacity, kW	Standard	Minimum Performance
Single-package, space constrained	< 19	CSA C656 or DOE 10 C.F.R. Appendix M1 for EER2, SEER2 and HSPF2	SEER = 13 / HSPF V = 6.4 Or SEER2 = 11.9 / HSPF2 V = 5.0
Single-package, others			SEER = 15 / HSPF V = 7.4 or SEER2 = 13.4 / HSPF2 V = 5.4
Split system, space-constrained			SEER = 13 / HSPF V = 6.4 Or SEER2 = 11.9 / HSPF2 V = 5.0
Split system, others			SEER = 15 / HSPF V = 7.4 Or SEER2 = 14.3 / HSPF2 V = 6.0
Small-duct, high-velocity			SEER = 13 / HSPF V = 5.9 Or SEER2 = 12 / HSPF2 V = 4.9

Certain Authorities Having Jurisdiction have expressed a desire for conversion factors that can be used to translate EER, SEER and HSPF into EER2, SEER2 and HSPF2 respectively. While an exact conversion is impossible due to fundamental differences in the test procedures, the Air-Conditioning, Heating, and Refrigeration Institute has developed the following M1 crosswalk for the Consortium of Energy Efficiency which provides factors for an approximated conversion of the old performance rating metrics to the new ones.

*Table 1 AHRI M1 Crosswalk (Factors for converting SEER, EER and HSPF to SEER2, EER2 and HSPF2)*

	SEER2	EER2	HSPF2
Ducted	0.95	0.95	0.91
Non-Ducted	1.00	1.00	0.95
Packaged	0.95	0.95	0.84

### **Implications on Energy Modeling**

Energy Advisors seeking to demonstrate compliance to the energy code using HOT2000 in EnerGuide mode are invited to consult program bulletin #98 for guidance on how to use the use the new performance rating metrics for energy modelling purposes.