



## DEPARTMENT OF ENERGY

[Case Number 2020-009; EERE-2020-BT-WAV-0025]

### **Energy Conservation Program: Decision and Order Granting a Waiver to Heat Transfer Products Group from the Department of Energy Walk-in Coolers and Walk-in Freezers Test Procedure**

**AGENCY:** Office of Energy Efficiency and Renewable Energy, Department of Energy.

**ACTION:** Notification of decision and order.

**SUMMARY:** The U.S. Department of Energy (“DOE”) gives notification of a Decision and Order (Case Number 2020-009) that grants to Heat Transfer Products Group (“HTPG”) a waiver from specified portions of the DOE test procedure for determining the energy efficiency of specified carbon dioxide (“CO<sub>2</sub>”) direct expansion unit coolers. Under the Decision and Order, HTPG is required to test and rate the specified basic models of its CO<sub>2</sub> direct expansion unit coolers in accordance with the alternate test procedure set forth in the Decision and Order.

**DATES:** The Decision and Order is effective on **[INSERT DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**. The Decision and Order will terminate upon the compliance date of any future amendment to the test procedure for walk-in refrigeration systems located at title 10 of the Code of Federal Regulations (“CFR”), part 431, subpart R, appendix C that addresses the issues presented in this waiver. At such time, HTPG must use the relevant test procedure for these CO<sub>2</sub> direct expansion unit coolers for any testing to demonstrate compliance with the applicable standards, and any other representations of energy use.

**FOR FURTHER INFORMATION CONTACT:** Ms. Lucy deButts, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Office, EE-5B, 1000 Independence Avenue, SW., Washington, DC, 20585-0121. E-mail: *AS\_Waiver\_Requests@ee.doe.gov*.

Mr. Michael Kido, U.S. Department of Energy, Office of the General Counsel, Mail Stop GC-33, Forrestal Building, 1000 Independence Avenue SW., Washington, DC 20585-0103. Telephone: (202) 586-8145. Email: *Michael.Kido@hq.doe.gov*.

**SUPPLEMENTARY INFORMATION:** In accordance with §431.401(f)(2) of Title 10 of the Code of Federal Regulations (10 CFR 431.401(f)(2)), DOE gives notification of the issuance of its Decision and Order as set forth below. The Decision and Order grants HTPG a waiver from the applicable test procedure at 10 CFR part 431, subpart R, appendix C for specified basic models of CO<sub>2</sub> direct expansion unit coolers, and provides that HTPG must test and rate such CO<sub>2</sub> direct expansion unit coolers using the alternate test procedure specified in the Decision and Order. HTPG's representations concerning the energy efficiency of the specified basic models must be based on testing according to the provisions and restrictions in the alternate test procedure set forth in the Decision and Order, and the representations must fairly disclose the test results. Distributors, retailers, and private labelers are held to the same requirements when making representations regarding the energy efficiency of this equipment. (42 U.S.C. 6314(d))

Consistent with 10 CFR 431.401(j), not later than [**INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER***], any manufacturer currently distributing in commerce in the United States CO<sub>2</sub> direct expansion unit coolers employing a technology or characteristic that results in the same need for a waiver from the applicable test procedure must submit a petition for waiver. Manufacturers not currently distributing such

products/equipment in commerce in the United States must petition for and be granted a waiver prior to the distribution in commerce of CO2 direct expansion unit coolers in the United States. 10 CFR 431.401(j). Manufacturers may also submit a request for interim waiver pursuant to the requirements of 10 CFR 431.401.

**Case # 2020-009**  
**Decision and Order**

**I. Background and Authority**

The Energy Policy and Conservation Act, as amended (“EPCA”),<sup>1</sup> authorizes the U.S. Department of Energy (“DOE”) to regulate the energy efficiency of a number of consumer products and certain industrial equipment. (42 U.S.C. 6291–6317) Title III, Part C<sup>2</sup> of EPCA established the Energy Conservation Program for Certain Industrial Equipment, which sets forth a variety of provisions designed to improve energy efficiency for certain types of industrial equipment. This equipment includes walk-in cooler and walk-in freezer (collectively, “walk-in”) refrigeration systems, the focus of this document. (42 U.S.C. 6311(1)(G))

The energy conservation program under EPCA consists essentially of four parts: (1) testing, (2) labeling, (3) Federal energy conservation standards, and (4) certification and enforcement procedures. Relevant provisions of EPCA include definitions (42 U.S.C. 6311), test procedures (42 U.S.C. 6314), labeling provisions (42 U.S.C. 6315), energy conservation standards (42 U.S.C. 6313), and the authority to require information and reports from manufacturers (42 U.S.C. 6316).

The Federal testing requirements consist of test procedures that manufacturers of covered equipment must use as the basis for: (1) certifying to DOE that their equipment complies with

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<sup>1</sup> All references to EPCA in this document refer to the statute as amended through the Energy Act of 2020, Public Law 116-260 (Dec. 27, 2020).

<sup>2</sup> For editorial reasons, upon codification in the U.S. Code, Part C was redesignated as Part A-1.

the applicable energy conservation standards adopted pursuant to EPCA (42 U.S.C. 6316(a); 42 U.S.C. 6295(s)), and (2) making representations about the efficiency of that equipment (42 U.S.C. 6314(d)). Similarly, DOE must use these test procedures to determine whether the equipment complies with relevant standards promulgated under EPCA. (42 U.S.C. 6316(a); 42 U.S.C. 6295(s))

Under 42 U.S.C. 6314, EPCA sets forth the criteria and procedures DOE is required to follow when prescribing or amending test procedures for covered equipment. EPCA requires that any test procedures prescribed or amended under this section must be reasonably designed to produce test results which reflect energy efficiency, energy use or estimated annual operating cost of covered equipment during a representative average use cycle and requires that test procedures not be unduly burdensome to conduct. (42 U.S.C.6314(a)(2)) The test procedure for walk-in refrigeration systems is set forth in the Code of Federal Regulations (“CFR”) at 10 CFR part 431, subpart R, appendix C, *Uniform Test Method for the Measurement of Net Capacity and AWEF of Walk-In Cooler and Walk-In Freezer Refrigeration Systems* (“Appendix C”).

Any interested person may submit a petition for waiver from DOE’s test procedure requirements. 10 CFR 431.401(a)(1). DOE will grant a waiver from the test procedure requirements if DOE determines either that the basic model(s) for which the waiver was requested contains a design characteristic that prevents testing of the basic model according to the prescribed test procedures, or that the prescribed test procedures evaluate the basic model in a manner so unrepresentative of its true energy consumption characteristics as to provide materially inaccurate comparative data. 10 CFR 431.401(f)(2). DOE may grant the waiver subject to conditions, including adherence to alternate test procedures. *Id.*

As soon as practicable after the granting of any waiver, DOE will publish in the *Federal Register* a notice of proposed rulemaking to amend its regulations so as to eliminate any need for

the continuation of such waiver. 10 CFR 431.401(l). As soon thereafter as practicable, DOE will publish in the *Federal Register* a final rule to that effect. *Id.* When DOE amends the test procedure to address the issues presented in a waiver, the waiver will automatically terminate on the date on which use of that test procedure is required to demonstrate compliance. 10 CFR 431.401(h)(3).

## **II. HTPG's Petition for Waiver: Assertions and Determinations**

By letter dated July 6, 2020, HTPG filed a petition for waiver and a petition for interim waiver from the DOE test procedure applicable to CO<sub>2</sub> direct expansion unit coolers set forth in Appendix C. HTPG claimed that the test conditions described in the Air-Conditioning, Heating, and Refrigeration Institute (“AHRI”) Standard 1250-2009, Standard for Performance Rating of Walk-In Coolers and Freezers (“AHRI 1250-2009”) (for walk-in refrigerator unit coolers and freezer unit coolers tested alone), as incorporated by Appendix C with modification, cannot be achieved by the specified basic models and are not consistent with operation of HTPG’s CO<sub>2</sub> direct expansion unit coolers. HTPG asserted that the prescribed test procedure is not appropriate for HTPG’s CO<sub>2</sub> direct expansion unit coolers and the test conditions are not achievable, since CO<sub>2</sub> refrigerant has a critical temperature of 87.8 °F<sup>3</sup> and the current DOE test procedure requires a liquid inlet saturation temperature of 105 °F and liquid inlet subcooling of 9 °F. HTPG suggested that the test conditions should be more consistent with typical operating conditions for a transcritical CO<sub>2</sub> booster system.

HTPG’s suggested test procedure specifies using modified liquid inlet saturation and liquid inlet subcooling temperatures of 38 °F and 5 °F, respectively, for both walk-in refrigerator unit coolers and walk-in freezer unit coolers. Additionally, because the subject units are used in

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<sup>3</sup> The test procedure specifies the unit cooler refrigerant inlet condition in terms of a saturation temperature (the temperature at which it completes the condensation process in a condenser) and the subcooling temperature (additional reduction in temperature lower than the specified saturation temperature). For CO<sub>2</sub>, the critical temperature above which there cannot exist separate liquid and gas phases is below the saturation condition specified in the test procedure -- hence, the specified condition cannot be achieved.

transcritical CO2 booster systems, HTPG recommended that the calculations in AHRI 1250-2009, section 7.9 should be used to determine the annual walk-in energy factor (“AWEF”) and net capacity for unit coolers matched to parallel rack systems, as required under the DOE test procedure. This section of AHRI 1250-2009 is prescribed by the DOE test procedure for determining AWEF for all unit coolers tested alone (see section 3.3.1 of Appendix C). Finally, HTPG also recommended that AHRI 1250-2009, Table 17, EER for Remote Commercial Refrigerated Display Merchandisers and Storage Cabinets, should be used to determine power consumption of CO2 direct expansion unit cooler systems, as required under the DOE test procedure.

On December 23, 2020, DOE published a notification that announced its receipt of the petition for waiver and granted HTPG an interim waiver. 85 FR 83927 (“Notification of Petition for Waiver”). In the Notification of Petition for Waiver, DOE acknowledged the difference in critical pressure and temperature between traditional refrigerants (such as R404A) and CO2 as used in HTPG’s direct expansion unit coolers. 85 FR 83927, 83929. DOE also noted that the transcritical nature of CO2 generally requires a more complex refrigeration cycle design to approach the efficiency of traditional refrigerant cycles during operation in high temperature conditions. *Id.*

In the Notification of Petition for Waiver, DOE also solicited comments from interested parties on all aspects of the petition and the specified alternate test procedure. 85 FR 83927, 83827. DOE received no substantive comments<sup>4</sup> in response to the Notification of Petition for Waiver.

For the reasons explained here and in the Notification of Petition for Waiver, absent a waiver, the basic models identified by HTPG in its petition cannot be tested and rated for energy

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<sup>4</sup> One comment was received, but it did not contain any content. The comment only stated the docket number for the notification of petition for waiver and grant of an interim waiver.

consumption on a basis representative of their true energy consumption characteristics. DOE has reviewed the recommended procedure suggested by HTPG and concludes that it will allow for the accurate measurement of the energy use of the CO2 direct expansion unit coolers, while alleviating the testing issues associated with HTPG's implementation of DOE's applicable walk-in refrigeration systems test procedure for the specified basic models.

Thus, DOE is requiring that HTPG test and rate specified CO2 direct expansion unit cooler basic models according to the alternate test procedure specified in this Decision and Order, which is identical to the procedure provided in the interim waiver.

This Decision and Order applies only to the basic models listed and does not extend to any other basic models. DOE evaluates and grants waivers for only those basic models specifically set out in the petition, not future models that may be manufactured by the petitioner. HTPG may request that DOE extend the scope of this waiver to include additional basic models that employ the same technology as those listed in this waiver. 10 CFR 431.401(g). HTPG may also submit another petition for waiver from the test procedure for additional basic models that employ a different technology and meet the criteria for test procedure waivers. 10 CFR 431.401(a)(1).

DOE notes that it may modify or rescind the waiver at any time upon DOE's determination that the factual basis underlying the petition for waiver is incorrect, or upon a determination that the results from the alternate test procedure are unrepresentative of the basic models' true energy consumption characteristics. 10 CFR 431.401(k)(1). Likewise, HTPG may request that DOE rescind or modify the waiver if the company discovers an error in the information provided to DOE as part of its petition, determines that the waiver is no longer needed, or for other appropriate reasons. 10 CFR 431.401(k)(2).

### **III. Order**

After careful consideration of all the material that was submitted by HTPG, HTPG’s consumer-facing materials, including websites and product specification sheets for the basic models listed in HTPG’s petition, as well as other industry information pertaining to the subject basic models listed by HTPG, it is **ORDERED** that:

(1) HTPG must, as of the date of publication of this Order in the *Federal Register*, test and rate the following CO2 direct expansion unit cooler basic models with the alternate test procedure as set forth in paragraph (2):

**Russell-branded Basic Model Numbers:**

RL6A041ADAF	RL6A041DDAF	RL6A052ADAF	RL6A052DDAF	RL6A066ADAF	RL6A066DDAF
RL6A073ADAF	RL6A073DDAF	RL6A094ADAF	RL6A094DDAF	RL6A117ADAF	RL6A117DDAF
RL6A130ADAF	RL6A130DDAF	RL6A141ADAF	RL6A141DDAF	RL6A161ADAF	RL6A161DDAF
RL6A181ADAF	RL6A181DDAF	RL6A195ADAF	RL6A195DDAF	RL6A235ADAF	RL6A235DDAF
RL6A260ADAF	RL6A260DDAF	RL6A295ADAF	RL6A295DDAF	RL6A330ADAF	RL6A330DDAF
RL6A390ADAF	RL6A390DDAF	RL6E035DDAF	RL6E042DDAF	RL6E049DDAF	RL6E066DDAF
RL6E077DDAF	RL6E090DDAF	RL6E105DDAF	RL6E121DDAF	RL6E142DDAF	RL6E162DDAF
RL6E182DDAF	RL6E200DDAF	RL6E200EDAF	RL6E244DDAF	RL6E244EDAF	RL6E281DDAF
RL6E281EDAF	RL4E027DDAF	RL4E032DDAF	RL4E038DDAF	RL4E051DDAF	RL4E064DDAF
RL4E080DDAF	RL4E094DDAF	RL4E110DDAF	RL4E125DDAF	RL4E141DDAF	RL4E155DDAF
RL4E155EDAF	RL4E195DDAF	RL4E195EDAF	RL4E230DDAF	RL4E230EDAF	
RM6A182ADAF	RM6A182DDAF	RM6A182FADF	RM6A220ADAF	RM6A220DDAF	RM6A220FADF
RM6A276ADAF	RM6A276DDAF	RM6A276FADF	RM6A370ADAF	RM6A370DDAF	RM6A370FADF
RM6A442ADAF	RM6A442DDAF	RM6A442FADF	RM6A549ADAF	RM6A549DDAF	RM6A549FADF
RM6A658ADAF	RM6A658DDAF	RM6A658FADF	RM6E153DDAF	RM6E153EDAF	RM6E153FADF
RM6E153GADF	RM6E184DDAF	RM6E184EDAF	RM6E184FADF	RM6E184GADF	RM6E311DDAF
RM6E311EDAF	RM6E311FADF	RM6E311GADF	RM6E374DDAF	RM6E374EDAF	RM6E374FADF
RM6E374GADF	RM6E469EDAF	RM6E469FADF	RM6E469GADF	RM6E564EDAF	RM6E564FADF
RM6E564GADF	RM4E110DDAF	RM4E110EDAF	RM4E110FADF	RM4E110GADF	RM4E143DDAF
RM4E143EDAF	RM4E143FADF	RM4E143GADF	RM4E232DDAF	RM4E232EDAF	RM4E232FADF
RM4E232GADF	RM4E288DDAF	RM4E288EDAF	RM4E288FADF	RM4E288GADF	RM4E336EDAF
RM4E336FADF	RM4E336GADF	RM4E419EDAF	RM4E419FADF	RM4E419GADF	
RV6A043ADAF	RV6A043DDAF	RV6A053ADAF	RV6A053DDAF	RV6A085ADAF	RV6A085DDAF
RV6A106ADAF	RV6A106DDAF	RV6A129ADAF	RV6A129DDAF	RV6A158ADAF	RV6A158DDAF
RV6A176ADAF	RV6A176DDAF	RV6A218ADAF	RV6A218DDAF	RV6A271ADAF	RV6A271DDAF
RV6E043DDAF	RV6E053DDAF	RV6E085DDAF	RV6E106DDAF	RV6E129DDAF	RV6E158DDAF
RV6E176DDAF	RV6E218DDAF	RV6E271DDAF			
ASLA25048ADAF	ASLA25048DDAF	ASLA25061ADAF	ASLA25061DDAF	ASLA35073ADAF	ASLA35073DDAF

ASLA45098ADAF	ASLA45098DDAF	ASLA55122ADAF	ASLA55122DDAF	ASLA65158ADAF	ASLA65158DDAF
ASLE25048DDAF	ASLE25058DDAF	ASLE35070DDAF	ASLE45094DDAF	ASLE55117DDAF	ASLE65150DDAF
RE6A041ADAF	RE6A041DDAF	RE6A070ADAF	RE6A070DDAF	RE6A084ADAF	RE6A084DDAF
RE6A104ADAF	RE6A104DDAF	RE6A128ADAF	RE6A128DDAF	RE6A141ADAF	RE6A141DDAF
RE6A169ADAF	RE6A169DDAF	RE6A204ADAF	RE6A204DDAF	RE6A258ADAF	RE6A258DDAF
RE6E037DDAF	RE6E045DDAF	RE6E075DDAF	RE6E089DDAF	RE6E108DDAF	RE6E125DDAF
RE6E137DDAF	RE6E182DDAF	RE6E221DDAF	RE6E278DDAF	RE4E037DDAF	RE4E075DDAF
RE4E107DDAF	RE4E149DDAF	RE4E186DDAF	RE4E234DDAF		
RH6A031DDAF	RH6A031FDAF	RH6A043DDAF	RH6A043FDAF	RH6A052DDAF	RH6A052FDAF
RH6A063DDAF	RH6A063FDAF	RH6A087DDAF	RH6A087FDAF	RH6A105DDAF	RH6A105FDAF
RH6A132DDAF	RH6A132FDAF	RH6A156DDAF	RH6A156FDAF	RH6A175DDAF	RH6A175FDAF
RH6A209DDAF	RH6A209FDAF	RH6E033DDAF	RH6E033EDAF	RH6E033FDAF	RH6E033GDAF
RH6E044DDAF	RH6E044EDAF	RN6E044FDAF	RH6E044GDAF	RH6E053DDAF	RH6E053EDAF
RH6E053FDAF	RH6E053GDAF	RH6E066DDAF	RH6E066EDAF	RH6E066FDAF	RH6E066GDAF
RH6E089DDAF	RH6E089EDAF	RH6E089FDAF	RH6E089GDAF	RH6E109DDAF	RH6E109EDAF
RH6E109FDAF	RH6E109GDAF	RH6E134DDAF	RH6E134EDAF	RH6E134FDAF	RH6E134GDAF
RH6E163DDAF	RH6E163EDAF	RH6E163FDAF	RH6E163GDAF	RH6E199DDAF	RH6E199EDAF
RH6E199FDAF	RH6E199GDAF	RH4E035DDAF	RH4E035EDAF	RH4E035FDAF	RH4E035GDAF
RH4E044DDAF	RH4E044EDAF	RH4E044FDAF	RH4E044GDAF	RH4E071DDAF	RH4E071EDAF
RH4E071FDAF	RH4E071GDAF	RH4E087DDAF	RH4E087EDAF	RH4E087FDAF	RH4E087GDAF
RH4E107DDAF	RH4E107EDAF	RH4E107FDAF	RH4E107GDAF	RH4E131DDAF	RH4E131EDAF
RH4E131FDAF	RH4E131GDAF	RH4E167DDAF	RH4E167EDAF	RH4E167FDAF	RH4E167GDAF

(2) The alternate test procedure for the HTPG basic models listed in paragraph (1) of this Order is the test procedure for walk-in refrigeration systems prescribed by DOE at 10 CFR part 431, subpart R, appendix C (“Appendix C”), except that the liquid inlet saturation temperature test condition and liquid inlet subcooling temperature test condition shall be modified to 38 °F and 5 °F, respectively, for both walk-in refrigerator unit coolers and walk-in freezer unit coolers, as detailed below. All other requirements of Appendix C and DOE's other relevant regulations remain applicable.

In Appendix C, under section 3.1. *General modifications: Test Conditions and Tolerances*, revise section 3.1.5., to read as follows:

3.1.5. Tables 15 and 16 shall be modified to read as follows:

**TABLE 15—REFRIGERATOR UNIT COOLER**

<b>Test description</b>	<b>Unit cooler air entering dry-bulb, °F</b>	<b>Unit cooler air entering relative humidity, %</b>	<b>Saturated suction temp, °F</b>	<b>Liquid inlet saturation temp, °F</b>	<b>Liquid inlet subcooling temp, °F</b>	<b>Compressor capacity</b>	<b>Test objective</b>
Off Cycle Fan Power	35	<50	—	—	—	Compressor Off	Measure fan input power during compressor off cycle.
Refrigeration Capacity Suction A	35	<50	25	38	5	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler.

**Note:** Superheat to be set according to equipment specification in equipment or installation manual. If no superheat specification is given, a default superheat value of 6.5 °F shall be used. The superheat setting used in the test shall be reported as part of the standard rating.

**TABLE 16—FREEZER UNIT COOLER**

<b>Test description</b>	<b>Unit cooler air entering dry-bulb, °F</b>	<b>Unit cooler air entering relative humidity, %</b>	<b>Saturated suction temp, °F</b>	<b>Liquid inlet saturation temp, °F</b>	<b>Liquid inlet subcooling temp, °F</b>	<b>Compressor capacity</b>	<b>Test objective</b>
Off Cycle Fan Power	-10	<50	—	—	—	Compressor Off	Measure fan input power during compressor off cycle.
Refrigeration Capacity Suction A	-10	<50	-20	38	5	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler.
Defrost	-10	Various	—	—	—	Compressor Off	Test according to Appendix C Section C11.

**Note:** Superheat to be set according to equipment specification in equipment or installation manual. If no superheat specification is given, a default superheat value of 6.5 °F shall be used. The superheat setting used in the test shall be reported as part of the standard rating.

(3) *Representations.* HTPG may not make representations about the energy efficiency of a basic model listed in paragraph (1) of this Order for compliance or marketing, unless the basic model has been tested in accordance with the provisions set forth above and such representations fairly disclose the results of such testing.

(4) This waiver shall remain in effect according to the provisions of 10 CFR 431.401.

(5) DOE issues this waiver on the condition that the statements, representations, and information provided by HTPG are valid. If HTPG makes any modifications to the controls or configurations of these basic models, such modifications will render the waiver invalid with respect to that basic model, and HTPG will either be required to use the current Federal test method or submit a new application for a test procedure waiver. DOE may rescind or modify this waiver at any time if it determines the factual basis underlying the petition for waiver is incorrect, or the results from the alternate test procedure are unrepresentative of a basic model's true energy consumption characteristics. 10 CFR 431.401(k)(1). Likewise, HTPG may request that DOE rescind or modify the waiver if HTPG discovers an error in the information provided to DOE as part of its petition, determines that the waiver is no longer needed, or for other appropriate reasons. 10 CFR 431.401(k)(2).

(6) HTPG remains obligated to fulfill any applicable requirements set forth at 10 CFR part 429.

### **Signing Authority**

This document of the Department of Energy was signed on March 15, 2021, by Kelly Speakes-Backman, Principal Deputy Assistant Secretary and Acting Assistant Secretary for Energy Efficiency and Renewable Energy, pursuant to delegated authority from the Secretary of Energy. That document with the original signature and date is maintained by DOE. For administrative purposes only, and in compliance with requirements of the Office of the Federal Register, the undersigned DOE Federal Register Liaison Officer has been authorized to sign and submit the document in electronic format for publication, as an official document of the Department of Energy. This administrative process in no way alters the legal effect of this document upon publication in the *Federal Register*.

Signed in Washington, DC, on March 16, 2021

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Treena V. Garrett,  
Federal Register Liaison Officer,  
U.S. Department of Energy.

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