AHRI Guideline N

2017 Guideline for

Assignment of Refrigerant Container Colors

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IMPORTANT

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Note:

This guideline supersedes AHRI Guideline N-2016 with Addendum 1.

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ASSIGNMENT OF REFRIGERANT CONTAINER COLORS

Section 1. Purpose

1.1 *Purpose*. The purpose of this guideline is to establish assignment of refrigerant container colors; definitions; basic considerations for developing the color guideline; and assignment criteria. This document is not intended to be an exhaustive listing of all good practices or requirements. Applicable federal, state and local requirements should be reviewed and may take precedence over this guideline.

1.1.1 *Intent.* This guideline is intended for the guidance of the industry, including manufacturers, engineers, installers, contractors and users.

1.1.2 *Review and Amendment.* This guideline is subject to review and amendment as technology advances.

Section 2. Scope

2.1 *Scope.* This guideline provides a means by which PMS colors can be assigned to printed materials, such as printed labels on refrigerant containers, for Refrigerants currently in use or newly developed Refrigerants, provided the Refrigerant is used in significant quantities as defined in this guideline. Colors should not be relied upon exclusively to determine the type of Refrigerant in the container.

This guideline also recommends a universal container color of light green gray (RAL 7044) for all Refrigerants.

2.2 *Exclusions*. This guideline does not cover container colors for recovered and recycled Refrigerants, which are covered in AHRI Guideline K.

Section 3. Definitions

All terms in this document will follow the standard industry definitions in the *ASHRAE Terminology* website (https://www.ashrae.org/resources--publications/free-resources/ashrae-terminology) unless otherwise defined in this section.

3.1 *Refrigerants.* Refrigerants for purposes of this guideline include single component refrigerants, zeotropes and azeotropes.

3.1.1 *Flammable Refrigerants*. Those Refrigerants that receive a flammability rating of 2, 2L, or 3 in ANSI/ASHRAE Standard 34, *Designation and Safety Classification of Refrigerants* with Addenda.

3.1.2 *High Pressure Refrigerants.* Those Refrigerants that meet the definition of a compressed gas and have a minimum cylinder service pressure exceeding 3447 kPa gage.

3.1.3 *Liquid Refrigerants*. Those Refrigerants with a normal boiling point greater than 20°C. These products normally are packaged in drums.

3.1.4 *Low Pressure Refrigerants.* Those Refrigerants that meet the definition of a compressed gas and have a minimum cylinder service pressure not exceeding 3447 kPa gage.

3.2 *"Should."* "Should" is used to indicate provisions which are not mandatory but which are desirable as good practice.

Section 4. Basic Considerations for Developing the Color Guideline

4.1 The color guideline is not a substitute for reading cylinder labels and markings. The color guideline does not apply to recovery containers. Refer to AHRI Guideline K for recovery containers.

4.2 Refrigerants are grouped in four classes in order to create more color opportunities within readily identifiable container styles and to clearly differentiate Flammable Refrigerants.

4.2.1 Class I: Liquid Refrigerants
4.2.2 Class II: Low Pressure Refrigerants
4.2.3 Class III: High Pressure Refrigerants
4.2.4 Class IV: Flammable Refrigerants

4.3 The color guideline should allow for the addition of new Refrigerants in each of the above classes.

4.4 Color codes only need to be differentiated within a class. Consideration should be given to the application before assigning colors to the Refrigerant.

4.5 Colors should be distinguishable from each other.

4.6 The color guideline should be standard industry-wide.

4.7 A red band on the shoulder or top of the container should designate flammable compounds, or mixtures that could become flammable in the event of a leak.

4.8 All Refrigerant containers should be painted light green gray (RAL 7044 corresponding with PMS 413). RAL colors previously designated in the guideline can continue to be used on refrigerant containers until December 31, 2019. The Refrigerant PMS color can be determined using Tables 1 and 2. The PMS/RAL color system is described in Table 3. By 2020, all refrigerant containers should transition to paint color RAL 7044. Existing inventories of previously painted cylinders will not be required to be repainted.

Section 5. Assignment Criteria

5.1 The refrigerant manufacturer should notify AHRI of its intent to use a color not previously assigned for that refrigerant class to a new Refrigerant they plan to commercialize within six months. The manufacturer requesting a color assignment should provide a specific PMS color or request that AHRI assign a specific PMS color.

5.2 In order to retain assignment of the color, the manufacturer should furnish confirmation to AHRI that:

5.2.1 A refrigerant number has been published in ANSI/ASHRAE Standard 34.

5.2.2 There have been commercial sales, and there will be continued offering of the Refrigerant within one year of assignment.

Table 1. Assigned Refrigerant Color & Class			
Refrigerant	**Color**	**PMS #**	**Class**
Default	Light Green Gray	413	N/A
R-11	Orange	021	I
R-12	White	None	II
R-13	Light Blue (Sky)	2975	III
R-13B1	Pinkish-Red (Coral)	177	III
R-14	Yellow-Brown (Mustard)	124	III
R-22	Light Green	352	II
R-23	Light Blue-Grey	428	III
R-32	Light Blue-Green	631	IV
R-113	Dark Purple (Violet)	266	I
R-114	Dark Blue (Navy)	302	II
R-116	Dark Grey (Battleship)	424	III
R-123	Light Blue-Grey	428	I
R-124	Deep Green (DOT Green)	335	II
R-125[1]	Medium Brown (Tan)	465	II
R-134a	Light Blue (Sky)	2975	II
R-236fa	Dark Grey (Battleship)	424	II
R-245fa	Maroon	194	II
R-401A	Pinkish-Red (Coral)	177	II
R-401B	Yellow-Brown (Mustard)	124	II
R-401C	Blue-Green (Aqua)	3268	II
R-402A	Light Brown (Sand)	461	II
R-402B	Green-Brown (Olive)	385	II
R-403B[2]	Light Purple (Lavender)	251	II
R-404A	Orange	021	II
R-407A	Lime Green	368	II
R-407B	Cream	156	II
R-407C	Medium Brown (Brown)	471	II
R-407D	Dark Brown (Chocolate)	450	II
R-407F	Green-Yellow-White	373	II
R-407H	Light Purple (wisteria)	2573	I
R-408A	Medium Purple (Purple)	248	II
R-409A[1]	Medium Brown (Tan)	465	II
R-410A	Rose	507	II
R-411A	Dark Purple (Violet)	266	IV
R-411B	Blue-Green (Teal)	326	IV
R-413A	Deep Blue	3015	II
R-414A	Beige	4545	II
R-414B	Medium Blue (Blue)	2995	II
R-416A	Yellow-Green (Lime)	381	II
R-417A	Green	354	II
R-421A	Light Green-Blue	333	II
R-422A	Yellow-Orange	128	II
R-422D	Green-Yellow	375	II
R-423A	Wedge Wood Blue	292	II
R-424A	Black	None	II
R-426A	Pastel Orange	804	II
R-427A	Green-Blue (Jungle Green)	3405	II
R-428A	Traffic Yellow	803	II
R-434A	Sulfur Yellow	388	II

PMS = Pantone® Matching System, an international printing, publishing and packaging color language.

CLASS I
Liquid Refrigerants: Normal boiling point greater than 20°C. These products are normally packaged in drums.

CLASS II
Low Pressure Refrigerants: These Refrigerants meet the definition of a compressed gas and have a minimum cylinder service pressure not exceeding 3447 kPa gage.

CLASS III
High Pressure Refrigerants: These Refrigerants meet the definition of a compressed gas and have a minimum cylinder service pressure exceeding 3447 kPa gage.

CLASS IV
Flammable Refrigerants.

Notes:
1. **R-125 and R-409A are used for different applications.**
2. **R-403B must not be used as an R-502 replacement per EPA requirements.**

Table 1. Assigned Refrigerant Color & Class (continued)

Refrigerant	Color	PMS #	Class
R-437A	Royal Blue	286	II
R-438A	Blue Jay	2727	II
R-442A	Night Blue	268	II
R-448A	Gentian Blue	300	II
R-449A	Grayish Blue	7707	II
R-450A	Sapphire Blue	2955	II
R-452A	Metallic Blue	2746	II
R-453A	Dark Purple (Violet)	266	II
R-455A	Sea Foam Green	3395	IV
R-500	Yellow	109	II
R-502[2]	Light Purple (Lavender)	251	II
R-503	Blue-Green (Aqua)	3268	III
R-507A	Blue Green (Teal)	326	II
R-508B	Dark Blue (Navy)	302	III
R-513A	Sky Blue	7460	II
R-514A	Pinkish Purple	523	II

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1. **R-125 and R-409A are used for different applications.**
2. **R-403B must not be used as an R-502 replacement per EPA requirements.**

Table 2. Assigned Refrigerant Color & Class by PMS Number					
PMS	**Color**	**Class I**	**Class II**	**Class III**	**Class IV**
None	White		R-12		
None	Black		R-424A		
021	Orange	R-11	R-404A		
109	Yellow		R-500		
124	Yellow-Brown (Mustard)		R-401B	R-14	
128	Yellow-Orange		R-422A		
156	Cream		R-407B		
177	Pinkish-Red (Coral)		R-401A	R-13B1	
185	Red (DOT Red)	FOR FLAMMABLE REFRIGERANT IDENTIFICATION WHEN USED WITH PRIMARY CONTAINER COLOR			
194	Maroon		R-245fa		
248	Medium Purple (Purple)		R-408A		
251	Light Purple (Lavender)		R-502; R-403B[2]		
266	Dark Purple (Violet)	R-113	R-453A		R-411A
268	Night Blue		R-442A		
286	Royal Blue		R-437A		
292	Wedge Wood Blue		R-423A		
300	Gentian Blue		R-448A		
302	Dark Blue (Navy)		R-114	R-508B	
326	Blue-Green (Teal)		R-507A		R-411B
333	Light Green-Blue		R-421A		
335	Deep Green (DOT Green)		R-124		
352	Light Green		R-22		
354	Green		R-417A		
368	Lime Green		R-407A		
373	Green-Yellow-White		R-407F		
375	Green-Yellow		R-422D		
381	Yellow-Green (Lime)		R-416A		
385	Green-Brown (Olive)		R-402B		
388	Sulfur Yellow		R-434A		
413	Light Green Gray	DEFAULT PMS COLOR USED FOR REFRIGERANTS			
424	Dark Grey (Battleship)		R-236fa	R-116	
428	Light Blue-Grey	R-123		R-23	
461	Light Brown (Sand)		R-402A		
465	Medium Brown (Tan)		R-125; R-409A[1]		
450	Dark Brown (Chocolate)		R-407D		
471	Medium Brown (Brown)		R-407C		
507	Rose		R-410A		
523	Pinkish Purple		R-514A		
631	Light Blue-Green				R-32
803	Traffic Yellow		R-428A		
804	Pastel Orange		R-426A		
2573	Light Purple (Wisteria)	R-407H			
2727	Blue Jay		R-438A		

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CLASS IV
Flammable Refrigerants.

Notes:
1. **R-125 and R-409A are used for different applications.**
2. **R-403B must not be used as an R-502 replacement per EPA requirements.**

Table 2. Assigned Refrigerant Color & Class by PMS Number (continued)

PMS	Color	Class I	Class II	Class III	Class IV
2746	Metallic Blue		R-452A		
2955	Sapphire Blue		R-450A		
2975	Light Blue (Sky)		R-134a	R-13	
2995	Medium Blue (Blue)		R-414B		
3015	Deep Blue		R-413A		
3268	Blue-Green (Aqua)		R-401C	R-503	
3395	Sea Foam Green				R-455A
3405	Green-Blue (Jungle Green)		R-427A		
4545	Beige		R-414A		
7707	Grayish Blue		R-449A		
7460	Sky Blue		R-513A		

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1. **R-125 and R-409A are used for different applications.**
2. **R-403B must not be used as an R-502 replacement per EPA requirements.**

Table 3. PMS/RAL Color System			
Refrigerant Color	PMS #	Possible RAL K5 Classic #	RAL Color Description
White	None	N/A	N/A
Black	None	5004	Black Blue
Orange	21	2004	Pure Orange
Yellow	109	1018	Zinc Yellow
Yellow-Brown (Mustard)	124	1003	Signal Yellow
Yellow-Orange	128	1021	Rape Yellow
Cream	156	1034	Pastel Yellow
Pinkish-Red (Coral)	177	3017	Rose
Red (DOT Red)	185	3020	Traffic Red
Maroon	194	4002	Red Violet
Medium Purple (Purple)	248	4006	Traffic Purple
Light Purple (Lavender)	251	4009	Pastel Violet
Dark Purple (Violet)	266	4007	Purple Violet
Night Blue	268	5022	Night Blue
Royal Blue	286	5005	Signal Blue
Wedge Wood Blue	292	5012	Light Blue
Dark Blue (Navy)	302	5019	Capri Blue
Blue-Green (Teal)	326	5018	Turquoise Blue
Deep Green (DOT Green)	335	6032	Signal Green
Light Green	352	6019	Pastel Green
Green	354	6001	Emerald Green
Lime Green	368	Note[1]	Note[1]
Green-Yellow-White	373	No match available	No match available
Green-Yellow	375	No match available	No match available
Yellow-Green (Lime)	381	No match available	No match available
Green-Brown (Olive)	385	6003	Olive Green
Sulfur Yellow	388	1016	Sulfur Yellow
Light Green Gray[2]	413	7044	Light green gray
Dark Grey (Battleship)	424	7023	Concrete Grey
Light Blue-Grey	428	7035	Light Grey
Light Brown (Sand)	461	1002	Sand Yellow
Medium Brown (Tan)	465	1001	Beige
Dark Brown (Chocolate)	450	6014	Yellow Olive
Medium Brown (Brown)	471	8023	Orange Brown
Rose	507	3015	Heather Violet
Light Blue-Green	631	6027	Light Green
Traffic Yellow	803	1023	Traffic Yellow
Pastel Orange	804	2003	Pastel Orange
Blue Jay	2727	5014	Pigeon Blue
Light Blue (Sky)	2975	5012	Light Blue
Medium Blue (Blue)	2995	5015	Sky Blue
Deep Blue	3015	5017	Traffic Blue
Blue-Green (Aqua)	3268	5021	Water Blue
Green-Blue (Jungle Green)	3405	6024	Traffic Green
Beige	4545	8024	Beige Brown

RAL = *Reichsausschuß für Lieferbedingungen und Gütesicherung*" = State Commission for Delivery Terms and Quality Assurance
Notes:
1. No match provided due to conflict with the European Cylinder Gas Identification Standard EN 1089-3.
2. RAL 7044 applies to all containers of refrigerant as of January 1, 2020

APPENDIX A. REFERENCES – NORMATIVE

A1 Listed here are all standards, handbooks and other publications essential to the formation and implementation of the standards. All references in this appendix are considered as part of the standard.

None.

APPENDIX B. REFERENCES – INFORMATIVE

B1 Listed here are standards, handbooks and other publications which may provide useful information and background, but are not considered essential. References in this appendix are not considered part of the guideline.

B1.1 AHRI Guideline K-2017, *Containers for Fluorocarbon Refrigerants*, 2017, Air-Conditioning, Heating and Refrigeration Institute, 2111 Wilson Blvd., Ste. 500, Arlington, VA 22201, U.S.A.

B1.2 ANSI/ASHRAE Standard 34-2016 with Addenda, *Designation and Safety Classification of Refrigerants*, 2016, with Addenda, American Society of Heating, Refrigerating and Air-Conditioning, Inc., 1791 Tullie Circle, N.E., Atlanta, GA 30329, U.S.A.

B1.3 *ASHRAE Terminology*, https://www.ashrae.org/resources--publications/free-resources/ashrae-terminology, 2017, American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., 1791 Tullie Circle, N.E., Atlanta, GA 30329, U.S.A.

B1.4 BS EN 1089-3:2011, *Transportable gas cylinders. Gas identification (excluding LPG). Colour coding*, 2011, British Adopted European Standard, European Committee for Standardization, Rue De Stassart 36 B-1050 Brussels, Belgium.

B1.5 Pantone Color Matching System, Pantone Inc., 590 Commerce Boulevard, Carlstadt, New Jersey 07072-3098, U.S.A.

B1.6 RAL Colours, http://www.ral-farben.de/en/home/, 2016, RAL gGmbH, Siegenburgerstrasse 39, D-53757 Sankt Augustin, Germany.

B1.7 Title 49 CFR, Code of Federal Regulations, Office of the Federal Register, National Archives and Records Administration, 800 North Capitol Street, NW, Washington, DC 20402, U.S.A.