

# Enhanced refrigerant management

Possible 1 point

## 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	SI units
$LCGWP + LCODP \times 10^5 \leq 100$	$LCGWP + LCODP \times 10^5 \leq 13$
<b>Calculation definitions for <math>LCGWP + LCODP \times 10^5 \leq 100</math> (IP units)</b>	<b>Calculation definitions for <math>LCGWP + LCODP \times 10^5 \leq 13</math> (SI units)</b>
$LCODP = [ODPr \times (Lr \times Life + Mr) \times Rc] / Life$	$LCODP = [ODPr \times (Lr \times Life + Mr) \times Rc] / Life$
$LCGWP = [GWPr \times (Lr \times Life + Mr) \times Rc] / Life$	$LCGWP = [GWPr \times (Lr \times Life + Mr) \times Rc] / Life$
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 CO <sub>2</sub> /Ton-Year)	LCGWP: Lifecycle Direct Global Warming Potential (kg CO <sub>2</sub> /kW-year)
GWPr: Global Warming Potential of Refrigerant (0 to 12,000 lb CO <sub>2</sub> /lbr)	GWPr: Global Warming Potential of Refrigerant (0 to 12,000 kg CO <sub>2</sub> /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
$\sum (LCGWP + LCODP \times 10^5) \times Q_{unit} \leq 100$	$\sum (LCGWP + LCODP \times 10^5) \times Q_{unit} \leq 13$
Qtotal	Qtotal
<b>Calculation definitions for <math>[\sum (LCGWP + LCODP \times 10^5) \times Q_{unit}] / Q_{total} \leq 100</math> (IP units)</b>	<b>Calculation definitions for <math>[\sum (LCGWP + LCODP \times 10^5) \times Q_{unit}] / Q_{total} \leq 13</math> (SI units)</b>
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)

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.