



SURFACE VEHICLE STANDARD

J3214™

MAY2023

Issued 2021-01
Revised 2023-05

Superseding J3214 JAN2021

(R) Breath-Based Alcohol Detection System

RATIONALE

Since its publication, we have been performing testing against the standard and have identified sections in the standard that require revisions and clarifications. These sections did not contain all the necessary information to successfully conduct the tests against the standards.

FOREWORD

To reduce the risks associated with driving under the influence of alcohol, vehicle owners with oversight responsibilities—such as fleet owners or parents with teenagers—may enact zero-tolerance alcohol policies. The zero-tolerance breath alcohol detection system can support execution of such policies. This system measures the driver's breath alcohol concentration (BrAC) through a directed breath with or without a mouthpiece and uses a setpoint to either provide a warning and/or restrict the driver's ability to operate a vehicle. This setpoint is based on applicable national and local laws as well as vehicle owners' policies. Thus, there is a need for a new specification adopted for such applications.

This standard defines the accuracy and precision requirements of the BrAC measurement, as well as the acceptability criteria and key parameters to test these requirements. Additionally, this standard sets the zero-tolerance breath alcohol detection system performance requirements for ethanol sensitivity, the measurement speed, and the long-term reliability (including different environmental and electrical conditions) the system may encounter throughout the lifespan of the vehicle.

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Full document details: SAE J3214_202305

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Documents

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1. SCOPE

This SAE Standard establishes the performance specifications for the zero-tolerance breath alcohol detection system to reduce the risks of driving under the influence of alcohol. It defines the accuracy and precision requirements of the breath alcohol concentration (BrAC) measurement, as well as the acceptability criteria and key parameters to test these requirements. Additionally, this standard sets the performance requirements of the system for ethanol sensitivity, the response time, and the electrical, mechanical, and environmental conditions the system may encounter throughout the lifespan of the vehicle.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.2 CENELEC Publications

Available from CEN-CENELEC Management Centre, Rue de la science, 23, B-1040 Brussels, Tel: +32 2 550 08 11, <https://www.cenelec.eu/>.

EN 50436-1 Alcohol interlocks - Test methods and performance requirements - Part 1: Instruments for drink-driving offender programs

2.3 European Government Publications

Available from European Union Law, <https://eur-lex.europa.eu>.

Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on Waste Electrical and Electronic Equipment (WEEE)

2.4 IEC Publications

Available from IEC Central Office, 3, rue de Varembe, P.O. Box 131, CH-1211 Geneva 20, Switzerland, Tel: +41 22 919 02 11, www.iec.ch.

IEC 60068-2-78 Test Cab: Damp heat, steady state

IEC 60529 Degrees of protection provided by enclosures (IP Code)

IEC CISPR 25 Vehicles, boats, and internal combustion engines - Radio disturbance characteristics - Limits and methods of measurement for the protection of on-board receivers

2.5 Industrial Publications

Available from American Chemistry Council, <https://www.gadsl.org/>.

Available from RoHS Guide, <https://www.rohsguide.com/>.

Available from Burea International des Poids et Mesure, Pavillon de Breteuil F-92312 Sèvres Cedex, France, <https://www.bipm.org/en/publications/guides/>.

Global Automotive Declarable Substance List (GASDL).

Restriction of Hazardous Substances Directives 2015/63.

2.6 ISO Publications

Copies of these documents are available online at <https://webstore.ansi.org/>.

ISO 10605	Road vehicles - Test methods for electrical disturbances from electrostatic discharge
ISO 16750-1	Road vehicles - Environmental conditions and testing for electrical and electronic equipment - Part 1: General
ISO 16750-2	Road vehicles - Environmental conditions and testing for electrical and electronic equipment - Part 2: Electrical loads
ISO 16750-3	Road vehicles - Environmental conditions and testing for electrical and electronic equipment - Part 3: Mechanical loads
ISO 16750-4	Road vehicles - Environmental conditions and testing for electrical and electronic equipment - Part 4: Climatic loads
ISO 7637-2	Road vehicles - Electrical disturbances from conduction and coupling - Part 2: Electrical transient conduction along supply lines only
ISO 7637-3	Road vehicles - Electrical disturbances from conduction and coupling - Part 3: Electrical transient transmission by capacitive and inductive coupling via lines other than supply lines
ISO/IEC Guide 98	Uncertainty of Measurement (GUM)
ISO/IEC Guide 99	International Vocabulary of Metrology (VIM)

3. DEFINITIONS

3.1 ACCEPTED BREATH SAMPLE

Breath sample fulfilling the set requirements for volume, flow, exhalation time, and other human breath sample characteristics.

3.2 ALCOHOL

Ethanol or ethyl alcohol with a defined chemical composition of C_2H_5OH .

3.3 BREATH ALCOHOL CONCENTRATION (BrAC)

The primary means of expressing the breath alcohol concentration. The mass concentration of ethanol, expressed in mg/L (milligram of ethanol per liter breath air), in a breath sample delivered to the system.

3.4 BREATH SAMPLE

A breath air sample taken under forced expiration.

3.5 BREATH TEST

Providing a breath sample to the system.

3.6 BYPASS

Operating the vehicle without providing a breath sample or without engaging an override function.

3.7 CALIBRATION

The process of comparing the system breath alcohol concentration measurements against reference standards.

3.8 CIRCUMVENTION

An intentional attempt to bypass the system, whether by providing samples other than the natural unfiltered breath of the driver or by engaging the vehicle's motive power without first providing an accepted breath test.

3.9 CONTACTLESS DIRECTED BREATH SAMPLE

A breath sample for analysis that is expelled from the driver in the direction of the system without making physical contact between the driver's mouth and the inlet of the system.

3.10 CONTROL UNIT

Part of the system that is connected to the vehicular system(s) that directs the operation of the system and maintains data.

NOTE: A control unit is not necessarily a separate piece of hardware; rather, its functionality can be managed via different individual components.

3.11 DATA

All events that are detected by the system and recorded in a secured format harmonized to applicable local laws.

3.12 DATA MEMORY

Record of breath test results and other events with date and time stored in the internal memory of the system.

3.13 DEVICE UNDER TEST (DUT)

The system or device being tested.

3.14 DIRECTED BREATH SAMPLE USING MOUTHPIECE

A breath sample for analysis that is expelled from the driver into the system using a mouthpiece to connect the driver's mouth and the inlet of the system.

3.15 ELECTROMAGNETIC COMPATIBILITY (EMC)

A state that is achieved when two or more electrical devices function in proximity to each other and do not influence either device's performance.

3.16 ELECTROMAGNETIC INTERFERENCE (EMI)

When the electromagnetic field of one device interferes with the normal operation of another device by coming into proximity with the other device.

3.17 ENCRYPTION

The method of encoding the data so that it can only be read but not altered by the intended recipient or intercepted.

3.18 EXPERIMENTAL TARGET CONCENTRATION

The measured concentration when attempting to achieve the nominal target concentrated stated in this standard.

3.19 FILTERED SAMPLES

Breath samples that are passed through some form of a filter or other device to remove alcohol from the breath sample.

3.20 INITIAL TEST

A breath test provided before the vehicle can be moved.

3.21 LITERS PER MINUTE (L/min)

A unit of volumetric flow for a gas or liquid.

3.22 MOUTHPIECE

The hygienic interface between the breath alcohol device and the driver delivering the breath sample. The mouthpiece's function is to ensure that the breath sample is not mixed with ambient air.

NOTE: In contactless operating modes, the system shall not require the use of a mouthpiece.

3.23 NON-PASSING STATE

State in which the system sends a signal to warn the driver and/or restricted vehicle operation.

3.24 PARTS PER MILLION (ppm)

A definition of concentration, this expression illustrates the ratio of one gas in a diluent gas. This unit is expressly used for the concentration of the calibration gas. This unit is not the primary unit for the system alcohol measurements.

3.25 PASSING STATE

A state in which the vehicle can be moved without warning and/or restriction.

3.26 PASSING TEST

An accepted breath sample that is delivered to the system that has been determined the alcohol concentration is lower than the setpoint.

3.27 POWER FAILURE

Any time a part of the system is deactivated by power being removed.

3.28 READY FOR TEST

An indication that the operating parameters of the system are met.

3.29 SETPOINT

A customer and manufacturer agreed defined value of breath alcohol concentration below which the vehicle's operation shall be in the passing state.

3.30 SUPPLY VOLTAGE

Voltage from the electric power source of the vehicle for operation of the system.

3.31 SYSTEM PARAMETERS

Programmable, configurable variables used in the operation of the system that may be modified only by the manufacturer or the service provider.