

# MMC 2021 – Chapter 11 Refrigeration

Sec 1101 General

Sec 1102 System Requirement

Sec 1103 Refrigeration System Classification

2 Credits Specialty MI

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# PURON ADVANCE LETTER P3

- Letter by Heidi Gehring.
- Bryant shows a commitment to going beyond the minimum with a refrigerant that will easily surpass the EPA's lower Global Warming Potential (GWP) requirements for 2025.
- Puron Advance delivers a greater than 75% decrease in GWP than the original Puron refrigerant.
- Operating pressures & temperatures are similar to the original Puron refrigerant.

# WHAT IS PURON ADVANCE P7

- Puron Advance is Bryant's trade name for R-454B.
- 80% of the industry is using R-454B, with only one major player using R-32.
- Puron Advance performs very well in normal & high ambient conditions.
- Puron Advance offers similar operating temperatures, pressures & oil compatibility to Puron, meaning technicians will have less of a learning curve compared to the alternative.

# WHAT'S THE DIFFERENCE BETWEEN PURON ADVANCE & PURON P7

	PURON	PURON ADVANCE
REFRIGERANT TYPE	R-410A	
LAUNCH TIMING	1996	LATE 2023
GWP LEVEL	2.088	466
OZONE DEPLETION POTENTIAL (ODP)	NO ODP	NO ODP
ASHRAE CLASSIFICATION	A1	A2L
FLAMMABILITY	NO FLAME PROPAGATION	MILDY FLAMMABLE
LEAK DETECTION	NONE	REQUIRED

# THE BOTTOM LINE P7

- Puron Advance = 78% lower GWP vs. Puron

# WHT THE CHANGE FROM PURON TO PURON ADVANCE? P8

- Change is inevitable in every industry & the HVAC industry is no different.
- We just transitioned to new minimum efficiency standards for 2023, & now we turn our focus to 2025 & a new target: global warming potential (GWP) of refrigerants.
- The AIM Act has put limitations on the allowed emissions of total refrigerant supply, targeting an 85% reduction in production & consumption of refrigerant emission levels by 2036.
- A second regulation from the EPA impacts the manufacturing of equipment, requiring units to use refrigerants lower than 700 GWP.
- On January 1, 2025, R-410A will no longer be allowed in newly manufactured residential & light commercial rooftop HVAC products.

# REFRIGERANT R-410A PHASEDOWN TIMELINE P9

- 2022: 10% Reduction.
- 2024: 40% Reduction.
- 2029: 70% Reduction.
- 2034: 80% Reduction.
- 2036: 85% Reduction.



# REFRIGERANT CLASSIFICATIONS P10

ASHRAE CLASS	A3	A2	A2L	A1
EXAMPLE REFRIGERANTS	PROPANE, ISOBUTANE	R-152A	R-32 R-454B	R-410A
FLAMMABILITY LEVEL	HIGH	MEDIUM	MEDIUM	LOW

# PURON VS. PURON ADVANCE VS R-32 P11

	PURON	PURON ADVANCE	R-32
	NON-COMPLIANT WITH NEW UNIT MANUFACTURING AS OF 1/1/25	COMPLIANT FOR PHASE 1 OF LOW GWP ALTERNATIVES	COMPLIANT FOR PHASE 1 OF LOW GWP ALTERNATIVES
GWP	2088	466	675
DISCHARGE TEMPERATURES	LOWER DISCHARGE TEMPERATURES	LOWER DISCHARGE TEMPERATURES	HIGHER DISCHARGE TEMPERATURE TEMPERATURES
GLIDE	NO GLIDE	LITTLE TO NO GLIDE	LITTLE TO NO GLIDE
FORMULA	50% R-32/50% R-125	68.9% R-32/31.1% R-1234yf	100% r-32

# SERVICING P11

- Charging/servicing techniques will remain the same when switching from Puron to Puron Advance as they are both low glide blends.
- Charge limits to be based on the home's square footage & other design criteria.
- R-32 & R-454B systems should be properly leak checked & should be evacuated & purged before any brazing.
- Reclaiming equipment & other servicing tools will need to be A2L-certified for both R-32 & R-454B, i.e. a separate set of hoses is required for each unique refrigerant.

# WHAT ABOUT FLAMMABILITY? P14

- The main apprehension for Puron Advance is its “mildly flammable” classification.
- Puron Advance falls into a new ASHRAE classification: A2L or mildly flammable.
- R-32, that is used by some other manufacturers is also classified A2L.
- A2L refrigerants are so mildly flammable that there must be a direct flame source & a high concentration of refrigerant to create a flame.
- If a A2L refrigerant were to ignite, the flame would be unsustainable.
- An A2L refrigerant flame would spread at an extremely slow speed – less than half a mile per hour – you can walk faster than that.

# REFRIGERANT CHARGE LIMITS & MITIGATION REQUIREMENTS P16

- The new refrigerant charge limits with all of the manufacturers using A2L refrigerants must comply.
- According to new UL guidelines, mitigation will be required in the event of a refrigerant leak & will be based on a combination of total square footage & total system charge.
- The total system charge includes the line set, indoor coils & the outdoor unit. In other words, any component that holds refrigerant.
- M1 = Charge limits that fall at or below 3.9 pounds of total charge will not require a dissipation system.
- M2 = Charge limits that fall between 4.0 – 33.9 pounds of total charge will require a dissipation system. Note: Most typical residential HVAC equipment will fall into this category.
- M3 = Charge limits that fall between 34.0 – 169.3 pounds of total charge will require a dissipation system in addition to other requirements that may be defined by separate commercial or control room requirements.

# BRYANT DISSIPATION SYSTEM P16

- All products using Puron Advance are designed with a dissipation system that consists of:
  - A factory-installed leak sensor located in the indoor coil cabinet.
  - A mitigation control board.
  - Unit blower.
- How it works: In the event of a leak, the leak sensor sends a signal to the mitigation board, which energizes a blower to dissipate the refrigerant into the air stream.
- Once activated, the blower is always on in the dissipation mode & stay on for five minutes of mitigation as long as the sensor is reading below the threshold.

# IGNITION SOURCE ISOLATION P17

- In addition to installing dissipation systems on all of our Puron Advanced products the following have been added to the outdoor & indoor unit:
- Compressor Plugs have been assessed & provide the necessary isolation from ignition.
- Electrical ignition points: Wire sleeves may be installed on compressor & crankcase heater wiring to mitigate potential ignition points.
- Contactor: a new top cover design eliminates the gap that resulted from push button operation. Minimal air gaps inside the contactor acts as a fire arrester.
- Indoor unit: Protection is factory-installed on wiring to prevent pinching & arcing.
- Evaluating approved fan coil electric heaters for ignition sources.
- Note: Bryant approved electric heaters are not considered an ignition source

# STORAGE P17

- As we transition to utilizing Puron Advance, it will be important to acquaint yourselves with the proper storage requirements for this refrigerant.
- The International Fire Code (IFC) & the National Fire Protection Association (NFPA) have established detailed codes & standards for on-site refrigeration storage.
- For more information go to [NFPA.org](http://NFPA.org)



# REQUIRED LABELS P18

- In accordance with UL requirements, new & additional labels are now required on equipment & literature using Puron Advance products.
- These labels help to warn technicians on the mild flammability of the refrigerant & new components that require extra attention to detail.
- See page 18 labels.

# TRANSPORTATION P18

- The rules for transporting a refrigerant like Puron Advance are set by the U.S. Department of Transportation, with additional requirements coming from state & municipal departments of transportation.

# CYLINDER DIFFERENTIATION P20

- Color: As of 2020, all refrigerant cylinders went to a universal light green-gray color. The A2L refrigerant cylinders will have a red top for identification, to warn that it contains a mildly flammable substance.
- Threads: Cylinders for A1 refrigerants like Puron have a right-handed thread. Cylinders for A2L refrigerants, like Puron Advance have a left-handed thread. And for extra safety measure, connectors for A1 refrigerants will not work to connect to an A2L cylinder.
- Pressure Relief valves: A1 service cylinders feature a rupture disc for safety that will release all of the cylinder contents when it activates. A2L service cylinders are required to have a pressure relief valve instead of a rupture disc, for increased safety.

# WARNING LABELS P20

- Two warning labels are required for cylinders that contain A2L refrigerants.
- The Flammable pictogram warns of potentially flammable contents.
- The Compressed Gas pictogram warns of high-pressure gas that could explode when heated.

# DISPOSAL PROCEDURE P20

- Handling of disposable refrigerant cylinders for A1 & A2 will have a slight difference.
- With A1 cylinders, the technician removes or punctures the rupture disc.
- For A2L, a non-sparking piercing tool must be used to puncture the side of the cylinder itself.

# RECOVERY P20

- Both A2L & A1 recovery cylinders are gray in color with a yellow top.
- A2L cylinders may also have a red band or stripe, as well as left-handed threads.
- Note: Keep all refrigerant types clearly identified and do not mix refrigerants.

# TOOL CHANGES P22

SERVICE ITEM/TOOL	USE WITH PURON ASDVANCE (VS. PURON)
GAUGE MANIFOLD	NO CHANGE
CHARGING HOSES	SEPARATE SET FOR EACH TYPE OF REFRIGERANT
REFRIGERANT LEAK DETECTOR	MOVE TO A2L-COMPATIBLE
ELECTRIC HAND TOOLS	NON-SPARKING REQUIRED
VENTILATION FAN	SIMILAR (MAY BE DIFFERENCES IN MACHINE ROOMS)
DRY CHEMICAL/ CO2 FIRE EXTINGUISHER	CHEMICAL-COMPATIBLE
SCALES	NO CHANGE
GAS DETECTOR	MOVE TO A2L-COMPATIBLE
VACUUM PUMP	CHECK WITH MANUFACTURER
RECOVERY MACHINE	MOVE TO A2L-COMPATIBLE
REFRIGERANT RECOVERY CYLINDER	MUST BE FOR FLAMMABLE GAS (GHS LABEL); LEFT-HANDED THREADS
REFRIGERANT CYLINDER	LEFT-HANDED THREADS

# FIELD SERVICE PROCEDURAL CHANGES P23

REQUIREMENT	PURON	
REMOVE REFRIGERANT SAFELY FOLLOWING LOCAL & NATIONAL CODES	REQUIRED	
PURGE CIRCUIT & INERT GAS (NITROGEN)	BEST PRACTICE	
EVACUATE	BEST PRACTICE	
PURGE WITH INERT GAS FOR FIVE MINUTES	BEST PRACTICE	
EVACUATE AGAIN	BEST PRACTICE	
OPEN THE CIRCUIT BY CUTTING OR BRAZING	FINAL STEP	
FOR REPAIRS, PURGE WITH NITROGEN DURING BRAZING	REQUIRED	
PRESSURE TEST	BEST PRACTICE	
LEAK TEST	BEST PRACTICE	



# PURON ADVANCE KEY MESSAGING P24

- Bryant is focused on providing a refrigerant that offers a higher efficiency & the lowest GWP that will positively impact people, our planet, & our communities.
- Bryant is easing fears of dealers, technicians & homeowners through robust resources & product enhancements.
- Bryant goes beyond the regulatory minimums & thinks about long-term innovations & solutions.

# TOP 11 THINGS TO REMEMBER ABOUT PURON ADVANCE P25

- REVIEW POINTS 1 – 11.

# FREQUENTLY ASKED QUESTIONS P26

- PURON ADVANCE- GENERAL QUESTIONS 1-11.

# FREQUENTLY ASKED QUESTIONS P27

- INSTALLATION/SERVICE QUESTIONS 12 -31.

# FREQUENTLY ASKED QUESTIONS P28

- SAFETY QUESTIONS 32-38.

# WHERE TO GO FOR MORE INFORMATION P29

- MY LEARNING CENTER TRAINING