BS EN 50436-1:2014

BSI Standards Publication

Alcohol interlocks — Test methods and performance requirements

Part 1: Instruments for drink-driving-offender programs

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of EN 50436-1:2014. It supersedes BS EN 50436-1:2005 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee AUE/16, Electrical and electronic equipment.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

ISBN 978 0 580 78456 9

ICS 43.040.10; 71.040.40

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 January 2014.

Amendments issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50436-1

January 2014

ICS 43.040.10; 71.040.40

Supersedes EN 50436-1:2005

English version

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

Ethylotests anti-démarrage - Méthodes d'essais et exigences de performance - Partie 1: Appareils pour programmes de lutte contre la conduite en état d'ivresse

Alkohol-Interlocks - Prüfverfahren und Anforderungen an das Betriebsverhalten - Teil 1: Geräte für Programme mit Trunkenheitsfahrern

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 50436-1:2014 E

Contents

Page

Page

Foreword

This document (EN 50436-1:2014) has been prepared by CLC/BTTF 116-2 "Alcohol interlocks".

The following dates are fixed:

• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2014-10-21
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2016-10-21

This document supersedes EN 50436-1:2005.

EN 50436-1:2014 includes the following significant technical changes with respect to EN 50436-1:2005:

– Clause 3: definitions are added for mouthpiece, data memory, supply voltage, calibration interval, service reminder, recall, manufacturer and aftermarket installation.

– Clause 4: requirements for communication integrity, wireless communication and basic funtionality are added.

– Sub-clauses 5.1 and 5.3.2: accessory devices are included.

– Sub-clause 5.5: the requirement in test type 3 is modified.

– Clause 6: tests with 24 V power supply are added.

– Sub-clause 6.8: the chapter electrical discharge is added.

– Clause 7: the requirement for the calibration curve is increased.

– Clause 8: the references to basic standards are updated.

– Clause 9: the chapter for environmental tests is revised, the references to basic standards are updated, and tests for 24 V power supply are added.

– Clause 10: the chapter for breath sample with volume, flow, exhalation time and response time is revised.

– Clause 12: manipulation and circumvention is completely revised.

– Normative Annex A with requirements for the description of events is added.

– Informative Annex B with performance testing is added.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Introduction

The purpose of alcohol interlocks is to enhance traffic safety by preventing persons with alcohol concentrations exceeding a set limit value from driving a motor vehicle. EN 50436 series specifies test methods and essential performance requirements for alcohol interlocks and gives guidance for decision makers, purchasers and users.

The content and requirements of this part of EN 50436 are based on the experience and necessities of drink driving offender programmes in different countries over several decades. Therefore, alcohol interlocks used in programmes for drink driving offenders should comply with this European Standard.

Alcohol interlocks for general preventive use are the subject of EN 50436-2. General preventive use, which concerns a much larger number of drivers and vehicles, applies to both professional and private drivers of motor vehicles.

The purpose of EN 50436 series is to specify essential performance requirements and to provide the respective test methods for available technologies. The technology of alcohol interlocks continues to evolve, and further innovations can be expected. These could be considered in new parts or revisions of this European Standard.

1 Scope

This European Standard specifies test methods and performance requirements for breath alcohol controlled alcohol interlocks. It covers alcohol interlocks intended to be used in programmes for drink driving offenders as well as in programmes monitored or controlled in a comparable way.

This European Standard is directed at test laboratories and manufacturers of alcohol interlocks. It defines requirements and test procedures for type testing.

Several parameters (such as alcohol concentration or breath volume) are specified in this European Standard for the purpose of type testing according to this standard only. However, it may be necessary due to national regulations or depending on user requests to set the values of the prescribed parameters differently when the alcohol interlocks are in use.

This European Standard also applies to alcohol interlocks integrated into other control systems of the vehicle as well as to accessory devices connected to the alcohol interlock.

This European Standard does not apply to

– alcohol interlocks intended for general preventive use (see EN 50436-2),
– instruments measuring the alcohol concentration in the ambient air in the vehicle,
– alcohol interlocks not having a mouthpiece,
– methods of installation and connections to the vehicle.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 60068-2-78, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state (IEC 60068-2-78)*

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

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 by conduction and coupling – Part 3: Electrical transient transmission by capacitive and inductive coupling via lines other than supply lines*

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 16750-2:2010, *Road vehicles – Environmental conditions and testing for electrical and electronic equipment – Part 2: Electrical loads*

ISO 16750-3:2007, *Road vehicles – Environmental conditions and testing for electrical and electronic equipment – Part 3: Mechanical loads*

ISO 16750-4:2010, *Road vehicles – Environmental conditions and testing for electrical and electronic equipment – Part 4: Climatic loads*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
alcohol interlock
device which is normally in the blocking state when installed to prevent the starting of the vehicle motor, and which can be brought into the not-blocking state only after the presentation and analysis of a breath sample with an alcohol concentration below a limit value

Note 1 to entry: It normally consists of a handset and a control unit electrically connected to the vehicle.

Note 2 to entry: In this European Standard the expression “starting of the vehicle motor” includes provision of an output signal from the alcohol interlock to the vehicle to enable the starting, operation or movement of the vehicle.

3.2
breath alcohol concentration
mass concentration of ethanol, expressed in mg/l (milligram ethanol per litre breath air), in a breath sample delivered into an alcohol interlock

3.3
breath sample
breath air sample taken under forced expiration

3.4
accepted breath sample
breath sample fulfilling set requirements for volume, flow, exhalation time and other human breath sample characteristics

Note 1 to entry: The acceptance of a breath sample is independent from the alcohol concentration.

3.5
breath test
providing a breath sample to an alcohol interlock

3.6
mouthpiece
part through which the breath sample is delivered into the alcohol interlock

3.7
blocking state
state in which the alcohol interlock inhibits the starting of the vehicle motor

3.8
not-blocking state
state in which the vehicle motor can be started

3.9
breath alcohol concentration limit
set value of the breath alcohol concentration at or above which the vehicle motor will be prevented from being started

3.10
ready for test
indication that the operating parameters of the alcohol interlock are met

3.11
initial test
breath test provided before the vehicle motor is started

3.12
retest
breath test provided after the vehicle motor has started

Note 1 to entry: The retest function is a measure to assist in the detection of circumvention.

3.13
start period
time interval after an accepted breath sample with an alcohol concentration below the breath alcohol concentration limit has been delivered, during which the vehicle motor may be started

3.14
restart period
time interval after the ignition is switched off during which the vehicle motor may be started again without the delivery of another breath sample

Note 1 to entry: This restart period is intended to ensure the driver's ability to restart the vehicle motor after a stall situation.

3.15
override
method of allowing the starting of the vehicle motor without providing a breath sample

Note 1 to entry: The override function is for use in exceptional circumstances only, for example in case of a device malfunction.

3.16
bypass
starting the vehicle motor without providing a breath sample or without engaging the override function

3.17
tampering
unauthorised change to or interference with the alcohol interlock or its installation in the vehicle or its functioning

3.18
data memory
record of breath test results and other events with date and time stored in the internal memory of the alcohol interlock

3.19
supply voltage
voltage obtained from the electric power source of the vehicle for operation of the alcohol interlock

3.20
calibration interval
time period between calibrations during which the alcohol interlock fulfils the stability requirements for the measurement of the breath alcohol concentration

3.21
service reminder
notice by the alcohol interlock to remind the driver of a service requirement

3.22
recall
response of the alcohol interlock due to a service requirement of the device or an action of the driver which requires service of the alcohol interlock or downloading of the data memory

3.23
manufacturer
person or organisation responsible for the design, construction and/or production of the alcohol interlock

3.24
aftermarket installation
any installation of an alcohol interlock in a vehicle after the original production of a vehicle

4 General requirements

4.1 Blocking and not-blocking

Not-blocking state shall be achieved after delivery and analysis of an accepted breath sample with a breath alcohol concentration below a limit value.

The alcohol interlock shall be in the blocking state without supplementary action from the driver after switching off the ignition of the vehicle motor and the following expiration of a restart period (see 13.2).

4.2 Influence on the vehicle motor

The alcohol interlock shall not cause a running vehicle motor to stop, even in the case of a missed or a failed retest.

4.3 Tampering

The alcohol interlock shall be designed and manufactured such that, when installed in a vehicle, according to the manufacturer‘s instructions, it cannot be opened or the electrical connection cannot be modified without visible changes.

The access to the data memory or to means for setting parameters or to adjustment possibilities shall be designed so as to deter unauthorised or inadvertent interference.

4.4 Concentration limit

The nominal breath alcohol concentration limit of the alcohol interlock shall be at least 0,09 mg/l.

NOTE There is a limitation for the lower limit of the detection of alcohol concentrations in breath due to technological and physiological reasons. Effectively, the lower limit for a reliable measurement of breath alcohol concentrations is 0,09 mg/l.

4.5 Mouthpiece

The alcohol interlock shall have an exchangeable mouthpiece.

4.6 Readiness

The alcohol interlock shall provide a visual and/or audible indication when it is ready for a breath test. A breath test shall only be accepted after a ready indication.

4.7 Data memory, download and evaluation

The alcohol interlock shall be capable of recording events with date and time in a data memory, even if the handset is disconnected. These events are at least the following:

– breath samples,

– test results,

– blocking and not-blocking,
– information about the use of the vehicle, such as motor start and stop, vehicle motion or distance driven,
– missed retest,
– overriding and bypassing,
– handset exchange,
– connections and disconnections of supply voltage,
– changing of parameters and adjustments,
– results of calibration, verification and/or readjustment.

NOTE 1 For a full list of events see Annex A.

Receiving the information from the vehicle after reattachment of the handset is accepted for alcohol interlocks that are combined with other vehicle systems or integrated into them.

Data shall be stored in such a way that it will not be lost or corrupted.

It shall be possible to download and evaluate the data. Downloading and reading of the data shall only be possible by authorised access.

NOTE 2 There may be national regulations on data storage, transmission, access and evaluation.

NOTE 3 It is foreseen that an additional part of this series of European Standards for alcohol interlocks will be developed concerning data encryption and data protection.

4.8 Retests

The alcohol interlock shall be capable of requesting retests by visual and/or audible signals at adjustable random time intervals.

NOTE National regulations may restrict the use of visual or audible signals.

When requesting a retest, the alcohol interlock shall remain in the not-blocking state as long as the motor is running or the restart period is not expired.

4.9 Recall

The alcohol interlock shall be capable of requesting an earlier service if certain events occur (for example failed initial test, failed or missed retest, overriding, bypassing).

4.10 Override function

An override function is permissible.

It shall be possible to enable or to disable the parameter permitting the override function.

It shall be indicated when the alcohol interlock is in the override mode. It shall be possible to end the override mode.

4.11 Combination with other systems

The performance requirements of this European Standard apply to alcohol interlocks that are stand-alone instruments, combined with other vehicle systems or integrated into them (e.g. engine management or alarm systems).

Tests of different parts of the alcohol interlock may be performed separately, as to be agreed between the manufacturer and the testing laboratory.

4.12 Communication integrity

If the handset of the alcohol interlock is detachable or if the handset and the control unit communicate through wireless communication, the communication between the handset and the control unit shall be encoded in a secure method so that it is difficult to compromise the communication integrity and to bring the alcohol interlock into a not-blocking state.

NOTE It is foreseen that an additional part of this series of European Standards for alcohol interlocks will be developed concerning data encryption and data protection.

4.13 Wireless communication

If the handset and the control unit of the alcohol interlock transmit signals between each other by wireless communication, the alcohol interlock shall go into a not-blocking state not later than 30 s after delivery and analysis of an accepted breath sample with a breath alcohol concentration below the limit value.

The maximum distance for the wireless communication between the handset and the control unit under free field conditions shall be 50 m.

4.14 Basic functionality

Basic functionality of the user guidance includes all means necessary to lead the user through the measuring procedure and to perform an accepted measurement. This includes all indications to signal each step of the procedure and the correct interpretation of the result. At least the following shall be indicated:

– warm-up time;
– test requested;
– test accepted;
– test not accepted;
– test passed;
– test failed;
– test to be repeated;
– restart period.

The indication may be audible and/or visible and/or a text display.

5 General test methods

5.1 Samples

All the tests shall be carried out on two alcohol interlocks. However, at the discretion of the test laboratory additional samples may be used if this is not considered to affect the results of the other tests.

Integrated batteries may be replaced or recharged before individual tests unless otherwise stated.

Accessory devices of the alcohol interlock authorised by the manufacturer as being part of the alcohol interlock system and which are intended to be used in the vehicle during operation shall be tested according to this European Standard. For example cameras or GPS systems generating data related to event data of the alcohol interlock, as well as accessory devices handling or transferring data for a

drink-driving-offender programme are to be tested. For example GPS or fleet management systems only receiving data from the alcohol interlock are not to be tested.

NOTE National regulations may define which accessory devices have to be type tested.

All the tests shall be carried out on two samples of each accessory device. However, at the discretion of the test laboratory additional samples may be used if this is not considered to affect the results of the other tests.

5.2 Preparation of alcohol interlock before testing

The alcohol interlock shall be calibrated and adjustments shall be carried out, if needed, at the beginning of the test procedure and before the long-term stability test (see Clause 14) by the manufacturer or according to his instructions to obtain correct indications.

If the calibration interval given by the manufacturer expires during the test procedure, the alcohol interlock may be readjusted after the expiry, if necessary, with the exception of the durability tests (see Clause 8) and the long-term stability test (see Clause 14).

With the exception of the tests for manipulation and circumvention (see Clause 12), the measures against manipulation and circumvention may be de-activated for the tests.

5.3 Sequence of tests

5.3.1 Alcohol interlock

The alcohol interlocks shall be tested according to the respective test procedures in the following sequence: electrical tests (Clause 6), calibration curve (Clause 7), durability tests (Clause 8).

The sequence of the remaining tests may be agreed between the test laboratory and the manufacturer.

The tests according to Clauses 10 to 13 may be performed with two additional alcohol interlocks in parallel.

The long-term stability test of Clause 14 may be performed with two additional alcohol interlocks in parallel.

5.3.2 Accessory devices

The following tests shall be performed with the accessory devices:

– tampering (4.3), to be tested together with the alcohol interlock,
– data memory, download and evaluation (4.7), where applicable,
– electrical tests (Clause 6) to be tested together with the alcohol interlock,
– durability (Clause 8), with drop test (8.4) applicable only for accessory devices intended to be removable by the user,
– environmental tests (Clause 9) without pressure test (9.6), to be tested together with the alcohol interlock.

After having passed the tests according to 5.3.2 the accessory devices shall perform as specified by the manufacturer.

5.4 Normal conditions for tests

All tests shall be performed with the alcohol interlock connected to the power supply voltage and power-on under the following normal conditions, unless otherwise stated:

– voltage: as specified by the manufacturer (nominal operating voltage ± 5 %) or with sufficiently charged integrated batteries;

– ambient temperature: T = 23 °C ± 5 °C;

– ambient pressure: 98 kPa ± 20 kPa;

– test gases:
  dry gases, temperature 23 °C ± 5 °C, or
  wet gases, temperature 34 °C ± 2 °C with temperature of the water bath known ± 0,1 °C;

– test gas flow: 0,25 l/s ± 0,05 l/s;

– uncertainty of test gas concentration: ± 0,01 mg/l;

– test gas volume: 1,5 l ± 10 %.

5.5 Functional test

As stated in the respective clauses, tests shall be performed according to one of the following three test types.

The limit value at or above which the alcohol interlock is blocking shall be adjusted to 0,25 mg/l for these tests.

NOTE The limit value of 0,25 mg/l is chosen to facilitate the test procedures and to differentiate between the influence of disturbances and the uncertainty of the measurement results. Because the test of the calibration curve is additionally performed at different concentrations and the related requirements have to be fulfilled, the test results of a type testing according to this European Standard are also applicable to alcohol interlocks having a different limit value in the range of 0,09 mg/l up to 0,4 mg/l.

Test type 1

Test gas with an alcohol concentration of 0,30 mg/l shall be applied to the alcohol interlock successively ten times in intervals of at least 3 min. The alcohol interlock shall remain in a blocking state in each test.

Test gas with an alcohol concentration of 0,20 mg/l shall be applied to the alcohol interlock successively ten times in intervals of at least 3 min. The alcohol interlock shall go into a not-blocking state in each test.

Test type 2

Test gas with an alcohol concentration of 0,35 mg/l shall be applied to the alcohol interlock successively ten times in intervals of at least 3 min. The alcohol interlock shall remain in a blocking state in each test.

Test gas with an alcohol concentration of 0,15 mg/l shall be applied to the alcohol interlock successively ten times in intervals of at least 3 min. The alcohol interlock shall go into a not-blocking state in each test.

Test type 3

Test gas consisting of air shall be applied to the alcohol interlock successively ten times in intervals of at least 3 min. No individual indication shall be higher than 0,03 mg/l.

6 Electrical tests

6.1 General

If an alcohol interlock is combined with other vehicle systems or integrated into them, the vehicle manufacturer may provide these test results.

For alcohol interlocks with 12 V to 24 V nominal operating voltage for one power input, the tests shall be performed with the most severe of the voltage conditions.

6.2 Supply voltage

The alcohol interlock shall be tested for the influence of the supply voltage according to ISO 16750-2:2010, 4.2 with the following test conditions:

– alcohol interlocks with 12 V nominal operating voltage: code C (9 V and 16 V),

– alcohol interlocks with 24 V nominal operating voltage: code F (16 V and 32 V).

The alcohol interlock shall under these conditions fulfil the requirements of functional test type 1 in 5.5 with functional status A as defined in ISO 16750-1.

6.3 Excess supply voltage

a) An alcohol interlock with 12 V nominal operating voltage shall be subjected at 65 °C ambient temperature to an excess supply voltage of 18 V for 60 min according to ISO 16750-2:2010, 4.3.1.1.

   An alcohol interlock with 12 V nominal operating voltage shall be subjected at room temperature to an excess supply voltage of 24 V for (60 $\pm$ 6) s according to ISO 16750-2:2010, 4.3.1.2.

   The alcohol interlock shall after the test fulfil functional status C as defined in ISO 16750-1 when tested according to 6.10.

b) An alcohol interlock with 24 V nominal operating voltage shall be subjected at 65 °C ambient temperature to an excess supply voltage of 36 V for 60 min according to ISO 16750-2:2010, 4.3.2.

   The alcohol interlock shall after the test fulfil functional status C as defined in ISO 16750-1 when tested according to 6.10.

6.4 Short-circuit

a) The alcohol interlock shall be tested for the short circuit protection of signal circuits according to ISO 16750-2:2010, 4.10.2 with the following test conditions:

   – alcohol interlocks with 12 V nominal operating voltage: U_{Smax} = 16 V,

   – alcohol interlocks with 24 V nominal operating voltage: U_{Smax} = 32 V.

   The alcohol interlock shall after the test fulfil functional status C as defined in ISO 16750-1 when tested according to 6.10.

   Communication lines such as RS-232, USB or Ethernet are not be considered to be signal circuits and are not to be included in this test.

b) The alcohol interlock shall be tested for the short circuit protection of load circuits according to ISO 16750-2:2010, 4.10.3.

   The alcohol interlock shall after the test fulfil the relevant functional status as required in ISO 16750-2:2010, 4.10.3 when tested according to 6.10.

6.5 Reversed polarity

An alcohol interlock with power supply from the vehicle battery shall be tested according to ISO 16750-2:2010, 4.7.2.3.

If the alcohol interlock has integrated exchangeable batteries, the batteries shall be inserted with reversed polarity for a duration of 60 s.

After the test and after replacing all blown fuse links, the alcohol interlock shall fulfil functional status C as defined in ISO 16750-1 when tested according to 6.10.

6.6 Low-power-consumption state

The current in low-power-consumption state (sleep mode of the instrument) shall not exceed 5 mA at 12 V and at 24 V for the alcohol interlock. For short periods of time the current may be higher.

NOTE The limit of 5 mA is high in respect of extending the battery life of a standing vehicle. However, this limit is necessitated by requirements of detecting bypassing, short warm-up time, internal clock, monitoring power disconnection or exchange of handset, among others, together with the state of the technology. Additionally, for the standard capacity of present-day vehicle batteries it is a reasonable compromise.

6.7 Electrical disturbances (not applicable to parts of the alcohol interlock integrated into other vehicle systems)

6.7.1 Supply lines

The alcohol interlock shall be tested for the influence of electrical disturbances according to ISO 7637-2 under the following test conditions:

– test pulses 2a, 2b, 3a, 3b

– test level: IV

– functional status: class A as defined in ISO 16750-1.

The alcohol interlock shall be tested for the influence of discontinuity in supply voltage according to ISO 16750-2:2010, 4.6.3 under the following test conditions:

– test level: IV

– functional status: class C as defined in ISO 16750-1.

6.7.2 Lines other than supply lines

The alcohol interlock shall be tested for the influence of electrical disturbances according to ISO 7637-3 under the following test conditions:

– test pulses: a, b

– test level: IV

– functional status: class A as defined in ISO 16750-1.

6.8 Electrostatic discharge

The alcohol interlock shall be tested for the influence of electrostatic discharge according to ISO 10605 under the following test conditions:

– direct contact discharge

– direct air discharge

– test severity level: L_{1i}

– function performance status: III.

The alcohol interlock shall fulfil functional status C as defined in ISO 16750-1 after the test when tested according to 6.10.

6.9 Electromagnetic compatibility

The alcohol interlock shall fulfil the relevant legal technical requirements with regard to electromagnetic compatibility (EMC).

The tests shall be performed with the alcohol interlock being ready to accept a breath sample.

The alcohol interlock, when tested for immunity, shall remain in the blocking state and not change the displayed information.

NOTE For the European Union, the Directive 72/245/EEC is repealed by Regulation (EC) No 661/2009 of the European Parliament and the Council of 13 July 2009. Hence, the UNECE Regulation ECE 10 and its last amendment are giving the legal requirements.

6.10 Functional test under normal conditions

After having passed the tests of 6.3 to 6.9, the alcohol interlock shall under normal conditions fulfil the requirements of functional test type 1 in 5.5.

7 Calibration curve

The alcohol interlock shall be tested with test gases having alcohol concentrations of 0 mg/l, 0,10 mg/l, 0,25 mg/l, 0,40 mg/l, 0,75 mg/l and 1,50 mg/l. At each concentration 10 measurements shall be performed in intervals of at least 3 min, starting with the lowest and finishing with the highest concentration (i.e. 10 measurements at 0 mg/l, then 10 measurements at 0,10 mg/l, and so on).

Each individual indication in the set of ten test results obtained for the concentrations 0 mg/l, 0,10 mg/l, 0,25 mg/l, 0,40 mg/l and 0,75 mg/l shall not differ from the nominal values by more than ± 0,02 mg/l or ± 15 % of the nominal value, whichever is the greater.

For each of the ten test results for the concentration 1,50 mg/l the indication shall not be lower than 1,0 mg/l.

8 Durability tests

8.1 Temperature cycles

Two classes of ambient temperatures are defined according to ISO 16750-4:2010, Table 1 as follows:

a) code G (-40 °C to +85 °C) for parts to be fitted permanently in the passenger or luggage compartment;

b) code O (-40 °C to +125 °C) for parts to be fitted in the engine compartment unless otherwise specified.

The alcohol interlock while in the low-power-consumption state (sleep mode of the instrument) shall be tested according to ISO 16750-4:2010, 5.3.1.2, Table 2.

After completion of the test, the basic functionality of the user guidance (see 4.14) shall not be compromised. The alcohol interlock, upon external inspection, shall not show damage impairing the functionality and shall, no earlier than 1 h after the case of the alcohol interlock has reached normal temperature condition, fulfil under normal conditions the requirements of functional test type 1 in 5.5.

8.2 Condensed water

The alcohol interlock while in the low-power-consumption state (sleep mode of the instrument) shall be tested for humidity resistance according to ISO 16750-4:2010, 5.6.2.2.

After completion of the test the alcohol interlock shall fulfil under normal conditions the requirements of functional test type 1 in 5.5.

8.3 Vibrations

If an alcohol interlock is combined with other vehicle systems or integrated into them, the vehicle manufacturer may provide these test results.

The alcohol interlock shall be mounted on a vibration table with its cabling representing the fixing points of the installation in the vehicle according to the manufacturer’s instructions.

Alcohol interlocks to be used in passenger cars shall be tested according to ISO 16750-3:2007, 4.1.2.4.

Alcohol interlocks to be used in commercial vehicles shall be tested according to ISO 16750-3:2007, 4.1.2.8.

After completion of the test the basic functionality of the user guidance (see 4.14) shall not be compromised and the alcohol interlock, upon external inspection, shall not show damage impairing the functionality and shall fulfil under normal conditions the requirements of functional test type 1 in 5.5.

8.4 Drop test

The handset of the alcohol interlock shall be tested at room temperature according to ISO 16750-3:2007, 4.3.

After completion of the test the basic functionality of the user guidance (see 4.14) shall not be compromised and the alcohol interlock, upon external inspection, shall not show damage impairing the functionality and shall fulfil under normal conditions the requirements of functional test type 1 in 5.5.

9 Environmental tests

9.1 General

The tests in 9.2. to 9.5 shall be performed with the following conditions.

Wet test gases shall be used.

The mouthpiece shall be fitted to the alcohol interlock and shall remain on the alcohol interlock during the tests.

The tests shall be performed in the following way:

– take the alcohol interlock out of the climatic chamber while assuring a minimised heat transfer,
– perform the test,
– immediately place the alcohol interlock back into the climatic chamber.

For alcohol interlocks with 12 V to 24 V nominal operating voltage for one power input the tests shall be performed with the most severe of the voltage conditions.

The most severe voltage conditions have to be defined by the test laboratory in consultation with the manufacturer. The justification for the chosen conditions shall be part of the test report.

9.2 Temperature

The alcohol interlock shall be subjected to ambient temperatures of -20 °C, 0 °C and 70 °C.

No earlier than 1 h after the case of the alcohol interlock has reached each required temperature, it shall be tested and fulfil the requirements of functional test type 1 in 5.5.

9.3 Temperature and supply voltage

The tests shall be performed:

– at -40 °C ambient temperature with
  – for 12 V nominal operating voltage: supply voltage of 10 V,
  – for 24 V nominal operating voltage: supply voltage of 20 V,
  – for integrated batteries: supply voltage of 0,1 V above the voltage at which the low-battery condition is given and a current limited to the respective worst case conditions of the batteries according to the battery specification,

– at 85 °C ambient temperature with
  – for 12 V nominal operating voltage: supply voltage of 16 V,
  – for 24 V nominal operating voltage: supply voltage of 32 V,
  – for integrated batteries: supply voltage of 125 % of the nominal battery voltage and a current limited to the respective worst case conditions of the batteries according to the battery specification.

No earlier than 1 h after the case of the alcohol interlock has reached each required temperature, the alcohol interlock shall be tested under the supply voltage conditions and shall fulfil the requirements of functional test type 2 in 5.5.

9.4 Temperature and humidity

An ambient temperature of 40 °C and 93 % relative humidity shall be applied to the alcohol interlock for the duration of 12 h according to EN 60068-2-78.

Afterwards, the alcohol interlock shall be tested and fulfil the requirements of functional test type 1 in 5.5, and upon external inspection shall not show damage impairing the functionality.

9.5 Warm-up time

9.5.1 Temperature 20 °C

Being at 20 °C, the alcohol interlock in low-power-consumption state (sleep mode of the instrument) shall be ready to accept a breath sample within 30 s after it is switched on, and it shall fulfil the requirement for the lower test gas concentration of functional test type 1 in 5.5, applying test gas only once.

The test shall be repeated two more times with a time interval of at least 15 min.

No earlier than after 15 min, being at 20 °C the alcohol interlock in low-power-consumption state (sleep mode of the instrument) shall be ready to accept a breath sample within 30 s after it is switched on, and it shall fulfil the requirement for the higher test gas concentration of functional test type 1 in 5.5, applying test gas only once.

The test shall be repeated two more times with a time interval of at least 15 min.

9.5.2 Temperature -5 °C

An ambient temperature of -5 °C shall be applied to the alcohol interlock in low-power-consumption state (sleep mode of the instrument).

The supply voltage shall be:

– for 12 V nominal operating voltage: supply voltage of 11 V,
– for 24 V nominal operating voltage: supply voltage of 22 V,
– for integrated batteries: supply voltage of 0,1 V above the voltage at which the low-battery condition is given and a current limited to the respective worst case conditions of the batteries according to the battery specification.

No earlier than 1 h after the case of the alcohol interlock has reached the required temperature, the alcohol interlock shall be ready to accept a breath sample within 60 s after it is switched on, and it shall fulfil, under these supply voltage conditions, the requirement for the lower test gas concentration of functional test type 2 in 5.5, applying test gas only once.

The test shall be repeated two more times with a time interval of at least 15 min.

No earlier than after 15 min, being at -5 °C, the alcohol interlock shall be ready to accept a breath sample within 60 s after it is switched on, and it shall fulfil, under these supply voltage conditions, the requirement for higher test gas concentration of functional test type 2 in 5.5, applying test gas only once.

The test shall be repeated two more times with a time interval of at least 15 min.

9.5.3 Temperature -20 °C

An ambient temperature of -20 °C shall be applied to the alcohol interlock being in low-power-consumption state (sleep mode of the instrument).

The supply voltage shall be:

– for 12 V nominal operating voltage: supply voltage of 11 V,

– for 24 V nominal operating voltage: supply voltage of 22 V,

– for integrated batteries: supply voltage of 0,1 V above the voltage at which the low-battery condition is given and a current limited to the respective worst case conditions of the batteries according to the battery specification.

No earlier than 1 h after the case of the alcohol interlock has reached the required temperature, the alcohol interlock shall be ready to accept a breath sample within 2 min after it is switched on, and it shall fulfil, under these supply voltage conditions, the requirement for the lower test gas concentration of functional test type 2 in 5.5, applying test gas only once.

The test shall be repeated two more times with a time interval of at least 15 min.

No earlier than after 15 min, being at -20 °C, the alcohol interlock shall be ready to accept a breath sample within 2 min after it is switched on, and it shall fulfil, under these supply voltage conditions, the requirement for higher test gas concentration of functional test type 2 in 5.5, applying test gas only once.

The test shall be repeated two more times with a time interval of at least 15 min.

9.6 Pressure

The tests shall be performed at 80 kPa and 110 kPa ambient pressure.

The alcohol interlock shall fulfil the requirements of functional test type 1 in 5.5 after reaching the ambient pressure.

If dry test gases are used, the test results shall be compensated for the pressure dependence of the dry test gas concentration.

9.7 Protection by enclosure

The alcohol interlock with the mouthpiece always attached shall be tested for the following degrees of protection by enclosures in accordance with EN 60529:

– IP40 for parts to be fitted in the passenger compartment, in the luggage compartment or in a compartment with a type of protection specified below;

– IP42 for parts to be fitted in the passenger compartment of roadsters/convertibles and cars with moveable roof-panels if the installation location requires a higher degree of protection than IP40; the alcohol interlock shall be in an orientation as it is installed with a holder in the vehicle according to the manufacturers instructions;

– IP54 for all other parts.

After completion of the test, the alcohol interlock shall fulfil under normal conditions the requirements of functional test type 1 in 5.5.

10 Breath sample

10.1 Volume

The nominal limit value for the breath volume should be 1,0 l, shall not be less than 0,7 l and shall not be more than 1,2 l.

NOTE The lower limit of 0,7 l is required to assure that deep lung air is analysed and to avoid that children deliver the breath sample.

For this test the limit value for the breath volume shall be adjusted to 0,95 l.

The test shall be performed with air as the test gas and a test gas volume of 0,75 l, respectively 1,15 l. The flow shall be above the minimum flow accepted by the alcohol interlock.

The alcohol interlock shall accept the volume of 1,15 l as valid for a breath sample, and shall give a failure message at the volume of 0,75 l.

The test shall be repeated two times more.

10.2 Flow

The test shall be performed in laboratory condition with air as the test gas and the following test gas flows:

– 0,1 l/s;

– 0,3 l/s;

– 1,0 l/s or a flow at which the back pressure on the entrance of the mouthpiece is 5 kPa; whichever is the lower.

The alcohol interlock shall accept the flow of 0,3 l/s as a valid flow, and shall not accept the other flows for a breath sample.

10.3 Exhalation time

The minimum exhalation time to deliver a breath sample shall be 3 s.

For this test, the limit value for the breath volume shall be adjusted to 1,0 l. The test shall be performed with air as the test gas and a test gas flow of 0,5 l/s delivering 1,25 l in 2,5 s.

The alcohol interlock shall not accept this as a correct breath sample.

10.4 Response time

After a breath test has been delivered the alcohol interlock shall supply the respective output signal

– for a test gas having an alcohol concentration of 0 mg/l at the latest after 10 s;

– for a test gas having an alcohol concentration of 0,25 mg/l at the latest after 15 s;

– for a test gas having an alcohol concentration of 0,35 mg/l at the latest after 20 s.

11 Analytical specificity

11.1 Test gases

The ethanol limit value at or above which the alcohol interlock is blocking shall be adjusted to 0,09 mg/l for this test. The test shall be performed in any sequence with each of the following test gases.

Acetaldehyde 0,08 mg/l

Acetone	0,25 mg/l
Carbon monoxide	0,10 mg/l
Diethylether	0,15 mg/l
Ethylacetate	0,08 mg/l
n-Heptane	0,10 mg/l
n-Hexane	0,10 mg/l
Methane	0,15 mg/l
Methanol	0,05 mg/l
n-Octane	0,10 mg/l
n-Pentane	0,10 mg/l
2-Propanol	0,05 mg/l
Toluene	0,10 mg/l

The alcohol interlock, when tested three times with each of the test gases, shall go into a not-blocking state. To facilitate the preparation of the test gases, the tests may be performed with higher gas concentrations as long as the alcohol interlock goes into a not-blocking state.

NOTE 1 The substances are derived from OIML R 126 and the alkanes are added because alcohol interlocks are installed in vehicles. The concentrations of the OIML R 126 are lowered by a factor of 2.

NOTE 2 The concentrations of the test gases are chosen to test the influence on the alcohol interlock under ordinary conditions. However, it may happen that the alcohol interlock remain in a blocking state at much higher concentrations.

NOTE 3 OIML R 126 is presently under revision. Depending on the outcome this clause may be revised in the future.

11.2 Cigarette smoke

The ethanol limit value at or above which the alcohol interlock is blocking shall be adjusted to 0,09 mg/l for this test.

A sober person who normally smokes shall smoke a cigarette until it is almost finished, then breath normally for 30 s and afterwards exhale into the alcohol interlock to provide an accepted breath sample.

The alcohol interlock, when tested with the exhaled breath, shall go into a not-blocking state.

12 Manipulation and circumvention

12.1 General

The following clauses concern techniques incorporated into the alcohol interlock to prevent the use of non-human samples or filtered breath samples to enable the starting of the vehicle motor.

The limit value at or above which the alcohol interlock is blocking shall be adjusted to 0,20 mg/l for these tests. The alcohol interlock measures against manipulation and circumvention shall be activated.

The tests in 12.3 to 12.5 shall be performed with a human subject who is trained in delivering an accepted breath sample. The breath samples for the test shall have an alcohol concentration below 0,1 mg/l.

The tests in 12.6 to 12.8 shall be performed with a human subject being trained in delivering an accepted breath sample. The breath samples for the test shall have an alcohol concentration above 0,3 mg/l. The test sample shall be applied according to the manufacturer’s instructions for delivery of a

breath sample. Before each test according to 12.6 to 12.8, the human subject shall deliver an accepted breath sample with the alcohol interlock remaining in the blocking state.

12.2 Pressurised air

The test gas shall be air with a temperature of 23 °C.

The source of the test gas shall be from commonly available devices (at least balloons, compressors, and hand pumps). The test gas sample shall be applied to the alcohol interlock with a high enough flow three times with each of the mentioned devices.

The alcohol interlock, when tested, shall remain in the blocking state.

12.3 Providing of the sample with a mouthpiece attached

For the following tests the sample shall be applied to the alcohol interlock through the mouthpiece.

a) The sample shall be applied to the alcohol interlock three times by blowing into the mouthpiece through the mouthpiece inlet until the minimum flow has been reached and then immediately sucking in the reversed direction.

   The alcohol interlock, when tested, shall remain in the blocking state.

b) The sample shall be applied to the alcohol interlock three times by sucking through the mouthpiece inlet.

   The alcohol interlock, when tested, shall remain in the blocking state.

c) If possible, the sample shall be applied to the alcohol interlock three times by sucking at the breath outlet of the mouthpiece.

   The alcohol interlock, when tested, shall remain in the blocking state.

d) If possible, the sample shall be applied to the alcohol interlock three times by sucking at the breath outlet of the alcohol interlock.

   The alcohol interlock, when tested, shall remain in the blocking state.

12.4 Providing of the sample without a mouthpiece attached

For the following tests the sample shall be applied to the alcohol interlock without using the mouthpiece.

a) The sample shall be applied to the alcohol interlock three times by blowing in the direction of the inlet of the alcohol interlock from a distance of 0,5 cm to 1 cm.

   The alcohol interlock, when tested, shall remain in the blocking state.

b) The sample shall be applied to the alcohol interlock three times by blowing into the inlet of the alcohol interlock until the minimum flow has been reached and by then immediately sucking in the reversed direction.

   The alcohol interlock, when tested, shall remain in the blocking state.

c) The sample shall be applied to the alcohol interlock three times by sucking through the inlet of the alcohol interlock.

   The alcohol interlock, when tested, shall remain in the blocking state.

d) If possible, the sample shall be applied to the alcohol interlock three times by sucking at the breath outlet of the alcohol interlock.

   The alcohol interlock, when tested, shall remain in the blocking state.

12.5 Obstruction of the mouthpiece

For the following tests the sample shall be applied with a mouthpiece having a fully obstructed air outlet.

a) The sample shall be applied to the alcohol interlock three times by blowing through the mouthpiece.

   The alcohol interlock, when tested, shall remain in the blocking state.

b) The sample shall be applied to the alcohol interlock three times by sucking through the mouthpiece inlet.

   The alcohol interlock, when tested, shall remain in the blocking state.

12.6 Filter

For this test a tube (length approx. 10 cm, diameter approx. 2 cm) shall be filled with activated charcoal (for example a mixture of pieces with diameters of 3 mm to 8 mm). It shall be assured before the test that an ethanol concentration of 0,3 mg/l is completely adsorbed by the filter in three tests at intervals of 3 min with a test gas volume of 1,5 l per test.

After refilling the tube with new charcoal, the breath sample shall be applied to the alcohol interlock through the tube three times at intervals of 3 min.

The alcohol interlock, when tested, shall remain in the blocking state.

12.7 Condensation

For this test a tube (for example length approx. 100 cm, diameter approx. 1 cm) shall be cooled to -10 °C. It shall be assured before the test that an ethanol concentration of 0,3 mg/l is completely adsorbed by the tube with a test gas volume of 1,5 l per test.

The tube shall be exchanged or cleaned before each test.

The breath sample shall be applied to the alcohol interlock three times through the cooled tube.

The alcohol interlock, when tested, shall remain in the blocking state.

12.8 Water

For this test a laboratory washing bottle (volume approx. 0,5 l) shall be filled with water (volume approx. 0,25 l, temperature 23 °C). It shall be assured before the test that an ethanol concentration of 0,3 mg/l is completely adsorbed by the water in three tests at intervals of 3 min with a test gas volume of 1,5 l per test.

The breath sample shall after bubbling through the water be applied to the alcohol interlock three times at intervals of 3 min.

The alcohol interlock, when tested, shall remain in the blocking state.

12.9 Putting out of service

The alcohol interlock in the blocking state shall be disconnected for 10 s from the supply voltage of the vehicle and, if a part of the alcohol interlock is powered by integrated batteries, from the batteries and then reconnected to the power supply and the batteries.

The alcohol interlock shall not go into a not-blocking state after reconnection without delivery of an accepted breath sample.

The test shall be repeated three times.

The alcohol interlock shall record the disconnection from the supply voltage and the batteries, as well as the reconnection, in the data memory.

12.10 Removal of handset

The following tests shall be repeated three times.

a) If a cable connection between the handset and the control unit of the alcohol interlock is detachable by the user, it shall be detached. The alcohol interlock with the handset detached shall not go into a not-blocking state without delivery of an accepted breath sample.

   Subsequently the handset shall be reattached to the control unit. The alcohol interlock shall record in the data memory the detachment and the reattachment.

b) If the handset and the control unit of the alcohol interlock communicate through wireless communication, the handset shall be removed from the control unit by more than 50 m so that the communication ceases. The alcohol interlock with the handset removed shall not go into a not-blocking state without delivery of an accepted breath sample.

   Subsequently, the handset shall be brought back to the control unit to re-establish the communication. The alcohol interlock shall record the interruption and the re-establishment of the communication in the data memory.

12.11 Bypass

For this test an alcohol interlock shall be installed in a vehicle.

If possible, the motor of a vehicle with an installed alcohol interlock shall be started

– by electrical bypassing, and

– by pushing the vehicle

without an accepted breath sample having been delivered, and the vehicle shall be driven in each case for more than 2 min.

The alcohol interlock shall record in a data memory or shall indicate by some means the start or running of the vehicle motor within 30 s and/or the movement of the vehicle within 2 min.

The test shall be repeated three times.

13 Timer

13.1 Start period

The start period shall not be less than 1 min, unless it is ended intentionally, and should not be more than 5 min.

The alcohol interlock shall until 10 s before the expiry of the start period remain in a not-blocking state, and shall 10 s after the expiry of the start period be in a blocking state.

The test shall be repeated three times.

13.2 Restart period

a) The restart period shall not be less than 1 min, unless it is ended intentionally, and should not be more than 30 min.

b) It shall not be possible by manual resetting to bring the alcohol interlock into a blocking state as long as the motor is running.

The request for a retest is permissible when the motor is running.

c) The alcohol interlock shall until 10 s before the expiry of the restart period remain in a not-blocking state, and shall 10 s after the expiry of the restart period be in a blocking state.

The test shall be repeated three times.

13.3 Service reminder

The service interval shall be set to 2 d. After expiry of this service interval, the alcohol interlock shall be capable of entering a grace period of up to 7 days and shall, each time after it is activated, display a reminder of the expiry of the service interval.

The alcohol interlock shall be capable of going into a blocking state after expiry of the service interval and a grace period up to 7 d, unless a service is performed.

The test shall be performed once.

13.4 Calibration interval

The calibration date of the alcohol interlock shall only be settable by performing a calibration procedure.

The calibration interval shall be set to 2 d. After expiry of this calibration interval the alcohol interlock shall be capable of entering a grace period of up to 7 days and shall, each time after it is activated, display a reminder of the expiry of the calibration interval.

The alcohol interlock shall be capable of going into a blocking state after expiry of the calibration interval and a grace period of up to 7 d.

The test shall be performed once.

14 Long term behaviour

The alcohol interlock shall be calibrated and adjustments shall be carried out, if needed, at the beginning of this test by the manufacturer or according to his instructions.

For this test the alcohol interlock shall be connected to the supply voltage continuously and it shall be activated before the application of the test gases.

A test sample with a concentration of approximately 0,3 mg/l + 0,1 mg/l shall be applied ten times per working day to the alcohol interlock. A test sample with cigarette smoke shall be applied as described in 11.2 five times every tenth working day to the alcohol interlock. The alcohol interlock, when tested with the exhaled breath containing cigarette smoke, shall go into a not-blocking state.

In intervals of 20 working days the alcohol interlock shall fulfil the requirements of functional test type 1 and type 3 in 5.5 under normal conditions.

No earlier than after 40 working days, at least after 60 days and at least after expiry of the calibration interval given by the manufacturer and after an additional 7 d, the alcohol interlock shall fulfil the requirements of functional test type 1 and type 3 in 5.5 under normal conditions.

15 Instructions

15.1 Instructions for installation (applicable to alcohol interlocks for aftermarket installation only)

The manufacturer shall prepare instructions for installation containing at least the following information:

a) list of vehicles and vehicle models for which the device is intended or for which it is known that an installation is not possible. This list may be specific or generic, e.g. "all cars with petrol engines and 12 V batteries with grounded negative pole", or "vehicles for dangerous goods transportation according to the ADR regulations";

b) method of installation illustrated by photographs and/or very clear drawings;

c) detailed installation instructions such that when correctly followed by a competent installer, the safety and reliability of the vehicle is not affected and the electrical properties of the on-board circuitry of the vehicle (lead cross-sections, contact safety, etc.) is not adversely affected;

d) any restrictions on the positioning of any part of the installation with respect to potential influences by dust, water and temperature;

e) special attention shall be paid to safety-related matters, for example:

- airbags;
- passenger safety;
- positioning of the handset within easy reach of the driver;
- secure mounting of the handset;

f) identification of the electrical power requirements of the alcohol interlock and, where relevant, advice for suitable electrical or battery conditions of the vehicle;

g) additional legal requirements, for example especially for drink driving offender programmes;

h) post installation procedures for checking the alcohol interlock and the function of the vehicle;

i) instruction for removal of the alcohol interlock and returning vehicle wiring to safe conditions;

j) information on proper disposal of the alcohol interlock at the end of its service life.

15.2 Instructions for use

Each alcohol interlock shall be accompanied by instructions for use containing at least the following information:

a) statements calling attention to the following points (applicable to alcohol interlocks for after market installation only):

- the alcohol interlock should be installed in accordance with the manufacturer's instructions and in accordance with national regulations by a qualified installer;
- unqualified installation may affect safety and reliability of the vehicle;

NOTE 1 National regulations may require certified installers.

b) complete instructions for proper and safe operation of the alcohol interlock;

c) recommendations to regularly check and calibrate the alcohol interlock;

NOTE 2 National regulations may require certain service, calibration, and verification procedures.

d) details of proper operation and operational limitations including the following:

- the actual breath alcohol concentration limit of the alcohol interlock and its meaning;
- operating temperature range and warm up time;
- battery voltage;
- influence of mouth alcohol;
- influence of substances containing alcohol;
- influence of other substances than alcohol;

e) list of recommended replacement parts and accessories;

f) recommendations for hygiene procedures (e.g. exchange of mouthpieces);

g) statements of the nature and significance of signals, alarms and messages;

h) details of common sources of malfunction and any corrective procedures (i.e. trouble shooting procedures);

i) general warning regarding the dangers of making any alterations or additions to the alcohol interlock;

j) special instructions for servicing of vehicles that have an alcohol interlock installed;

k) information on proper disposal of the alcohol interlock at the end of its service life.

15.3 Instructions for servicing the alcohol interlock

The manufacturer shall prepare instructions for service of the alcohol interlock containing at least the following information:

a) download of data from the memory of the alcohol interlock;

b) service procedures and general functional test;

c) calibration procedures;

d) general inspection;

e) maintenance procedures.

NOTE National regulations may have additional requirements.

16 Test report

A test report shall contain at least the following:

– name, address and accreditation (if any) of the laboratory which performed the tests,

– type of alcohol interlock tested including make model, serial numbers and software version,

– setting of main parameters influencing the test results (for example measures against anti-circumvention, alcohol concentration limits, voltage conditions and their justification),

– organisation for which the test is performed (for example manufacturer, importer, dealer),

– test equipment,

– uncertainty of test gas concentrations,

– data, results and conclusions for all tests,

– date and time of the tests,

– summary.

NOTE National regulations or the testing laboratory may require that the manufacturer informs the testing laboratory and/or approval authorities about hardware and/or software changes of the alcohol interlock.

17 Labelling and marking

The alcohol interlock shall be marked legibly with the following minimum requirements:

– name or trademark of the manufacturer or of the authorised representative,

– designation of series or type,

– type approval, if required by national regulations,

– serial number.

NOTE National regulations may require additional labelling (for example software version).

Annex A
(normative)

Description of events

It is the intention of this annex to harmonise the naming and the content of the different events which are stored in the data memory of the alcohol interlock. This facilitates the interpretation of event data downloaded from alcohol interlocks produced by different manufacturers.

If an alcohol interlock stores a certain event in the data memory according to the description given below, then this event has to be named according to this annex.

NOTE An alcohol interlock may store additional events.

Table A.1 - Description of alcohol interlock events (1 of 4)

No.:	***Event (English):***	***Description:***
1	Ignition On	Vehicle ignition has been activated. (Ignition includes the equivalent for hybrid or electric vehicles.)
2	Ignition Off	Vehicle ignition has been deactivated.
3	Trip Duration	Time period between "Ignition On" and "Ignition Off".
4	Engine Run	Vehicle engine run has been detected. (Engine includes combustion and electric motors.)
5	Engine Stop	Vehicle engine off has been detected.
6	Engine Run Time	Time period during which the engine was running.
7	Vehicle Movement Begins	Vehicle movement has been detected by the alcohol interlock.
8	Vehicle Movement Ends	Movement is no longer detected by the alcohol interlock.
9	Vehicle Movement Time	Time period during which the vehicle was in motion.
10	Trip Distance	Distance that the vehicle travelled.
11	Starter Relay Closed	Alcohol interlock relay closed enabling the vehicle ignition system. The alcohol interlock is in a not-blocking state. (The expression “relay closed” includes alternatively the provision of a respective output signal.)
12	Starter Relay Opened	Alcohol interlock relay open disabling the vehicle ignition system. The alcohol interlock is in a blocking state.
13	Ready for Breath Test	Alcohol interlock is ready to accept a breath sample.
14	Breath Test Started	Breath sample delivery detected by the alcohol interlock.
15	Invalid Breath Sample	Breath sample has been performed incorrectly (for example flow or volume not within requirements, or circumvention attempt detected).
16	Initial Test Passed	Initial breath alcohol test passed. Alcohol measurement result is less than limit value for initial test.
17	Initial Test Not Delivered	Initial breath sample not delivered within a certain time period.
18	Initial Test Failed	Initial breath alcohol test failed. Alcohol test result is equal to or above limit value for initial test.

Table A.1 - Description of alcohol interlock events (2 of 4)

No.:	*Event (English):*	*Description:*
19	Initial Test Lockout	Temporary lockout after a failed initial test. Further breath test attempts are prevented for a certain time period.
20	Initial Test Failed High BrAC	Initial breath alcohol test failed. Breath alcohol result is equal to or above high concentration limit value for initial test.
21	Initial Test High BrAC Lockout	Temporary lockout after a failed initial test because of high alcohol concentration. Further breath test attempts are prevented for a certain time period.
22	Temporary Lockout Reset	Temporary lockout has been reset, for example by a service technician using a PC communication.
23	Temporary Lockout End	Temporary lockout time has expired.
24	Retest Request	Notification by alcohol interlock that a retest (second or subsequent test) is required.
25	Retest Warning	Audible and/or visual warnings to the driver that an accepted breath sample for a retest has not yet been provided.
26	Retest Warning Acknowledged	Driver has acknowledged that retest has been requested.
27	Retest Passed	Breath alcohol retest passed. Alcohol result is less than limit value for retest.
28	Retest Not Delivered	Retest breath sample not delivered within a certain time period.
29	Retest Failed	Retest breath alcohol test failed. Breath alcohol result is equal to or above concentration limit value for retest.
30	Retest Lockout	Temporary lockout after a failed retest. After the ignition is switched off and the restart timer has expired, further breath test attempts are prevented for a certain time period.
31	Retest Failed High BrAC	Retest breath alcohol test failed. Alcohol result is equal to or above high concentration limit value for retest.
32	Retest High BrAC Lockout	Temporary lockout after a failed retest because of high alcohol concentration. After the ignition is switched off and the restart timer has expired, further breath test attempts are prevented for a certain time period.
33	Handset Exchanged	Handset has been replaced by another handset.
34	Handset Disconnected	Handset has been disconnected from the control unit, or, if handset and control unit communicate through wireless communication, the communication between handset and control unit has been interrupted.
35	Handset Reconnected	Handset has been reconnected to the control unit, or, if handset and control unit communicate through wireless communication, the communication between handset and control unit has been re-established.
36	Handset Temperature Out of Range	Handset temperature is outside the operating temperature range of the alcohol interlock.
37	Device Error	Error has occurred in the alcohol interlock.
38	Device Early Recall	Next service date has been forced to an earlier date due to a device error.

Table A.1 - Description of alcohol interlock events (3 of 4)

No.:	*Event (English):*	*Description:*
39	Occupational Time Begins	Occupational time period has started. Only during the occupational driving times set in the parameters does the alcohol interlock allow use of the vehicle.
40	Occupational Time Ends	Occupational time period has expired.
41	Occupational Time Warning	Warning to alert drivers that they are exceeding the occupational driving time.
42	Test Outside Occupational Time	Alcohol interlock does not accept an initial breath test to start vehicle if outside occupational time period.
43	Access Code Entry	Access code entered.
44	Access Timer Reset	Access timer has been reset.
45	Access Timer Expired	Access timer period has ended.
46	Power On	Main power to the alcohol interlock has been supplied.
47	Power Off	Main power to the alcohol interlock has been lost.
48	Power Loss Duration	Time length of the power loss to the alcohol interlock.
49	Engine On Without Breath Test	Vehicle start detected without a passed initial test.
50	Vehicle Movement Without Breath Test	Vehicle movement detected without a passed initial test.
51	Early Service Recall	Next service date has been set to an earlier service date due to malfunction of the alcohol interlock or action of the driver which requires service of the alcohol interlock.
52	Service Date Reset	Early service date has been reset to the original service date.
53	Service Reminder	Reminder that the alcohol interlock has a limited number of days of use before the normal service period expires.
54	Service Reminder (Grace Period)	Reminder that the alcohol interlock is in the grace period following the expiration of the service period, and that the alcohol interlock has a certain number of days (grace period) before it may permanently be locked out of use.
55	Service Period Expired	Reminder that the service period and the grace period have expired.
56	Calibration Reminder	Reminder that the alcohol interlock has a limited number of days of use before the calibration period will expire.
57	Calibration Reminder (Grace Period)	Reminder that the alcohol interlock is in the grace period following the expiration of the calibration period, and that the alcohol interlock has a certain number of days (grace period) before it may permanently be locked out of use.
58	Calibration Period Expired	Reminder that the calibration period has expired.
59	Permanent Lockout	Service or calibration period has expired (including any grace period) and alcohol interlock prevents any breath test attempts.

Table A.1 - Description of alcohol interlock events (4 of 4)

No.:	*Event (English):*	*Description:*
60	Control Unit PC-Comm. Mode On	Control unit has been switched from normal operational mode to communication mode for service.
61	Control Unit PC-Comm. Mode Off	Control unit has been switched from communication mode to normal operational mode for normal use.
62	Handset PC-Comm. Mode On	Handset has been switched from normal operational mode to communication mode for service.
63	Handset PC-Comm. Mode Off	Handset has been switched from communication mode to normal operational mode for normal use.
64	Control Unit Diagnostic Test	Control unit test during maintenance.
65	Handset Diagnostic Test	Handset test during maintenance.
66	Options Modified	Options of the alcohol interlock (parameter settings) have been changed.
67	Real Time Clock Adjusted	Real time clock has been adjusted (date or time).
68	Daylight Savings Time Change	Real time clock of the alcohol interlock has been automatically adjusted +/- 1 h to allow for the daylight saving time change (summer / winter time).
69	Calibration - Initial Value	Result of the sensor calibration before the adjustment performed during service of the alcohol interlock. (Calibration: check of the indication of the alcohol interlock using a test gas with a given concentration. Adjustment: operation on the alcohol interlock so that it provides an indication corresponding to the concentration of the test gas. Accuracy check: additional check of the indication of the alcohol interlock after the adjustment.)
70	Calibration Setpoint	Nominal alcohol concentration used for adjustment.
71	Accuracy Check - Solution Value	Nominal alcohol concentration used for accuracy check.
72	Accuracy Check Result	Result of the accuracy check.
73	Gas Type	Gas type (wet gas or dry gas) used during calibration, adjustment or accuracy check.

Annex B
(informative)

Performance testing

The alcohol interlock should be type tested according to this European Standard by an independent laboratory satisfying the requirements of one of the following alternatives:

Alternative A:

– the laboratory is based in the EU (European Union) or the EFTA (European Free Trade Association);

– the laboratory is accredited according to EN ISO/IEC 17025 "General requirements for the competence of testing and calibration laboratories";

– the scope of the accreditation of the laboratory includes breath alcohol measuring instruments;

– the accreditation certificate of the laboratory is issued by a national accreditation body based in the EU (European Union) or the EFTA (European Free Trade Association);

or

Alternative B:

– the laboratory is a national authority for legal metrology;

– the authority is designated by the OIML (International Organization of Legal Metrology) to perform tests according to OIML R 126 "Evidential breath analysers".

Bibliography

[1] *Council Directive 72/245/EEC [1)] of 20 June 1972 on the approximation of the laws of the Member States relating to the suppression of radio interference produced by spark-ignition engines fitted to motor vehicles*, OJ L 152 of 6.7.1972, p.15-24, available from: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=DD:I:1972_II:31972L0245:EN:PDF

[2] *Regulation (EC) No 661/2009 of the European Parliament and the Council of 13 July 2009 concerning type-approval requirements for the general safety of motor vehicles, their trailers and systems, components and separate technical units intended therefor*, OJ L 200 of 31.7.2009, p. 1-24, available from: http://eur-lex.europa.eu/JOHtml.do?uri=OJ:L:2009:200:SOM:EN:HTML

[3] *Regulation No 10 of the Economic Commission for Europe of the United Nations (UN/ECE) - Uniform provisions concerning the approval of vehicles with regard to electromagnetic compatibility*, available from: http://www.unece.org/trans/main/wp29/wp29regs1-20.html

[4] EN 50436-2, *Alcohol interlocks – Test methods and performance requirements – Part 2: Instruments having a mouthpiece and measuring breath alcohol for general preventive use*

[5] CLC/TR 50436-3:2010, *Alcohol interlocks – Test methods and performance requirements – Part 3: Guidance for decision makers, purchasers and users*

[6] EN ISO/IEC 17025:2005, *General requirements for the competence of testing and calibration laboratories (IEC 17025:2005)*

[7] International Recommendation OIML R 126:1998, *Evidential breath analyzers*. International Bureau of Legal Metrology, 11, rue Turgot – 75 009 Paris – France

[8] Australian Standard AS 3547:1997, *Breath alcohol testing devices for personal use*, Type 4.

[9] National Highway Traffic Safety Administration, *Model Specifications for Breath Alcohol Ignition Interlock Devices (BAIIDS)*, Federal Register, Vol. 57, No. 67, 7. April 1992, p. 11772.

[10] *Qualification Test Specification for Breath Alcohol Ignition Interlock Devices (BAIID) for use in the Province of Alberta*. Electronics Test Centre, Document No. 355A02-01, October 1992.

[11] National Research Council Canada, *Technical Standard for Vehicular Breath Alcohol Ignition Interlock Devices in Canada*, CSTT-HVC-TR-114, 9. August 2011.

[12] National Research Council Canada, *Test Protocol for Vehicular Breath Alcohol Ignition Interlock Devices in Canada*, CSTT-HVC-TR-150, 27. July 2011.

[13] National Research Council Canada, *A Review of Breath Alcohol Ignition Interlock Device Test Facilities*, CSTT-HVC-LR-335, 30. March 2011.

---

1 Directive 72/245/EEC is repealed by Regulation (EC) No 661/2009 of the European Parliament and of the Council of 13 July 2009 concerning type-approval requirements for the general safety of motor vehicles, their trailers and systems, components and separate technical units intended therefor, OJ L 200, 31.7.2009, p. 1–24, available from: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:200:0001:0024:EN:PDF

This page deliberately left blank

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards -based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email bsmusales@bsigroup.com.

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Copyright

Useful Contacts:

Customer Services
Tel: +44 845 086 9001
Email (orders): orders@bsigroup.com
Email (enquiries): cservices@bsigroup.com

Subscriptions
Tel: +44 845 086 9001
Email: subscriptions@bsigroup.com

Knowledge Centre
Tel: +44 20 8996 7004
Email: knowledgecentre@bsigroup.com

Copyright & Licensing
Tel: +44 20 8996 7070
Email: copyright@bsigroup.com

bsi.

...making excellence a habit.™