

STANDARD

**ANSI/ASHRAE/IBPSA Addendum e to
ANSI/ASHRAE Standard 205-2023**

Representation of Performance Data for HVAC&R and Other Facility Equipment

Approved by ASHRAE and the American National Standards Institute on April 30, 2026, and by the International Building Performance Simulation Association on April 28, 2026.

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Cognizant TC: 4.7, Energy Calculations

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Foreword to Addendum e

Standard 205-2023 Addendum e adds coverage of heating performance to RS0004, Air-to-Air Direct Expansion System. This allows representation of direct expansion coil heating in addition to cooling. This addition will allow RS0002 Unitary Cooling Air-Conditioning Equipment to be extended to cover heat pump performance. Addendum e also adds the common enumeration "PerformanceCapabilities", that is used to indicate whether a system is capable of heating and/or cooling (and in the future, other capabilities such as humidification/dehumidification).

Note that Addendum e does not address auxiliary heating typically provided in heat pump systems. Inclusion of auxiliary heating will be provided via future addenda that extend RS0002 (currently Unitary Cooling Air-Conditioning Equipment, will be retitled Unitary Air-Conditioning Equipment) and add representations for resistance- and fuel-based heating equipment.

In the following text, additions are shown in blue with underline, deletions are shown in red with strikeout, and unchanged sections (provided for context) are shown in black. In some cases, unchanged text includes modifications introduced in previously-published Addendum d.

5.6.4 Prerequisite Array Value. The data element value shall be required if a specific prerequisite array data element is defined and contains a specific value in the representation. A data element `option_a`, that is required when the prerequisite data element `option_types` contains the value `OPTION_A`, has the requirement stated as `if option_types contains (OPTION_A)`.

Informative note: In JSON Schema this is indicated through the use of “if-then” and “contains” constructs.

[...]

Table 5–12 PerformanceCapabilities

<u>Enumerator</u>	<u>Attributes</u>
<u>COOLING</u>	<u>Description:</u> Indicates that the equipment provides explicitly controlled cooling and the representation contains <u>cooling-related performance data</u>
<u>HEATING</u>	<u>Description:</u> Indicates that the equipment provides explicitly controlled heating and the representation contains <u>heating-related performance data</u>

[...]

RS0004 AIR-TO-AIR DIRECT EXPANSION SYSTEM

RS0004.1 Identification and History. schema: RS0004

schema_version	Date	Initial Approved Standard	Notes
1.0.0	2023	2023	Initial publication
2.0.0	2024	2023 - Addenda a, b, & c	
3.0.0	2024	2023 - Addendum e	Add heating performance

RS0004.2 Scope and Description

RS0004.2.1 Applicability. Direct expansion vapor compression refrigerant systems with two coils (one evaporator and one condenser) both exchanging heat with air streams to provide cooling, [heating, or both](#).

RS0004.2.2 Exclusions.

RS0004.2.3 Exclusions ~~Systems with reversing capability to provide heating or systems with heat recovery.~~

- [Systems with hot gas reheat used for dehumidification](#)
- [Systems with evaporative condenser type](#)

RS0004.2.4 Embedded Representations. None.

RS0004.2.5 Referencing Representations

- RS0002: Unitary Cooling Air-Conditioning Equipment

RS0004.2.6 Schematic. Figure RS0004–2 illustrates the ~~components of the refrigerant systems~~ [representation of components within the scope of this appendix during cooling operation.](#)

[Figure RS0004–2 illustrates the representation of components](#) within the scope of this appendix [during heating operation.](#)

RS0004.3 Data Model

RS0004.3.1 Data Group Hierarchy. A representation implementation conforming to this representation specification shall consist of the following data groups:

- RS0004
 - Metadata
 - Description*
 - ProductInformation*
 - Performance
 - PerformanceMapCooling
 - GridVariablesCooling
 - LookupVariablesCooling
 - PerformanceMapHeating
 - GridVariablesHeating
 - LookupVariablesHeating
 - PerformanceMapDefrostCorrection
 - GridVariablesDefrostCorrection
 - LookupVariablesDefrostCorrection
 - PerformanceMapStandby
 - GridVariablesStandby
 - LookupVariablesStandby

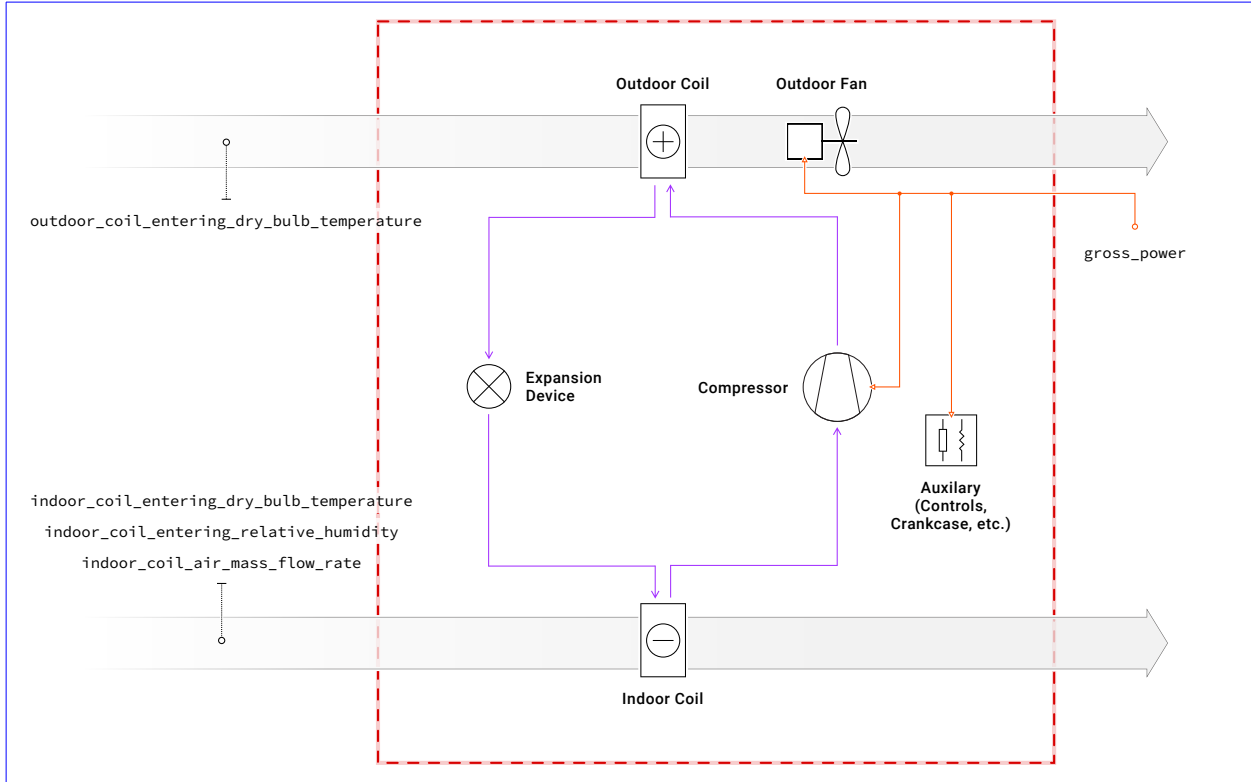


Figure RS0004-1 [Air-to-Air direct expansion system during cooling operation.](#)

where asterisks (*) indicate data groups that are not required to be present in a representation conforming to this representation specification.

RS0004.3.2 Enumerations. None.

RS0004.3.3 Data Groups

Table RS0004-2 RS0004

Name	Attributes
metadata	<p>Description: Metadata data group</p> <p>Data Type: {Metadata}</p> <p>Constraints: schema=RS0004</p> <p>Req: ✓</p>
description	<p>Description: Data group describing product and rating information</p> <p>Data Type: {Description}</p>
performance	<p>Description: Data group containing performance information</p> <p>Data Type: {Performance}</p> <p>Req: ✓</p>

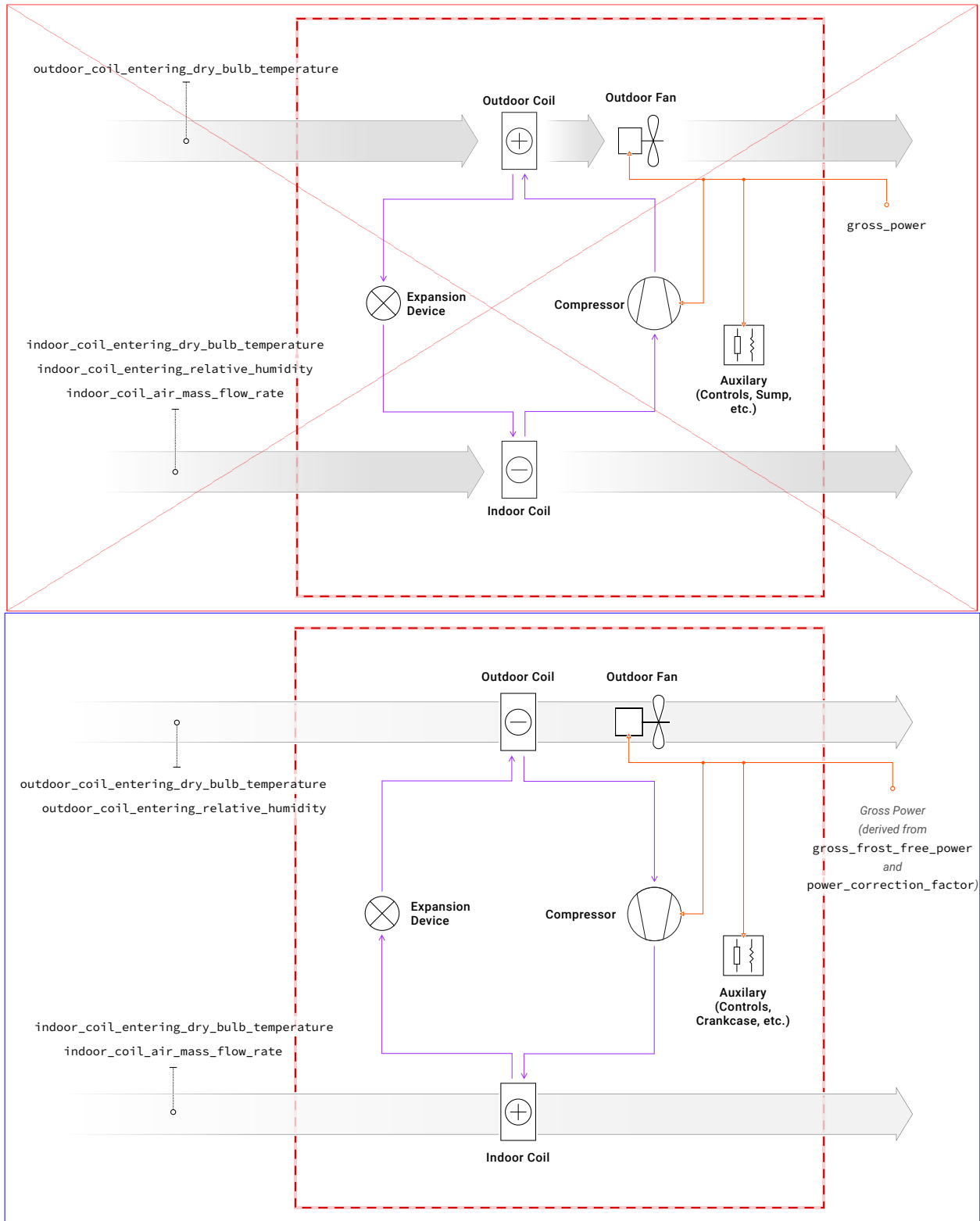


Figure RS0004–2 Air-to-Air direct expansion refrigerant system during heating operation. Features unrelated to data elements may be omitted, such as the refrigerant reversing valve.

Table RS0004–3 Description

Name	Attributes
product_information	Description: Data group describing product information Data Type: {ProductInformation}

Table RS0004–4 ProductInformation

Name	Attributes
outdoor_unit_manufacturer	Description: Outdoor unit manufacturer name Data Type: String
outdoor_unit_model_number	Description: Outdoor unit model number Data Type: Pattern Notes: Pattern shall match all model numbers that can be represented by the representation
indoor_unit_manufacturer	Description: Indoor unit manufacturer name Data Type: String Notes: May be omitted for packaged systems with a single manufacturer
indoor_unit_model_number	Description: Indoor unit model number Data Type: Pattern Notes: Pattern shall match all model numbers that can be represented by the representation
refrigerant	Description: Refrigerant used Data Type: String Notes: The string shall start with 'R-' and then include the refrigerant number designation conforming to ANSI/ASHRAE Standard 34 ¹
compressor_type	Description: Type of compressor Data Type: <CompressorType>

Table RS0004–5 Performance

Name	Attributes
performance_capabilities	Description: An array of unique operating modes that indicate the capabilities of the equipment Data Type: [<PerformanceCapabilities>] Req: ✓
compressor_speed_control_type	Description: Method used to control different speeds of the compressor Data Type: <SpeedControlType> Req: ✓
cooling_cycling_degradation_coefficient	Description: Cycling Cooling cycling degradation coefficient (C_D) as described in AHRI 210/240^c Data Type: Numeric Units: - Constraints: ≥0.0, <1.0 Req: ✓ if performance_capabilities contains (COOLING) Notes: <ul style="list-style-type: none"> Used for the lowest stage when the unit cycles to meet load Informative note: 340/360 specifies a fixed

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Name	Attributes
heating_cycling_degradation_coefficient	<p>Description: Heating cycling degradation coefficient of approximately 0.12(C_D^h)</p> <p>Data Type: Numeric</p> <p>Units: -</p> <p>Constraints: ≥ 0.0, < 1.0</p> <p>Req: if performance_capabilities contains(HEATING)</p> <p>Notes:</p> <ul style="list-style-type: none"> Used for the lowest stage when the unit cycles to meet load
scaling	<p>Description: Specifies the range the performance data can be scaled to represent different capacity equipment</p> <p>Data Type: {Scaling}</p> <p>Notes: If not present, scaling of the performance data is not allowed</p>
performance_map_cooling	<p>Description: Data group describing cooling performance over a range of conditions</p> <p>Data Type: {PerformanceMapCooling}</p> <p>Req: if performance_capabilities contains(COOLING)</p>
performance_map_heating	<p>Description: Data group describing heating performance over a range of conditions</p> <p>Data Type: {PerformanceMapHeating}</p> <p>Req: if performance_capabilities contains(HEATING)</p>
performance_map_defrost_correction	<p>Description: Data group describing the impact on heating performance due to frost formation, defrost operation, or both</p> <p>Data Type: {PerformanceMapDefrostCorrection}</p> <p>Req: if performance_capabilities contains(HEATING)</p>
performance_map_standby	<p>Description: Data group describing standby performance</p> <p>Data Type: {PerformanceMapStandby}</p> <p>Req: ✓</p>

Table RS0004–6 PerformanceMapCooling

Name	Attributes
grid_variables	<p>Description: Data group defining the grid variables for cooling performance</p> <p>Data Type: {GridVariablesCooling}</p> <p>Req: ✓</p>
lookup_variables	<p>Description: Data group defining the lookup variables for cooling performance</p> <p>Data Type: {LookupVariablesCooling}</p> <p>Req: ✓</p>

Table RS0004–7 GridVariablesCooling

Name	Attributes
outdoor_coil_entering_dry_bulb_temperature	<p>Description: Dry bulb temperature of the air entering the outdoor coil</p> <p>Data Type: [Numeric][1..]</p> <p>Units: K</p> <p>Constraints: ≥ 0.0</p> <p>Req: ✓</p>

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Name	Attributes
indoor_coil_entering_relative_humidity	<p>Description: Relative humidity of the air entering the indoor coil</p> <p>Data Type: [Numeric] [1..]</p> <p>Units: -</p> <p>Constraints: ≥ 0.0, ≤ 1.0</p> <p>Req: ✓</p> <p>Notes: As measured immediately before entering the coil (i.e., after the fan in a blow-through configuration)</p>
indoor_coil_entering_dry_bulb_temperature	<p>Description: Dry bulb temperature of the air entering the indoor coil</p> <p>Data Type: [Numeric] [1..]</p> <p>Units: K</p> <p>Constraints: ≥ 0.0</p> <p>Req: ✓</p> <p>Notes: As measured immediately before entering the coil (i.e., after the fan in a blow-through configuration)</p>
indoor_coil_air_mass_flow_rate	<p>Description: Mass flow rate of air entering the indoor coil</p> <p>Data Type: [Numeric] [1..]</p> <p>Units: kg/s</p> <p>Constraints: ≥ 0.0</p> <p>Req: ✓</p> <p>Scalable: ✓</p>
compressor_sequence_number	<p>Description: Index indicating the relative capacity order of the compressor speed/stage expressed in order from lowest capacity (starting at 1) to highest capacity</p> <p>Data Type: [Integer] [1..]</p> <p>Units: -</p> <p>Constraints: ≥ 1</p> <p>Req: ✓</p> <p>Notes:</p> <ul style="list-style-type: none"> • If <code>compressor_speed_control_type</code> is DISCRETE, sequence numbers shall be provided for each discrete stage of the compressor(s) • If <code>compressor_speed_control_type</code> is CONTINUOUS, sufficient sequence numbers shall be provided to capture the continuous operation of the compressor(s)
ambient_absolute_air_pressure	<p>Description: Ambient absolute air pressure</p> <p>Data Type: [Numeric] [1..]</p> <p>Units: Pa</p> <p>Constraints: ≥ 0.0</p> <p>Req: ✓</p>

Table RS0004–8 LookupVariablesCooling

Name	Attributes
gross_total_capacity	<p>Description: Total heat removed by the indoor coil</p> <p>Data Type: [Numeric][1..]</p> <p>Units: W</p> <p>Constraints: ≥0.0</p> <p>Req: ✓</p> <p>Scalable: ✓</p> <p>Notes: Shall not include fan heat</p>
gross_sensible_capacity	<p>Description: Sensible heat removed by the indoor coil</p> <p>Data Type: [Numeric][1..]</p> <p>Units: W</p> <p>Constraints: ≥0.0</p> <p>Req: ✓</p> <p>Scalable: ✓</p> <p>Notes: Shall not include fan heat</p>
gross_power	<p>Description: Gross power draw (of the outdoor unit)</p> <p>Data Type: [Numeric][1..]</p> <p>Units: W</p> <p>Constraints: ≥0.0</p> <p>Req: ✓</p> <p>Scalable: ✓</p> <p>Notes:</p> <ul style="list-style-type: none"> • Includes compressor, outdoor fan, and any auxiliary power used by the unit's controls and any sump-crankcase heater • Shall not include power drawn by the indoor fan
operation_state	<p>Description: The operation state at the operating conditions</p> <p>Data Type: [<OperationState>]</p> <p>Units: -</p> <p>Req: ✓</p>

Table RS0004–9 PerformanceMapHeating

<u>Name</u>	<u>Attributes</u>
grid_variables	<p>Description: Data group defining the grid variables for heating performance</p> <p>Data Type: {GridVariablesHeating}</p> <p>Req: ✓</p>
lookup_variables	<p>Description: Data group defining the lookup variables for heating performance</p> <p>Data Type: {LookupVariablesHeating}</p> <p>Req: ✓</p>

Table RS0004-10 [GridVariablesHeating](#)

<u>Name</u>	<u>Attributes</u>
outdoor_coil_entering_dry_bulb_temperature	<p>Description: Dry bulb temperature of the air entering the outdoor coil</p> <p>Data Type: [Numeric] [1..]</p> <p>Units: K</p> <p>Constraints: ≥0.0</p> <p>Req: ✓</p>
indoor_coil_entering_dry_bulb_temperature	<p>Description: Dry bulb temperature of the air entering the indoor coil</p> <p>Data Type: [Numeric] [1..]</p> <p>Units: K</p> <p>Constraints: ≥0.0</p> <p>Req: ✓</p> <p>Notes: As measured immediately before entering the coil (i.e., after the fan in a blow-through configuration)</p>
indoor_coil_air_mass_flow_rate	<p>Description: Mass flow rate of air entering the indoor coil</p> <p>Data Type: [Numeric] [1..]</p> <p>Units: kg/s</p> <p>Constraints: ≥0.0</p> <p>Req: ✓</p> <p>Scalable: ✓</p>
compressor_sequence_number	<p>Description: Index indicating the relative capacity order of the compressor speed/stage expressed in order from lowest capacity (starting at 1) to highest capacity</p> <p>Data Type: [Integer] [1..]</p> <p>Units: -</p> <p>Constraints: ≥1</p> <p>Req: ✓</p> <p>Notes:</p> <ul style="list-style-type: none"> • If compressor_speed_control_type is DISCRETE, sequence numbers shall be provided for each discrete stage of the compressor(s) • If compressor_speed_control_type is CONTINUOUS, sufficient sequence numbers shall be provided to capture the continuous operation of the compressor(s)

Table RS0004–11 [LookupVariablesHeating](#)

<u>Name</u>	<u>Attributes</u>
gross_frost_free_capacity	<p>Description: Rate of heat added by the indoor coil under steady state conditions with no frost present on the outdoor coil</p> <p>Data Type: [Numeric][1..]</p> <p>Units: W</p> <p>Constraints: ≥0.0</p> <p>Req: ✓</p> <p>Scalable: ✓</p> <p>Notes:</p> <ul style="list-style-type: none"> • Informative note: Sometimes also referred to as “instantaneous” or “steady state” capacity • Does not account for heat added by the fan
gross_frost_free_power	<p>Description: Gross power draw of the outdoor unit under steady state conditions with no frost present on the outdoor coil</p> <p>Data Type: [Numeric][1..]</p> <p>Units: W</p> <p>Constraints: ≥0.0</p> <p>Req: ✓</p> <p>Scalable: ✓</p> <p>Notes:</p> <ul style="list-style-type: none"> • Informative note: Sometimes also referred to as “instantaneous” or “steady state” power • Does not include power drawn by the indoor fan • Includes compressor, outdoor fan, and any auxiliary power used by the unit’s controls and any crankcase heater
operation_state	<p>Description: The operation state at the operating conditions</p> <p>Data Type: [<OperationState>]</p> <p>Units: -</p> <p>Req: ✓</p>

Table RS0004–12 [PerformanceMapDefrostCorrection](#)

<u>Name</u>	<u>Attributes</u>
grid_variables	<p>Description: Data group defining the grid variables for the impact on heating performance due to the effects of frost formation, defrost operation, or both</p> <p>Data Type: {GridVariablesDefrostCorrection}</p> <p>Req: ✓</p>
lookup_variables	<p>Description: Data group defining the lookup variables for the impact on heating performance due to the effects of frost formation, defrost operation, or both</p> <p>Data Type: {LookupVariablesDefrostCorrection}</p> <p>Req: ✓</p>

Table RS0004–13 [GridVariablesDefrostCorrection](#)

<u>Name</u>	<u>Attributes</u>
outdoor_coil_entering_dry_bulb_temperature	<p>Description: Dry bulb temperature of the air entering the outdoor coil</p> <p>Data Type: [Numeric] [1..]</p> <p>Units: K</p> <p>Constraints: ≥0.0</p> <p>Req: ✓</p>
outdoor_coil_entering_relative_humidity	<p>Description: Relative humidity of the air entering the outdoor coil</p> <p>Data Type: [Numeric] [1..]</p> <p>Units: -</p> <p>Constraints: ≥0.0, ≤1.0</p> <p>Req: ✓</p>
compressor_sequence_number	<p>Description: Index indicating the relative capacity order of the compressor speed/stage expressed in order from lowest capacity (starting at 1) to highest capacity</p> <p>Data Type: [Integer] [1..]</p> <p>Units: -</p> <p>Constraints: ≥1</p> <p>Req: ✓</p> <p>Notes: Shall be consistent with the values of compressor_sequence_number in GridVariablesHeating</p>

Table RS0004–14 [LookupVariablesDefrostCorrection](#)

<u>Name</u>	<u>Attributes</u>
capacity_correction_factor	<p>Description: Factor representing the correction to the gross frost-free heating capacity to account for impacts of frost formation, defrost operation, or both over the integrated time period</p> <p>Data Type: [Numeric] [1..]</p> <p>Units: -</p> <p>Constraints: ≥0.0, ≤1.0</p> <p>Req: ✓</p> <p>Notes: A value of 1.0 indicates no frost formation or defrost operation</p>
power_correction_factor	<p>Description: Factor representing the correction to the gross frost-free power to account for impacts of frost formation, defrost operation, or both over the integrated time period</p> <p>Data Type: [Numeric] [1..]</p> <p>Units: -</p> <p>Constraints: ≥0.0</p> <p>Req: ✓</p> <p>Notes: A factor greater than 1.0 indicates electric resistance strip heat might be applied to defrost the outdoor coil</p>

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<u>Name</u>	<u>Attributes</u>
defrost_time_fraction	<p>Description: Fraction of integrated time period when defrost operation is active</p> <p>Data Type: [Numeric] [1..]</p> <p>Units: -</p> <p>Constraints: ≥0.0, ≤1.0</p> <p>Req: ✓</p> <p>Notes: <i>Informative note:</i> This value is used to inform application software when it may need to control supplemental heating during defrost</p>

Table RS0004–15 PerformanceMapStandby

<u>Name</u>	<u>Attributes</u>
grid_variables	<p>Description: Data group defining the grid variables for standby performance</p> <p>Data Type: {GridVariablesStandby}</p> <p>Req: ✓</p>
lookup_variables	<p>Description: Data group defining the lookup variables for standby performance</p> <p>Data Type: {LookupVariablesStandby}</p> <p>Req: ✓</p>

Table RS0004–16 GridVariablesStandby

<u>Name</u>	<u>Attributes</u>
outdoor_coil_environment_dry_bulb_temperature	<p>Description: Dry bulb temperature of the air in the environment of the outdoor coil</p> <p>Data Type: [Numeric] [1..]</p> <p>Units: K</p> <p>Constraints: ≥0.0</p> <p>Req: ✓</p>

Table RS0004–17 LookupVariablesStandby

<u>Name</u>	<u>Attributes</u>
gross_power	<p>Description: Gross power draw (of the outdoor unit)</p> <p>Data Type: [Numeric] [1..]</p> <p>Units: W</p> <p>Constraints: ↔≥0.0</p> <p>Req: ✓</p> <p>Scalable: ✓</p> <p>Notes: Includes any auxiliary power used by the unit's controls and any sump-crankcase heater</p>

RS0004.4 Verification Rules. Performance data supplied must satisfy the following verification tests. The psychrometric functions used below shall follow the definitions provided by the ASHRAE Handbook of Fundamentals-2021, Chapter 1².

RS0004.4.1 Apparatus Dew Point. An apparatus dew point for the indoor coil must be determinable from the given combination of entering air conditions, total cooling capacity, and sensible heat ratio. That is, a line drawn on a psychrometric chart between the inlet and outlet conditions must intersect the saturation curve when extended beyond the outlet conditions:

There exists $T_{db,ADP}$ and ω_{ADP} such that:

$$\frac{\omega_e - \omega_l}{T_{db,e} - T_{db,l}} = \frac{\omega_e - \omega_{ADP}}{T_{db,e} - T_{db,ADP}}$$

and

$$\phi(T_{db,ADP}, \omega_{ADP}, P) = 1.0$$

RS0004.4.2 Moisture Conservation. The resulting humidity ratio of the air leaving the indoor coil shall not exceed the humidity ratio of the air entering the indoor coil:

$$\omega_l \leq \omega_e$$

RS0004.4.3 Nomenclature

Symbol	Description
ϕ	Relative humidity
ω	Humidity ratio, kg _{water} / kg~dry air~
T_{db}	Dry-bulb temperature, K
P	Absolute pressure, Pa
e	Subscript indicating entering coil conditions
l	Subscript indicating leaving coil conditions
ADP	Subscript indicating Apparatus Dew Point (ADP) conditions

RS0004.5 Publishing Rules:

RS0004.6 Publishing Rules None:-

RS0004.6.1 Heating Performance. [performance_map_defrost_correction](#) approximates the impact on heating performance due to frost formation, defrost operation, or both over the integrated time period. Figure RS0004-3 and Figure RS0004-4 illustrate the modeling simplification used to represent capacity and power.

The time integrated average capacity shall be calculated with the following equation:

$$\dot{Q}_{int} = \frac{\int_{t_1}^{t_2} \dot{Q} dt}{t_2 - t_1}$$

The time integrated average power shall be calculated with the following equation:

$$\dot{P}_{int} = \frac{\int_{t_1}^{t_2} \dot{P} dt}{t_2 - t_1}$$

The capacity correction factor shall be calculated with the following equation:

$$f_{\dot{Q}} = \frac{\dot{Q}_{int}}{\dot{Q}_{ff}}$$

The power correction factor shall be calculated with the following equation:

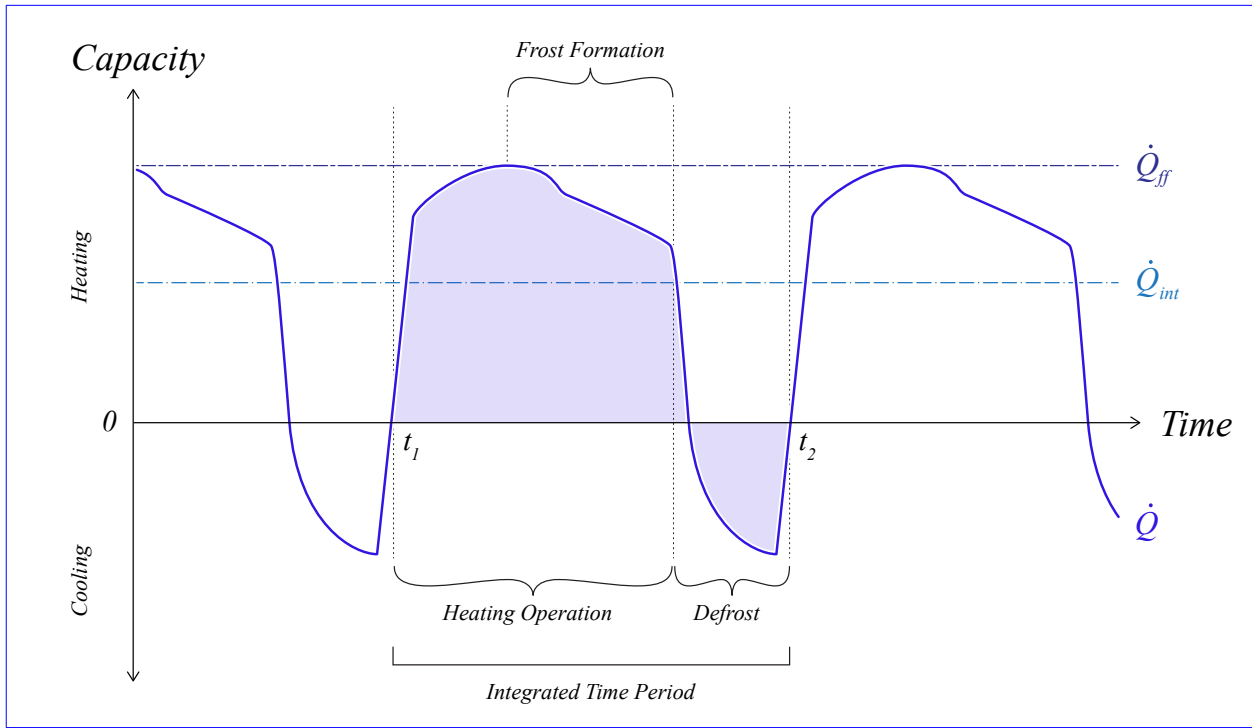


Figure RS0004-3 [Reverse-cycle heat pump capacity performance during heating.](#)

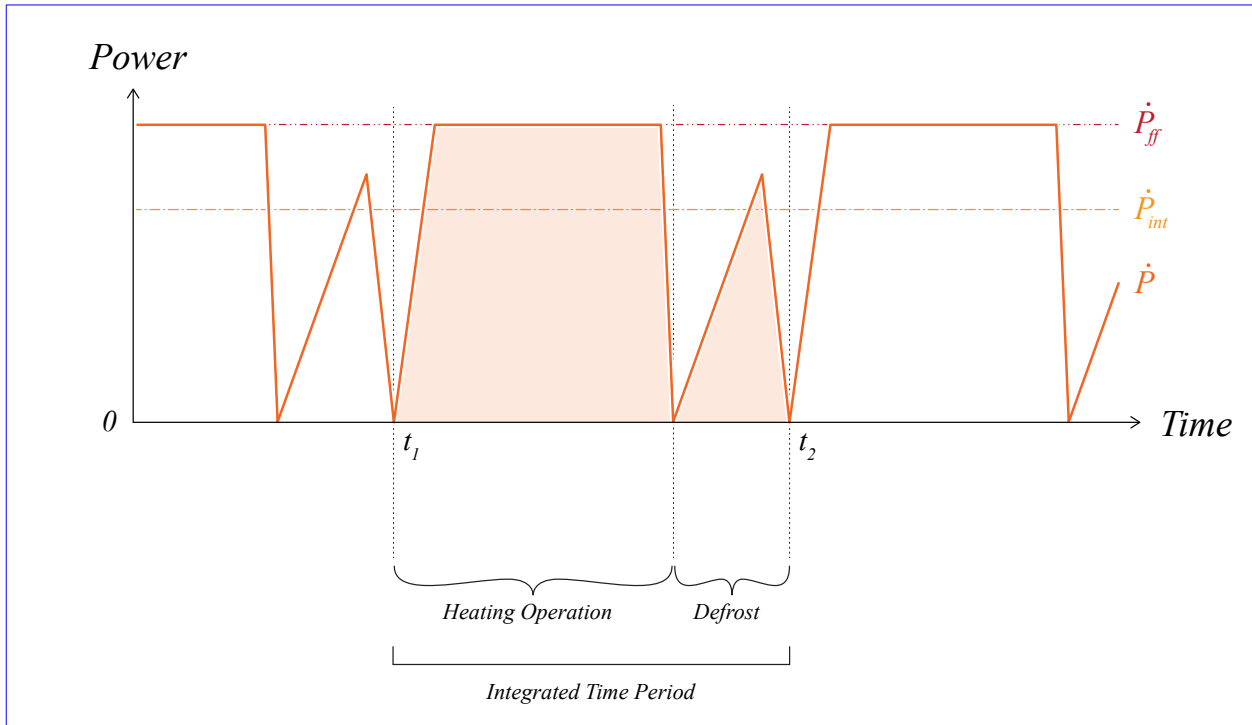


Figure RS0004-4 [Reverse-cycle heat pump power during heating.](#)

$$f_P = \frac{\dot{P}_{int}}{\dot{P}_{ff}}$$

RS0004.6.2 Nomenclature

Symbol	Data element	Description
\dot{Q}_{int}		Time integrated average gross capacity over the integrated time period, W
\dot{Q}_{ff}	gross_frost_free_capacity	Rate of heat added by the indoor coil under steady state conditions with no frost present on the outdoor coil, W
\dot{Q}		Rate of heat added by the indoor coil, W
f_Q	capacity_correction_factor	Factor representing the average correction to the gross frost-free capacity over the integrated time period
\dot{P}_{int}		Time integrated average gross power over the integrated time period, W
\dot{P}_{ff}	gross_frost_free_power	Gross power draw of the outdoor unit under steady state conditions with no frost present on the outdoor coil, W
\dot{P}		Gross power, W
f_P	power_correction_factor	Factor representing the average correction to the gross frost-free power over the integrated time period
t_1		Time at the initial defrost termination, s
t_2		Time at the successive defrost termination, s

RS0004.7 Application Rules

RS0004.7.1 Cooling Performance. [performance_map_cooling](#) shall be used to simulate performance when system controls call for cooling.

RS0004.7.2 Heating Performance. [performance_map_heating](#) and [performance_map_defrost_correction](#) shall be used to simulate performance under the following conditions:

- when system controls call for heating, and
- the corresponding lookup variable [operation_state](#) in [performance_map_heating](#) has a value of [NORMAL](#) at the current simulated conditions

The simulated capacity shall be modeled with the following equation:

$$\dot{Q}_{int} = \dot{Q}_{ff} \cdot f_Q$$

The simulated power shall be modeled with the following equation:

$$\dot{P}_{int} = \dot{P}_{ff} \cdot f_P$$

RS0004.7.3 Standby Performance. `performance_map_standby` shall be used to simulate performance under any of the following conditions:

- a. system controls are not calling for cooling [or heating](#), or
- b. system controls are calling for cooling [or heating](#), but either:
 1. the current simulated conditions are outside the range of grid variables in [performance_map_cooling](#) [the respective performance map](#), or
 2. the corresponding lookup variable `operation_state` in [performance_map_cooling](#) [the respective performance map](#) has a value of **STANDBY**-**STANDBY** at the current simulated conditions.

RS0004.7.4 Cycling Degradation. [The cycling degradation coefficients, `cooling_cycling_degradation_coefficient` and `heating_cycling_degradation_coefficient`, shall be used to adjust the gross power when the system is cycling between the lowest `compressor_sequence_number` of the respective performance map and standby operation.](#)

[The time integrated average gross power during heating or cooling operation while cycling shall be calculated as:](#)

$$\bar{P}_{cyc} = f_{cyc} \cdot \frac{\dot{P}_{low}}{1 - C_D \cdot (1 - f_{cyc})}$$

[The average power during standby operation while cycling shall be calculated as:](#)

$$\bar{P}_{sb} = (1 - f_{cyc}) \cdot \dot{P}_{sb}$$

RS0004.7.5 [Nomenclature](#)

Symbol	Data element	Description
\dot{Q}_{int}		Time integrated average gross capacity over the integrated time period, W
\dot{Q}_{ff}	gross_frost_free_capacity	Rate of heat added by the indoor coil under steady state conditions with no frost present on the outdoor coil, W
$f_{\dot{Q}}$	capacity_correction_factor	Factor representing the average correction to the gross frost-free capacity over the time between defrost terminations
\dot{P}_{int}		Time integrated average gross power over the integrated time period, W
\dot{P}_{ff}	gross_frost_free_power	Gross power draw of the outdoor unit under steady state conditions with no frost present on the outdoor coil, W
f_P	power_correction_factor	Factor representing the average correction to the gross frost-free power over the time between defrost terminations
f_{cyc}		Cycling ratio, fraction of time the system is in heating or cooling operation while cycling
\bar{P}_{cyc}		Time integrated average heating or cooling gross power draw of the outdoor unit while cycling, W
\dot{P}_{low}		Gross power draw of the outdoor unit at its lowest compressor sequence number during the respective operating mode, W (Note: this is \dot{P}_{int} in heating mode)
C_D	cooling_cycling_degradation_coefficient or heating_cycling_degradation_coefficient	Cycling degradation coefficient for the respective operating mode

[\(continued on next page\)](#)

(continued from previous page)

<u>Symbol</u>	<u>Data element</u>	<u>Description</u>
\bar{P}_{sb}		<u>Time integrated average standby power draw of the outdoor unit while cycling, W</u>
\dot{P}_{sb}		<u>Gross power draw of the outdoor unit during standby operation, W</u>

RS0004.8 References

1. ASHRAE. *Standard 34: Designation and Safety Classification of Refrigerants*. Atlanta, Georgia: ASHRAE, 2022.
2. ASHRAE. *ASHRAE Handbook—Fundamentals*. Atlanta, Georgia: ASHRAE, 2021.

RS0004.9 Example (Informative). See <https://data.ashrae.org/Standard205/examples.html>.

POLICY STATEMENT DEFINING ASHRAE'S CONCERN FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES

ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted Standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the Standards and Guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive Technical Committee structure, continue to generate up-to-date Standards and Guidelines where appropriate and adopt, recommend, and promote those new and revised Standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date Standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating Standards and Guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.

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About ASHRAE

Founded in 1894, ASHRAE is a global professional society committed to serve humanity by advancing the arts and sciences of heating, ventilation, air conditioning, refrigeration, and their allied fields.

As an industry leader in research, standards writing, publishing, certification, and continuing education, ASHRAE and its members are dedicated to promoting a healthy and sustainable built environment for all, through strategic partnerships with organizations in the HVAC&R community and across related industries.

To stay current with this and other ASHRAE Standards and Guidelines, visit www.ashrae.org/standards, and connect on LinkedIn, Facebook, Twitter, and YouTube.

Visit the ASHRAE Bookstore

ASHRAE offers its Standards and Guidelines in print, as immediately downloadable PDFs, and via ASHRAE Digital Collections, which provides online access with automatic updates as well as historical versions of publications. Selected Standards and Guidelines are also offered in redline versions that indicate the changes made between the active Standard or Guideline and its previous version. For more information, visit the Standards and Guidelines section of the ASHRAE Bookstore at www.ashrae.org/bookstore.

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