



Refrigerant 2,3,3,3 – Tetrafluoro-1-Propene HFO-1234yf

1 Scope

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose/Material Description. This specification covers the overall requirements for 2,3,3,3 – Tetrafluoro-1-Propene refrigerant (HFO-1234yf) for use in GM mobile air conditioning systems.

1.2 Symbols. Not applicable.

1.3 Applicability. As a refrigerant in automotive air conditioners.

1.4 Remarks. Specification number and effective date of specification shall be referred to by suppliers when making quotations or acknowledging orders.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

AHRI 700 ASTM D2111 SAE J2844
ANSI/ASHRAE 34 SAE J2842

2.2 GM Standards/Specifications.

GMW3059

3 Requirements

3.1 All materials supplied to this standard must comply with GMW3059, **Restricted and Reportable Substances**, including the requirement to obtain a GM-approved International Material Data System (IMDS) submission.

3.2 Performance Requirements. Material supplied to this standard shall have performance characteristics equivalent to the accepted approved sources. GM reserves the right to require any additional tests that may be deemed necessary to ensure satisfactory vehicle component performance with candidate refrigerants submitted for approval.

3.3 Chemical and Physical Requirements. Material supplied to this specification shall have chemical and physical property values conforming to the established limits listed in Table 1, Table 2, and Table 3. No sample for specification testing shall be taken until the contents of the container have been mixed to ensure uniformity of the liquid phase and equilibrium with the gas phase.

Table 1: Physical Properties

Properties	Test Method	Units	Value
Appearance	Visual	Not applicable	Clear, colorless, liquefied gas
Purity, percent (%) by weight as HFO-1234yf	Gas Chromatography per SAE J2844	% by weight	99.5 minimum
Density at 25 °C	ASTM D2111	kg/dm ³	1.08 to 1.10

Note: HFO = Hydrofluoroolefin.

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Table 2: Liquid Phase Contaminants (Maximum Limits)

Contaminants	Test Method	Units	Value
Water	Karl Fischer or equivalent	ppm w/w	20 maximum
Acidity	AHRI 700, Appendix C	ppm w/w	1.0 maximum as HCl
Total Organic Impurities	Gas Chromatography	ppm w/w	5000 maximum
HFO-1225ye	Gas Chromatography	ppm w/w	150 maximum
Non-volatile residue	AHRI 700, Appendix C	ppm v/v	100
Chlorides	AHRI 700, Appendix C Part 4	ppm w/w	3.0 maximum

Note: AHRI = Air-Conditioning, Heating and Refrigeration Institute; HCl = Hydrogen Chloride; ppm = parts per million; v/v = volume to volume; w/w = weight to weight.

Table 3: Vapor Phase Contaminants (Maximum Limit)

Properties	Test Method	Units	Values
Non-condensable Gases	AHRI 700, Appendix C	ppm v/v	15 000 maximum

Note: AHRI = Air-Conditioning, Heating and Refrigeration Institute; ppm = parts per million; v/v = volume to volume

3.4 Label Requirements. Containers of material supplied to this specification shall, for ready identification of contents, prominently display the GM part number, refrigerant number HFO-1234yf (ANSI/ASHRAE 34), batch number, and supplier name and other labeling requirements as outlined in SAE J2842.

4 Manufacturing Process

Not applicable.

5 Rules and Regulations

5.1 Legal Regulations. All materials must satisfy applicable laws, rules, regulations and recommendations valid in the country of usage.

5.2 Language. In the event of conflict between the English and domestic language, the English language shall take precedence.

5.3 Inspection and Rejection. Samples of components or materials released to a GM material specification shall be tested for conformity with the requirements of this material specification and approved by the responsible Engineering department prior to commencement of delivery of bulk supplies.

A new approval must be received for any changes, e.g., properties, manufacturing process, location of manufacture, etc. If not otherwise agreed, all testing and documentation normally required for initial release must be completed.

It is the responsibility of the supplier to inform the customer in a timely manner, without solicitation, and to include documentation of all modifications of materials and/or processes and to apply for a new release.

5.3.1 All shipments of material or parts under contract or purchase order manufactured to this specification shall be equivalent in every respect to the initial samples approved by Engineering. There shall be no changes in either formulation or manufacturing processes permitted without prior notification and approval by Engineering. Lack of notification by the supplier constitutes grounds for rejection of any shipment. While samples may be taken from incoming shipments and checked for conformance to this specification, the supplier shall accept the responsibility for incoming shipments meeting this specification without dependence upon purchaser's inspection.

The series of tests used to approve each batch of product along with acceptance limits will be agreed upon by the purchaser and seller. The laboratory providing the certificate of analysis must also participate in a proficiency