



DRAFT Store Certification Program Guidance

This document includes draft criteria and guidance for meeting Store Certification requirements under the U.S. Environmental Protection Agency’s (EPA’s) GreenChill Program. Sample application forms will appear on the [GreenChill Store Certification webpage](#) or can be obtained by emailing GreenChill@epa.gov.

Stores that apply for GreenChill Store Certification fall into two categories with different criteria:

- **Category 1:** Stores with primary refrigeration equipment installed **before January 1, 2025**
- **Category 2:** Stores with primary refrigeration equipment installed **after January 1, 2025**

Note: Qualifying stores must go above what is required by federal regulations at the time of installation. Refrigerants must align with those allowable under the Clean Air Act’s Significant New Alternatives Policy (SNAP) program and American Innovation and Manufacturing (AIM) Act’s Technology Transitions Program. All criteria are subject to future revision based on regulation or industry advances.

CATEGORY 1 STORES

Stores with equipment installed before January 1, 2025 need to meet Global Warming Potential (GWP)-weighted criteria based on their charge-to-load ratio and emissions rate. These criteria will apply to all remote systems serving the store’s commercial refrigeration load. Reference GWP values are available through the [Technology Transitions Program](#) and [Significant New Alternatives Policy Program](#).

Level	GWP-weighted Refrigerant Charge-to-Load Ratio (pounds/MBTU/hour)	GWP-weighted Annual Emissions-to-Load (MTCO _{2e} /MBTU/hour)
Platinum	<1,600	<0.03
Gold	1,600 to 2,000	0.03 to 0.08
Silver	>2,000 to 2,400	>0.08 to 0.13

MBTU: one thousand British thermal units MTCO_{2e}: metric tons carbon dioxide equivalent

Criteria Calculations

The draft GreenChill Store Certification application form automatically calculates the criteria values based on the required data inputs. For illustrative purposes, example calculations appear in the [Appendix](#).

The GWP-weighted refrigerant charge-to-load ratio is calculated as:

$$\sum (GWP \text{ of system refrigerant}_{i...n} \times \text{charge in pounds refrigerant}_{i...n}) \div \text{system refrigeration load in MBTU per hour}$$

The emissions rate is calculated as:

$$\text{pounds emitted refrigerant}_{i...n} \div \text{charge in pounds refrigerant}_{i...n}$$

The GWP-weighted annual emissions-to-load value is calculated as:

$$\sum (GWP \text{ of system refrigerant}_{i...n} \times \text{emissions rate refrigerant}_{i...n} \times \text{charge in pounds refrigerant}_{i...n}) \div \text{load in MBTU per hour} \div 2,204.623 \text{ (conversion to MTCO}_{2e}\text{)}$$

Required Data and Documentation

- Leak rate data (existing stores)
- Leak tightness documentation (new stores)
- Charge size documentation
- Refrigeration legend or schedule depicting all remote commercial refrigeration loads in MBTUs/hour

CATEGORY 2 STORES

Stores with equipment installed after January 1, 2025 must meet the criteria described below to certify. Stores that meet these two sets of criteria are considered “GreenChill Certified” (without using Silver, Gold, or Platinum distinctions).

Category 2 stores must meet all these criteria:

- **GWP:** Stores must use a refrigerant with a GWP <150 in their primary refrigeration systems. Primary refrigeration systems serve >5 percent of the total store refrigeration load. Primary systems typically include rack or micro-distributed systems that serve the majority of medium- and low-temperature refrigerated display cases in a store. More than one refrigerant type may be used in primary systems, but all refrigerants must have a GWP <150.
- **Low Charge-to-Load Ratio:** Stores must meet the Platinum-Level charge-to-load ratio for Category 1 stores of <1,600 pounds/MBTU/hour.
- **Low Emissions Rate:** Stores must meet the Platinum-Level emissions rate for Category 1 stores of <0.03 MTCO_{2e}/MBTU/hour.
- **Leak Data:** Operational stores must provide leak information. Newly constructed stores must verify that all remote commercial refrigeration systems meet the [GreenChill Leak Tightness Guidelines](#) (unless they are self-contained and factory-sealed units).

Category 2 stores must meet at least two of the following criteria:¹

- 1) **Lower-GWP refrigerant in primary refrigeration systems:** To satisfy this criterion, stores must use a refrigerant with a GWP <10 in their primary refrigeration systems. (See the definition of primary refrigeration systems above under “GWP.” More than one refrigerant type may be used in primary systems, but all refrigerants must have a GWP <10.)
- 2) **Advanced Refrigeration Technology:** Applicants can satisfy the advanced refrigeration technologies criterion by using qualifying technologies that promote lower-GWP refrigerants, improve system energy efficiency, or otherwise reduce the environmental impact of supermarket refrigeration systems. Unless otherwise specified, these technologies must be used with the primary refrigeration systems. [Details on the advance refrigeration technologies criterion appear below.](#)
- 3) **Use of Reclaimed Refrigerant:** Applicants can satisfy the use of reclaimed refrigerant criterion by sending recovered refrigerants for reclamation and/or using reclaimed refrigerants in initial charge and servicing. [Details on the use of reclaimed refrigerant criterion appear below.](#)
- 4) **Technician Training Program:** Applicants can satisfy the technician training program criterion by implementing a technician training program that educates refrigeration technicians on proper equipment installation, service, repair, maintenance, and disposal practices, and emerging technologies and refrigerants to reduce refrigerant leaks and ensure efficient operation. [Details on the training criterion appear below.](#)
- 5) **Lower-GWP refrigerant in heating/ventilation/air conditioning (HVAC) systems:** To satisfy this criterion, stores must use a refrigerant with a GWP <400 in their HVAC system.

Required Data and Documentation

- Leak rate data (existing stores)
- Leak tightness documentation (new stores)
- Refrigeration legend or schedule depicting all remote commercial refrigeration loads in MBTUs/hour
- Charge size documentation
- Reclaim documentation²
- Training program documentation²
- HVAC documentation²
- Advanced refrigeration technologies²

¹ EPA does not prefer one criterion over another.

² If pursuing this additional criterion.

QUALIFYING ADVANCED REFRIGERATION TECHNOLOGIES

Applicants can satisfy the advanced refrigeration technologies criterion by using at least one of the qualifying technologies below that promote lower-GWP refrigerants, improve system energy efficiency, or otherwise reduce the environmental impact of supermarket refrigeration systems. Unless otherwise specified, these technologies must be used with the primary refrigeration systems.

Mechanical subcooling. Mechanical subcooling involves cooling the liquid refrigerant below its saturation temperature using an additional refrigeration circuit. By lowering the temperature of the liquid refrigerant, mechanical subcooling reduces the load on the compressor and improves the overall efficiency of the refrigeration system. Qualifying technologies must achieve mechanical subcooling through an additional dedicated refrigeration circuit.

Thermal energy storage (TES). TES systems use phase-change materials or other storage media to store thermal energy. Qualifying TES technologies include hardware solutions that involve the physical installation of phase-change materials or a thermal battery, or software solutions that use existing store product for thermal energy storage.

Predictive analytics software utilized for refrigeration system preventative maintenance and commissioning. Software products can collect vast amounts of data from sensors installed throughout the refrigeration system, including pressures, temperatures, compressor status, and superheat. Advanced machine learning algorithms analyze the collected data to identify patterns and predict potential issues. To qualify, applicants must document the data/metrics collected via predictive analytics and attest that the predictive analytics are associated with a system to alert store operators and/or technicians to issues.

Automatic leak detection (ALD) systems. ALD systems are technologies calibrated to continuously monitor for evidence of leaks and alert an operator upon detection of a leak. ALD systems detect leaks either by a direct system that detects the presence of refrigerant leaked into the air (e.g., an alert is triggered at a specified concentration), or by an indirect system that analyzes operating conditions (e.g., temperature or pressure) as indicators of whether a refrigerant leak has occurred. When using an ALD system to meet the advanced technology criteria, in addition to having an ALD system installed, the applying store must demonstrate that there is a system in place for technicians to act in a timely way to address leak alarms and prevent emissions. Qualifying ALD systems must be:

- Configured to monitor all leak-prone components of the refrigerant circuit (e.g., compressor, evaporator, condenser) enclosed within the store
 - For direct ALD systems, this requires multiple sensors to be installed throughout the store (or in the machine room in the case of a secondary loop system); a single sensor in the mechanical room will not qualify for this criterion
 - For indirect ALD systems, this requires monitoring of at least two “measurements” to determine whether a system is leaking above the alarm criteria. Some examples of appropriate measurements include but are not limited to temperature, liquid levels, and pressure.
- Calibrated or audited annually
- Programmed to alert at a concentration of 500 ppm for CO₂ systems and 100 ppm for all other systems (direct ALD systems only)
- Capable of detecting a concentration of 10 ppm (direct ALD systems only)
- Calibrated to provide an alarm for a leak of 50 pounds of refrigerant or 10 percent of the full charge of refrigerant, whichever is less (indirect ALD systems only)

Condensing units with a GWP <10. Qualifying units do *not* need to be used with the primary refrigeration system (i.e., they can be installed to serve walk-in coolers, freezers, specialized equipment, etc.) and will use a refrigerant with a GWP of 10 or less. At this time, the installation of one qualifying unit in a store will satisfy this criterion.

Supporting documentation

To satisfy this criterion, stores must provide any one of the following:

- Refrigeration schedule depicting advanced technology
- Signed letter from design engineer, refrigeration technician, or original equipment manufacturer attesting to the installation of the advanced technology at the store location
- Data from installed and operational advanced technology (e.g., operating parameters and logged leak monitoring data from an ALD system)
- Statement describing procedures to address alarms from ALD systems (if pursuing the ALD criterion)

USE OF RECLAIMED REFRIGERANT

Applicants can satisfy the use of reclaim criterion by sending recovered refrigerants for reclamation to an EPA-certified reclaimer, and/or use of reclaimed refrigerants.

Refrigerant recovery while repairing or servicing systems is required for ozone depleting substances, HFCs, HFC blends, and substitute refrigerants subject to venting prohibitions under the Clean Air Act and American Innovation and Manufacturing (AIM) Act.

Reclamation is defined by EPA under the AIM Act as “the reprocessing of regulated substances to all of the specifications in Appendix A of [40 CFR part 82, subpart F](#) [based on [Air-Conditioning, Heating, and Refrigeration Institute \(AHRI\) Standard 700-2016](#)] that are applicable to that regulated substance and to verify that the regulated substance meets these specifications using the analytical methodology prescribed in section 5 of Appendix A of 40 CFR part 82, subpart F.” Sending recovered refrigerant to an EPA certified reclaimer for reclamation is eligible for credit under this criterion with proper supporting documentation.

Use of reclaimed refrigerants for servicing and/or initial charge of systems with reclaimed refrigerant is eligible for credit under this criterion with the proper supporting documentation.

Note: Refrigerant that is recovered from one refrigeration system and used in another system without being reclaimed to AHRI purity standards by an EPA-certified reclaimer does not meet this criterion.

Supporting documentation

Any one of the following:

- Store-level documentation
 - Signed documentation from technician or refrigerant wholesaler attesting that purchased refrigerant was reclaimed by an EPA-certified reclaimer
- Company-level documentation
 - Signed documentation from head of refrigeration (or equivalent position) attesting to refrigerant recovery and reclamation practices implemented at the chain-level
 - Signed contract or letter certifying an agreement with an EPA-certified reclaimer(s) or distributor(s) to purchase reclaimed refrigerants, as supplies allow
- Store or company-level documentation
 - Invoice (with pricing redacted) or other certification letter from an EPA-certified reclaimer listing the refrigerants and amounts recovered and sold for reclamation or purchased as reclaimed refrigerants

EPA recognizes non-reclaimed (virgin) refrigerant may be needed in limited time-sensitive maintenance situations; such use will not invalidate a store’s achievement of this criterion, as long as the use of virgin refrigerant is limited to these events and reasonable efforts are made to obtain reclaimed refrigerant.

TECHNICIAN TRAINING PROGRAM

Applicants can satisfy the technician training program criterion by implementing a technician training program across all of its stores that educates internal or in-house refrigeration technicians on proper equipment installation, service, repair, maintenance, and disposal practices, and emerging technologies and refrigerants to reduce refrigerant leaks and ensure efficient operation. *Note: All technicians must be Clean Air Act [Section 608 certified](#). These technician training program criteria must be in addition to Section 608 requirements.*

Course content for internal technician training programs must cover at a minimum:

- Refrigerant identification (e.g., carbon dioxide, propane) and handling (e.g., noxious, high pressure, flammable, other safety handling considerations)
- Refrigerants subject to venting prohibitions
- Refrigerant recovery and reclamation
- Leak inspection and automatic leak detection
- [Leak prevention and repairs](#)
- Advanced system characteristics and repair (e.g., transcritical, micro-distributed)
- [Leak tight installation and testing](#)
- Recordkeeping

Individual in-house technicians must be re-trained at least every three years, and at least 80% of technicians must be trained in these topics in order to meet this criterion. Currently this criterion only applies to those technicians who work directly for the retailer; external, contracted, or third-party technicians are not required to meet these requirements at this time.

Supporting documentation

An annual signed statement providing the following for in-house technician training:

- The total number and percentage of technicians trained or retrained within the last three years. The names of individual technicians are not needed
- The approximate length in hours of the training curriculum for participants
- If the technician training program was developed internally or by a third-party educator
- The training program outline, module titles, or other curriculum materials to demonstrate the minimum content
- A general description of updates or improvements to the training curriculum from past offerings, if any

APPENDIX: CATEGORY 1 CALCULATION EXAMPLES

Category 1 Evaluation Criteria

Level	GWP-weighted Refrigerant Charge-to-Load Ratio (pounds/MBTU/hr)	GWP-weighted Annual Emissions-to-Load (MTCO ₂ e/MBTU/hour)
Platinum	<1,600	<0.03
Gold	1,600 to 2,000	0.03 to 0.08
Silver	>2,000 to 2,400	>0.08 to 0.13

Criteria Equations

GWP-weighted refrigerant charge-to-load ratio:

$$\frac{\sum (GWP \text{ of system refrigerant}_{i...n} \times \text{charge in pounds refrigerant}_{i...n})}{\text{system refrigeration load in MBTU per hour}}$$

Emissions rate:

$$\frac{\text{pounds emitted refrigerant}_{i...n}}{\text{charge in pounds refrigerant}_{i...n}}$$

GWP-weighted annual emissions-to-load ratio:

$$\frac{\sum (GWP \text{ of system refrigerant}_{i...n} \times \text{emissions rate refrigerant}_{i...n} \times \text{charge in pounds refrigerant}_{i...n})}{\text{load in MBTU per hour} \div 2,204.623 \text{ (conversion to MTCO}_2\text{e)}}$$

Application Example 1

Store A uses R-404A in the primary medium- and low-temperature refrigeration systems.

Store A Data Points:

- Operational before January 1, 2025
- Load: 850 MBTU/hour
- Refrigerant: R-404A
 - GWP: 3,922
- Charge: 1,200 pounds
- Annual emissions: 100 pounds
 - Emissions rate: 0.08 (8%)

GWP-weighted refrigerant charge-to-load ratio

$$\begin{aligned} & 3,922 \text{ GWP} \times 1,200 \text{ pounds} \div 850 \text{ MBTU/hour} \\ & = 5,537 \text{ pounds/MBTU/hour} \end{aligned}$$

GWP-weighted annual emissions-to-load ratio

$$\begin{aligned} & 3,922 \text{ GWP} \times (100 \text{ pounds} \div 1,200 \text{ pounds}) \times 1,200 \text{ pounds} \div 850 \text{ MBTU/hour} \div 2,204.623 \\ & = 0.21 \text{ MTCO}_2\text{e/MBTU/hour} \end{aligned}$$

Result: Store A does not qualify for certification

Application Example 2

Store B uses R-448A in the primary medium- and low-temperature refrigeration systems.

Store B Data Points:

- Operational before January 1, 2025
- Load: 500 MBTU/hour
- Refrigerant: R-448A
 - GWP: 1,386
- Charge: 730 pounds
- Annual emissions: 50 pounds
 - Emissions rate: 0.07 (7%)

GWP-weighted charge-to-load ratio

$$1,386 \text{ GWP} \times 730 \text{ pounds} \div 500 \text{ MBTU/hour} \\ = 2,024 \text{ pounds/MBTU/hour}$$

GWP-weighted annual emissions-to-load ratio

$$1,386 \text{ GWP} \times (50 \text{ pounds} \div 730 \text{ pounds}) \times 730 \text{ pounds} \div 500 \text{ MBTU/hour} \div 2,204.623 \\ = 0.06 \text{ MTCO}_2\text{e/MBTU/hour}$$

Result:

- Silver-Level Certification based on GWP-weighted charge-to-load ratio
- Gold-Level Certification based on GWP-weighted annual emissions-to-load ratio
- **Store B earns Silver-Level Certification** based on GreenChill's protocol for awarding the lowest level achieved across criteria

Application Example 3

Store C uses R-744 in the primary medium- and low-temperature refrigeration systems. A secondary refrigerant, R-448A, is used in condensing units serving walk-in coolers and freezers.

Store C Data Points:

- Operational before January 1, 2025
- Load: 2,170 MBTU/hour
- Refrigerant₁: R-744
 - GWP refrigerant₁: 1
- Charge refrigerant₁: 4,500 pounds
- Annual emissions refrigerant₁: 450 pounds
 - Emissions rate refrigerant₁: 0.1 (10%)
- Refrigerant₂: R-448A
 - GWP refrigerant₂: 1,386
- Charge refrigerant₂: 110 pounds
- Annual emissions refrigerant₂: 11 pounds
 - Emissions rate refrigerant₂: 0.1 (10%)

GWP-weighted charge-to-load ratio

$$[(1 \text{ GWP} \times 4,500 \text{ pounds}) + (1,386 \text{ GWP} \times 110 \text{ pounds})] \div 2,170 \text{ MBTU/hour} \\ = 72.3 \text{ pounds/MBTU/hour}$$

GWP-weighted annual emissions-to-load ratio

$$[(1 \text{ GWP} \times 0.1 \text{ emissions rate} \times 4,500 \text{ pounds}) + (1,386 \text{ GWP} \times 0.1 \text{ emissions rate} \times 110 \text{ pounds})] \div \\ 2,170 \text{ MBTU/hour} \div 2,204.623 \\ = 0.003 \text{ MTCO}_2\text{e/MBTU/hour}$$

Result: Store C earns Platinum-Level Certification