

## FOR CHARGING R-290 AND R-600a REFRIGERANT SYSTEMS

- Refrigerant-grade propane (R-290) and isobutane (R-600a)
- Meets AHRI 700 Standard (99.5% pure)
- Non-odorized
- Re-sealable canister, use contents to completion
- EcoPure Charging System is the most simple, accurate, and complete approach in the market
- EcoPure Charging System provides integrated charging hose and shut-off valve with precision weigh scale for simplified and accurate charging
- System or Assembly provides stable platform for liquid charging into system

### Description

EcoPure R-290 and R-600a are refrigerant grade products that meet AHRI 700 Standard purity requirements. The EcoPure refrigerants are colorless and non-odorized, so extreme care is required when handling these refrigerants. EcoPure R-290 and R-600a refrigerants are approved by the EPA's SNAP program for the US market, effective April 2015. EcoPure refrigerants are for qualified professionals and only for equipment specifically designed and clearly identified that it uses R-290 or R-600a refrigerant.

Although these refrigerants are highly flammable, they are eco-friendly. Both R-290 and R-600a refrigerants have zero ozone depletion potential (ODP) and global warming potential (GWP) of three or less. In addition to EcoPure's low environmental impact, they are more efficient than the HFC refrigerants they replace. Improved system efficiency reduces energy usage and life cycle costs.

### Application

EcoPure R-290 or R-600a refrigerant are for service requirements for the following applications, that have a system charge of 150 grams (5.3 ounces) or less, and are clearly designed and identified for these hydrocarbon refrigerants:

- Refrigerators & freezers
- Retail food refrigerators & freezers
- Vending machines
- PTAC & PTHP systems
- Ice machines
- Water coolers

EcoPure R-290 (propane) and R600a (isobutane) are refrigerant-grade hydrocarbons. The products are closely

### Specialty Products

## EcoPure™ Refrigerants & Accessories



controlled during their manufacture to ensure low levels of contamination, including low levels of moisture and sulphur. Refrigerants that do not meet desired purity requirements can cause issues such as freezing at the metering device, accelerated acid production, copper plating, lubricant foaming or breakdown potentially reducing system longevity. It's for these reasons, EcoPure R-290 and R600a refrigerants are non-odorized to meet AHRI Standard 700 (99.5% purity). Refrigerants that do not meet this criterion shouldn't be used in these systems.

Hydrocarbon refrigerants provide more efficient performance than currently used HFC refrigerants, thus reducing energy usage and life cycle costs. Inaccurate R-290/R-600a refrigerant charging is very detrimental and will nullify system efficiency and perhaps reduce system life. For example, even a 5 gram overcharge or undercharge will compromise its functionality. Therefore, it's important to charge in the one gram range for best performance. The EcoPure Refrigerant Charging System is the simplest, most reliable and accurate method for charging R-290/R-600a systems in the market. The EcoPure Refrigerant Charging System allows the ability to recharge the system with one gram accuracy! The assemblies are rated for a 400 psig working pressure.

### Packaging

EcoPure Charging Assembly	<b>4175-10</b>
EcoPure Refrigerant Charging System	<b>4175-11</b>
EcoPure Canister Valve	<b>4175-12</b>
EcoPure R-290 Refrigerant, 13 oz. Canister	<b>4175-20</b>
EcoPure R-290 Refrigerant, 10.6 oz. Canister	<b>4175-21</b>
EcoPure R-600 Refrigerant, 14.8 oz. Canister	<b>4175-30</b>

## Directions for Use

**FOR USE BY QUALIFIED PROFESSIONALS ONLY.**

**ALWAYS USE IN ACCORDANCE WITH COMPLETE SERVICE INSTRUCTIONS DETAILED BY THE SPECIFIC EQUIPMENT MANUFACTURER.**

1. Always use EcoPure Charging Assembly or Refrigerant Charging System when charging with Nu-Calgon's EcoPure refrigerants for best charge accuracy. **For specific usage instructions for the EcoPure Precision Refrigerant Charging System (4175-11); consult Nu-Calgon publication 3-154.**
2. Wear protective eyewear and gloves when charging system. Service in a well-ventilated area. ALWAYS use a combustible gas monitor in work area when removing or adding a hydrocarbon refrigerant charge.
3. Prep the system for system charging by pulling a deep vacuum with the newly created access port on the process tube for low side service.
4. Use the EcoPure Charging Assembly with a commercial available weigh scale capable of accurately measuring to equipment specifications. The assembly is capable of charging to gram weight accuracy to aid in charging to OEM specifications.
5. Close hand valve to the Charging Assembly before installing the EcoPure refrigerant canister.
6. With canister upright, install EcoPure Charging Assembly to canister.
7. Invert assembly on a commercially available weigh scale capable of measuring in grams. The charging base will securely hold canister in an inverted position for liquid charging.
8. In a ventilated area, purge line of EcoPure Charging Assembly by momentary cracking hand valve and then close.
9. Install charging hose to newly created access connection for low side system service ONLY. Do NOT install to high side pressure.
10. Tare the weigh scale so it measures zero; then slowly add refrigerant to system to desired specifications. If necessary during charging process cycle system operation as necessary to add correct refrigerant charge. DO NOT overcharge the system.
11. After charging, close hand valve on EcoPure Charging Assembly and remove from system.
12. In a ventilated area, turn EcoPure canister upright and quickly remove charge base from cylinder so that only a small amount of refrigerant vapor escapes when disassembling. If refrigerant remains in the canister, use for another system designed for R-290 or R600a.
13. Following the manufacturer's guidelines, seal the process tube to eliminate possibility of a EcoPure leak from the system.

***MOST SIMPLE AND ACCURATE APPROACH IN THE MARKET!***

**Available in two options:**

### EcoPure Charging Assembly P/N: 4175-10

Use any market scale capable of weighing in grams for precise charging.



### EcoPure Charging System P/N: 4175-11



## Questions & Answers:

### **What physical properties are important to remember when handling EcoPure refrigerants?**

EcoPure R-290 and R-600a are hydrocarbon refrigerants and are extremely flammable. In addition, refrigerant-grade R-290 and R-600a do not contain an odorant (or stenching agent) used to help identify a leak. A common odorant, such as methyl mercaptan that smells like rotten cabbage, is added to fuel-grade propane. This additive is not in refrigerant-grade hydrocarbons. Odorant additives will form corrosive by-products in a refrigerant system.

### **What type of applications will I find systems charged with R-290 or R-660a?**

Household, commercial and retail food refrigerators and freezers, vending machines, PTAC & HTHP systems, ice machines and water cooler systems that have a refrigerant holding charge of 150 grams (0.3lbs.) or less. These systems use mineral or alkylbenzene oil within the compressor. R-600a is typically used in medium temperature refrigeration applications and R-290 is a common hydrocarbon charge for medium and low temperature refrigeration applications.

### **Can I use any type of propane for these applications?**

Refrigerant-grade R-290 (propane) that meets AHRI-700 Standard on purity is required when used as a refrigerant. Refrigerant-grade propane does not contain an odorant; whereas fuel grade propane does to help detect a leak. Never use a fuel-grade propane as a refrigerant due to low-purity requirements resulting in a corrosive effect within a system.

### **Nu-Calgon's EcoPure refrigerants meet AHRI Standard 700 specifications. Why is this important?**

Use only refrigerant-grade hydrocarbons that meet AHRI Standard 700 purity specifications since they are produced with added safeguards to ensure their desired composition for their applications. The use of refrigerants that do not meet these purity guidelines can cause issues such as a restriction at the metering device due to ice and clathrates (mixture of hydrocarbon and frozen water), accelerated acid production, copper plating, lubricant foaming or breakdown, which can result in potential compressor failure.

### **Do I have to be EPA certified to purchase EcoPure refrigerants?**

No, the EPA has exempted R-290 and R-600a from the sales restriction.

### **Do I require certification to service an approved hydrocarbon refrigerant system?**

No, the EPA does not require technician certification for exempt refrigerants such as EcoPure R-290 and R-600a. However, it is strongly recommended to take a training class through an industry source or through the specific equipment manufacturer before servicing the hydrocarbon refrigerant systems.

### **What special tools will I need to service an R-290 or R-600a systems?**

Contractors will need a combustible gas meter or electronic leak detector designed specifically for R-290 and R-600a refrigerants. In addition, jobsite-placarding advising no smoking or open flames during equipment service is required if there are other occupants at the location. Other standard refrigeration tools are also required such a pinch-off tool for the system process tube, tubing cutter, nitrogen, vacuum pump, micron gauge, manifold gage set, torch and Cal-Blue Plus to check for leaks.

### **Can I use other market available access valves for use with Nu-Calgon's EcoPure canisters?**

Nu-Calgon recommends only the EcoPure Charging System or Assembly for charging hydrocarbon systems with EcoPure R-290 or R-600a refrigerants. The unique assembly is the simplest, most reliable and accurate way to liquid charge EcoPure refrigerant into these systems – within gram weight accuracy. Small overcharge or undercharging of hydrocarbon systems nullifies their efficiency benefit when compared to a similar HFC system it replaced. Other methods in the market are more cumbersome to use in practice when compared to the EcoPure Charging System or Assembly options .

### **How do I check for leaks on R-290 or R-600a systems?**

Electronic leak detectors designed for combustion gas is required. In addition, Nu-Calgon suggests Cal-Blue Plus for checking leaking R-290 or R-600a systems. NEVER use a halide leak detector intended for HFC systems for leak testing a hydrocarbon system.

### **What are the recovery requirements of R-290 or R600a containing system?**

The EPA has exempted R-290 and R-600a from the recovery requirement since it is not required under its Significant New Alternatives Policy (SNAP), so it can legally be vented to atmosphere. If the hydrocarbon refrigerant is vented to atmosphere, it can be done with moving the unit to a safe area outdoors, use a long hose to discharge safely outdoor, use a recovery cylinder that has been placed in a 1000-micron vacuum or use an approved hydrocarbon recovery unit and recovery tank. NOTE: Always follow safe practices to prevent the ignition of R-290 or R-600a.

## Questions & Answers (continued):

### What are some guidelines for pulling a vacuum on a hydrocarbon containing system?

Proper ventilation of the service area is required. The discharge of the vacuum pump must lead to an open-air area. Evacuate the system to a minimum 500 microns to rid system of excess moisture that may be present.

### What are some guidelines with brazing to an R-290 or R-600a system?

To displace any trapped flammable refrigerant, purge dry nitrogen at 5psi for two minutes prior to brazing. Continue purging with nitrogen through system during entire brazing process.

### Why is the EcoPure Charging System or Assembly a must-have tool for charging EcoPure refrigerants?

The EcoPure Charging System or Assembly securely holds the Ecopure refrigerant canister in an inverted position on a readily available market scale so that the system is charged with liquid refrigerant with gram-weight accuracy. Undercharging or overcharging a system dramatically affects system performance.

### How should I store EcoPure refrigerants?

Store in an upright position and in a ventilated area. Protect from sunlight. Do not expose to heat or store temperatures above 120°F. Do not store in parked vehicles where the temperature can exceed 120°F. Keep away from children.

### Where can I learn more before service hydrocarbon refrigerants?

Training before working on flammable hydrocarbon refrigerant containing system for the first time is strongly recommended. Contact the equipment manufacturer to see what training information they have available. RSES also has online classes and educational materials available.

Temperature-Pressure Chart for EcoPure Refrigerants					
	R-290	R-600a		R-290	R-600a
Temp. (°F)	Pressure	Pressure	Temp. (°F)	Pressure	Pressure
-40	1.4	*21.4	60	93	23.5
-35	3.4	*20.2	65	101.4	27.0
-30	5.7	*18.8	70	110.2	30.6
-25	8.1	*17.2	75	119.5	34.5
-20	10.7	*15.4	80	129.3	38.7
-15	13.6	*13.5	85	139.7	43.1
-10	16.7	*11.4	90	150.5	47.8
-5	20.1	*9.0	95	161.9	52.7
0	23.7	*6.4	100	173.9	57.9
5	27.6	*3.6	105	186.5	63.5
10	31.8	*0.6	110	199.6	69.3
15	36.3	1.4	115	213.4	75.5
20	41.1	3.2	120	227.8	82.0
25	46.3	5.1	125	242.9	88.8
30	51.8	7.2	130	258.7	95.9
35	57.7	9.4	135	275.1	103.5
40	63.9	11.9	140	292.3	111.4
45	70.6	14.5	145	310.2	119.6
50	77.6	17.3	150	328.9	128.3
55	85.1	20.3	155	348.4	137.4

Pressures are psig, except (\*) indicates inches of mercury (vacuum)

## PRODUCT SAFETY:

- EcoPure R-290 and R-600a is extremely flammable. Always store and transport canister upright, keep away from direct sunlight and heat, do not store in park vehicles where temperatures can exceed 120°F. Keep away from children.
- Use only tools and equipment certified for use in hazardous areas.
- Do not use other market option access valves for use with EcoPure refrigerants.
- Refer to the Safety Data Sheet (SDS) for other guidelines with handling EcoPure refrigerants.