

LEED BD+C: Retail | v4 - LEED v4

Enhanced refrigerant management

Possible 1 point

1 result in All .

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:

<p>IP units</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td>LCGWP+</td> <td>LCODP</td> <td>x</td> <td>10⁵</td> <td>≤</td> <td>100</td> </tr> </table> <p>Calculation definitions for LCGWP + LCODP x 10⁵ ≤ 100 (IP units)</p> <p>LCODP = [ODPr 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) LCGWP: Lifecycle Direct Global Warming Potential (lb CO2/Ton-Year) GWPr: Global Warming Potential of Refrigerant (0 to 12,000 lb CO2/lbr) ODPr: Ozone Depletion Potential of Refrigerant (0 to 0.2 lb CFC 11/lbr) Lr: Refrigerant Leakage Rate (2.0%) 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) Life: Equipment Life (10 years; default based on equipment type, unless otherwise demonstrated)</p>	LCGWP+	LCODP	x	10 ⁵	≤	100	<p>SI units</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td>LCGWP+</td> <td>LCODP</td> <td>x</td> <td>10⁵</td> <td>≤</td> <td>13</td> </tr> </table> <p>Calculation definitions for LCGWP + LCODP x 10⁵ ≤ 13 (SI units)</p> <p>LCODP = [ODPr x (Lr x Life +Mr) x Rc]/Life LCGWP = [GWPr x (Lr x Life +Mr) x Rc]/Life LCODP: Lifecycle Ozone Depletion Potential (kg CFC 11/(kW/year)) LCGWP: Lifecycle Direct Global Warming Potential (kg CO2/kW-year) GWPr: Global Warming Potential of Refrigerant (0 to 12,000 kg CO2/kg r) ODPr: Ozone Depletion Potential of Refrigerant (0 to 0.2 kg CFC 11/kg r) Lr: Refrigerant Leakage Rate (2.0%) Mr: End-of-life Refrigerant Loss (10%) 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)</p>	LCGWP+	LCODP	x	10 ⁵	≤	13
LCGWP+	LCODP	x	10 ⁵	≤	100								
LCGWP+	LCODP	x	10 ⁵	≤	13								

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

<p>IP units</p> $\frac{\sum (LCGWP + LCODP \times 10^5) \times Q_{unit}}{Q_{total}} \leq 100$ <p>Calculation definitions for [∑ (LCGWP + LCODP x 10⁵) x Qunit] / Qtotal ≤ 100 (IP units)</p> <p>Qunit = Gross AHRI rated cooling capacity of an individual HVAC or refrigeration unit (Tons) Qtotal = Total gross AHRI rated cooling capacity of all HVAC or refrigeration</p>	<p>SI units</p> $\frac{\sum (LCGWP + LCODP \times 10^5) \times Q_{unit}}{Q_{total}} \leq 13$ <p>Calculation definitions for [∑ (LCGWP + LCODP x 10⁵) x Qunit] / Qtotal ≤ 13 (SI units)</p> <p>Qunit = Eurovent Certified cooling capacity of an individual HVAC or refrigeration unit (kW) Qtotal = Total Eurovent Certified cooling capacity of all HVAC or refrigeration (kW)</p>
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Meet Option 1 or 2 for all HVAC systems.

Stores with commercial refrigeration systems must comply with the following.

- Use only non-ozone-depleting refrigerants.
- Select equipment with an average HFC refrigerant charge of no more than 1.75 pounds of refrigerant per 1,000 Btu/h (2.72 kg of refrigerant per kW) total evaporator cooling load.
- Demonstrate a predicted store-wide annual refrigerant emissions rate of no more than 15%. Conduct leak testing using the procedures in GreenChill's best practices guideline for leak tightness at installation.

Alternatively, stores with commercial refrigeration systems may provide proof of attainment of EPA GreenChill's silver-level store certification for newly constructed stores.