- Credits
- Energy & atmosphere
  - Awareness & education
  - Energy & atmosphere
  - Indoor environmental quality
  - Innovation & design process
  - Location & linkages
  - Material & resources
  - Sustainable sites
  - Water efficiency
- EA126 | Enhanced refrigerant management
  - EA1 | Optimize energy performance
  - EA10 | District heating and cooling
  - EA101 | Fundamental commissioning and verification
  - EA101 | Fundamental commissioning and verification
  - EA101 | Fundamental commissioning and verification
  - EA102 | Energy efficiency best management practices
  - EA102 | Energy efficiency best management practices
  - EA103 | Minimum energy performance
  - EA103 | Minimum energy performance
  - EA103 | Minimum energy performance
  - EA104 | Minimum energy performance
  - EA104 | Minimum energy performance
  - EA105 | Minimum energy performance
  - EA106 | Building-level energy metering
  - EA106 | Building-level energy metering
  - EA107 | Building-level energy metering
  - EA108 | Fundamental refrigerant management
  - EA108 | Fundamental refrigerant management
  - EA109 | Fundamental refrigerant management
  - EA11 | Infrastructure energy efficiency
  - EA110 | Enhanced commissioning
  - EA110 | Enhanced commissioning
  - EA110 | Enhanced commissioning
  - EA112 | Existing building commissioning—analysis
  - EA112 | Existing building commissioning—analysis
  - EA113 | Existing building commissioning—implementation
  - EA114 | Ongoing commissioning
  - EA118 | Advanced energy metering
  - EA118 | Advanced energy metering
  - EA118 | Advanced energy metering
  - EA120 | Advanced energy metering
  - EA121 | Demand response
  - EA122 | Demand response
  - EA123 | Renewable energy production
  - EA123 | Renewable energy production
  - EA125 | Renewable energy and carbon offsets
  - EA126 | Enhanced refrigerant management
  - EA126 | Enhanced refrigerant management
  - EA126 | Enhanced refrigerant management
  - EA126 | Enhanced refrigerant management
  - EA127 | Enhanced refrigerant management
  - EA127 | Enhanced refrigerant management
  - EA128 | Green power and carbon offsets
  - EA128 | Green power and carbon offsets
  - EA128 | Green power and carbon offsets
  - EA2.1 | New construction commissioning
  - EA2.2 | Existing building commissioning
  - EA2.3 | Ongoing & monitoring-based commissioning
  - EA3.1 | Energy metering
  - EA3.2 | Measurement & verfication
  - EA4 | Demand response
  - EA5 | Renewable energy
  - EA5.1 | Solar orientation
  - EA6 | Green power
  - EA7 | Refrigerant management
  - EA8 | Emissions reduction reporting
  - EA9 | Community contaminant prevention - airborne releases
  - EA903 | Optimize energy performance
  - EA903 | Optimize energy performance
  - EA903 | Optimize energy performance
  - EA903 | Optimize energy performance
  - EA903 | Optimize energy performance
  - EA904 | Optimize energy performance
  - EA904 | Optimize energy performance
  - EA905 | Optimize energy performance
  - EAc1 | Optimize energy performance
  - EAc1 | Optimize energy performance
  - EAc1 | Optimize energy performance
  - EAc1 | Optimize energy performance
  - EAc1 | Optimize energy performance
  - EAc1 | Optimize energy efficiency performance
  - EAc1 | Optimize energy performance
  - EAc1 | Optimize energy performance
  - EAc1 | Optimize energy efficiency performance
  - EAc1 | Optimize energy performance
  - EAc1 | Optimize energy performance
  - EAc1 | Optimize energy performance
  - EAc1 | Optimize energy performance
  - EAc1 | Annual energy use

- EAc1 | Annual energy use
- EAc1 | Optimize energy performance
- EAc1 | Optimize energy performance
- EAc1 | Optimize energy performance
- EAc1.1 | Optimize energy performance - lighting power
- EAc1.1 | Optimize energy performance - lighting power
- EAc1.1 | Optimize energy performance, lighting power
- EAc1.1-1.5 | Optimize energy performance
- EAc1.2 | Optimize energy performance - lighting controls
- EAc1.2 | Optimize energy performance - lighting controls
- EAc1.2 | Optimize energy performance, lighting controls
- EAc1.3 | Optimize energy performance - HVAC
- EAc1.3 | Optimize energy performance - HVAC
- EAc1.3 | Optimize energy performance, HVAC
- EAc1.4 | Optimize energy performance - equipment and appliances
- EAc1.4 | Optimize energy performance - equipment and appliances
- EAc1.4 | Optimize energy performance, equipment & appliances
- EAc1.5 | Optimize energy performance - building envelope
- EAc1.5 | Optimize energy performance, envelope
- EAc10 | Renewable energy
- EAc10 | Space heating and cooling equipment
- EAc11 | Residential refrigerant management
- EAc11 | Heating and cooling distribution systems
- EAc12 | Efficient domestic hot water equipment
- EAc13 | Lighting
- EAc14 | High-efficiency appliances
- EAc15 | Renewable energy
- EAc2 | Enhanced commissioning
- EAc2 | On-site renewable energy
- EAc2 | On-site renewable energy
- EAc2 | On-site renewable energy
- EAc2 | On-site renewable energy
- EAc2 | Insulation
- EAc2 | On-site renewable energy
- EAc2 | Enhanced commissioning
- EAc2 | On-site and off-site renewable energy
- EAc2 | On-site renewable energy
- EAc2 | On-site renewable energy
- EAc2 | Efficient hot water distribution system
- EAc2 | On-site renewable energy
- EAc2 | Enhanced commissioning
- EAc2 | On-site renewable energy
- EAc2 | On-site renewable energy, 1%
- EAc2.1 | Existing building commissioning - investigation and analysis
- EAc2.1 | Existing building commissioning - investigation and analysis
- EAc2.1 | Renewable energy - 5%
- EAc2.1-2.3 | Renewable energy
- EAc2.2 | Existing building commissioning - implementation
- EAc2.2 | Existing building commissioning - implementation
- EAc2.2 | Renewable energy - 10%
- EAc2.3 | Existing building commissioning - ongoing commissioning
- EAc2.3 | Existing building commissioning - ongoing commissioning
- EAc2.3 | Renewable energy - 20%
- EAc3 | Enhanced commissioning
- EAc3 | Enhanced commissioning
- EAc3 | Measurement and verification
- EAc3 | Air infiltration
- EAc3 | Enhanced commissioning
- EAc3 | Energy use, measurement and payment accountability
- EAc3 | Enhanced commissioning
- EAc3 | Enhanced commissioning
- EAc3 | Additional commissioning
- EAc3 | Additional commissioning
- EAc3 | Advanced utility tracking
- EAc3 | Enhanced commissioning
- EAc3 | Energy use, measurement & payment accountability
- EAc3 | Enhanced commissioning
- EAc3.1 | Performance measurement - building automation system
- EAc3.1 | Performance measurement - building automation system
- EAc3.1 | Building operations and maintenance - staff education
- EAc3.2 | Performance measurement - system-level metering
- EAc3.2 | Performance measurement - system-level metering
- EAc3.2 | Building operations and maintenance - building systems maintenance
- EAc3.3 | Building operations and maintenance - building systems monitoring
- EAc3.3 | Performance measurement - system-level metering
- EAc4 | Enhanced refrigerant management
- EAc4 | Enhanced refrigerant management
- EAc4 | Green power
- EAc4 | On-site and off-site renewable energy
- EAc4 | Green power
- EAc4 | Windows
- EAc4 | Enhanced refrigerant management
- EAc4 | Enhanced refrigerant management
- EAc4 | Green power
- EAc4 | Additional ozone protection
- EAc4 | Enhanced refrigerant management
- EAc4 | Enhanced refrigerant management
- EAc4 | Ozone protection
- EAc4 | Ozone depletion
- EAc4 | Enhanced refrigerant management
- EAc4 | Active solar-ready design
- EAc4 | Enhanced refrigerant management
- EAc4 | Green power
- EAc4 | Enhanced refrigerant management

- EAc4.1 | On-site and off-site renewable energy
- EAc4.2 | On-site and off-site renewable energy
- EAc4.3 | On-site and off-site renewable energy
- EAc4.4 | On-site and off-site renewable energy
- EAc5 | Measurement and verification
- EAc5 | Measurement and verification
- EAc5 | Measurement and verification
- EAc5 | Measurement and verification
- EAc5 | Enhanced refrigerant management
- EAc5 | On-site renewable energy
- EAc5 | Heating and cooling distribution system
- EAc5 | Measurement and verification
- EAc5 | Refrigerant management
- EAc5 | Measurement and verification
- EAc5 | Measurement and verification
- EAc5 | Measurement and verification
- EAc5 | HVAC Start-up credentialing
- EAc5 | Measurement and verification
- EAc5 | On-site renewable energy
- EAc5 | Measurement and verification
- EAc5.1 | Measurement and verification - base building
- EAc5.1 | Performance measurement - enhanced metering
- EAc5.1 | Measurement and verification - base building
- EAc5.1 | Measurement and verification - base building
- EAc5.2 | Measurement and verification - tenant submetering
- EAc5.2 | Measurement and verification - tenant submetering
- EAc5.2 | Performance measurement - enhanced metering
- EAc5.2 | Measurement and verification - tenant submetering
- EAc5.3 | Performance measurement - enhanced metering
- EAc5.4 | Performance measurement - emission reduction reporting
- EAc6 | Emissions reduction reporting
- EAc6 | Green power
- EAc6 | Green power
- EAc6 | Green power
- EAc6 | Green power
- EAc6 | Space heating and cooling equipment
- EAc6 | Green power
- EAc6 | Emissions reduction reporting
- EAc6 | Documenting sustainable building cost impacts
- EAc6 | Green power
- EAc6 | Green power
- EAc6 | Green power
- EAc6 | Green power
- EAc6 | Building orientation for passive solar
- EAc6 | Green power
- EAc6 | Green power
- EAc7 | Community contaminant prevention - airborne releases
- EAc7 | Water heating
- EAc7 | Air infiltration
- EAc8 | Lighting
- EAc8 | Envelope Insulation
- EAc9 | Appliances
- EAc9 | Windows
- EAp1 | Fundamental commissioning of building energy systems
- EAp1 | Fundamental commissioning of building energy systems
- EAp1 | Energy efficiency best management practices - planning, documentation and opportunity assessment
- EAp1 | Fundamental commissioning of building energy systems
- EAp1 | Fundamental commissioning of the building energy systems
- EAp1 | Energy efficiency best management practices - planning, documentation and opportunity assessment
- EAp1 | Fundamental commissioning
- EAp1 | Existing building commissioning
- EAp1 | Fundamental commissioning of the building energy systems
- EAp1 | Fundamental commissioning of the building energy systems
- EAp1 | Fundamental building systems commissioning
- EAp1 | Fundamental building systems commissioning
- EAp1 | Minimum energy performance
- EAp1 | Minimum energy performance
- EAp1 | Fundamental commissioning of the building energy systems
- EAp1 | Fundamental Commissioning
- EAp1 | Fundamental commissioning of building energy systems
- EAp1 | Fundamental commissioning of building energy systems
- EAp2 | Minimum energy performance
- EAp2 | Minimum energy performance
- EAp2 | Minimum energy performance
- EAp2 | Minimum energy performance
- EAp2 | Minimum energy efficiency performance
- EAp2 | Minimum energy performance
- EAp2 | Minimum energy performance
- EAp2 | Minimum energy efficiency performance
- EAp2 | Minimum energy performance
- EAp2 | Minimum energy performance
- EAp2 | Minimum energy performance
- EAp2 | Minimum energy performance
- EAp2 | Minimum energy performance
- EAp2 | Minimum energy performance
- EAp2 | Energy metering
- EAp2 | Minimum energy performance
- EAp2 | Minimum energy performance
- EAp2 | Minimum energy performance
- EAp3 | Fundamental refrigerant management
- EAp3 | Fundamental refrigerant management
- EAp3 | Fundamental refrigerant management
- EAp3 | Fundamental refrigerant management
- EAp3 | Refrigerant management - ozone protection

- EAp3 | CFC reduction in HVAC/R equipment
- EAp3 | Ozone protection
- EAp3 | Fundamental refrigerant management
- EAp3 | Fundamental refrigerant management
- EAp3 | CFC reduction in HVAC/R equipment
- EAp3 | CFC reduction in HVAC/R equipment
- EAp3 | Education of homeowner, tenant, or building manager
- EAp3 | Fundamental refrigerant management
- EAp3 | CFC reduction in HVAC&R equipment
- EAp3 | Fundamental refrigerant management
- EAp4 | Home size
- MEAc1 | Optimize energy performance in mid-rise buildings


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LEED BD+C: Core and Shell | v4 - LEED v4

Enhanced refrigerant management

Possible 1 point

1 result in**All** .

- Glossary

Intent

To reduce ozone depletion and support early compliance with the Montreal Protocol while minimizing direct contributions to climate change.

Requirements

Option 1. No refrigerants or low-impact refrigerants (1 point)

Do not use refrigerants, or use only refrigerants (naturally occurring or synthetic) that have an ozone depletion potential (ODP) of zero and a global warming potential (GWP) of less than 50.

OR

Option 2. Calculation of refrigerant impact (1 point)

Select refrigerants that are used in heating, ventilating, air-conditioning, and refrigeration (HVAC&R) equipment to minimize or eliminate the emission of compounds that contribute to ozone depletion and climate change. The combination of all new and existing base building and tenant HVAC&R equipment that serve the project must comply with the following formula:

IP units

$$LCGWP + LCODP \times 10^5 \leq 100$$

SI units

$$LCGWP + LCODP \times 10^5 \leq 13$$

Calculation definitions for LCGWP + LCODP x 10^5 ≤ 100 (IP units)	**Calculation definitions for LCGWP + LCODP x 10^5 ≤ 13 (SI units)**
LCODP = [ODPr x (Lr x Life +Mr) x Rc]/Life	LCODP = [ODPr x (Lr x Life +Mr) x Rc]/Life
LCGWP = [GWPr x (Lr x Life +Mr) x Rc]/Life	LCGWP = [GWPr x (Lr x Life +Mr) x Rc]/Life
LCODP: Lifecycle Ozone Depletion Potential (lb CFC 11/Ton-Year)	LCODP: Lifecycle Ozone Depletion Potential (kg CFC 11/(kW/year))
LCGWP: Lifecycle Direct Global Warming Potential (lb CO2/Ton-Year)	LCGWP: Lifecycle Direct Global Warming Potential (kg CO2/kW-year)
GWPr: Global Warming Potential of Refrigerant (0 to 12,000 lb CO2/lbr)	GWPr: Global Warming Potential of Refrigerant (0 to 12,000 kg CO2/kg r)
ODPr: Ozone Depletion Potential of Refrigerant (0 to 0.2 lb CFC 11/lbr)	ODPr: Ozone Depletion Potential of Refrigerant (0 to 0.2 kg CFC 11/kg r)
Lr: Refrigerant Leakage Rate (2.0%)	Lr: Refrigerant Leakage Rate (2.0%)
Mr: End-of-life Refrigerant Loss (10%)	Mr: End-of-life Refrigerant Loss (10%)
Rc: Refrigerant Charge (0.5 to 5.0 lbs of refrigerant per ton of gross AHRI rated cooling capacity)	Rc: Refrigerant Charge (0.065 to 0.65 kg of refrigerant per kW of AHRI rated or Eurovent Certified cooling capacity)
Life: Equipment Life (10 years; default based on equipment type, unless otherwise demonstrated)	Life: Equipment Life (10 years; default based on equipment type, unless otherwise demonstrated)

For multiple types of equipment, calculate a weighted average of all base building HVAC&R equipment, using the following formula:

IP units	**SI units**
$\frac{\sum (LCGWP + LCODP \times 10^5) \times Qunit}{Qtotal} \leq 100$	$\frac{\sum (LCGWP + LCODP \times 10^5) \times Qunit}{Qtotal} \leq 13$
Calculation definitions for [∑ (LCGWP + LCODP x 10^5) x Qunit] / Qtotal ≤ 100 (IP units)	**Calculation definitions for [∑ (LCGWP + LCODP x 10^5) x Qunit] / Qtotal ≤ 13 (SI units)**

Qunit = Gross AHRI rated cooling capacity of an individual HVAC or refrigeration unit (Tons)	Qunit = Eurovent Certified cooling capacity of an individual HVAC or refrigeration unit (kW)
Qtotal = Total gross AHRI rated cooling capacity of all HVAC or refrigeration	Qtotal = Total Eurovent Certified cooling capacity of all HVAC or refrigeration (kW)

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