Appliance Standards and Rulemaking Federal Advisory Committee

Refrigeration Systems Walk-in Coolers and Freezers

Term Sheet

Tuesday, December 15, 2015

Background

The U.S. Department of Energy (DOE or the Department) established a negotiated rulemaking working group under the Appliance Standards and Rulemaking Federal Advisory Committee (ASRAC) in accordance with the Federal Advisory Committee Act (FACA) and the Negotiated Rulemaking Act (NRA) to negotiate proposed energy conservation standards for six equipment classes (i.e., the two equipment classes of multiplex condensing refrigeration systems operating at medium and low temperatures and the four equipment classes of dedicated condensing refrigeration systems operating at low temperatures) of walk-in coolers and freezers (WICFs), per the order of the court entering an agreement between the parties in *Lennox International, Inc. v. United States Department of Energy*, Case No. 14-60535 (5th Cir. 2015). The purpose of the working group will be to discuss and, if possible, reach consensus on a proposed rule regarding amended energy conservation standards for only those aforementioned equipment classes of refrigeration systems of WICFs, as authorized by the Energy Policy and Conservation Act (EPCA) of 1975, as amended.

Per the ASRAC Charter, the working group was expected to make a concerted effort to negotiate a final term sheet by December 27, 2015. The final term sheet will be presented to ASRAC at an open meeting for their deliberation and decision on whether to pass it on as a formal recommendation to DOE.

Ultimately, the working group consisted of 12 members and one DOE representative (see Appendix A). The working group met in-person during 13 days of meetings held August 27, September 11, September 30, October 1, October 15, October 16, November 3, November 4, November 20, December 3, December 4, December 14, and December 15. This document includes the working group's recommendations to ASRAC on the proposed energy conservation standards for six equipment classes (i.e., the two equipment classes of multiplex condensing refrigeration systems operating at medium and low temperatures and the four equipment classes of dedicated condensing refrigeration systems operating at low temperatures) of WICFs and associated definitions.

Definitions related to Refrigeration Systems of WICFs

Recommendation #1.

Dedicated condensing unit means a positive displacement condensing unit that is part of a refrigeration system (as defined in 10 CFR 431.302) and is a factory-made assembly that (1) includes 1 or more compressors, a condenser, and one refrigeration circuit and (2) is designed to serve one refrigerated load.

Matched condensing unit is a dedicated condensing unit that is distributed in commerce with one or more unit cooler(s) specified by the condensing unit manufacturer.

Outdoor condensing unit means a dedicated condensing unit or matched condensing unit that is encased and is capable of maintaining the medium temperature or low temperature DOE test

procedure box conditions (as specified in 10 CFR Part 431.304) for an extended period at the 35 degree F outdoor temperature condition.

Definitions related to Defrost Systems

Recommendation #2.

Adaptive defrost means a defrost control system that reduces defrost frequency by initiating defrosts or adjusting the number of defrosts per day in response to operating conditions (e.g., moisture levels in the refrigerated space, measurements that represent coil frost load) rather than initiating defrost strictly based on compressor run time or clock time.

Modifications to the Current Test Procedure for WICF Refrigeration Systems to Implement the Recommendations in this Term Sheet

Recommendation #3.

Remove hot gas defrost from the test procedure.

Representative Values for Dedicated Condensing Units and Unit Coolers

Recommendation #4.

Manufacturers must make representations, including certifications of compliance to DOE, of the energy efficiency/consumption for each dedicated condensing unit basic model and unit cooler basic model without adaptive defrost (see 10 CFR 431.304-reference to test procedure). Compliance with the applicable WICF refrigeration system standard will be assessed without adaptive defrost. Manufacturers may make an additional representation of the energy efficiency/consumption for a basic model using adaptive defrost as measured in accordance with the DOE test procedure, provided that the additional represented value has been certified to DOE per 10 CFR 429.12.

Manufacturers must make representations, including certifications of compliance to DOE, of the energy efficiency/consumption for each unit cooler basic model without on-cycle variable speed evaporator fans that modulate fan speed in response to the load (see 10 CFR 431.304-reference to test procedure). Compliance with the applicable WICF refrigeration system standard will be assessed without on-cycle variable speed evaporator fans that modulate fan speed in response to the load. Manufacturers may make an additional representation of the energy efficiency/consumption for a basic model using on-cycle variable speed evaporator fans that modulate fan speed in response to the load as measured in accordance with the DOE test procedure, provided that the additional represented value has been certified to DOE per 10 CFR 429.12.

Proposed Energy Conservation Standards

Recommendation #5.

All WICF refrigeration systems manufactured starting 3 years after the final rule publication date in the Federal Register, must satisfy the following standards:

Equipment Class	**Minimum AWEF (Btu/W-h)**	
Multiplex Refrigeration Systems – Low with a Net Capacity (C_{net}) of	<15,500 Btu/h	$1.575*10^{-5}*C_{net} + 3.91$
	$\geq$ 15,500 Btu/h	4.15

Multiplex Refrigeration System – Medium	9.00	
Dedicated Condensing System – Low, Outdoor with a Net Capacity (C_{net}) of	<6,500 Btu/h	$6.522*10^{-5}*C_{net} + 2.73$
	$\geq$ 6,500 Btu/h	3.15
Dedicated Condensing System – Low, Indoor with a Net Capacity (C_{net}) of	<6,500 Btu/h	$9.091*10^{-5}*C_{net} + 1.81$
	$\geq$ 6,500 Btu/h	2.4

* Where C_{net} is net capacity as determined and certified pursuant to 10 CFR 431.304.

Future Test Procedure Recommendations

Recommendation #6

The Working Group recommended that DOE initiate a new test procedure rulemaking to address the following issues with respect to WICF refrigeration systems:

- Incorporation of off-cycle power consumption, including crankcase heater power consumption;
- Method to separately rate variable-capacity condensing units; and
- Method to measure defrost energy consumption, including hot gas and adaptive defrost.

The result of this test procedure rulemaking would be used to develop amended standards in future rulemakings.

Additional Elements for the Rulemaking

Recommendation #7

DOE will add WICF specific definitions process cooling, preparation room refrigeration, and storage space.

This term sheet has been approved by the ASRAC WICF Refrigeration Systems Working Group by consensus (13 yes – 0 no – 0 absent) on 12/15/15. It can now be passed on to ASRAC for consideration. It should be noted that the exact language in this term sheet may be modified when implemented by the Department as regulatory text, but the intent should remain unchanged.

Appendix A—Members

U.S. Department of Energy—ASRAC
Walk-in Coolers and Freezers Refrigeration Systems Negotiated Rulemaking Working Group

Full Name	Affiliation
Ashley Armstrong	U.S. Department of Energy
Lane Burt	Natural Resources Defense Council
Mary Dane	Traulsen
Cyril Fowble	Lennox International, Inc.
Sean Gouw	CA Investor-Owned Utilities
Andrew Haala	Hussmann Corp
Armin Hauer	ebm-papst, Inc.
John Koon	Manitowoc Company
Joanna Mauer	Appliance Standards Awareness Project
Charlie McCrudden	Air Conditioning Contractors of America
Louis Starr	Northwest Energy Efficiency Alliance
Michael Straub	Rheem Manufacturing
Wayne Warner	Emerson Climate Technologies