



# Improving HVAC Refrigerant Charge Value Estimates for Commercial Systems

## Final Report

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Prepared by:  
**Parker Wall, TRC**

**Aaron Kwon, TRC**

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## Executive Summary

This report provides recommended normalized refrigerant charge values for all commercial heating, ventilation, and air conditioning (HVAC) equipment types contained in the Database for Energy Efficiency Resources Refrigerant Avoided Cost Calculator and Combined Refrigerant Avoided Cost and Fuel-Substitution Calculators, Version 3.1 (RACC-FSC\_v3.1 Tool) (collectively referred to as “RACC Tools”). [Appendix C](#) includes all data collected to generate the recommended normalized refrigerant charge values.

The phasedown of hydrofluorocarbon refrigerants and limits of refrigerant global warming potential through federal and state regulations have resulted in new refrigerants being used in commercial HVAC equipment. For California investor-owned utility programs, avoiding greenhouse gas emissions from HVAC system refrigerant leakage has a direct effect on the cost effectiveness of a measure and whether it passes the fuel substitution test. Measures in the California Electronic Technical Reference Manual measure catalog will benefit from more accurate refrigerant charge value data for estimating leakage rates. This research will impact all California energy efficiency programs offering commercial HVAC measures.

The research team recommends updating the refrigerant charge tables underlying the RACC Tools to match the commercial HVAC equipment categories and charge values in [Table 8](#). If the investor-owned utilities decide not to update categories for the HVAC equipment categories, the refrigerant charge values should be updated to reflect the values in [Table 9](#).

## Abbreviations and Acronyms

Acronym	Meaning
CARB	California Air Resources Board
eTRM	Electronic Technical Reference Manual
CARB, Appx B	Appendix B of California Facilities and Greenhouse Gas Emissions Inventory – High-Global Warming Potential Stationary Source Refrigerant Management Program
GWP	Global warming potential
HFC	Hydrofluorocarbon
HVAC	Heating, ventilation, and air conditioning
IOU	Investor-owned utility
RACC	Refrigerant Avoided Cost Calculator
RACC-FSC_v3.1 Tool	Combined Refrigerant Avoided Cost and Fuel-Substitution Calculators, Version 3.1

# Contents

Executive Summary .....	ii
Abbreviations and Acronyms .....	iii
Introduction.....	1
Background .....	1
Objectives .....	2
Methodology and Approach.....	2
Manufacturer Identification .....	2
Data Collection .....	3
Data Analysis .....	2
Findings .....	2
Data Collection .....	2
Data Analysis .....	5
Recommendations.....	15
References.....	17
Appendix A: Average Charge Size Data by Equipment Type .....	18
Appendix B: Existing Baseline Characteristics.....	23
Appendix C: Data Collection .....	26

## Tables

Table 1: Commercial measures affected by changes in refrigerant cost.....	3
Table 2: Contacted stakeholders.....	3
Table 3: Recommended HVAC equipment categories and the related existing categories.....	4
Table 4: Final data collection summary.....	5
Table 5: Average refrigerant charge size for recommended HVAC equipment categories. ....	6
Table 6: Average refrigerant charge size for recommended HVAC equipment categories. ....	7
Table 7: Average refrigerant charge size for existing HVAC equipment categories.....	8
Table 8: Refrigerant charge per unit for each commercial HVAC type. ....	8
Table 9: Average refrigerant charge size for existing HVAC equipment categories.....	9
Table 10: Average refrigerant charge per equipment type by rated capacity (R-32/R-454B) for small systems.....	10
Table 11: Average refrigerant charge per equipment type by rated capacity (R-32/R-454B) for medium systems.....	10
Table 12: Average refrigerant charge per equipment type by rated capacity (R-32/R-454B) for large systems.....	11
Table 13: Average refrigerant charge per equipment type by rated capacity (R-32/R-454B) for large chillers. ....	11
Table 14: Average refrigerant charge per equipment type by rated capacity (R-410A) for small systems. ....	12
Table 15: Average refrigerant charge per equipment type by rated capacity (R-410A) for medium systems. ....	12
Table 16: Average refrigerant charge per equipment type by rated capacity (R-410A) for large systems. ....	13
Table 17: Average refrigerant charge per equipment type by rated capacity (R-410A) for large chillers... ..	13
Table 18: Average refrigerant charge size per equipment type by refrigerant type. ....	14
Table 19: Large chillers average refrigerant charge.....	18
Table 20: Medium chillers average refrigerant charge. ....	18
Table 21: Large commercial split system AC average refrigerant charge.....	19
Table 22: Medium commercial split system AC average refrigerant charge. ....	19
Table 23: Small commercial split system AC average refrigerant charge.....	19
Table 24: Large commercial packaged system AC average refrigerant charge. ....	20
Table 25: Medium commercial packaged system AC average refrigerant charge.....	20

Table 26: Small commercial packaged system AC average refrigerant charge. ....	20
Table 27: Large commercial split system HP average refrigerant charge. ....	20
Table 28: Medium commercial split system HP average refrigerant charge. ....	21
Table 29: Small commercial split system HP average refrigerant charge. ....	21
Table 30: Large commercial packaged system HP average refrigerant charge. ....	21
Table 31: Medium commercial packaged system HP average refrigerant charge. ....	21
Table 32: Small commercial packaged system HP average refrigerant charge. ....	21
Table 33: Packaged terminal AC (PTAC) average refrigerant charge. ....	22
Table 34: Packaged terminal HP (PTHP) average refrigerant charge (R-454b/R-32). ....	22
Table 35: Packaged terminal HP (PTHP) average refrigerant charge (R-410). ....	22
Table 36: Existing baseline characteristics for stationary AC. ....	23
Table 37: Existing baseline characteristics for R/AC equipment. ....	24
Table 38: Commercial HVAC equipment database. ....	26

## Figures

Figure 1: Comfortably California commercial installations by manufacturer. ....	3
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## Introduction

The research team conducted this study on behalf of the California Public Utilities Commission and CalNEXT to research refrigerant charge amounts of commercial heating, ventilation, and air conditioning (HVAC) equipment. To achieve California's decarbonization goals through electrification, the state is encouraging the replacement of gas HVAC equipment with electric HVAC systems. This includes the increased installation of HVAC heat pumps (HP), which introduces refrigerant and makes refrigerant management more urgent.

For California investor-owned utility (IOU) programs, avoiding greenhouse gas emissions from HVAC system refrigerant leakage has a direct effect on the cost effectiveness of a measure and whether it passes the fuel substitution test. This project proposes updates to the underlying data tables in the Database for Energy Efficiency Resources and Combined Refrigerant Avoided Cost and Fuel-Substitution Calculators, Version 3.1 (RACC-FSC\_v3.1 Tool) (collectively referred to as "RACC Tools"). Measures in the Electronic Technical Reference Manual (eTRM) measure catalog will benefit from better estimates of refrigerant charge values used to predict leakage rates. This research will impact all California energy efficiency programs offering commercial HVAC measures.

This report provides recommended refrigerant charge values for low global warming potential (GWP) refrigerants (R454B and R32) in commercial HVAC equipment. In support of those values, this report also provides the following:

- A review of existing eTRM measures that will be affected by updated commercial HVAC refrigerant charge values.
- The impact of the HVAC equipment capacities on the refrigerant charge values.
- The HVAC equipment manufacturers identified for data collection.
- The refrigerant charge data collected by manufacturer, equipment type, and capacity.
- The existing refrigerant Commercial HVAC charge estimates used in the RACC Tools.

## Background

Since 2006, the California Air Resources Board (CARB) and the US Environmental Protection Agency have been actively phasing down the use of hydrofluorocarbons (HFCs) due to their high GWP. In October 2018, CARB announced a new rulemaking prohibiting refrigerant with a GWP of 750 or greater in commercial HVAC equipment, starting January 1, 2023. Since these regulations render R-410A ineligible for many commercial HVAC applications, most manufacturers of Commercial HVAC equipment have been switching from R-410A to R-32 or R-454B as the primary refrigerant for their North American product lines; other refrigerants that also have a GWP less than 750 are being used, but less commonly. The transition to new refrigerants changes the impact of fuel substitution measures as newer equipment is charged with different amounts of compliant, low-GWP refrigerants.

Programs that use eTRM measures require accurate refrigerant charge value estimates. These estimates greatly affect costs and savings calculations associated with adding refrigerants derived

by RACC Tools. This research will improve the accuracy of the RACC Tools used in savings calculations for existing and future measures.

## Objectives

The objectives of the study are solutions for commercial HVAC equipment:

- Collect refrigerant type and charge value data for:
  - Multiple examples of each commercial HVAC equipment used in the RACC Tools.
  - At least three manufacturers of each commercial HVAC equipment type.
  - A range of HVAC equipment capacities.

This report includes analysis of the following:

- Existing measures affected by refrigerant charge values.
- Impact of the HVAC equipment capacities on the refrigerant charge values.
- Existing estimates of refrigerant charge.
- Make and model of several specific units representing each HVAC equipment category for each manufacturer.
- Recommendation for updates to the RACC Tools' HVAC refrigerant charge value estimates by equipment type and capacity.

## Methodology and Approach

The research team's method for collecting and analyzing relevant HVAC data is described below, as well as our approach to identifying key market manufacturers, affected measure packages, and equipment categories.

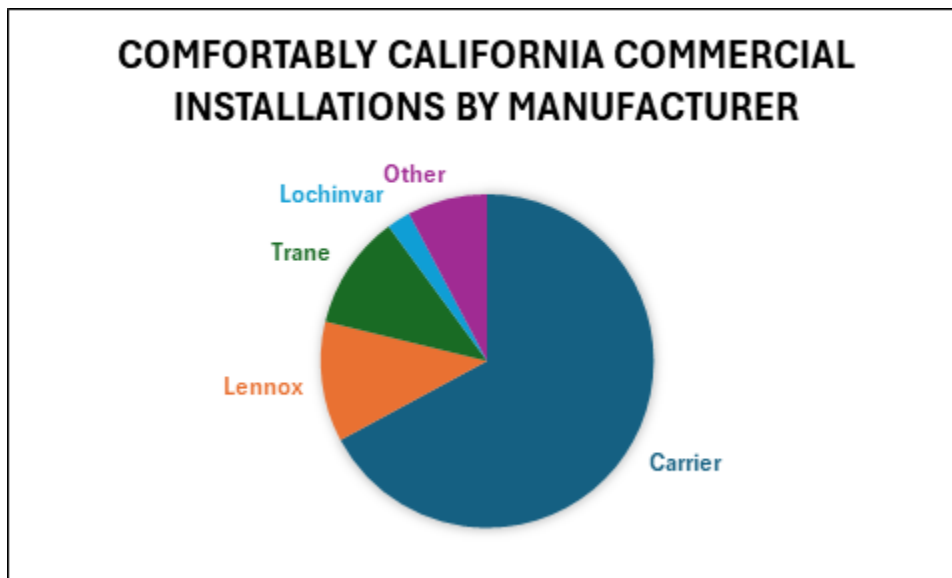
### Manufacturer Identification

The research team reviewed program participation data for commercial HVAC systems installed in California to identify manufacturers with equipment commonly participating in the California program. [Figure 1](#) represents the share of commercial HVAC installations in the Comfortably California midstream program<sup>1</sup>, broken down by manufacturer. We also identified manufacturers that are likely to be in support of research efforts and may be willing to share relevant data with us.

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<sup>1</sup> (Comfortably California n.d.) Note that the TECH Clean California program database does not include manufacturer as a field, so the research team did not conduct similar analysis for TECH Clean California.





**Figure 1: Comfortably California commercial installations by manufacturer.**

Source: Comfortably CA Participation Data, CLEAResult.

The research team collected data from 14 manufacturers, including 3 manufacturers with the largest market share that participated in the Comfortably California program as shown in [Figure 1](#)—Carrier, Lennox, and Trane.

The following 11 manufacturers are included in “Other” of [Figure 1](#) or have not participated in the Comfortably California program:

- Rheem Manufacturing Company
- Daikin Industries
- LG Electronics
- York International Corporation
- Goodman Manufacturing Company
- Johnson Controls International
- Robert Bosch GmbH
- Friedrich
- General Electric
- Amana
- Midea

## Data Collection

The research team conducted outreach to identified manufacturers, surveying them on the publicly stored location of refrigerant charge values and availability of existing datasets. The research team collected refrigerant charge values from manufacturers’ specification sheets, online databases, and shared datasets.

The research team collected the following data for each analyzed system:

- Manufacturer
- Model number
- Equipment type
- Rated capacity

- Refrigerant type
- Refrigerant charge

## Data Analysis

The data analysis consisted of:

- Aggregation of collected data.
- Identification of trends in refrigerant quantities by equipment type, rated capacity, and refrigerant type, as further described in the [Data Analysis](#) section of this report.
- Summary of data sources, as described in the [Data Collection](#) section above.

The research team’s recommendations to the RACC Tools’ refrigerant charge value estimates—which should result in more accurate cost estimates for relevant measures—can be found in [Table 8](#).

## Findings

The research team’s recommendations are based on actual refrigerant charge data for the equipment collected from key manufacturers of commercial HVAC equipment in 2025. In the current version of the RACC Tools, refrigerant charge estimates are based on equipment shipment data from CARB’s 2016 F-Gas Inventory<sup>2</sup>, along with an estimated 3.5 pounds per ton for air conditioning (AC) systems, as described in *Appendix B - California Facilities and Greenhouse Gas Emissions Inventory – High-Global Warming Potential Stationary Source Refrigerant Management Program*<sup>3</sup> (CARB, Appx B).

This research proposes improved charge estimates with the following updates:

- Equipment categories used to identify unique equipment, with significant differences in refrigerant charge size.
- Equipment category specific refrigerant charge per capacity.

All the data tables in this report were generated based on data collected in [Table 38](#) with the exception of Table 7 which is based on the RACC-FSC\_V3.1<sup>4</sup> ‘CARB\_RefrigLeaks\_DEER’ sheet.

## Data Collection

### Measure Identification

The research team reviewed all measures in the eTRM measure catalog that use the RACC Tools and would be impacted by changes to commercial HVAC refrigerant charge values. The measure is not the only commercial HVAC measure that uses refrigerant-containing equipment, but it is the only one

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<sup>2</sup> (CARB 2023)

<sup>3</sup> (R. D. CARB 2009)

<sup>4</sup> (CPUC 2024)

where refrigerant charge values are changing as part of the measure installation. [Table 1](#) contains the one identified commercial measure that matches this criterion.

The research team found heat pumps using low-GWP refrigerants (R-454B and R-32) typically contained less refrigerant than similar heat pumps using R-410A. A decrease in refrigerant charge and refrigerant GWP will increase the avoided cost of refrigerant and improve total system benefit.

**Table 1: Commercial measures affected by changes in refrigerant cost.**

Code	Measure
SWHC046-05	Packaged Heat Pump Air Conditioner Commercial, Fuel Substitution

Source: <https://www.caetrm.com/>

Measure SWHC046-05 is defined as the replacement of a gas-electric packaged or split commercial AC unit—e.g., an integrated gas furnace unit—with an all-electric, heat pump roof top unit (RTU). RTUs deliver 1.5 to 3 times more heat energy than the electricity they consume. This is a fuel substitution measure that meets all eligibility requirements of the Decision 19-08-009 issued by the California Public Utilities Commission. Note that this measure pertains to commercial HVAC products, which are distinct from residential units for purposes of energy code.

### Stakeholder Feedback

The research team contacted stakeholders to collect feedback on data availability and confirmation of data collection processes. [Table 2](#) lists the contacted stakeholders, who include equipment manufacturers, distributors, and a program implementer.

The feedback provided by manufacturers and distributors confirmed data availability and the location of refrigerant charge values. The manufacturers also provided feedback on the equipment categories used within the RACC Tools, leading to the updated equipment categories recommended within this report.

CLEAResult provided program participation data for Comfortably California, a statewide midstream program implemented by CLEAResult on behalf of San Diego Gas & Electric and California IOUs.

**Table 2: Contacted stakeholders.**

Stakeholder	Stakeholder Category
Carrier	Manufacturer
Rheem	Manufacturer
Trane	Manufacturer
Lennox	Manufacturer
LG Electronics	Manufacturer
Daikin	Manufacturer
Midea	Manufacturer
Mitsubishi Electric	Manufacturer
Fujitsu	Manufacturer
Johnson Controls	Manufacturer

Stakeholder	Stakeholder Category
Haier	Manufacturer
Gradient Comfort	Manufacturer
Carrier Enterprise	Distributor
Ferguson HVAC Supply	Distributor
CLEAResult	Program Implementer

## Equipment Categorization

The research team received feedback from key manufacturers that the categories used in the RACC Tools are not typically used in the industry. Upon receiving this feedback, we restructured the equipment categories into those seen in [Table 3](#). [Table 3](#) shows the recommended equipment categories in relation to the RACC Tools' existing equipment categories to allow the Database for Efficient Energy Resources the ability to keep the existing equipment categories if desired.

**Table 3: Recommended HVAC equipment categories and the related existing categories.**

Recommended HVAC Equipment Category	Existing HVAC Equipment Category
Large Chiller [ $\geq 2,000$ lbs]	Large Chiller 2,000 lbs. +
Medium Chiller [ $< 2,000$ lbs]	Medium Chiller 200-2,000 lbs.
Large Commercial Split AC [ $\geq 135$ kBtu/h]	Commercial Unitary AC 50-200 lbs., $> 135,000$ BTUh
Medium Commercial Split AC [135 kBtu/h > Capacity $\geq 65$ kBtu/h]	Commercial Unitary AC, $< 50$ -lbs., $< 135,000$ BTUh
Small Commercial Split AC [ $\leq 65$ kBtu/h]	Commercial Unitary AC, $< 50$ -lbs., $< 135,000$ BTUh
Large Commercial Packaged AC [ $\geq 135$ kBtu/h]	Commercial Unitary AC 50-200 lbs., $> 135,000$ BTUh
Medium Commercial Packaged AC [135 kBtu/h > Capacity $\geq 65$ kBtu/h]	Commercial Unitary AC, $< 50$ -lbs., $< 135,000$ BTUh
Small Commercial Packaged AC [ $\leq 65$ kBtu/h]	Commercial Unitary AC, $< 50$ -lbs., $< 135,000$ BTUh
Large Commercial Split HP [ $\geq 135$ kBtu/h]	Commercial Unitary AC 50-200 lbs., $> 135,000$ BTUh
Medium Commercial Split HP [135 kBtu/h > Capacity $\geq 65$ kBtu/h]	Commercial Unitary AC, $< 50$ -lbs., $< 135,000$ BTUh
Small Commercial Split HP [ $\leq 65$ kBtu/h]	Commercial Unitary AC, $< 50$ -lbs., $< 135,000$ BTUh
Large Commercial Packaged HP [ $\geq 135$ kBtu/h]	Commercial Unitary AC 50-200 lbs., $> 135,000$ BTUh
Medium Commercial Packaged HP [135 kBtu/h > Capacity $\geq 65$ kBtu/h]	Commercial Unitary AC, $< 50$ -lbs., $< 135,000$ BTUh
Small Commercial Packaged HP [ $\leq 65$ kBtu/h]	Commercial Unitary AC, $< 50$ -lbs., $< 135,000$ BTUh
PTAC	Window/Room AC and PTAC Units, commercial
PTHP	Window/Room AC and PTAC Units, commercial

## Data Collection Summary

The research team collected data for 448 systems from 14 manufacturers, as described in [Table 4](#). [Table 38](#) contains a dataset with the collected make, model, capacity, charge value, and equipment type for each system. This study includes different types of packaged heat pumps, as well as other types of HVAC equipment that might be currently used for baseline calculations.

Table 4: Final data collection summary.

HVAC Equipment Category	Data Collected	Unique Manufacturers
Large Chiller	43	3
Medium Chiller	97	3
Large Commercial Split AC [≥135 kBtu/h]	18	4
Medium Commercial Split AC [135 kBtu/h > Capacity ≥65 kBtu/h]	17	4
Small Commercial Split AC [≤65 kBtu/h]	41	3
Large Commercial Packaged AC [≥135 kBtu/h]	31	4
Medium Commercial Packaged AC [135 kBtu/h > Capacity ≥65 kBtu/h]	22	4
Small Commercial Packaged AC [≤65 kBtu/h]	28	4
Large Commercial Split HP [≥135 kBtu/h]	9	3
Medium Commercial Split HP [135 kBtu/h > Capacity ≥65 kBtu/h]	19	4
Small Commercial Split HP [≤65 kBtu/h]	34	3
Large Commercial Packaged HP [≥135 kBtu/h]	17	4
Medium Commercial Packaged HP [135 kBtu/h > Capacity ≥65 kBtu/h]	21	6
Small Commercial Packaged HP [≤65 kBtu/h]	12	4
PTAC	13	3
PTHP	26	6

## Data Analysis

### Accuracy of Refrigerant Charge Estimates

The current version of the RACC Tools uses average charge size data for small and medium commercial unitary AC, which is calculated by a combination of the residential AC/HP charge values listed in Table 24 of the CARB, Staff Report of the *Public Hearing to Consider Proposed Amendments to the Prohibition on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Chillers,*

*Aerosols-Propellants, and Foam End-uses Regulation*<sup>5</sup> (CARB, Staff Report) and the conversion factor for AC systems in the CARB, Appx B ([Equation 1](#)). This calculation uses broad industry data from CARB's F-Gas Inventory 2016<sup>6</sup> to estimate average R-410A charge size for residential AC/HP systems and multiplies this estimate against a conversion factor of 3.5.

Not only does this calculation disregard nuances between different equipment categories that can significantly improve the accuracy of the RACC Tools, but it also is based on estimates of residential AC/HP systems, as shown in [Table 36](#). More granular refrigerant charge estimates can be made for each equipment category with the recommended HVAC equipment categories. [Table 37](#) shows the current assumed baseline refrigerant and average charge size, based on the CARB, Appx B.

The average charge size data for the remaining commercial HVAC equipment types are based on system charge values listed in Table 4 of the CARB, Appx B. The research team recommends a consistent source for all commercial HVAC equipment types to improve the reliability of RACC Tool estimates.

### Advantages of Updated Equipment Categories

The recommended HVAC equipment categories in [Table 5](#) provide more robust results for refrigerant charge values by equipment type than the existing HVAC equipment categories in [Table 7](#). The research team found differences in the results of the data analysis between equipment categories that were previously included in the same category within the RACC Tools. Additionally, we noticed that the previous equipment categories used different units and referenced different sources for some categories, creating inconsistency and making it harder to broadly compare refrigerant charge sizes. The research team recommends adopting the recommended HVAC equipment categories to improve the accuracy of the RACC Tools' calculations.

Again, [Table 5](#) describes recommended refrigerant charge sizes by HVAC equipment category, while [Table 6](#) is specific to data for refrigerant R-410A. [Table 7](#) shows the existing categories and the charge amounts assumed in the current RACC Tool, which is based on the CARB, Appx B and can be found in [Table 37](#).

**Table 5: Average refrigerant charge size for recommended HVAC equipment categories.**

HVAC Equipment Category	Baseline Refrigerant	Refrigerant Charge Size per unit
Large Chiller	R-454, R-32	0.63 lb/ton
Medium Chiller	R-454, R-32	1.01 lb/ton
Large Commercial Split AC [≥135 kBtu/h]	R-454, R-32	1.66 lb/ton
Medium Commercial Split AC [135 kBtu/h > Capacity ≥65 kBtu/h]	R-454, R-32	1.32 lb/ton
Small Commercial Split AC [≤65 kBtu/h]	R-454, R-32	1.75 lb/ton

<sup>5</sup> (R. D. CARB 2020)

<sup>6</sup> (CARB 2023)

HVAC Equipment Category	Baseline Refrigerant	Refrigerant Charge Size per unit
Large Commercial Packaged AC [≥135 kBtu/h]	R-454, R-32	1.11 lb/ton
Medium Commercial Packaged AC [135 kBtu/h > Capacity ≥65 kBtu/h]	R-454, R-32	1.03 lb/ton
Small Commercial Packaged AC [≤65 kBtu/h]	R-454, R-32	1.14 lb/ton
Large Commercial Split HP [≥135 kBtu/h]	R-454, R-32	2.19 lb/ton
Medium Commercial Split HP [135 kBtu/h > Capacity ≥65 kBtu/h]	R-454, R-32	1.84 lb/ton
Small Commercial Split HP [≤65 kBtu/h]	R-454, R-32	2.4 lb/ton
Large Commercial Packaged HP [≥135 kBtu/h]	R-454, R-32	2.09 lb/ton
Medium Commercial Packaged HP [135 kBtu/h > Capacity ≥65 kBtu/h]	R-454, R-32	2.13 lb/ton
Small Commercial Packaged HP [≤65 kBtu/h]	R-454, R-32	2.37 lb/ton
PTAC	R-454, R-32	1.47 lb/ton
PTHP	R-454, R-32	1.93 lb/ton

Table 6: Average refrigerant charge size for recommended HVAC equipment categories.

HVAC Equipment Category	Baseline Refrigerant	Refrigerant Charge Size per unit
Large Chiller	R410A	1.28 lb/ton
Medium Chiller	R410A	1.36 lb/ton
Large Commercial Split AC [≥135 kBtu/h]	R410A	2.02 lb/ton
Medium Commercial Split AC [135 kBtu/h > Capacity ≥65 kBtu/h]	R410A	1.94 lb/ton
Small Commercial Split AC [≤65 kBtu/h]	R410A	1.76 lb/ton
Large Commercial Packaged AC [≥135 kBtu/h]	R410A	1.58 lb/ton
Medium Commercial Packaged AC [135 kBtu/h > Capacity ≥65 kBtu/h]	R410A	1.34 lb/ton
Small Commercial Packaged AC [≤65 kBtu/h]	R410A	2.75 lb/ton
Large Commercial Split HP [≥135 kBtu/h]	R410A	3.53 lb/ton
Medium Commercial Split HP [135 kBtu/h > Capacity ≥65 kBtu/h]	R410A	3.17 lb/ton
Small Commercial Split HP [≤65 kBtu/h]	R410A	3.14 lb/ton
Large Commercial Packaged HP [≥135 kBtu/h]	R410A	2.33 lb/ton

HVAC Equipment Category	Baseline Refrigerant	Refrigerant Charge Size per unit
Medium Commercial Packaged HP [135 kBtu/h > Capacity ≥65 kBtu/h]	R410A	2.55 lb/ton
Small Commercial Packaged HP [≤65 kBtu/h]	R410A	N/A
PTAC	R410A	N/A
PTHP	R410A	2.19 lb/ton

Table 7: Average refrigerant charge size for existing HVAC equipment categories.

HVAC Equipment Category	Baseline Refrigerant	Existing Refrigerant Charge Size per unit
Large Chiller 2,000 lbs. +	R-410A, R-22	3,978 lb/each
Medium Chiller 200-2,000 lbs.	R-410A, R-134A	526 lb/each
Commercial Unitary AC 50-200 lbs., > 135,000 BTU/h size	R-410A	70 lb/each
Commercial Unitary AC, < 50-lbs., < 135,000 BTU/h size (includes smaller "residential-type" central AC and heat pumps)	R-410A	3.20 lb/ton
Window/Room AC and PTAC Units, commercial	R-410A; R-32	1.54 lb/each

Source: RACC-FSC\_v3.1 'CARB\_RefrigLeaks\_DEER' (CPUC 2024)

[Table 8](#) compares recommended refrigerant charge per unit for both current and legacy refrigerants, as well as existing refrigerant charge per unit by HVAC equipment category. HVAC equipment categories with a "N/A" value under recommended R-410A charge values did not have enough data available to conclusively recommend an accurate, updated charge value. The research team recommends using existing R-410A charge values for these categories.

[Table 9](#) provides the recommended updates to refrigerant charge values if HVAC equipment categories are not updated to the research team's recommended HVAC equipment categories.

Table 8: Refrigerant charge per unit for each commercial HVAC type.

HVAC Equipment Category	Recommended Refrigerant Charge per unit (R-32/R-454B)	Recommended Refrigerant Charge per unit (R-410A)	Existing Refrigerant Charge per unit
Large Chiller	0.63 lb/ton	1.28 lb/ton	3,978 lb each
Medium Chiller	1.01 lb/ton	1.36 lb/ton	526 lb each
Large Commercial Split AC [≥135 kBtu/h]	1.66 lb/ton	2.02 lb/ton	70 lb each
Medium Commercial Split AC [135 kBtu/h > Capacity ≥65 kBtu/h]	1.32 lb/ton	1.94 lb/ton	3.20 lb/ton
Small Commercial Split AC [≤65 kBtu/h]	1.75 lb/ton	1.76 lb/ton	3.20 lb/ton



HVAC Equipment Category	Recommended Refrigerant Charge per unit (R-32/R-454B)	Recommended Refrigerant Charge per unit (R-410A)	Existing Refrigerant Charge per unit
Large Commercial Packaged AC [≥135 kBtu/h]	1.11 lb/ton	1.58 lb/ton	70 lb each
Medium Commercial Packaged AC [135 kBtu/h > Capacity ≥65 kBtu/h]	1.03 lb/ton	1.34 lb/ton	3.20 lb/ton
Small Commercial Packaged AC [≤65 kBtu/h]	1.14 lb/ton	2.75 lb/ton	3.20 lb/ton
Large Commercial Split HP [≥135 kBtu/h]	2.19 lb/ton	3.53 lb/ton	70 lb each
Medium Commercial Split HP [135 kBtu/h > Capacity ≥65 kBtu/h]	1.84 lb/ton	3.17 lb/ton	3.5 lb/ton
Small Commercial Split HP [≤65 kBtu/h]	2.4 lb/ton	3.14 lb/ton	3.5 lb/ton
Large Commercial Packaged HP [≥135 kBtu/h]	2.09 lb/ton	2.33 lb/ton	70 lb each
Medium Commercial Packaged HP [135 kBtu/h > Capacity ≥65 kBtu/h]	2.13 lb/ton	2.55 lb/ton	3.5 lb/ton
Small Commercial Packaged HP [≤65 kBtu/h]	2.37 lb/ton	N/A	3.5 lb/ton
PTAC	1.47 lb/ton	N/A	1.54 lb each
PTHP	1.93 lb/ton	2.19 lb/ton	1.54 lb each

Source: OEM Product Submittals.

**Table 9: Average refrigerant charge size for existing HVAC equipment categories.**

HVAC Equipment Category	Recommended Refrigerant Charge per unit (R-32/R-454B)	Recommended Refrigerant Charge per unit (R-410A)
Large Chiller 2,000 lbs. +	0.63 lb/ton	1.28 lb/ton
Medium Chiller 200-2,000 lbs.	1.01 lb/ton	1.36 lb/ton
Commercial Unitary AC 50-200 lbs., > 135,000 BTUh size	1.54 lb/ton	2.15 lb/ton
Commercial Unitary AC, < 50-lbs., < 135,000 BTUh size (includes smaller "residential-type" central AC and heat pumps)	1.75 lb/ton	2.30 lb/ton
Window/Room AC and PTAC Units, commercial	1.20 lb/ton	1.72 lb/ton

## Refrigerant Charge Trends

The research team analyzed trends in factory refrigerant charge data collected for this study. This section reviews results for trends in charge size by rated capacity of commercial HVAC equipment, equipment type, and refrigerant type.

### RATED CAPACITY

The refrigerant charge data in [Table 10](#) through [Table 13](#) show refrigerant charge by rated capacity. The results show that refrigerant charge size typically increases with rated capacity, as expected. There are a few exceptions to this trend; these differences may be attributed to other equipment design factors, and do not discount the research team's recommendation of using charge per ton as a unit of measure to improve the accuracy of RACC Tool calculations.

Table 10: Average refrigerant charge per equipment type by rated capacity (R-32/R-454B) for small systems.

HVAC Equipment Category	Average Refrigerant Charge by Rated Capacity (lb)									
	0.75 ton	1.00 ton	1.25 ton	1.50 ton	2.00 ton	2.50 ton	3.00 ton	3.50 ton	4.00 ton	5.00 ton
Small Commercial Split AC [≤65 kBtu/h]	-	-	-	4.44	4.63	5.26	4.74	5.32	6.14	6.84
Small Commercial Packaged AC [≤65 kBtu/h]	-	-	-	-	2.38	2.90	3.21	4.33	5.08	5.09
Small Commercial Split HP [≤65 kBtu/h]	-	-	-	-	4.00	-	4.67	7.00	7.33	7.33
Small Commercial Packaged HP [≤65 kBtu/h]	-	-	-	-	-	-	8.03	-	9.69	10.1
PTAC	1.45	1.32	2.13	-	-	-	-	-	-	-
PTHP	1.46	1.72	1.79	-	-	-	-	-	-	-

Table 11: Average refrigerant charge per equipment type by rated capacity (R-32/R-454B) for medium systems.

HVAC Equipment Category	Average Refrigerant Charge by Rated Capacity (lb)					
	6.00 ton	8.33 ton	8.50 ton	10.00 ton	12.00 ton	12.50 ton
Medium Commercial Split AC [135 kBtu/h > Capacity ≥65 kBtu/h]	10.90	-	-	10.83	-	-
Medium Commercial Packaged AC [135 kBtu/h > Capacity ≥65 kBtu/h]	6.98	-	8.29	10.52	-	10.50

HVAC Equipment Category	Average Refrigerant Charge by Rated Capacity (lb)					
	6.00 ton	8.33 ton	8.50 ton	10.00 ton	12.00 ton	12.50 ton
Medium Commercial Split HP [135 kBtu/h> Capacity ≥65 kBtu/h]	17.77	-	-	18.19	-	-
Medium Commercial Packaged HP [135 kBtu/h> Capacity ≥65 kBtu/h]	13.03	19.00	17.75	19.85	-	-

Table 12: Average refrigerant charge per equipment type by rated capacity (R-32/R-454B) for large systems.

HVAC Equipment Category	Average Refrigerant Charge by Rated Capacity (lb)									
	12.50 ton	15 ton	20.00 ton	25.00 ton	30.00 ton	40.00 ton	50.00 ton	60.00 ton	70.00 ton	80.00 ton
Medium Chiller	-	12.25	22.42	19.63	30.33	38.00	42.25	45.67	72.53	83.67
Large Commercial Split AC [≥135 kBtu/h]	20.03	26.25	27.95	25.60	-	-	-	-	-	-
Large Commercial Packaged AC [≥135 kBtu/h]	14.37	17.06	22.39	23.97	26.75	-	-	-	-	-
Large Commercial Split HP [≥135 kBtu/h]	-	38.47	36.43	-	-	-	-	-	-	-
Large Commercial Packaged HP [≥135 kBtu/h]	31.50	35.23	42.17	41.00	-	-	-	-	-	-

Table 13: Average refrigerant charge per equipment type by rated capacity (R-32/R-454B) for large chillers.

HVAC Equipment Category	Average Refrigerant Charge by Rated Capacity (lb)						
	152 ton	160 ton	167.6 ton	180 ton	200 ton	215 ton	230 ton
Large Chiller	119.90	87.50	149.00	113.00	113.00	131.00	135.50

[Table 14](#) through [Table 17](#) shows similar information as the tables above—refrigerant charge size increases with rated capacity—but for the refrigerant R-410A.

Table 14: Average refrigerant charge per equipment type by rated capacity (R-410A) for small systems.

HVAC Equipment Category	Average Refrigerant Charge by Rated Capacity (lb)									
	0.75 ton	1.00 ton	1.25 ton	1.50 ton	2.00 ton	2.50 ton	3.00 ton	3.50 ton	4.00 ton	5.00 ton
Small Commercial Split AC [≤65 kBtu/h]	-	-	-	3.15	3.15	4.36	5.38	5.84	7.19	8.40
Small Commercial Packaged AC [≤65 kBtu/h]	-	-	-	-	6.75	7.13	6.88	10.25	9.25	-
PTHP	1.87	1.89	1.95	-	-	-	-	-	-	-

Table 15: Average refrigerant charge per equipment type by rated capacity (R-410A) for medium systems.

HVAC Equipment Category	Average Refrigerant Charge by Rated Capacity (lb)		
	7.5 ton	8.5 ton	10.0 ton
Medium Commercial Split AC [135 kBtu/h > Capacity ≥65 kBtu/h]	14.40	0.00	19.53
Medium Commercial Packaged AC [135 kBtu/h > Capacity ≥65 kBtu/h]	10.73	11.34	12.63
Medium Commercial Split HP [135 kBtu/h > Capacity ≥65 kBtu/h]	24.01	0.00	31.12
Medium Commercial Packaged HP [135 kBtu/h > Capacity ≥65 kBtu/h]	17.75	22.75	26.15

Table 16: Average refrigerant charge per equipment type by rated capacity (R-410A) for large systems.

HVAC Equipment Category	Average Refrigerant Charge by Rated Capacity (lb)									
	12.50 ton	15 ton	20.00 ton	25.00 ton	60.00 ton	70.00 ton	80.00 ton	90.00 ton	100.0 ton	120.0 ton
Medium Chiller	-	-	-	-	91.75	94.00	101.	125.0	136.0	163.5
Large Commercial Split AC [≥135 kBtu/h]	25.67	34.00	38.85	35.00	-	-	-	-	-	-
Large Commercial Packaged AC [≥135 kBtu/h]	18.81	24.00	32.00	37.63	-	-	-	-	-	-
Large Commercial Split HP [≥135 kBtu/h]	-	54.00	68.00	-	-	-	-	-	-	-
Large Commercial Packaged HP [≥135 kBtu/h]	31.25	35.75	46.00	48.00	-	-	-	-	-	-

Table 17: Average refrigerant charge per equipment type by rated capacity (R-410A) for large chillers.

HVAC Equipment Category	Average Refrigerant Charge by Rated Capacity (lb)						
	150 ton	160 ton	170 ton	190 ton	210 ton	225 ton	250 ton
Large Chiller	192	214.5	219	245	275.5	278.5	309.5

## EQUIPMENT TYPE

The research team found that heat pump systems typically require more refrigerant charge than AC systems, as seen in [Table 15](#) and [Table 16](#). These tables also reveal that packaged systems typically require less refrigerant charge than split systems. This trend may be attributed to split systems' refrigerant line length.

## REFRIGERANT TYPE

[Table 18](#) shows that equipment typically has a lower charge for low-GWP refrigerants (R-32 or R-454B) than for the legacy refrigerant R-410A.

Refrigerant charge data for packaged terminal AC (PTAC) units charged with R-410A were difficult to source due to current market conditions that highly favor the use of R-32 in PTAC units. However, the available refrigerant charge data reflects existing estimated charge values for this category.

Table 18: Average refrigerant charge size per equipment type by refrigerant type.

HVAC Equipment Category	Average Refrigerant Charge by Refrigerant Type (lbs)	
	R-410A	R32/R-454B
Large Chiller	272.50	117.94
Medium Chiller	128.28	79.08
Large Commercial Unitary AC (split) [≥135 kBtu/h]	33.05	26.56
Medium Commercial Unitary AC (split) [135 kBtu/h > Capacity ≥65 kBtu/h]	16.96	10.34
Small Commercial Unitary AC (split) [≤65 kBtu/h]	5.71	5.52
Large Commercial Unitary AC (packaged) [≥135 kBtu/h]	29.45	21.15
Medium Commercial Unitary AC (packaged) [135 kBtu/h > Capacity ≥65 kBtu/h]	11.57	8.54
Small Commercial Unitary AC (packaged) [≤65 kBtu/h]	8.05	4.22
Large Commercial Unitary HP (split) [≥135 kBtu/h]	58.67	37.45
Medium Commercial Unitary HP (split) [135 kBtu/h > Capacity ≥65 kBtu/h]	26.38	17.17
Small Commercial Unitary HP (split) [≤65 kBtu/h]	9.92	6.31
Large Commercial Unitary HP (packaged) [≥135 kBtu/h]	39.14	37.67
Medium Commercial Unitary HP (packaged) [135 kBtu/h > Capacity ≥65 kBtu/h]	22.22	16.93
Small Commercial Unitary HP (packaged) [≤65 kBtu/h]	8.05	9.27
PTAC	N/A	1.31
PTHP	1.86	1.63

## Recommendations

The research team recommends updating the underlying HVAC Equipment Categories and refrigerant charge value tables used in the RACC-FSC\_v3.1 Tool to reflect the following (see *ET25SWE0036(37)\_RACC-FSC\_v3.1 Update Guide*<sup>7</sup> for more details):

- **'O Refrig Research' sheet, columns B and C:** Update the Commercial HVAC Equipment Categories to the Recommended HVAC Equipment Categories in [Table 3](#) and the corresponding refrigerant types in [Table 5](#).
- **'O Refrig Research' sheet, columns E and F:** Update the refrigerant charge values to reflect the results of the data analysis for each Commercial HVAC Equipment Category. The values associated with each HVAC Equipment Category can be found in [Table 8](#).
- **'CARB\_RefrigLeaks\_DEER' sheet, column B:** Update the Commercial HVAC Equipment Categories to the Recommended HVAC Equipment Categories in [Table 3](#).
  - Verify leakage rates are accurate (see *ET25SWE0036(37)\_RACC-FSC\_v3.1 Update Guide*)
- **'CARB\_RefrigLeaks\_DEER' sheet, column F:** Update the refrigerant charge values to reflect the results of the data analysis for each Commercial HVAC Equipment Category. The values associated with each HVAC Equipment Category can be found in [Table 8](#).
- **'1 Device Builder' sheet, column K:** Update default refrigerant charge values for default device type templates in [Table 3](#).

If the Commercial HVAC Equipment Categories are to remain as existing:

- **'O Refrig Research' sheet, columns E and F:** Update the refrigerant charge values to reflect the results of the data analysis for the existing HVAC Equipment Categories. These values are included in [Table 9](#).
- **'CARB\_RefrigLeaks\_DEER' sheet, column F:** Update the refrigerant charge values to reflect the results of the data analysis for the existing HVAC Equipment Categories. These values are included in [Table 9](#).

While the scope of this study was to collect refrigerant charge values for low-GWP refrigerants (R454B and R32), the research team also collected charge values for the legacy refrigerant R410A where available. While new equipment must use the low-GWP refrigerants, RACC tool users may still use the legacy refrigerant charge values in their assumptions for existing equipment for determining baseline impacts. The existing RACC tool uses refrigerant charge values for R410A that are outdated, since they are based on values from a 2016 study. This report recommends updated values for R410A in equipment types where the research team was able to obtain data from at least three manufacturers.

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<sup>7</sup> (TRC Companies 2025)

For equipment types where data from less than three manufacturers was available (for example, PTAC units), the research team recommends using the existing RACC charge values. Note that the R410A charge values gathered by the research team generally show *lower* charge values than in the existing RACC tool. If the IOUs incorporate these recommended updated values for R410A, it will show lower emissions estimates from baseline equipment and therefore, less GHG savings from the new equipment with low-GWP refrigerants. By updating the R410A assumptions in the RACC tool, the GHG savings assumptions will be more conservative.



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## Appendix A: Average Charge Size Data by Equipment Type

Appendix A categorizes all relevant refrigerant charge data collected for this report. This appendix contains manufacturer and average refrigerant charge per capacity for each equipment category of the systems analyzed. The values in this appendix are derived from data contained in [Appendix C](#).

**Table 19: Large chillers average refrigerant charge.**

Tonnage	Carrier	Trane	York
150	192	-	-
152	119.9	-	-
160	214.5	87.5	-
167.6	-	-	149
170	219	-	-
180	-	113	-
190	245	-	-
200	-	113	-
210	275.5	-	-
215	-	131	-
225	278.5	-	-
230	-	135.5	-
250	309.5	-	-
275	343.5	-	-
300	375	-	-

**Table 20: Medium chillers average refrigerant charge.**

Tonnage	Carrier	Trane	York
10	11.5	-	-
15	12.25	-	-
20	16.13	35	-
25	19.63	-	-
26	-	37	-
30	21.5	48	-
35	38.5	51	50.8
40	40	34	-
45	41.5	-	-
50	42.25	-	-
52	-	38	-
55	43	-	-
60	67.38	51	-
67	81.75	-	-
70	94	52	82.8
72	87.1	-	-

Tonnage	Carrier	Trane	York
76.6	-	-	68
80	101.5	83.67	-
80.6	-	-	70
82	92.5	-	-
90	125	69	-
92	108.68	-	-
95	-	-	79
100	136	103.67	-
102	109.3	-	-
105	-	-	152.4
110	146.5	74	-
112	132.3	-	-
118.2	-	-	90
120	163.5	102.33	-
122	139.78	-	-
123.4	-	-	123
130	168	93	-
132	152.93	-	-
140	-	85.5	203.2
143.2	-	-	122

Table 21: Large commercial split system AC average refrigerant charge.

Tonnage	Carrier	Trane	Lennox	Johnson
12.5	26.1	19.9	30	23.5
15	34	22.5	48	27
20	36.5	23.8	45.44	35.55
25	-	29.8	-	35

Table 22: Medium commercial split system AC average refrigerant charge.

Tonnage	Carrier	Daikin	Trane	Johnson
6	15.5	-	8.6	-
7.5	16.4	6.88	8.7	14.4
10	18.2	6.88	11.1	19.53

Table 23: Small commercial split system AC average refrigerant charge.

Tonnage	Carrier	Trane	Lennox
1.5	3.15	-	4.44
2	4.18	4	4.66
2.5	4.36	-	5.26
3	5.59	3.33	6.22

Tonnage	Carrier	Trane	Lennox
3.5	5.84	4	6.63
4	6.92	4.67	8.22
5	8.17	5.33	8.66

Table 24: Large commercial packaged system AC average refrigerant charge.

Tonnage	Carrier	Daikin	Rheem	Trane
12.5	19.5	15.97	-	9.8
17.5	26.13	-	23.61	12
15	23	12.19	19.66	11.8
20	30.32	18.13	25.6	14
25	33.57	21.31	27.21	14.6
27.5	42	-	-	-
30	-	-	26.75	-

Table 25: Medium commercial packaged system AC average refrigerant charge.

Tonnage	Carrier	Daikin	Rheem	Trane
6	7.81	5.13	-	8
7.5	11.69	7.45	5.5	7.6
8.5	12.38	7.84	7.13	8.3
10	14.79	9.53	10.69	8
12.5	-	-	10.5	-

Table 26: Small commercial packaged system AC average refrigerant charge.

Tonnage	Carrier	Daikin	Rheem	Trane
2	-	6.75	2.38	-
2.5	-	7.13	2.9	-
3	4.31	4.88	3	3.1
3.5	-	10.25	4.33	
4	8.81	6.47	4.9	3.3
5	7.69	3.94	5	3.9

Table 27: Large commercial split system HP average refrigerant charge.

Tonnage	Carrier	Trane	Johnson
15	36.5	42.4	54
20	34.75	39.8	68

Table 28: Medium commercial split system HP average refrigerant charge.

Tonnage	Carrier	Daikin	Trane	Johnson
6	18	-	17.3	-
7.5	24.5	6.875	16.2	24.01
10	27	6.88	23.2	31.12

Table 29: Small commercial split system HP average refrigerant charge.

Tonnage	Carrier	Rheem	Trane
1.5	5.9	5.19	-
2	6.3	7.48	4
2.5	9	6.19	-
3	9	9.06	4.67
3.5	9.9	8.13	7
4	10.8	10.6	7.33
5	13.7	13.04	7.33

Table 30: Large commercial packaged system HP average refrigerant charge.

Tonnage	Carrier	Trane	Lennox	Goodman
12.5	24.88	31.5	-	37.63
17.5	-	31	-	-
15	29	32	43.6	-
20	46.5	38	43.75	-
25	47.5	35	-	-

Table 31: Medium commercial packaged system HP average refrigerant charge.

Tonnage	Carrier	Daikin	Rheem	Trane	Lennox	Goodman
6	15	-	8.88	15.2	-	-
7.5	17.1	17.88	-	15.5	22	13.75
8.33	-	19	-	-	-	-
8.5	20.07	-	-	16.5	21.5	25.63
10	20.91	17.56	-	21.5	29	28.13

Table 32: Small commercial packaged system HP average refrigerant charge.

Tonnage	Carrier	Daikin	Rheem	Trane
3	12	8.75	5.25	6.1
4	11.44	10.5	8.94	7.9
5	13	10.19	9.13	8

Table 33: Packaged terminal AC (PTAC) average refrigerant charge.

Tonnage	LG	General Electric	Midea
0.58	-	1.63	-
0.75	-	1.69	1.21
0.83	0.9	-	-
1	0.95	2	1.72
1.17	1.14	-	-
1.25	-	2.13	-

Table 34: Packaged terminal HP (PTHP) average refrigerant charge (R-454b/R-32).

Tonnage	Trane	GE	Midea
0.58	1.7	1.66	1.08
0.75	1.5	1.75	1.1
1	1.8	1.91	1.37
1.25	1.85	2.13	1.35

Table 35: Packaged terminal HP (PTHP) average refrigerant charge (R-410).

Tonnage	LG	Amana	Friedrich
0.58	1.63	-	-
0.75	1.33	2.25	1.95
1	1.34	2.11	2.05
1.25	1.95	-	-

## Appendix B: Existing Baseline Characteristics

[Table 36](#) shows the existing refrigerant charge assumptions in the RACC Tools, based on the CARB, Staff Report from 2020. [Table 7](#) references [Table 24. Baseline characteristics for stationary AC](#) of the CARB, Staff Report and [Table 4. Emission Factors by R/AC Equipment Category](#) of the CARB, Appx B (\*not to be confused with Table 24 in [Appendix A](#) of this report) to determine baseline refrigerant and average charge size.

**Table 36: Existing baseline characteristics for stationary AC.**

HVAC Equipment Category	Baseline Refrigerant	Average Charge Size (lbs)
Room AC – window/wall	R-410A; R-32	1.54
Room AC – portable	R-410A; R-32	1.54
Room AC – PTAC/PTHP	R-410A; R-32	1.0
Room AC – dehumidifiers	R-410A	1.0
Residential AC	R-410A	8.2
Residential HP	R-410A	7.5
Non-residential AC (≥65k to <135,000k Btu/hr)	R-410A	25
Non-residential AC (≥135,000k Btu/hr)	R-410A	60

Source: Table 24 (R. D. CARB 2020)

**Table 24. Baseline characteristics for stationary AC**

System Type	Baseline Refrigerant	Baseline GWP (100-year, AR4)	Lifetime (Years)	Average Charge Size (lbs.)	Average Annual Leak Rate (%)	Average End-of-Life Leak Rate (%)
Room AC – window/wall	R-410A; R-32	1,382	12	1.54	2.0%	98.5%
Room AC – portable	R-410A; R-32	1,382	10	1.54	1.0%	98.5%
Room AC – PTAC/PTHP	R-410A; R-32	1,382	12	1.0	2.0%	98.5%
Room AC – dehumidifiers	R-410A	2,088	5	1.0	1.0%	98.5%
Residential AC	R-410A	2,088	15	8.157	5.3%	80.0%
Residential HP	R-410A	2,088	15	7.5	5.0%	80.0%
Non-residential AC (≥ 65k to <135,000k Btu/hr)	R-410A	2,088	20	25	10.0%	56.0%
Non-residential AC (≥ 135,000k Btu/hr)	R-410A	2,088	20	60	7.0%	20.0%

Source: (R. D. CARB 2020)

The current RACC Tools average charge size for small and medium commercial unitary AC calculation follows [Equation 1](#), which uses the conversion factor of the CARB, Appx B<sup>8</sup> and the residential AC/HP charge of the CARB, Staff Report.

#### Equation 1

$$\text{Commercial AC Charge} = \text{Conversion Factor} \times \frac{\text{Residential AC Charge}}{\text{Residential Heat Pump Charge}}$$

$$\text{Commercial AC Charge} = 3.5 \times \frac{7.5}{8.2} = 3.2$$

Source: RACC-FSC\_v3.1 '0 Refrig Research' Cell E10, (CPUC, 2024)

[Table 37](#) shows the existing refrigerant charge assumptions in the RACC Tools, which are based on the CARB, Appx B.

**Table 37: Existing baseline characteristics for R/AC equipment.**

HVAC Equipment Category	Baseline Refrigerant	Average Charge Size (lbs)
Large Chiller 2,000 lbs. +	R-410A, R-22	3,978
Medium Chiller 200-2,000 lbs.	R-410A, R-134A	526
Commercial Unitary AC 50-200 lbs., > 135,000 BTUh size	R-410A	70
Commercial Unitary AC, < 50-lbs., < 135,000 BTUh size (includes smaller "residential-type" central AC and heat pumps)	R-410A	18.2
Window/Room AC and PTAC Units, commercial	R-410A; R-32	1.54

Source: Table 4 (R. D. CARB 2009)

<sup>8</sup> (R. D. CARB 2009)



Table 4. Emission Factors by R/AC Equipment Category						
R/AC Equipment Type and Charge Size Category	Facility Number (2010)	Facility Number (2020)	Charge (lbs) / System <sup>4</sup>	% of Systems Leaking	% of Charge Leaked - leaking systems only	Avg. Annual Leak Rate - all systems <sup>5</sup>
Small Refrigeration Systems (≥ 50 lbs, < 200 lbs)						
refrigerant condensing units	15,500	17,123	122	22%	65%	14%
Medium Refrigeration Systems (≥ 200 lbs, < 2,000 lbs)						
centralized refrigeration system	7,500	8,285	704	36%	43%	15%
cold storage	900	994	565	45%	80%	36%
Large Refrigeration Systems (≥ 2,000 lbs)						
centralized refrigeration system	900	994	2,486	77%	28%	21%
cold storage	800	884	7,546	77%	36%	27%
process cooling	340	376	3,640	22%	31%	7%
Small AC Systems (≥ 50 lbs, < 200 lbs)						
unitary AC systems	14,300	15,800	100	19%	60%	11%
Medium AC Systems (≥ 200 lbs, < 2,000 lbs)						
centrifugal chiller	800	900	1,007	6%	23%	1%
packaged chiller	5,300	5,900	526	18%	37%	7%
Large AC Systems (≥ 2,000 lbs)						
centrifugal chiller	2,700	3,000	3,978	15%	16%	2%

Source: (R. D. CARB 2009)

## Appendix C: Data Collection

[Table 38](#) compiles all the data collected from this study. Databases accessed to collect this data are listed below and are publicly available:

- (Airtek Canada 2025)
- (AprilAire 2025)
- (Bosch Thermotechnology Corp. 2025)
- (CE 2025)
- (Carrier 2025)
- (Cooper&Hunter 2025)
- (Daikin Comfort Technologies North America, Inc. 2025)
- (Ferguson Enterprise LLC 2025)
- (Friedrich 2025)
- (GE Appliances 2025)
- (Gradient 2025)
- (Home Depot 2000-2025)
- (LG Electronics U.S.A., Inc. 2025)
- (Lennox International Inc. 2025)
- (Midea 2025)
- (Mitsubishi Electric Trane HVAC US LLC 2025)
- (Rheem Manufacturing Company 2004-2025)
- (Samsung HVAC, LLC 2025)
- (Toshiba Lifestyle Products and Services Corporation 2025)
- (Trane Supply 2025)
- (Trane 2025)

**Table 38: Commercial HVAC equipment database.**

Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
Trane Technologies	ACS	140.00	Medium Chiller	R-454B	50.00	0.36	lb/ton	Medium Chiller
Trane Technologies	ACS	160.00	Large Chiller	R-454B	54.00	0.34	lb/ton	Large Chiller
Trane Technologies	ACS	180.00	Large Chiller	R-454B	63.00	0.35	lb/ton	Large Chiller
Trane Technologies	ACS	200.00	Large Chiller	R-454B	63.00	0.32	lb/ton	Large Chiller
Trane Technologies	ACS	215.00	Large Chiller	R-454B	75.00	0.35	lb/ton	Large Chiller
Trane Technologies	ACS	230.00	Large Chiller	R-454B	82.00	0.36	lb/ton	Large Chiller
Trane Technologies	ACX	80.00	Medium Chiller	R-454B	92.00	1.15	lb/ton	Medium Chiller
Trane Technologies	ACX	100.00	Medium Chiller	R-454B	115.00	1.15	lb/ton	Medium Chiller

Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
Trane Technologies	ACX	120.00	Medium Chiller	R-454B	115.00	0.96	lb/ton	Medium Chiller
Trane Technologies	ACX	140.00	Medium Chiller	R-454B	121.00	0.86	lb/ton	Medium Chiller
Trane Technologies	ACX	160.00	Large Chiller	R-454B	121.00	0.76	lb/ton	Large Chiller
Trane Technologies	ACX	180.00	Large Chiller	R-454B	163.00	0.91	lb/ton	Large Chiller
Trane Technologies	ACX	200.00	Large Chiller	R-454B	163.00	0.82	lb/ton	Large Chiller
Trane Technologies	ACX	215.00	Large Chiller	R-454B	187.00	0.87	lb/ton	Large Chiller
Trane Technologies	ACX	230.00	Large Chiller	R-454B	189.00	0.82	lb/ton	Large Chiller
Trane Technologies	CG-PRC017W	20.00	Medium Chiller	R-454B	35.00	1.75	lb/ton	Medium Chiller
Trane Technologies	CG-PRC017W	26.00	Medium Chiller	R-454B	37.00	1.42	lb/ton	Medium Chiller
Trane Technologies	CG-PRC017W	30.00	Medium Chiller	R-454B	48.00	1.60	lb/ton	Medium Chiller
Trane Technologies	CG-PRC017W	35.00	Medium Chiller	R-454B	51.00	1.46	lb/ton	Medium Chiller
Trane Technologies	CG-PRC017W	40.00	Medium Chiller	R-454B	34.00	0.85	lb/ton	Medium Chiller
Trane Technologies	CG-PRC017W	52.00	Medium Chiller	R-454B	38.00	0.73	lb/ton	Medium Chiller
Trane Technologies	CG-PRC017W	60.00	Medium Chiller	R-454B	51.00	0.85	lb/ton	Medium Chiller
Trane Technologies	CG-PRC017W	70.00	Medium Chiller	R-454B	52.00	0.74	lb/ton	Medium Chiller
Trane Technologies	CG-PRC017W	80.00	Medium Chiller	R-454B	67.00	0.84	lb/ton	Medium Chiller
Trane Technologies	CG-PRC017W	90.00	Medium Chiller	R-454B	69.00	0.77	lb/ton	Medium Chiller
Trane Technologies	CG-PRC017W	100.00	Medium Chiller	R-454B	81.00	0.81	lb/ton	Medium Chiller
Trane Technologies	CG-PRC017W	110.00	Medium Chiller	R-454B	74.00	0.67	lb/ton	Medium Chiller

Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
Trane Technologies	CG-PRC017W	120.00	Medium Chiller	R-454B	77.00	0.64	lb/ton	Medium Chiller
Trane Technologies	CG-PRC017W	130.00	Medium Chiller	R-454B	93.00	0.72	lb/ton	Medium Chiller
Trane Technologies	5TTA3036A3000A	3.00	Small Commercial Unitary AC	R-454B	3.00	1.00	lb/ton	Small Commercial Split AC
Trane Technologies	5TTA3042A3000A	3.50	Small Commercial Unitary AC	R-454B	4.00	1.14	lb/ton	Small Commercial Split AC
Trane Technologies	5TTA3048A3000A	4.00	Small Commercial Unitary AC	R-454B	4.00	1.00	lb/ton	Small Commercial Split AC
Trane Technologies	5TTA3060A3000A	5.00	Small Commercial Unitary AC	R-454B	5.00	1.00	lb/ton	Small Commercial Split AC
Trane Technologies	5TTA3036A4000A	3.00	Small Commercial Unitary AC	R-454B	3.00	1.00	lb/ton	Small Commercial Split AC
Trane Technologies	5TTA3042A4000A	3.50	Small Commercial Unitary AC	R-454B	4.00	1.14	lb/ton	Small Commercial Split AC
Trane Technologies	5TTA3048A4000A	4.00	Small Commercial Unitary AC	R-454B	4.00	1.00	lb/ton	Small Commercial Split AC
Trane Technologies	5TTA3060A4000A	5.00	Small Commercial Unitary AC	R-454B	5.00	1.00	lb/ton	Small Commercial Split AC
Trane Technologies	5TWA4036A3000A	3.00	Small Commercial Unitary AC	R-454B	5.00	1.67	lb/ton	Small Commercial Split HP
Trane Technologies	5TWA4042A3000A	3.50	Small Commercial Unitary AC	R-454B	7.00	2.00	lb/ton	Small Commercial Split HP
Trane Technologies	5TWA4048A3000A	4.00	Small Commercial Unitary AC	R-454B	8.00	2.00	lb/ton	Small Commercial Split HP
Trane Technologies	5TWA4060A3000A	5.00	Small Commercial Unitary AC	R-454B	8.00	1.60	lb/ton	Small Commercial Split HP
Trane Technologies	5TWA4036A4000A	3.00	Small Commercial Unitary AC	R-454B	5.00	1.67	lb/ton	Small Commercial Split HP
Trane Technologies	5TWA4042A4000A	3.50	Small Commercial Unitary AC	R-454B	7.00	2.00	lb/ton	Small Commercial Split HP
Trane Technologies	5TWA4048A4000A	4.00	Small Commercial Unitary AC	R-454B	8.00	2.00	lb/ton	Small Commercial Split HP
Trane Technologies	5TWA4060A4000A	5.00	Small Commercial Unitary AC	R-454B	8.00	1.60	lb/ton	Small Commercial Split HP
Trane Technologies	5TTX7024A	2.00	Small Commercial Unitary AC	R-454B	4.00	2.00	lb/ton	Small Commercial Split AC

Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
Trane Technologies	5TTX7036A	3.00	Small Commercial Unitary AC	R-454B	4.00	1.33	lb/ton	Small Commercial Split AC
Trane Technologies	5TTX7048A	4.00	Small Commercial Unitary AC	R-454B	6.00	1.50	lb/ton	Small Commercial Split AC
Trane Technologies	5TTX7060A	5.00	Small Commercial Unitary AC	R-454B	6.00	1.20	lb/ton	Small Commercial Split AC
Trane Technologies	5TWX7024A	2.00	Small Commercial Unitary AC	R-454B	4.00	2.00	lb/ton	Small Commercial Split HP
Trane Technologies	5TWX7036A	3.00	Small Commercial Unitary AC	R-454B	4.00	1.33	lb/ton	Small Commercial Split HP
Trane Technologies	5TWX7048A	4.00	Small Commercial Unitary AC	R-454B	6.00	1.50	lb/ton	Small Commercial Split HP
Trane Technologies	5TWX7060A	5.00	Small Commercial Unitary AC	R-454B	6.00	1.20	lb/ton	Small Commercial Split HP
Rheem Manufacturing Company	RACAYB***AJT	2.00	Small Commercial Unitary AC	R-454B	2.38	1.19	lb/ton	Small Commercial Packaged AC
Rheem Manufacturing Company	RACAYB***ACT	2.50	Small Commercial Unitary AC	R-454B	2.90	1.16	lb/ton	Small Commercial Packaged AC
Rheem Manufacturing Company	RACAYB***AJT	2.50	Small Commercial Unitary AC	R-454B	2.90	1.16	lb/ton	Small Commercial Packaged AC
Rheem Manufacturing Company	RACAYB***ACT	3.00	Small Commercial Unitary AC	R-454B	3.00	1.00	lb/ton	Small Commercial Packaged AC
Rheem Manufacturing Company	RACAYB***ADT	3.00	Small Commercial Unitary AC	R-454B	3.00	1.00	lb/ton	Small Commercial Packaged AC
Rheem Manufacturing Company	RACAYB***AJT	3.00	Small Commercial Unitary AC	R-454B	3.00	1.00	lb/ton	Small Commercial Packaged AC
Rheem Manufacturing Company	RACAYB***ACT	3.50	Small Commercial Unitary AC	R-454B	4.33	1.24	lb/ton	Small Commercial Packaged AC
Rheem Manufacturing Company	RACAYB***AJT	3.50	Small Commercial Unitary AC	R-454B	4.33	1.24	lb/ton	Small Commercial Packaged AC
Rheem Manufacturing Company	RACAYB***ACT	4.00	Small Commercial Unitary AC	R-454B	4.90	1.23	lb/ton	Small Commercial Packaged AC

Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
Rheem Manufacturing Company	RACAYB***ADT	4.00	Small Commercial Unitary AC	R-454B	4.90	1.23	lb/ton	Small Commercial Packaged AC
Rheem Manufacturing Company	RACAYB***AJT	4.00	Small Commercial Unitary AC	R-454B	4.90	1.23	lb/ton	Small Commercial Packaged AC
Rheem Manufacturing Company	RACAYB***ACT	5.00	Small Commercial Unitary AC	R-454B	5.00	1.00	lb/ton	Small Commercial Packaged AC
Rheem Manufacturing Company	RACAYB***ADT	5.00	Small Commercial Unitary AC	R-454B	5.00	1.00	lb/ton	Small Commercial Packaged AC
Rheem Manufacturing Company	RACAYB***AJT	5.00	Small Commercial Unitary AC	R-454B	5.00	1.00	lb/ton	Small Commercial Packaged AC
Rheem Manufacturing Company	RACHYB	15.00	Large Commercial Unitary AC	R-454B	18.25	1.22	lb/ton	Large Commercial Packaged AC
Rheem Manufacturing Company	RACHYB	17.50	Large Commercial Unitary AC	R-454B	20.60	1.18	lb/ton	Large Commercial Packaged AC
Rheem Manufacturing Company	RACHYB	20.00	Large Commercial Unitary AC	R-454B	26.20	1.31	lb/ton	Large Commercial Packaged AC
Rheem Manufacturing Company	RACHYB	25.00	Large Commercial Unitary AC	R-454B	27.80	1.11	lb/ton	Large Commercial Packaged AC
Rheem Manufacturing Company	RACGYB	15.00	Large Commercial Unitary AC	R-454B	21.06	1.40	lb/ton	Large Commercial Packaged AC
Rheem Manufacturing Company	RACGYB	17.50	Large Commercial Unitary AC	R-454B	26.63	1.52	lb/ton	Large Commercial Packaged AC
Rheem Manufacturing Company	RACGYB	20.00	Large Commercial Unitary AC	R-454B	25.00	1.25	lb/ton	Large Commercial Packaged AC
Rheem Manufacturing Company	RACGYB	25.00	Large Commercial Unitary AC	R-454B	26.63	1.07	lb/ton	Large Commercial Packaged AC

Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
Rheem Manufacturing Company	RACHYB	30.00	Large Commercial Unitary AC	R-454B	26.75	0.89	lb/ton	Large Commercial Packaged AC
Rheem Manufacturing Company	RACDYB	7.50	Small Commercial Unitary AC	R-454B	5.50	0.73	lb/ton	Medium Commercial Packaged AC
Rheem Manufacturing Company	RACDYB	8.50	Small Commercial Unitary AC	R-454B	7.13	0.84	lb/ton	Medium Commercial Packaged AC
Rheem Manufacturing Company	RACDYB	10.00	Small Commercial Unitary AC	R-454B	10.69	1.07	lb/ton	Medium Commercial Packaged AC
Rheem Manufacturing Company	RACDYB	12.50	Small Commercial Unitary AC	R-454B	10.50	0.84	lb/ton	Medium Commercial Packaged AC
Rheem Manufacturing Company	RP19AY	2.00	Small Commercial Unitary AC	R-454B	12.50	6.25	lb/ton	Small Commercial Split HP
Rheem Manufacturing Company	RP19AY	3.00	Small Commercial Unitary AC	R-454B	12.50	4.17	lb/ton	Small Commercial Split HP
Rheem Manufacturing Company	RP19AY	4.00	Small Commercial Unitary AC	R-454B	12.50	3.13	lb/ton	Small Commercial Split HP
Rheem Manufacturing Company	RP19AY	5.00	Small Commercial Unitary AC	R-454B	13.13	2.63	lb/ton	Small Commercial Split HP
Rheem Manufacturing Company	RD18AY	2.00	Small Commercial Unitary AC	R-454B	4.75	2.38	lb/ton	Small Commercial Split HP
Rheem Manufacturing Company	RD18AY	3.00	Small Commercial Unitary AC	R-454B	8.81	2.94	lb/ton	Small Commercial Split HP
Rheem Manufacturing Company	RD18AY	4.00	Small Commercial Unitary AC	R-454B	12.13	3.03	lb/ton	Small Commercial Split HP
Rheem Manufacturing Company	RD18AY	5.00	Small Commercial Unitary AC	R-454B	13.88	2.78	lb/ton	Small Commercial Split HP

Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
Rheem Manufacturing Company	RP14AY	1.50	Small Commercial Unitary AC	R-454B	5.19	3.46	lb/ton	Small Commercial Split HP
Rheem Manufacturing Company	RP14AY	2.00	Small Commercial Unitary AC	R-454B	5.19	2.59	lb/ton	Small Commercial Split HP
Rheem Manufacturing Company	RP14AY	2.50	Small Commercial Unitary AC	R-454B	6.19	2.48	lb/ton	Small Commercial Split HP
Rheem Manufacturing Company	RP14AY	3.00	Small Commercial Unitary AC	R-454B	5.88	1.96	lb/ton	Small Commercial Split HP
Rheem Manufacturing Company	RP14AY	3.50	Small Commercial Unitary AC	R-454B	8.13	2.32	lb/ton	Small Commercial Split HP
Rheem Manufacturing Company	RP14AY	4.00	Small Commercial Unitary AC	R-454B	7.19	1.80	lb/ton	Small Commercial Split HP
Rheem Manufacturing Company	RP14AY	5.00	Small Commercial Unitary AC	R-454B	12.13	2.43	lb/ton	Small Commercial Split HP
Rheem Manufacturing Company	RHPCYB	3.00	Small Commercial Unitary AC	R-454B	5.25	1.75	lb/ton	Small Commercial Packaged HP
Rheem Manufacturing Company	RHPCYB	4.00	Small Commercial Unitary AC	R-454B	8.94	2.23	lb/ton	Small Commercial Packaged HP
Rheem Manufacturing Company	RHPCYB	5.00	Small Commercial Unitary AC	R-454B	9.13	1.83	lb/ton	Small Commercial Packaged HP
Rheem Manufacturing Company	RHPCYB	6.00	Small Commercial Unitary AC	R-454B	8.88	1.48	lb/ton	Medium Commercial Packaged HP
Daikin Industries	DP3DM	2.00	Small Commercial Unitary AC	R-410A	6.75	3.38	lb/ton	Small Commercial Packaged AC
Daikin Industries	DP3DM	2.50	Small Commercial Unitary AC	R-410A	7.13	2.85	lb/ton	Small Commercial Packaged AC
Daikin Industries	DP3DM	3.00	Small Commercial Unitary AC	R-410A	6.88	2.29	lb/ton	Small Commercial Packaged AC
Daikin Industries	DP3DM	3.50	Small Commercial Unitary AC	R-410A	10.25	2.93	lb/ton	Small Commercial Packaged AC



Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
Daikin Industries	DP3DM	4.00	Small Commercial Unitary AC	R-410A	9.25	2.31	lb/ton	Small Commercial Packaged AC
Carrier Corporation	26VNA1	2.00	Small Commercial Unitary AC	R-454B	5.20	2.60	lb/ton	Small Commercial Split AC
Carrier Corporation	26VNA1	3.00	Small Commercial Unitary AC	R-454B	6.00	2.00	lb/ton	Small Commercial Split AC
Carrier Corporation	26VNA1	4.00	Small Commercial Unitary AC	R-454B	6.40	1.60	lb/ton	Small Commercial Split AC
Carrier Corporation	26VNA1	5.00	Small Commercial Unitary AC	R-454B	7.70	1.54	lb/ton	Small Commercial Split AC
Carrier Corporation	24ABB3-15PD	1.50	Small Commercial Unitary AC	R-410A	3.15	2.10	lb/ton	Small Commercial Split AC
Carrier Corporation	24ABB3-15PD	2.00	Small Commercial Unitary AC	R-410A	3.15	1.58	lb/ton	Small Commercial Split AC
Carrier Corporation	24ABB3-15PD	2.50	Small Commercial Unitary AC	R-410A	4.62	1.85	lb/ton	Small Commercial Split AC
Carrier Corporation	24ABB3-15PD	2.50	Small Commercial Unitary AC	R-410A	4.10	1.64	lb/ton	Small Commercial Split AC
Carrier Corporation	24ABB3-15PD	3.00	Small Commercial Unitary AC	R-410A	5.42	1.81	lb/ton	Small Commercial Split AC
Carrier Corporation	24ABB3-15PD	3.00	Small Commercial Unitary AC	R-410A	5.34	1.78	lb/ton	Small Commercial Split AC
Carrier Corporation	24ABB3-15PD	3.50	Small Commercial Unitary AC	R-410A	5.84	1.67	lb/ton	Small Commercial Split AC
Carrier Corporation	24ABB3-15PD	4.00	Small Commercial Unitary AC	R-410A	7.37	1.84	lb/ton	Small Commercial Split AC
Carrier Corporation	24ABB3-15PD	4.00	Small Commercial Unitary AC	R-410A	7.00	1.75	lb/ton	Small Commercial Split AC
Carrier Corporation	24ABB3-15PD	5.00	Small Commercial Unitary AC	R-410A	8.80	1.76	lb/ton	Small Commercial Split AC
Carrier Corporation	24ABB3-15PD	5.00	Small Commercial Unitary AC	R-410A	8.00	1.60	lb/ton	Small Commercial Split AC
LG Electronics	LT1016CER	0.83	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	HFC-32	0.93	1.11	lb/ton	PTAC
LG Electronics	LT1036CER	0.83	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	HFC-32	0.93	1.11	lb/ton	PTAC

Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
LG Electronics	LT12124CNR	1.00	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	HFC-32	0.93	0.93	lb/ton	PTAC
LG Electronics	LT1236CER	1.00	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	HFC-32	1.06	1.06	lb/ton	PTAC
LG Electronics	LT1430CNR	1.17	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	HFC-32	1.14	0.98	lb/ton	PTAC
LG Electronics	LT1033HNR	0.83	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	HFC-32	0.84	1.01	lb/ton	PTAC
LG Electronics	LT1233HNR	1.00	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	HFC-32	0.88	0.88	lb/ton	PTAC
LG Electronics	LP073CDUC	0.58	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	R-410A	1.63	2.80	lb/ton	PTHP
LG Electronics	LP093CDUC	0.75	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	R-410A	1.33	1.77	lb/ton	PTHP
LG Electronics	LP123CDUC	1.00	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	R-410A	1.34	1.34	lb/ton	PTHP
LG Electronics	LP153CDUC	1.25	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	R-410A	1.95	1.56	lb/ton	PTHP
Lennox International	ELS150S4DS1J	12.50	Large Commercial Unitary AC	R-410A	30.00	2.40	lb/ton	Large Commercial Split AC
Lennox International	ELS180S4DS1J	15.00	Large Commercial Unitary AC	R-410A	48.00	3.20	lb/ton	Large Commercial Split AC
Lennox International	ELS240S4DS1J	20.00	Large Commercial Unitary AC	R-410A	45.44	2.27	lb/ton	Large Commercial Split AC
Daikin Industries	DFC0903D000001S	7.50	Small Commercial Unitary AC	R-410A	8.28	1.10	lb/ton	Medium Commercial Packaged AC
Daikin Industries	DFC1023D000001S	8.50	Small Commercial Unitary AC	R-410A	8.69	1.02	lb/ton	Medium Commercial Packaged AC
Daikin Industries	DFC1203D000001S	10.00	Small Commercial Unitary AC	R-410A	10.06	1.01	lb/ton	Medium Commercial Packaged AC
Daikin Industries	DFC1503D000001S	12.50	Large Commercial Unitary AC	R-410A	18.13	1.45	lb/ton	Large Commercial Packaged AC

Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
Carrier Corporation	38AXZ*07	6.00	Small Commercial Unitary AC	R-454B	15.50	2.58	lb/ton	Medium Commercial Split AC
Carrier Corporation	38AXZ*08	7.50	Small Commercial Unitary AC	R-454B	16.40	2.19	lb/ton	Medium Commercial Split AC
Carrier Corporation	38AXZ*12	10.00	Small Commercial Unitary AC	R-454B	18.20	1.82	lb/ton	Medium Commercial Split AC
Carrier Corporation	38AXZ*14	12.50	Large Commercial Unitary AC	R-454B	26.10	2.09	lb/ton	Large Commercial Split AC
Carrier Corporation	38AXZ*16	15.00	Large Commercial Unitary AC	R-454B	34.00	2.27	lb/ton	Large Commercial Split AC
Carrier Corporation	38AXZ*25	20.00	Large Commercial Unitary AC	R-454B	36.50	1.83	lb/ton	Large Commercial Split AC
Carrier Corporation	38AXQ*07	6.00	Small Commercial Unitary AC	R-454B	18.00	3.00	lb/ton	Medium Commercial Split HP
Carrier Corporation	38AXQ*08	7.50	Small Commercial Unitary AC	R-454B	24.50	3.27	lb/ton	Medium Commercial Split HP
Carrier Corporation	38AXQ*12	10.00	Small Commercial Unitary AC	R-454B	27.00	2.70	lb/ton	Medium Commercial Split HP
Carrier Corporation	38AXQ*16	15.00	Large Commercial Unitary AC	R-454B	24.00	1.60	lb/ton	Large Commercial Split HP
Carrier Corporation	38AXQ*25	20.00	Large Commercial Unitary AC	R-454B	23.50	1.18	lb/ton	Large Commercial Split HP
Carrier Corporation	48FC*M08	7.50	Small Commercial Unitary AC	R-410A	13.19	1.76	lb/ton	Medium Commercial Packaged AC
Carrier Corporation	48FC*M09	8.50	Small Commercial Unitary AC	R-410A	14.00	1.65	lb/ton	Medium Commercial Packaged AC
Carrier Corporation	48FC*M12	10.00	Small Commercial Unitary AC	R-410A	15.19	1.52	lb/ton	Medium Commercial Packaged AC
Carrier Corporation	48FC*M14	12.50	Large Commercial Unitary AC	R-410A	19.50	1.56	lb/ton	Large Commercial Packaged AC
Carrier Corporation	48FC*M16	15.00	Large Commercial Unitary AC	R-410A	24.00	1.60	lb/ton	Large Commercial Packaged AC
Carrier Corporation	48FC*M20	17.50	Large Commercial Unitary AC	R-410A	28.88	1.65	lb/ton	Large Commercial Packaged AC
Carrier Corporation	48FC*M24	20.00	Large Commercial Unitary AC	R-410A	32.00	1.60	lb/ton	Large Commercial Packaged AC
Carrier Corporation	48FC*M28	25.00	Large Commercial Unitary AC	R-410A	37.63	1.51	lb/ton	Large Commercial Packaged AC

Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
Carrier Corporation	48FC*M30	27.50	Large Commercial Unitary AC	R-410A	46.00	1.67	lb/ton	Large Commercial Packaged AC
Carrier Corporation	48FE*M04	3.00	Small Commercial Unitary AC	R-454B	4.31	1.44	lb/ton	Small Commercial Packaged AC
Carrier Corporation	48FE*M05	4.00	Small Commercial Unitary AC	R-454B	8.81	2.20	lb/ton	Small Commercial Packaged AC
Carrier Corporation	48FE*M06	5.00	Small Commercial Unitary AC	R-454B	7.69	1.54	lb/ton	Small Commercial Packaged AC
Carrier Corporation	48FE*M07	6.00	Small Commercial Unitary AC	R-454B	7.81	1.30	lb/ton	Medium Commercial Packaged AC
Carrier Corporation	48FE*M08	7.50	Small Commercial Unitary AC	R-454B	10.19	1.36	lb/ton	Medium Commercial Packaged AC
Carrier Corporation	48FE*M09	8.50	Small Commercial Unitary AC	R-454B	10.75	1.26	lb/ton	Medium Commercial Packaged AC
Carrier Corporation	48FE*M12	10.00	Small Commercial Unitary AC	R-454B	14.38	1.44	lb/ton	Medium Commercial Packaged AC
Carrier Corporation	48FE*M14	12.50	Large Commercial Unitary AC	R-454B	19.50	1.56	lb/ton	Large Commercial Packaged AC
Carrier Corporation	48FE*M16	15.00	Large Commercial Unitary AC	R-454B	22.00	1.47	lb/ton	Large Commercial Packaged AC
Carrier Corporation	48FE*M20	17.50	Large Commercial Unitary AC	R-454B	23.38	1.34	lb/ton	Large Commercial Packaged AC
Carrier Corporation	48FE*M24	20.00	Large Commercial Unitary AC	R-454B	28.63	1.43	lb/ton	Large Commercial Packaged AC
Carrier Corporation	48FE*M28	25.00	Large Commercial Unitary AC	R-454B	29.50	1.18	lb/ton	Large Commercial Packaged AC
Carrier Corporation	48FE*M30	27.50	Large Commercial Unitary AC	R-454B	38.00	1.38	lb/ton	Large Commercial Packaged AC
Daikin Industries	DSC1803D000001S	15.00	Large Commercial Unitary AC	HFC-32	12.19	0.81	lb/ton	Large Commercial Packaged AC
Daikin Industries	DSC2403D000001S	20.00	Large Commercial Unitary AC	HFC-32	18.13	0.91	lb/ton	Large Commercial Packaged AC
Daikin Industries	DSC3003D000001S	25.00	Large Commercial Unitary AC	HFC-32	21.31	0.85	lb/ton	Large Commercial Packaged AC
Daikin Industries	DSC0903D000001S	7.50	Small Commercial Unitary AC	HFC-32	6.63	0.88	lb/ton	Medium Commercial Packaged AC
Daikin Industries	DSC1023D000001S	8.50	Small Commercial Unitary AC	HFC-32	7.00	0.82	lb/ton	Medium Commercial Packaged AC

Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
Daikin Industries	DSC1203D000001S	10.00	Small Commercial Unitary AC	HFC-32	9.00	0.90	lb/ton	Medium Commercial Packaged AC
Daikin Industries	DSC1503D000001S	12.50	Large Commercial Unitary AC	HFC-32	13.81	1.11	lb/ton	Large Commercial Packaged AC
Daikin Industries	DSC0363D000001S	3.00	Small Commercial Unitary AC	HFC-32	2.88	0.96	lb/ton	Small Commercial Packaged AC
Daikin Industries	DSC0483D000001S	4.00	Small Commercial Unitary AC	HFC-32	3.69	0.92	lb/ton	Small Commercial Packaged AC
Daikin Industries	DSC0603D000001S	5.00	Small Commercial Unitary AC	HFC-32	3.94	0.79	lb/ton	Small Commercial Packaged AC
Daikin Industries	DSC0723D000001S	6.00	Small Commercial Unitary AC	HFC-32	5.13	0.85	lb/ton	Medium Commercial Packaged AC
Daikin Industries	DC6TE09030	7.50	Small Commercial Unitary AC	HFC-32	6.88	0.92	lb/ton	Medium Commercial Split AC
Daikin Industries	DC6TE09040	7.50	Small Commercial Unitary AC	HFC-32	6.88	0.92	lb/ton	Medium Commercial Split AC
Daikin Industries	DC6TE12030	10.00	Small Commercial Unitary AC	HFC-32	6.88	0.69	lb/ton	Medium Commercial Split AC
Daikin Industries	DC6TE12040	10.00	Small Commercial Unitary AC	HFC-32	6.88	0.69	lb/ton	Medium Commercial Split AC
Daikin Industries	DH6TE09030	7.50	Small Commercial Unitary AC	HFC-32	6.88	0.92	lb/ton	Medium Commercial Split HP
Daikin Industries	DH6TE09040	7.50	Small Commercial Unitary AC	HFC-32	6.88	0.92	lb/ton	Medium Commercial Split HP
Daikin Industries	DH6TE12030	10.00	Small Commercial Unitary AC	HFC-32	6.88	0.69	lb/ton	Medium Commercial Split HP
Daikin Industries	DH6TE12040	10.00	Small Commercial Unitary AC	HFC-32	6.88	0.69	lb/ton	Medium Commercial Split HP
Daikin Industries	DSH0361D000001S	3.00	Small Commercial Unitary AC	HFC-32	8.75	2.92	lb/ton	Small Commercial Packaged HP
Daikin Industries	DSH0481D000001S	4.00	Small Commercial Unitary AC	HFC-32	10.50	2.63	lb/ton	Small Commercial Packaged HP
Daikin Industries	DSH0601D000001S	5.00	Small Commercial Unitary AC	HFC-32	10.19	2.04	lb/ton	Small Commercial Packaged HP
Daikin Industries	DSH0901D000001S	7.50	Small Commercial Unitary AC	HFC-32	17.88	2.38	lb/ton	Medium Commercial Packaged HP
Daikin Industries	DSH1021D000001S	8.33	Small Commercial Unitary AC	HFC-32	19.00	2.28	lb/ton	Medium Commercial Packaged HP

Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
Daikin Industries	DSH1201D000001S	10.00	Small Commercial Unitary AC	HFC-32	17.56	1.76	lb/ton	Medium Commercial Packaged HP
Trane Technologies	ACS140	140.00	Medium Chiller	R-454B	50.00	0.36	lb/ton	Medium Chiller
Trane Technologies	ACS160	160.00	Large Chiller	R-454B	54.00	0.34	lb/ton	Large Chiller
Trane Technologies	ACS180	180.00	Large Chiller	R-454B	63.00	0.35	lb/ton	Large Chiller
Trane Technologies	ACS200	200.00	Large Chiller	R-454B	63.00	0.32	lb/ton	Large Chiller
Trane Technologies	ACS215	215.00	Large Chiller	R-454B	75.00	0.35	lb/ton	Large Chiller
Trane Technologies	ACS230	230.00	Large Chiller	R-454B	82.00	0.36	lb/ton	Large Chiller
Trane Technologies	ACX080	80.00	Medium Chiller	R-454B	92.00	1.15	lb/ton	Medium Chiller
Trane Technologies	ACX100	100.00	Medium Chiller	R-454B	115.00	1.15	lb/ton	Medium Chiller
Trane Technologies	ACX120	120.00	Medium Chiller	R-454B	115.00	0.96	lb/ton	Medium Chiller
Trane Technologies	ACX140	140.00	Medium Chiller	R-454B	121.00	0.86	lb/ton	Medium Chiller
Trane Technologies	ACX160	160.00	Large Chiller	R-454B	121.00	0.76	lb/ton	Large Chiller
Trane Technologies	ACX180	180.00	Large Chiller	R-454B	163.00	0.91	lb/ton	Large Chiller
Trane Technologies	ACX200	200.00	Large Chiller	R-454B	163.00	0.82	lb/ton	Large Chiller
Trane Technologies	ACX215	215.00	Large Chiller	R-454B	187.00	0.87	lb/ton	Large Chiller
Trane Technologies	ACX230	230.00	Large Chiller	R-454B	189.00	0.82	lb/ton	Large Chiller
Trane Technologies	WSK036	3.00	Small Commercial Unitary AC	R-454B	6.10	2.03	lb/ton	Small Commercial Packaged HP
Trane Technologies	WSK048	4.00	Small Commercial Unitary AC	R-454B	7.90	1.98	lb/ton	Small Commercial Packaged HP
Trane Technologies	WSK060	5.00	Small Commercial Unitary AC	R-454B	8.00	1.60	lb/ton	Small Commercial Packaged HP

Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
Trane Technologies	WSK072	6.00	Small Commercial Unitary AC	R-454B	15.20	2.53	lb/ton	Medium Commercial Packaged HP
Trane Technologies	WSK090	7.50	Small Commercial Unitary AC	R-454B	15.50	2.07	lb/ton	Medium Commercial Packaged HP
Trane Technologies	WSK102	8.50	Small Commercial Unitary AC	R-454B	16.50	1.94	lb/ton	Medium Commercial Packaged HP
Trane Technologies	WSK120	10.00	Small Commercial Unitary AC	R-454B	21.50	2.15	lb/ton	Medium Commercial Packaged HP
Trane Technologies	WSK150	12.50	Large Commercial Unitary AC	R-454B	31.50	2.52	lb/ton	Large Commercial Packaged HP
Trane Technologies	WSK180	15.00	Large Commercial Unitary AC	R-454B	32.00	2.13	lb/ton	Large Commercial Packaged HP
Trane Technologies	WSK210	17.50	Large Commercial Unitary AC	R-454B	31.00	1.77	lb/ton	Large Commercial Packaged HP
Trane Technologies	WSK240	20.00	Large Commercial Unitary AC	R-454B	38.00	1.90	lb/ton	Large Commercial Packaged HP
Trane Technologies	WSK300	25.00	Large Commercial Unitary AC	R-454B	35.00	1.40	lb/ton	Large Commercial Packaged HP
Trane Technologies	TSK036	3.00	Small Commercial Unitary AC	R-454B	3.10	1.03	lb/ton	Small Commercial Packaged AC
Trane Technologies	TSK048	4.00	Small Commercial Unitary AC	R-454B	3.30	0.83	lb/ton	Small Commercial Packaged AC
Trane Technologies	TSK060	5.00	Small Commercial Unitary AC	R-454B	3.90	0.78	lb/ton	Small Commercial Packaged AC
Trane Technologies	TSK072	6.00	Small Commercial Unitary AC	R-454B	8.00	1.33	lb/ton	Medium Commercial Packaged AC
Trane Technologies	TSK090	7.50	Small Commercial Unitary AC	R-454B	7.60	1.01	lb/ton	Medium Commercial Packaged AC
Trane Technologies	TSK102	8.50	Small Commercial Unitary AC	R-454B	8.30	0.98	lb/ton	Medium Commercial Packaged AC
Trane Technologies	TSK120	10.00	Small Commercial Unitary AC	R-454B	8.00	0.80	lb/ton	Medium Commercial Packaged AC
Trane Technologies	TSK150	12.50	Large Commercial Unitary AC	R-454B	9.80	0.78	lb/ton	Large Commercial Packaged AC
Trane Technologies	TSK180	15.00	Large Commercial Unitary AC	R-454B	11.80	0.79	lb/ton	Large Commercial Packaged AC
Trane Technologies	TSK210	17.50	Large Commercial Unitary AC	R-454B	12.00	0.69	lb/ton	Large Commercial Packaged AC



Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
Trane Technologies	TSK240	20.00	Large Commercial Unitary AC	R-454B	14.00	0.70	lb/ton	Large Commercial Packaged AC
Trane Technologies	TSK300	25.00	Large Commercial Unitary AC	R-454B	14.60	0.58	lb/ton	Large Commercial Packaged AC
Trane Technologies	TTA072	6.00	Small Commercial Unitary AC	R-454B	8.60	1.43	lb/ton	Medium Commercial Split AC
Trane Technologies	TTA090	7.50	Small Commercial Unitary AC	R-454B	8.70	1.16	lb/ton	Medium Commercial Split AC
Trane Technologies	TTA120	10.00	Small Commercial Unitary AC	R-454B	11.10	1.11	lb/ton	Medium Commercial Split AC
Trane Technologies	TTA150	12.50	Large Commercial Unitary AC	R-454B	19.90	1.59	lb/ton	Large Commercial Split AC
Trane Technologies	TTA180	15.00	Large Commercial Unitary AC	R-454B	22.50	1.50	lb/ton	Large Commercial Split AC
Trane Technologies	TTA240	20.00	Large Commercial Unitary AC	R-454B	23.80	1.19	lb/ton	Large Commercial Split AC
Trane Technologies	TTA300	25.00	Large Commercial Unitary AC	R-454B	29.80	1.19	lb/ton	Large Commercial Split AC
Carrier Corporation	30RC010-MCHX	10.00	Medium Chiller	HFC-32	7.50	0.75	lb/ton	Medium Chiller
Carrier Corporation	30RC015-MCHX	15.00	Medium Chiller	HFC-32	8.00	0.53	lb/ton	Medium Chiller
Carrier Corporation	30RC020-MCHX	20.00	Medium Chiller	HFC-32	10.50	0.53	lb/ton	Medium Chiller
Carrier Corporation	30RC025-MCHX	25.00	Medium Chiller	HFC-32	12.75	0.51	lb/ton	Medium Chiller
Carrier Corporation	30RC010-RTPF	10.00	Medium Chiller	HFC-32	15.50	1.55	lb/ton	Medium Chiller
Carrier Corporation	30RC015-RTPF	15.00	Medium Chiller	HFC-32	16.50	1.10	lb/ton	Medium Chiller
Carrier Corporation	30RC020-RTPF	20.00	Medium Chiller	HFC-32	21.75	1.09	lb/ton	Medium Chiller
Carrier Corporation	30RC025-RTPF	25.00	Medium Chiller	HFC-32	26.50	1.06	lb/ton	Medium Chiller
Carrier Corporation	30RC030-MCHX	30.00	Medium Chiller	HFC-32	14.00	0.47	lb/ton	Medium Chiller
Carrier Corporation	30RC035-MCHX	35.00	Medium Chiller	HFC-32	25.00	0.71	lb/ton	Medium Chiller



Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
Carrier Corporation	30RC040-MCHX	40.00	Medium Chiller	HFC-32	26.00	0.65	lb/ton	Medium Chiller
Carrier Corporation	30RC045-MCHX	45.00	Medium Chiller	HFC-32	27.00	0.60	lb/ton	Medium Chiller
Carrier Corporation	30RC050-MCHX	50.00	Medium Chiller	HFC-32	27.50	0.55	lb/ton	Medium Chiller
Carrier Corporation	30RC055-MCHX	55.00	Medium Chiller	HFC-32	28.00	0.51	lb/ton	Medium Chiller
Carrier Corporation	30RC060-MCHX	60.00	Medium Chiller	HFC-32	28.00	0.47	lb/ton	Medium Chiller
Carrier Corporation	30RC030-RTPF	30.00	Medium Chiller	HFC-32	29.00	0.97	lb/ton	Medium Chiller
Carrier Corporation	30RC035-RTPF	35.00	Medium Chiller	HFC-32	52.00	1.49	lb/ton	Medium Chiller
Carrier Corporation	30RC040-RTPF	40.00	Medium Chiller	HFC-32	54.00	1.35	lb/ton	Medium Chiller
Carrier Corporation	30RC045-RTPF	45.00	Medium Chiller	HFC-32	56.00	1.24	lb/ton	Medium Chiller
Carrier Corporation	30RC050-RTPF	50.00	Medium Chiller	HFC-32	57.00	1.14	lb/ton	Medium Chiller
Carrier Corporation	30RC055-RTPF	55.00	Medium Chiller	HFC-32	58.00	1.05	lb/ton	Medium Chiller
Carrier Corporation	30RC060-RTPF	60.00	Medium Chiller	HFC-32	58.00	0.97	lb/ton	Medium Chiller
Carrier Corporation	30RC067-MCHX/BPHE	67.00	Medium Chiller	HFC-32	46.90	0.70	lb/ton	Medium Chiller
Carrier Corporation	30RC072-MCHX/BPHE	72.00	Medium Chiller	HFC-32	52.30	0.73	lb/ton	Medium Chiller
Carrier Corporation	30RC082-MCHX/BPHE	82.00	Medium Chiller	HFC-32	57.60	0.70	lb/ton	Medium Chiller
Carrier Corporation	30RC092C-MCHX/BPHE	92.00	Medium Chiller	HFC-32	57.20	0.62	lb/ton	Medium Chiller
Carrier Corporation	30RC092-MCHX/BPHE	92.00	Medium Chiller	HFC-32	73.60	0.80	lb/ton	Medium Chiller
Carrier Corporation	30RC102C-MCHX/BPHE	102.00	Medium Chiller	HFC-32	58.10	0.57	lb/ton	Medium Chiller
Carrier Corporation	30RC102-MCHX/BPHE	102.00	Medium Chiller	HFC-32	73.20	0.72	lb/ton	Medium Chiller

Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
Carrier Corporation	30RC112-MCHX/BPHE	112.00	Medium Chiller	HFC-32	80.00	0.71	lb/ton	Medium Chiller
Carrier Corporation	30RC122C-MCHX/BPHE	122.00	Medium Chiller	HFC-32	78.90	0.65	lb/ton	Medium Chiller
Carrier Corporation	30RC122-MCHX/BPHE	122.00	Medium Chiller	HFC-32	87.10	0.71	lb/ton	Medium Chiller
Carrier Corporation	30RC132C-MCHX/BPHE	132.00	Medium Chiller	HFC-32	86.10	0.65	lb/ton	Medium Chiller
Carrier Corporation	30RC132-MCHX/BPHE	132.00	Medium Chiller	HFC-32	97.20	0.74	lb/ton	Medium Chiller
Carrier Corporation	30RC152C-MCHX/BPHE	152.00	Large Chiller	HFC-32	81.20	0.53	lb/ton	Large Chiller
Carrier Corporation	30RC152-MCHX/BPHE	152.00	Large Chiller	HFC-32	92.80	0.61	lb/ton	Large Chiller
Carrier Corporation	30RC067-AL-CU/BPHE	67.00	Medium Chiller	HFC-32	116.60	1.74	lb/ton	Medium Chiller
Carrier Corporation	30RC072-AL-CU/BPHE	72.00	Medium Chiller	HFC-32	121.90	1.69	lb/ton	Medium Chiller
Carrier Corporation	30RC082-AL-CU/BPHE	82.00	Medium Chiller	HFC-32	127.40	1.55	lb/ton	Medium Chiller
Carrier Corporation	30RC092C-AL-CU/BPHE	92.00	Medium Chiller	HFC-32	127.20	1.38	lb/ton	Medium Chiller
Carrier Corporation	30RC092-AL-CU/BPHE	92.00	Medium Chiller	HFC-32	176.70	1.92	lb/ton	Medium Chiller
Carrier Corporation	30RC102C-AL-CU/BPHE	102.00	Medium Chiller	HFC-32	128.10	1.26	lb/ton	Medium Chiller
Carrier Corporation	30RC102-AL-CU/BPHE	102.00	Medium Chiller	HFC-32	177.80	1.74	lb/ton	Medium Chiller
Carrier Corporation	30RC112-AL-CU/BPHE	112.00	Medium Chiller	HFC-32	184.60	1.65	lb/ton	Medium Chiller
Carrier Corporation	30RC122C-AL-CU/BPHE	122.00	Medium Chiller	HFC-32	184.00	1.51	lb/ton	Medium Chiller
Carrier Corporation	30RC122-AL-CU/BPHE	122.00	Medium Chiller	HFC-32	209.10	1.71	lb/ton	Medium Chiller
Carrier Corporation	30RC132C-AL-CU/BPHE	132.00	Medium Chiller	HFC-32	191.20	1.45	lb/ton	Medium Chiller
Carrier Corporation	30RC132-AL-CU/BPHE	132.00	Medium Chiller	HFC-32	237.20	1.80	lb/ton	Medium Chiller

Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
Carrier Corporation	30RC152C-AL-CU/BPHE	152.00	Large Chiller	HFC-32	186.40	1.23	lb/ton	Large Chiller
Carrier Corporation	30RC152-AL-CU/BPHE	152.00	Large Chiller	HFC-32	119.20	0.78	lb/ton	Large Chiller
Carrier Corporation	30RB060-MCHX	60.00	Medium Chiller	R-410A	60.00	1.00	lb/ton	Medium Chiller
Carrier Corporation	30RB070-MCHX	70.00	Medium Chiller	R-410A	60.00	0.86	lb/ton	Medium Chiller
Carrier Corporation	30RB080-MCHX	80.00	Medium Chiller	R-410A	66.00	0.83	lb/ton	Medium Chiller
Carrier Corporation	30RB090-MCHX	90.00	Medium Chiller	R-410A	80.00	0.89	lb/ton	Medium Chiller
Carrier Corporation	30RB100-MCHX	100.00	Medium Chiller	R-410A	82.00	0.82	lb/ton	Medium Chiller
Carrier Corporation	30RB110-MCHX	110.00	Medium Chiller	R-410A	93.00	0.85	lb/ton	Medium Chiller
Carrier Corporation	30RB120-MCHX	120.00	Medium Chiller	R-410A	100.00	0.83	lb/ton	Medium Chiller
Carrier Corporation	30RB130-MCHX	130.00	Medium Chiller	R-410A	97.00	0.75	lb/ton	Medium Chiller
Carrier Corporation	30RB150-MCHX	150.00	Large Chiller	R-410A	118.00	0.79	lb/ton	Large Chiller
Carrier Corporation	30RB060-RTPF	60.00	Medium Chiller	R-410A	123.50	2.06	lb/ton	Medium Chiller
Carrier Corporation	30RB070-RTPF	70.00	Medium Chiller	R-410A	128.00	1.83	lb/ton	Medium Chiller
Carrier Corporation	30RB080-RTPF	80.00	Medium Chiller	R-410A	137.00	1.71	lb/ton	Medium Chiller
Carrier Corporation	30RB090-RTPF	90.00	Medium Chiller	R-410A	170.00	1.89	lb/ton	Medium Chiller
Carrier Corporation	30RB100-RTPF	100.00	Medium Chiller	R-410A	190.00	1.90	lb/ton	Medium Chiller
Carrier Corporation	30RB110-RTPF	110.00	Medium Chiller	R-410A	200.00	1.82	lb/ton	Medium Chiller
Carrier Corporation	30RB120-RTPF	120.00	Medium Chiller	R-410A	227.00	1.89	lb/ton	Medium Chiller
Carrier Corporation	30RB130-RTPF	130.00	Medium Chiller	R-410A	239.00	1.84	lb/ton	Medium Chiller

Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
Carrier Corporation	30RB150-RTPF	150.00	Large Chiller	R-410A	266.00	1.77	lb/ton	Large Chiller
Carrier Corporation	30RB160-MCHX	160.00	Large Chiller	R-410A	142.00	0.89	lb/ton	Large Chiller
Carrier Corporation	30RB170-MCHX	170.00	Large Chiller	R-410A	143.00	0.84	lb/ton	Large Chiller
Carrier Corporation	30RB190-MCHX	190.00	Large Chiller	R-410A	166.00	0.87	lb/ton	Large Chiller
Carrier Corporation	30RB210-MCHX	210.00	Large Chiller	R-410A	176.00	0.84	lb/ton	Large Chiller
Carrier Corporation	30RB225-MCHX	225.00	Large Chiller	R-410A	182.00	0.81	lb/ton	Large Chiller
Carrier Corporation	30RB250-MCHX	250.00	Large Chiller	R-410A	207.00	0.83	lb/ton	Large Chiller
Carrier Corporation	30RB275-MCHX	275.00	Large Chiller	R-410A	238.00	0.87	lb/ton	Large Chiller
Carrier Corporation	30RB300-MCHX	300.00	Large Chiller	R-410A	264.00	0.88	lb/ton	Large Chiller
Carrier Corporation	30RB160-RTPF	160.00	Large Chiller	R-410A	287.00	1.79	lb/ton	Large Chiller
Carrier Corporation	30RB170-RTPF	170.00	Large Chiller	R-410A	295.00	1.74	lb/ton	Large Chiller
Carrier Corporation	30RB190-RTPF	190.00	Large Chiller	R-410A	324.00	1.71	lb/ton	Large Chiller
Carrier Corporation	30RB210-RTPF	210.00	Large Chiller	R-410A	375.00	1.79	lb/ton	Large Chiller
Carrier Corporation	30RB225-RTPF	225.00	Large Chiller	R-410A	375.00	1.67	lb/ton	Large Chiller
Carrier Corporation	30RB250-RTPF	250.00	Large Chiller	R-410A	412.00	1.65	lb/ton	Large Chiller
Carrier Corporation	30RB275-RTPF	275.00	Large Chiller	R-410A	449.00	1.63	lb/ton	Large Chiller
Carrier Corporation	30RB300-RTPF	300.00	Large Chiller	R-410A	486.00	1.62	lb/ton	Large Chiller
York International Corporation	YLAA0070	70.00	Medium Chiller	R-454B	64.00	0.91	lb/ton	Medium Chiller
York International Corporation	YLAA0080	76.60	Medium Chiller	R-454B	68.00	0.89	lb/ton	Medium Chiller

Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
York International Corporation	YLAA0089	80.60	Medium Chiller	R-454B	70.00	0.87	lb/ton	Medium Chiller
York International Corporation	YLAA0100	95.00	Medium Chiller	R-454B	79.00	0.83	lb/ton	Medium Chiller
York International Corporation	YLAA0120	118.20	Medium Chiller	R-454B	90.00	0.76	lb/ton	Medium Chiller
York International Corporation	YLAA0136	123.40	Medium Chiller	R-454B	123.00	1.00	lb/ton	Medium Chiller
York International Corporation	YLAA0155	143.20	Medium Chiller	R-454B	122.00	0.85	lb/ton	Medium Chiller
York International Corporation	YLAA0170	167.60	Large Chiller	R-454B	149.00	0.89	lb/ton	Large Chiller
York International Corporation	YMAE0035PJS	35	Medium Chiller	R-454B	50.80	1.45	lb/ton	Medium Chiller
York International Corporation	YMAE0070PJS	70	Medium Chiller	R-454B	101.60	1.45	lb/ton	Medium Chiller
York International Corporation	YMAE0105PJS	105	Medium Chiller	R-454B	152.40	1.45	lb/ton	Medium Chiller
York International Corporation	YMAE0140PJS	140	Medium Chiller	R-454B	203.20	1.45	lb/ton	Medium Chiller
Lennox International	ML13JC1018	1.50	Small Commercial Unitary AC	R-454B	4.00	2.67	lb/ton	Small Commercial Split AC
Lennox International	ML13JC1024	2.00	Small Commercial Unitary AC	R-454B	4.44	2.22	lb/ton	Small Commercial Split AC
Lennox International	ML13JC1030	2.50	Small Commercial Unitary AC	R-454B	4.88	1.95	lb/ton	Small Commercial Split AC
Lennox International	ML13JC1036	3.00	Small Commercial Unitary AC	R-454B	5.63	1.88	lb/ton	Small Commercial Split AC
Lennox International	ML13JC1042	3.50	Small Commercial Unitary AC	R-454B	6.13	1.75	lb/ton	Small Commercial Split AC

Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
Lennox International	ML13JC1048	4.00	Small Commercial Unitary AC	R-454B	7.63	1.91	lb/ton	Small Commercial Split AC
Lennox International	ML13JC1060	5.00	Small Commercial Unitary AC	R-454B	8.50	1.70	lb/ton	Small Commercial Split AC
Lennox International	ML14KC1018	1.50	Small Commercial Unitary AC	R-454B	4.88	3.25	lb/ton	Small Commercial Split AC
Lennox International	ML14KC1024	2.00	Small Commercial Unitary AC	R-454B	4.88	2.44	lb/ton	Small Commercial Split AC
Lennox International	ML14KC1030	2.50	Small Commercial Unitary AC	R-454B	5.63	2.25	lb/ton	Small Commercial Split AC
Lennox International	ML14KC1036	3.00	Small Commercial Unitary AC	R-454B	6.81	2.27	lb/ton	Small Commercial Split AC
Lennox International	ML14KC1041	3.50	Small Commercial Unitary AC	R-454B	7.13	2.04	lb/ton	Small Commercial Split AC
Lennox International	ML14KC1048	4.00	Small Commercial Unitary AC	R-454B	8.81	2.20	lb/ton	Small Commercial Split AC
Lennox International	ML14KC1060	5.00	Small Commercial Unitary AC	R-454B	8.81	1.76	lb/ton	Small Commercial Split AC
Lennox International	LHX180S5M	15.00	Large Commercial Unitary AC	R-454B	42.69	2.85	lb/ton	Large Commercial Packaged HP
Lennox International	LHX240S5M	20.00	Large Commercial Unitary AC	R-454B	43.50	2.18	lb/ton	Large Commercial Packaged HP
Lennox International	KHC180S43	15.00	Large Commercial Unitary AC	R-410A	44.50	2.97	lb/ton	Large Commercial Packaged HP
Lennox International	KHC240S4M	20.00	Large Commercial Unitary AC	R-410A	44.00	2.20	lb/ton	Large Commercial Packaged HP
Lennox International	ZHC092S4M	7.50	Small Commercial Unitary AC	R-410A	22.00	2.93	lb/ton	Medium Commercial Packaged HP
Lennox International	ZHC102S4M	8.50	Small Commercial Unitary AC	R-410A	21.50	2.53	lb/ton	Medium Commercial Packaged HP
Lennox International	ZHC120S4M	10.00	Small Commercial Unitary AC	R-410A	29.00	2.90	lb/ton	Medium Commercial Packaged HP
Goodman Manufacturing Company	DCH090	7.50	Small Commercial Unitary AC	R-410A	13.75	1.83	lb/ton	Medium Commercial Packaged HP
Goodman Manufacturing Company	DCH102	8.50	Small Commercial Unitary AC	R-410A	25.63	3.01	lb/ton	Medium Commercial Packaged HP

Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
Goodman Manufacturing Company	DCH120	10.00	Small Commercial Unitary AC	R-410A	28.13	2.81	lb/ton	Medium Commercial Packaged HP
Goodman Manufacturing Company	DCH150	12.50	Large Commercial Unitary AC	R-410A	37.63	3.01	lb/ton	Large Commercial Packaged HP
Carrier Corporation	50FCQM08	7.50	Small Commercial Unitary AC	R-410A	17.50	2.33	lb/ton	Medium Commercial Packaged HP
Carrier Corporation	50FCQM09	8.50	Small Commercial Unitary AC	R-410A	21.13	2.49	lb/ton	Medium Commercial Packaged HP
Carrier Corporation	50FCQM12	10.00	Small Commercial Unitary AC	R-410A	21.31	2.13	lb/ton	Medium Commercial Packaged HP
Carrier Corporation	50FCQM14	12.50	Large Commercial Unitary AC	R-410A	24.88	1.99	lb/ton	Large Commercial Packaged HP
Carrier Corporation	50FCQM17	15.00	Large Commercial Unitary AC	R-410A	27.00	1.80	lb/ton	Large Commercial Packaged HP
Carrier Corporation	50FCQM24	20.00	Large Commercial Unitary AC	R-410A	48.00	2.40	lb/ton	Large Commercial Packaged HP
Carrier Corporation	50FCQM28	25.00	Large Commercial Unitary AC	R-410A	48.00	1.92	lb/ton	Large Commercial Packaged HP
Carrier Corporation	50GEQM04	3.00	Small Commercial Unitary AC	R-454B	12.00	4.00	lb/ton	Small Commercial Packaged HP
Carrier Corporation	50GEQM05	4.00	Small Commercial Unitary AC	R-454B	11.44	2.86	lb/ton	Small Commercial Packaged HP
Carrier Corporation	50GEQM06	5.00	Small Commercial Unitary AC	R-454B	13.00	2.60	lb/ton	Small Commercial Packaged HP
Carrier Corporation	50GEQM07	6.00	Small Commercial Unitary AC	R-454B	15.00	2.50	lb/ton	Medium Commercial Packaged HP
Carrier Corporation	50GEQM08	7.50	Small Commercial Unitary AC	R-454B	16.69	2.23	lb/ton	Medium Commercial Packaged HP
Carrier Corporation	50GEQM09	8.50	Small Commercial Unitary AC	R-454B	19.00	2.24	lb/ton	Medium Commercial Packaged HP
Carrier Corporation	50GEQM12	10.00	Small Commercial Unitary AC	R-454B	20.50	2.05	lb/ton	Medium Commercial Packaged HP
Carrier Corporation	50GEQM17	15.00	Large Commercial Unitary AC	R-454B	31.00	2.07	lb/ton	Large Commercial Packaged HP
Carrier Corporation	50GEQM24	20.00	Large Commercial Unitary AC	R-454B	45.00	2.25	lb/ton	Large Commercial Packaged HP
Carrier Corporation	50GEQM28	25.00	Large Commercial Unitary AC	R-454B	47.00	1.88	lb/ton	Large Commercial Packaged HP

Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
Carrier Corporation	38AXQ*07	6	Small Commercial Unitary AC	R-454B	18.00	3.00	lb/ton	Medium Commercial Split HP
Carrier Corporation	38AXQ*08	7.5	Small Commercial Unitary AC	R-454B	24.50	3.27	lb/ton	Medium Commercial Split HP
Carrier Corporation	38AXQ*12	10	Small Commercial Unitary AC	R-454B	27.00	2.70	lb/ton	Medium Commercial Split HP
Carrier Corporation	38AXQ*16	15	Large Commercial Unitary AC	R-454B	49.00	3.27	lb/ton	Large Commercial Split HP
Carrier Corporation	38AXQ*25	20	Large Commercial Unitary AC	R-454B	46.00	2.30	lb/ton	Large Commercial Split HP
Johnson Controls International	PC090	7.50	Small Commercial Unitary AC	R-410A	23.90	3.19	lb/ton	Medium Commercial Split HP
Johnson Controls International	PE090	7.50	Small Commercial Unitary AC	R-410A	24.12	3.22	lb/ton	Medium Commercial Split HP
Johnson Controls International	PC120	10.00	Small Commercial Unitary AC	R-410A	31.12	3.11	lb/ton	Medium Commercial Split HP
Johnson Controls International	PC180	15.00	Large Commercial Unitary AC	R-410A	54.00	3.60	lb/ton	Large Commercial Split HP
Johnson Controls International	PD180	15.00	Large Commercial Unitary AC	R-410A	54.00	3.60	lb/ton	Large Commercial Split HP
Johnson Controls International	PD240	20.00	Large Commercial Unitary AC	R-410A	68.00	3.40	lb/ton	Large Commercial Split HP
Johnson Controls International	YC090	7.50	Small Commercial Unitary AC	R-410A	14.00	1.87	lb/ton	Medium Commercial Split AC
Johnson Controls International	YE090	7.50	Small Commercial Unitary AC	R-410A	14.80	1.97	lb/ton	Medium Commercial Split AC
Johnson Controls International	YC120	10.00	Small Commercial Unitary AC	R-410A	19.25	1.93	lb/ton	Medium Commercial Split AC
Johnson Controls International	YD120	10.00	Small Commercial Unitary AC	R-410A	19.80	1.98	lb/ton	Medium Commercial Split AC



Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
Johnson Controls International	YC150	12.50	Large Commercial Unitary AC	R-410A	24.00	1.92	lb/ton	Large Commercial Split AC
Johnson Controls International	YD150	12.50	Large Commercial Unitary AC	R-410A	23.00	1.84	lb/ton	Large Commercial Split AC
Johnson Controls International	YC180	15.00	Large Commercial Unitary AC	R-410A	27.00	1.80	lb/ton	Large Commercial Split AC
Johnson Controls International	YD180	15.00	Large Commercial Unitary AC	R-410A	27.00	1.80	lb/ton	Large Commercial Split AC
Johnson Controls International	YC240	20.00	Large Commercial Unitary AC	R-410A	33.50	1.68	lb/ton	Large Commercial Split AC
Johnson Controls International	YD240	20.00	Large Commercial Unitary AC	R-410A	37.60	1.88	lb/ton	Large Commercial Split AC
Johnson Controls International	YC300	25.00	Large Commercial Unitary AC	R-410A	35.00	1.40	lb/ton	Large Commercial Split AC
Robert Bosch GmbH	BOVA15-24	12.00	Small Commercial Unitary AC	R-454B	4.81	0.40	lb/ton	Medium Commercial Split HP
Robert Bosch GmbH	BOVA15-36	18.00	Small Commercial Unitary AC	R-454B	5.69	0.32	lb/ton	Medium Commercial Split HP
Robert Bosch GmbH	BOVA15-60	30.00	Small Commercial Unitary AC	R-454B	8.13	0.27	lb/ton	Medium Commercial Split HP
Trane Technologies	TTA072	6.00	Small Commercial Unitary AC	R-454B	8.60	1.43	lb/ton	Medium Commercial Split AC
Trane Technologies	TTA090	7.50	Small Commercial Unitary AC	R-454B	8.70	1.16	lb/ton	Medium Commercial Split AC
Trane Technologies	TTA120	10.00	Small Commercial Unitary AC	R-454B	11.10	1.11	lb/ton	Medium Commercial Split AC
Trane Technologies	TTA150	12.50	Large Commercial Unitary AC	R-454B	19.90	1.59	lb/ton	Large Commercial Split AC
Trane Technologies	TWA072	6.00	Small Commercial Unitary AC	R-454B	17.30	2.88	lb/ton	Medium Commercial Split HP
Trane Technologies	TWA090	7.50	Small Commercial Unitary AC	R-454B	16.20	2.16	lb/ton	Medium Commercial Split HP

Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
Trane Technologies	TWA120	10.00	Small Commercial Unitary AC	R-454B	23.20	2.32	lb/ton	Medium Commercial Split HP
Trane Technologies	TWA180	15.00	Large Commercial Unitary AC	R-454B	42.40	2.83	lb/ton	Large Commercial Split HP
Trane Technologies	TWA240	20.00	Large Commercial Unitary AC	R-454B	39.80	1.99	lb/ton	Large Commercial Split HP
Friedrich	PVH09K	0.75	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	R-410A	1.90	2.53	lb/ton	PTHP
Friedrich	PVH12K	1.00	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	R-410A	2.05	2.05	lb/ton	PTHP
Friedrich	PVH09R	0.75	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	R-410A	2.01	2.68	lb/ton	PTHP
Friedrich	PVH12R	1.00	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	R-410A	2.05	2.05	lb/ton	PTHP
General Electric	AZES07DCXXA	0.58	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	R-454B	1.63	2.79	lb/ton	PTAC
General Electric	AZES09DCXXA	0.75	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	R-454B	1.69	2.25	lb/ton	PTAC
General Electric	AZES12DCXXA	1.00	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	R-454B	2.00	2.00	lb/ton	PTAC
General Electric	AZES15DCXXA	1.25	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	R-454B	2.13	1.70	lb/ton	PTAC
General Electric	AZHS07	0.58	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	R-454B	1.66	2.84	lb/ton	PTHP
General Electric	AZHS09	0.75	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	R-454B	1.75	2.33	lb/ton	PTHP
General Electric	AZHS12	1.00	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	R-454B	1.91	1.91	lb/ton	PTHP

Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
General Electric	AZHS15	1.25	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	R-454B	2.13	1.70	lb/ton	PTHP
Amana	PTH093	0.75	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	R-410A	2.25	3.00	lb/ton	PTHP
Amana	PTH123	1.00	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	R-410A	2.11	2.11	lb/ton	PTHP
Midea	MP07EMB32	0.58	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	HFC-32	1.08	1.85	lb/ton	PTHP
Midea	MP09EMB32	0.75	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	HFC-32	1.10	1.47	lb/ton	PTHP
Midea	MP12EMB32	1.00	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	HFC-32	1.37	1.37	lb/ton	PTHP
Midea	MP15EMB32	1.25	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	HFC-32	1.35	1.08	lb/ton	PTHP
Midea	MP09EMB33	0.75	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	HFC-32	1.21	1.62	lb/ton	PTAC
Midea	MP12EMB33	1.00	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	HFC-32	1.72	1.72	lb/ton	PTAC
Trane Technologies	PTHG0701GAA	0.58	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	HFC-32	1.70	2.91	lb/ton	PTHP
Trane Technologies	PTHG0901GAA	0.75	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	HFC-32	1.50	2.00	lb/ton	PTHP
Trane Technologies	PTHG1201GAA	1.00	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	HFC-32	1.80	1.80	lb/ton	PTHP
Trane Technologies	PTHG1501GAA	1.25	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	HFC-32	1.90	1.52	lb/ton	PTHP

Manufacturer	Model Number	Capacity (ton)	Existing Equipment Category	Refrigerant Type	Refrigerant Charge (lb)	Refrigerant Charge per Ton	Unit	Recommended Equipment Category
Trane Technologies	PTHG0702GAA	0.58	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	HFC-32	1.70	2.91	lb/ton	PTHP
Trane Technologies	PTHG0902GAA	0.75	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	HFC-32	1.50	2.00	lb/ton	PTHP
Trane Technologies	PTHG1202GAA	1.00	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	HFC-32	1.80	1.80	lb/ton	PTHP
Trane Technologies	PTHG1502GAA	1.25	Window/Room/Wall AC and Packaged Terminal AC (PTAC)	HFC-32	1.80	1.44	lb/ton	PTHP
Carrier Corporation	GH5SAN418	1.50	Small Commercial Unitary AC	R-410A	5.90	3.93	lb/ton	Small Commercial Split HP
Carrier Corporation	GH5SAN424	2.00	Small Commercial Unitary AC	R-410A	6.30	3.15	lb/ton	Small Commercial Split HP
Carrier Corporation	GH5SAN430	2.50	Small Commercial Unitary AC	R-410A	9.00	3.60	lb/ton	Small Commercial Split HP
Carrier Corporation	GH5SAN436	3.00	Small Commercial Unitary AC	R-410A	9.00	3.00	lb/ton	Small Commercial Split HP
Carrier Corporation	GH5SAN442	3.50	Small Commercial Unitary AC	R-410A	9.90	2.83	lb/ton	Small Commercial Split HP
Carrier Corporation	GH5SAN448	4.00	Small Commercial Unitary AC	R-410A	10.80	2.70	lb/ton	Small Commercial Split HP
Carrier Corporation	GH5SAN460	5.00	Small Commercial Unitary AC	R-410A	13.70	2.74	lb/ton	Small Commercial Split HP