



Refrigerant 1,1,1,2-Tetrafluoroethane (HFC-134a)

1 Scope

This material Specification refers to the automotive refrigerant r134a or HFC-134a.

1.1 Material Description. This specification covers the overall requirements for 1,1,1,2-tetrafluoroethane refrigerant (HFC-134a) used in GM mobile air conditioning systems

1.2 Symbols. Not applicable.

1.3 Applicability. For use in GM mobile air conditioning units.

2 References

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

2.1 External Standards/Specifications.

ANSI/ASHRAE 34 ANSI/ASHRAE 97

2.2 GM Standards/Specifications.

GMW3059 GMW5038

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 specification shall have performance characteristics equivalent to the accepted approved sources.

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 through Table 3, as well as the requirements of GMW5038. 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.

3.2.1 Physical Properties. See Table 1.

3.2.2 Liquid Phase Contaminants. See Table 2.

3.2.3 Vapor Phase Contaminants. See Table 3.

Table 1: Physical Properties

Properties	Values
Appearance	Clear, colorless, liquid gas
Purity, percent (%) by weight (gas chromatography)	-
As R-134a	99.7 Minimum
As R-134a + R-134	99.8 Minimum
Boiling Point, Celsius (°C) at 760 mm Hg	-26.2
(Reference only)	-
High Boiling Residues, percent (%) by volume (volumetric)	0.01 Maximum

Table 2: Liquid Phase Contaminants

Contaminants	Maximum Limits
Water, part per million (ppm) by weight (Karl Fischer or equivalent)	10
Acidity, ppm by Weight ^{Note 1} (neutralization)	1
Halides, ppm by weight ^{Note 1} (specific ion electrode on potentiometric titration)	< 0.1
Other refrigerants ^{Note 2} (gas chromatography)	1960
Total unsaturates ^{Note 2} (gas chromatography)	40

Note 1: Alternative Analytical Procedure for Acidity and Halides. Acidity and Halides may be determined together via Aqueous Conductivity as Chloride, ppm by weight.

Note 2: These organic impurities must be identified and must not be harmful to mobile air conditioning systems as judged by ANSI/ASHRAE 97 Sealed Tube Testing in the presence of iron, copper, aluminum and GM approved HFC-134a lubricant.

Table 3: Vapor Phase Contaminants

Properties	Values
Non-condensable gases, percent (%) by volume (gas chromatography)	1.5 Maximum

3.3 Label Requirements. Containers of material supplied to this specification shall, for ready identification of contents, prominently display the refrigerant number "134a" (ANSI/ASHRAE 34).

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 shipment shall be made by any supplier until representative initial production samples have been approved by the Fuels, Fluids, and Lubricants Global Subsystem Leadership Team or designees meeting the requirements of this specification.