ADDENDA

ANSI/ASHRAE Addendum k to
ANSI/ASHRAE Standard 34-2019

Designation and Safety Classification of Refrigerants

Approved by ASHRAE and the American National Standards Institute on September 30, 2020.

This addendum was approved by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. Instructions for how to submit a change can be found on the ASHRAE® website (https://www.ashrae.org/continuous-maintenance).

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FOREWORD

Addendum k ensures blends with the same components cannot have an identical composition, including the allowance for the component composition tolerances.

Note: In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and ~~strikethrough~~ (for deletions) unless the instructions specifically mention some other means of indicating the changes.

Addendum k to Standard 34-2019

Add new Section 4.4.3 as shown.

4.4.3 Composition Uniqueness. To ensure composition uniqueness, blends with the same components, shall have at least one component range, including tolerances, that does not overlap and is separated by a minimum of 0.1% m/m. See Informative Appendix H, "Examples of Composition Uniqueness," for an example.

Add new Informative Appendix H as shown.

(This appendix is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

INFORMATIVE APPENDIX H
EXAMPLES OF COMPOSITION UNIQUENESS

Section 4.4.3 requires that blends comprising the same components shall have at least one component with composition range, including tolerances, that does not overlap. This requirement ensures that blends have unique compositions. That is, the composition resulting from a blend analysis can be assigned unambiguously to only a single refrigerant designation. This informative appendix provides examples to help visualize and clarify this requirement.

H1. EXAMPLE—BINARY BLENDS

Table H-1 lists example compositions for two binary blends comprising Component A and Component B that are not unique. Note that the concentration of Component A can be 45.0 mass % and that of Component B can be 55.0 mass % in both Refrigerant 1 and Refrigerant 2. This is shown visually in Figure H-1 where the edge of the lower range of component A in Refrigerant 2 is coincident with the edge of the upper range of Refrigerant 1 and vice versa for Component B.

Presuming that Refrigerant 1 received its designation first, the tolerances on Refrigerant 2 would need to be made smaller to make its composition unique. An example is listed in Table H-2. Here, the lower tolerance on Component A in Refrigerant 2 has been decreased by 0.1 mass % (the smallest increment allowed in Section 4.4.2 for reporting compositions). As seen in Figure H-2, the ranges for Refrigerant 1 and Refrigerant 2 no longer share coincident edges.

Alternatively, the tolerances for Refrigerant 2 could have been kept the same as those in Table H-1 and the nominal composition adjusted upward by a minimum of 0.1 mass % in Component A to create a blend unique from Refrigerant 1.

H2. EXAMPLE—TERNARY BLENDS

Table H-3 lists example compositions for two ternary blends comprising Component A, B, and C that are not unique. The concentrations of Components B and C are allowed to overlap if the concentrations of Component A does not. However, in this case, the upper boundary of Component A concentration in Refrigerant 2 (19.0) coincides with lower boundary of Refrigerant 1

Table H-1 Two Binary Blends That Are not Unique

	Concentration (mass %)	
Component	**A**	**B**
Refrigerant 1	44.0	56.0
Tolerances	–2.0/+1.0	–1.0/+2.0
Range	42.0 to 45.0	55.0 to 58.0
Refrigerant 2	46.0	54.0
Tolerances	±1.0	±1.0
Range	45.0 to 47.0	53.0 to 55.0

Table H-2 Two Binary Blends That Are Unique

	Concentration (mass %)	
Component	**A**	**B**
Refrigerant 1	44.0	56.0
Tolerances	–2.0/+1.0	–1.0/+2.0
Range	42.0 to 45.0	55.0 to 58.0
Refrigerant 2	46.0	54.0
Tolerances	–0.9/+1.0	–1.0/+0.9
Range	45.1 to 47.0	53.0 to 54.9

Table H-3 Two Ternary Blends That Are not Unique

	Concentration (mass %)		
Component	**A**	**B**	**C**
Refrigerant 1	20.0	40.0	40.0
Tolerances	±1.0	±1.0	±1.0
Range	19.0 to 21.0	39.0 to 41.0	39.0 to 41.0
Refrigerant 2	18.0	41.0	41.0
Tolerances	±1.0	±1.0	±1.0
Range	17.0 to 19.0	40.0 to 42.0	40.0 to 42.0

Table H-4 Two Ternary Blends That Are Unique

	Concentration (mass %)		
Component	**A**	**B**	**C**
Refrigerant 1	20.0	40.0	40.0
Tolerances	±1.0	±1.0	±1.0
Range	19.0 to 21.0	39.0 to 41.0	39.0 to 41.0
Refrigerant 2	18.0	41.0	41.0
Tolerances	–1.0/+0.9	±1.0	±1.0
Range	17.0 to 18.9	40.0 to 42.0	40.0 to 42.0

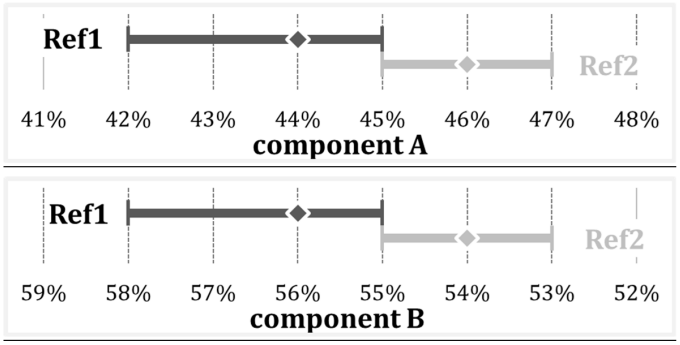

Figure H-1 Two binary blends that are not unique.

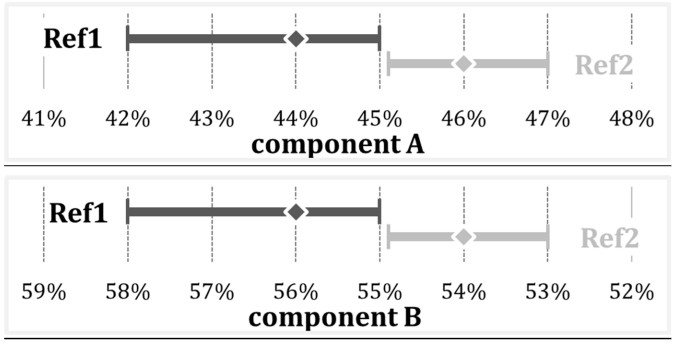

Figure H-2 Two binary blends that are unique.

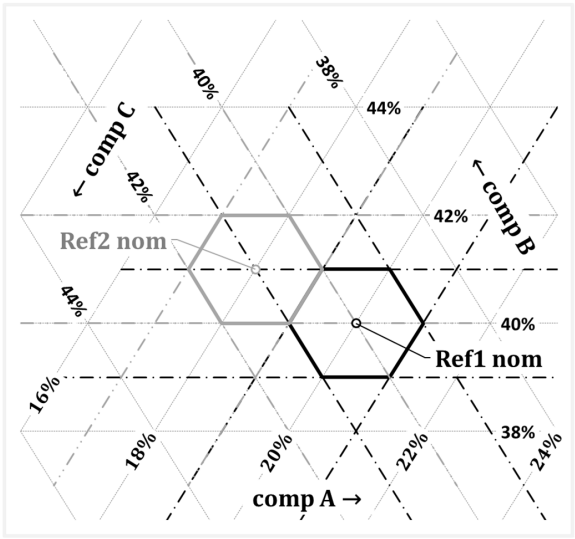

Figure H-3 Two ternary blends that are not unique.

(19.0). This is shown visually in Figure H-3. The hexagonal cells, created by the intersections of the tolerance ranges on each of the components, represent the range of compositions associated with each of the blends Refrigerant 1 and Refrigerant 2. Note that they share a common boundary along the Component A concentration line of 19.0 mass %.

Presuming that Refrigerant 1 received its designation first, the tolerance on Component A in Refrigerant 2 would need to be made smaller to make its composition unique. An example is listed in Table H-4. Here, the upper tolerance on Component A in Refrigerant 2 has been

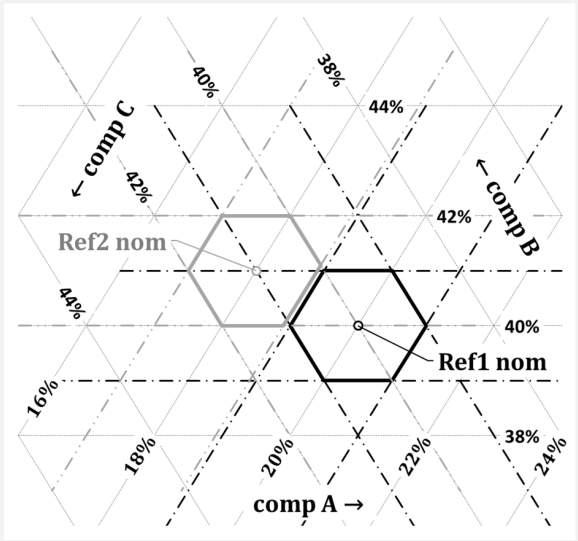

Figure H-4 Two ternary blends that are unique.

decreased by 0.1 mass %. As seen in Figure H-4, the ranges for Refrigerant 1 and Refrigerant 2 no longer share coincident boundaries.

As with the binary blends, an alternative is to simply move the nominal composition so that the blend range of Refrigerant 2 is not coincident with the range of Refrigerant 1.

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As an ongoing goal, ASHRAE will, through its Standards Committee and extensive Technical Committee structure, continue to generate up-to-date Standards and Guidelines where appropriate and adopt, recommend, and promote those new and revised Standards developed by other responsible organizations.

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