



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 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. Not applicable.

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

2.3 Additional References.

TMC003 Material Safety Data Sheet guidance documents (available at www.gmsupplypower.com).

3 Requirements

3.1 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.

3.2 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.

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

3.3 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. 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 testing program (round robin) that is approved by the Fuels, Fluids, and Lubricants Global Subsystem Leadership Team (GSSLT) or designate. The Fuels, Fluids, and Lubricants GSSLT or designate must receive copies of the proficiency testing reports directly from the test program administrator.

5.4 Initial Source Approval. No shipments shall be made by any supplier until representative initial production samples have been approved by the appropriate Materials Engineering department(s) as meeting the requirements of this specification.

5.5 Material Safety Data Sheets/Safety Data Sheets (MSDS/SDS). For new product submissions, or when a change in chemical composition of an existing product has occurred, a complete copy of the Material Safety