



SURFACE VEHICLE RECOMMENDED PRACTICE	J2646™	JUN2022
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Superseding J2646 MAY2011		
Cab Air-Conditioning Test Procedure - Heavy Trucks with and without Sleepers		

RATIONALE

This document has been revised to increase the air-conditioning performance by lowering the temperature goals for test phases 3 and 4, and by adding requirements for louver air temperatures. This recommended change is based on input from the truck user community through discussions at meetings of the Technology and Maintenance Council of the American Trucking Association. Performance criteria for the crew cab compartment have been added.

1. SCOPE

This SAE Recommended Practice establishes a uniform test procedures for on highway trucks equipped with an air-conditioning system used to condition the air in the cabin and sleeper compartment of the vehicle. This specification will apply to heavy trucks with and without sleeper compartments.

1.1 Purpose

The purpose is to provide a standard test procedure for comparison and evaluation of heavy truck air-conditioning performance.

2. REFERENCES

2.1 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Technical Report.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAE J1163 Determining Seat Index Point

SAE J1559 Measurement of Solar Heating Effect

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https://www.sae.org/standards/content/J2646_202206/

2.1.2 TMC Publications

Available from Technology & Maintenance Council – American Trucking Associations, 950 N. Gillebe Road, Arlington, VA 22203, Tel: 703-838-1763, <http://tmc.truckline.com>

TMC RP 436B(T) Air Conditioning System Performance Requirements For Truck Cabs With And Without Sleepers

3. DEFINITIONS

3.1 AIR CONDITIONING SYSTEM

Any system that lowers air temperature and humidity by the means of a refrigerant.

3.2 AMBIENT TEMPERATURE

Air temperature measured external to the vehicle and internal to the Vehicle Environmental Chamber.

3.3 DAY CAB AND FRONT CAB COMPARTMENT

A truck cab with single row front occupant space for a driver and one or two passengers.

3.4 FRONT CAB COMPARTMENT

The front occupant space in a crew cab or sleeper cab for a driver and one or two passengers.

3.5 FRONT CAB COMPARTMENT OR DAY CAB AVERAGE TEMPERATURE

The average of the six cab occupant probe locations for driver and passenger as shown in Figure 1.

3.6 CREW CAB COMPARTMENT

The back seating portion of a four-door cab.

3.7 CREW CAB COMPARTMENT AVERAGE TEMPERATURE

The average of the head, lap and foot probe locations for each belted crew compartment occupant as shown in Figure 1.

3.8 COMPRESSOR

A device that pumps low pressure refrigerant vapor out of the evaporator by suction, raises the pressure, then pumps it under high pressure into the condenser.

3.9 CONDENSER

A device that removes heat from the entering high pressure, high temperature de-superheated vapor refrigerant, changing it to a high pressure, high temperature subcooled liquid refrigerant.

3.10 EXPANSION DEVICE

Valve, orifice tube, or other expansion device in the refrigerant circuit for the purpose of metering liquid from the condenser into the evaporator inducing a large pressure drop changing the refrigerant to a low temperature, low pressure liquid.

3.11 EVAPORATOR

Removes unwanted heat from the air by the boiling of liquid refrigerant in the evaporator coil.

3.12 REFRIGERANT

A substance used by the air conditioning system that has the needed characteristics to boil at a low temperature and is able to change its state readily from liquid to vapor, and vice versa.

3.13 SLEEPER COMPARTMENT

The living and sleeping space at the back portion of a cab normally divided by a curtain from the seated and belted driver and occupant area.

3.14 SLEEPER COMPARTMENT AVERAGE TEMPERATURE

The average of the six probe locations as shown in Figure 2, Table 1.

4. TEST EQUIPMENT

4.1 Vehicle Environmental Chamber (VEC)

Environmental chamber large enough to contain the vehicle and test equipment. The chamber must have provisions to maintain ambient temperature, relative humidity, and solar intensity. Chamber capability shall maintain the following levels of accuracy:

Temperature: ± 1.7 °C (± 3 °F)
Relative Humidity: 3% (± 1.5 %)
Solar Load: ± 50 W/m²

4.2 Engine Speed

Engine tachometer with an accuracy of 2% of observed values.

4.3 Pyranometer

A device used to measure radiant energy from the solar load placed horizontal above the vehicle roof surface.

4.4 Temperature Measurement Devices

Devices used to measure temperature inside the VEC as well as inside and outside the vehicle to be used for calculating and comparison of cooling performance, i.e., thermocouples, RTDs, etc. Must have an accuracy of ± 1.5 °C (± 2.7 °F).

4.5 Air Velocity/Wind Speed

Anemometer to measure air velocity (with a measuring accuracy of 2% of observed values).

4.6 Data Acquisition System

System that will monitor and record all required test parameters and necessary measured conditions consistent with this specification at the required time interval.

4.7 Pressure Transducer

Device used to measure refrigerant pressure within the refrigeration system that are required within this specification for the purpose of calculating cooling performance.

4.8 Mass Flow Meter

Device used to measure the mass flow of refrigerant in the refrigeration system.