BS EN 50436-3:2016



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Alcohol interlocks — Test methods and performance requirements

Part 3: Guidance for authorities, decision makers, purchasers and users



BS EN 50436-3:2016 BRITISH STANDARD

National foreword

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European foreword

This document (EN 50436-3:2016) has been prepared by CLC/BTTF 116-2 "Alcohol interlocks".

The following dates are fixed:

have to be withdrawn

•	latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	[2017-10-31]
•	latest date by which the national standards conflicting with this document	(dow)	[2019-10-31]

This document supersedes CLC/TR 50436-3:2010.

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

EN 50436-3:2016 includes the following significant technical changes with respect to CLC/TR 50436-3:2010:

- Clause 3: definitions are added for primary prevention and secondary prevention.
- Clause 4: this clause has been revised including primary prevention and secondary prevention.
- Clause 5: the former content for automatic access control is now in a separate clause.
- Subclause 6.2: the chapter on International Standard ISO 39001 is added.
- Clause 7: the chapter on alcohol interlocks in drink driving offender programmes is added.
- Subclause 8.1: the text is updated with respect to the current legislation.
- Informative Annex C with a description of basic parameter settings is added.
- Informative Annex D with a description of basic steps of a drink driving offender programme is added.

Introduction

According to the European Transport Safety Council (ETSC), in about a quarter of the fatal accidents that occur in traffic on European roads, alcohol impairment has been a contributory factor. Drink-driving is found in all social classes and professional categories, often without their families, friends, colleagues or supervisors knowing about it. In those cases where there actually is an awareness, it is often difficult to know how to act or confront the problem. A strategy has been drawn up within the European Commission to decrease alcohol related injuries as well as to support countries that are working in different ways to tackle the problem of drink-driving.

One strategy to decrease alcohol-related accidents is to implement the use of alcohol interlocks. The main purpose of alcohol interlocks is to prevent persons with breath alcohol concentrations exceeding a set limit value from driving a vehicle.

The use of alcohol interlocks in the vehicles of drink-driving offenders was started in the USA in 1985 and followed a few years later in Canada. From the end of the 1990s, the use of alcohol interlocks has spread worldwide, especially in Australia and several European countries. In Sweden, offender programmes started in 1999, followed closely by the use of alcohol interlocks for quality assurance of transportation. Further examples for the implementation of alcohol interlocks saving human lives every year in Europe are Finland, France and the Netherlands. A continuously updated overview is published by ETSC (www.etsc.eu).

There are several areas in which alcohol interlocks may be used:

- installed in a vehicle as a general preventive measure for the promotion of traffic safety; or
- in vehicles as ordered by a court or an administrative authority as part of a drink-driving offender programme; or
- for persons subject to a medical or rehabilitation programme; or
- as a safety measure for the access to machinery or certain restricted areas.

This guidance for authorities, governments, political decision makers, transport companies, purchasers, unions and users contains numerous recommendations for those interested in the use of alcohol interlocks. However, it is not mandatory and it does not contain any requirements.

This European Standard is part of a series of European Standards which mainly describe test methods and requirements for alcohol interlocks. It is assumed that the recommendations given in this document are used for alcohol interlocks fulfilling the requirements of one or more of the performance standards of this series.

1 Scope

An alcohol interlock is a system comprising a breath alcohol measuring instrument and an immobiliser which may be easily installed in motor vehicles as passenger cars, coaches, taxis, hazardous goods transporters, lorries, trams, trains, motorcycles, boats, or snow mobiles. Before the vehicle motor can be started or the vehicle can be moved, a breath sample needs to be provided to the alcohol interlock, normally through a mouthpiece. Once the breath alcohol measurement has been performed, the alcohol interlock will prevent drivers from starting the motor if they have an alcohol concentration above a predetermined limit value. This limit may be set at the legal limit of a respective country or lower.

Alcohol interlocks that meet the relevant European Standards detect, for example, if the sample is delivered by a human being. They are also capable of preventing and detecting tampering with the instrument.

Additional parts of the system may include identity checking or recording mechanisms.

The purpose of this European Standard is to give practical guidance for selection, installation, use and maintenance of alcohol interlocks. It is directed to all those who have an interest in alcohol interlocks as well as companies selling and installing alcohol interlocks, purchasers and users for commercial, professional or private use. The European Standard gives information about the alcohol interlock and how it is to be used.

This European Standard describes alcohol interlocks for use in vehicles as a general preventive measure in traffic safety as well as for use in drink driving offender programmes. However, information provided may also be useful for alcohol interlocks in other applications.

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 50436-1:2014, Alcohol interlocks - Test methods and performance requirements - Part 1: Instruments for drink-driving-offender programs

EN 50436-2:2014, Alcohol interlocks - Test methods and performance requirements - Part 2: Instruments having a mouthpiece and measuring breath alcohol for general preventive use

EN 50436-6:2015, Alcohol interlocks - Test methods and performance requirements - Part 6: Data security

NOTE The technology of alcohol interlocks is rapidly evolving, and further innovations can be expected, which could be considered in future amendments or new parts of these European Standards.

ISO 39001:2012, Road traffic safety (RTS) management systems - Requirements with guidance for use

3 Terms and definitions

For the purposes of this document, the following terms and definitions, given in EN 50436-1:2014, 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

Br_AC

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

initial test

breath test provided before the vehicle motor is started

3.11

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.

3.12

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

3.13

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 drivers ability to restart the vehicle motor after a stall situation.

3.14

override

method of allowing the start 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.

3.15

bypass

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

3.16

tampering

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

3.17

violation

act of doing something that is not allowed by the rules of a drink-driving-offender programme

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

manufacturer

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

3.22

warm-up time

duration from power-up of the alcohol interlock until it is ready to accept a breath sample and to fulfil the functional test requirements

3.23

primary prevention

prevention of a driver with no current alcohol related driving licence restriction from starting the vehicle motor while under the influence of alcohol

3.24

secondary prevention

prevention of a driver with a current alcohol related driving licence restriction from starting the vehicle motor while under the influence of alcohol

4 Application of alcohol interlocks as a road safety measure

4.1 General

To date, alcohol interlocks have been applied predominantly in the framework of road safety policies, in the beginning exclusively aimed at the secondary prevention of drink-driving among arrested offenders. In recent years, however, especially in Europe, the primary prevention among commercial, professional and even private drivers has become more and more important.

4.2 Primary preventive application

Commercial and professional use

Installing an alcohol interlock as a general preventive measure in vehicles for the safe transport of persons or goods such as hazardous goods transporters, lorries, coaches, taxis, trams, trains, motorcycles, boats, snow mobiles or other modes of transportation can reduce accidents and related downtime. An installation can also improve the image of the transport company by increasing road safety, and improve their customers perception of their own safety. Alcohol interlocks may be used as a transport quality instrument for vehicles operated by companies or authorities. They may also be a requirement of employment within an alcohol policy of a company or authority, where they may be used for compliance monitoring.

Several countries have required legally to install alcohol interlocks in certain vehicles (e.g. buses) as a primary preventive application.

Private use by the general driving population

The control of drink-driving behaviour through alcohol interlocks may also be proposed for private use on a personal voluntary decision basis. In private vehicles, boats, snow mobiles or recreational vehicles the voluntary installation of an alcohol interlock as a preventive measure can help to ensure that vehicle drivers are sober. Furthermore, they can offer reassurance to partners or for example to parents whose children may also drive a vehicle. Interlocks may also be applicable with regard to self-control for families who wish to avoid drink driving under any circumstances, or to insurance companies which may allow a reduced insurance premium for drivers, especially young drivers or drivers with a personal history of alcohol problems.

The self-evaluation of alcohol levels is considered as a major factor in the prevention of alcohol related accidents. If alcohol interlocks are installed in private vehicles, then this will provide an additional means for self-evaluation.

Private use as part of addiction treatment

In European countries, the number of problem drinkers who voluntarily enter addiction care and have a valid driver's license, is much larger than the number of drink-driving offenders who are eligible to enter a mandatory alcohol interlock programme. These persons are probably higher motivated to use an

alcohol interlock than arrested offenders. Furthermore, the alcohol interlock may be helpful in the process of rehabilitation, both as a diagnostic instrument and as a remedial tool. The type of programme for this category of high-risk drivers shall be more or less similar to an offender programme. This means that the costs will be relatively high compared to the cost of a primary prevention programme which does not need close monitoring. But the cost-benefit rate may be even better than the one associated with offender programmes.

4.3 Secondary preventive application

The secondary preventive application of alcohol interlocks always has a more or less mandatory character. Participation in an alcohol interlock programme is ordered by the court or by an administrative body. Target groups may be all offenders or specific groups like offenders with high alcohol concentrations and/or recidivists. Some programmes are called 'voluntary', but generally the only alternatives are license revocation or (extended) suspension.

According to the results of North American and Swedish evaluation studies, alcohol interlocks may reduce repeat drink driving by approximately 75 % when compared to more conventional countermeasures like license suspension or revocation. In addition to road safety effects, evaluation of the Swedish offender programme produced strong indications of a beneficial health effect. Swedish programme participants, in vast majority diagnosed as problem drinker or alcohol-addicted, needed significantly less hospital care than before entering the programme, and also less than a control group with revoked licenses. Furthermore, their number of sick leave days was significantly reduced.

In order to realize long-term effects of offender programmes, the programme duration can be made flexible, depending on the offenders ability to separate drinking from driving. Furthermore, a rehabilitation or driver improvement programme may be integrated into the alcohol interlock programme.

This application requires alcohol interlocks with special capabilities, for example possibilities to request retests after the motor has started and data memory to store all relevant information.

5 Application of alcohol interlocks for automatic access control

A wider use of alcohol interlocks includes limiting entry to locations for which an alcohol policy or regulation is in place. These locations may include, for example, nuclear power plants, laboratories, factories and gates in harbours or mines. Other stationary or mobile applications may include access control to specialized machinery, cranes or forklifts.

An alcohol interlock is able to control access based on the measured alcohol concentration and could send a notification to security personnel under pre-determined circumstances.

As an integrated device, the alcohol interlock may be used in conjunction with other access control systems such as swipe cards, retinal scanners or PIN control. In these cases, the result of the breath sample could be recorded along with details of the user who provided the breath sample.

Requiring users of machinery to use an alcohol interlock for gaining access to the operation of the machinery would prevent alcohol related damage or injuries.

6 Introduction of alcohol interlocks for commercial and professional use

6.1 Alcohol interlocks, a way to ensure quality

Companies and organisations that procure or provide transportation improve road safety through the use of alcohol interlocks to counteract drink driving. These measures may also improve customers' opinions of the companies, create a better working environment, and gain competitive advantages for their own operations.

The use of alcohol interlocks by companies and organisations is a management decision to ensure that their vehicles and machinery are being operated by sober persons. Alcohol interlocks in all company vehicles are preferable. An approach like this requires strong support from staff, determination and patience, and needs to be integrated step by step into normal operations. Alcohol interlocks then become an element of a company's alcohol and general quality assurance policies, which are based on the concern for social, economic, medical and safety conditions in the field of work. It is recommended to have a company/organization policy to prevent drink-driving and alcohol related incidents.

For companies and organisations an alcohol and drug policy should

- contribute to quality assurance to customers and commissioners,
- contribute to increased traffic safety,
- show concern about the companies employees,
- prevent alcohol and drug problems in the enterprise,
- develop methods for early intervention and enable employers and employees to take action,
- provide help and assistance for employees already having a substance abuse problem.

6.2 International Standard ISO 39001

ISO 39001 specifies requirements for a road traffic safety management system to enable an organization that interacts with the road traffic system to reduce death and serious injuries related to road traffic crashes which it can influence. The requirements in this International Standard include development and implementation of an appropriate road traffic safety policy, development of road traffic safety objectives and action plans, which take into account legal and other requirements to which the organization subscribes. They also include information about elements and criteria related to road traffic safety that the organization identifies as those which it can control and those which it can influence.

ISO 39001 specifies alcohol interlocks among others as a road traffic safety performance factor to improve the fitness of drivers.

6.3 Systematic procedures to introduce alcohol interlocks

The main groups involved in the use of alcohol interlocks in commercial and professional applications are:

- the companies;
- the workers:
- the customers:
- the workers unions;
- the authorities.

For the introduction of alcohol interlocks it is necessary to create credibility for the programme. To achieve this, the introductory process could be divided into several steps:

Decision and support

In order to create a sense of commitment and involvement, management decisions should be communicated at an early stage so that they permeate the entire organization from the decision makers to the actual drivers.

Policy and objectives

Employees alcohol (mis)use should not be allowed to interfere with the companies and the employees working stake. A straightforward policy should be drafted with clear, realistic and quantifiable targets describing the direction and intention for the work ahead. This policy could be associated with legal issues and health and safety campaigns. The policy should be communicated repeatedly in order to be made known within the entire organization if it is to gain acceptance and stimulate a sense of involvement.

Action plan and measures

The alcohol policy of the company should be laid down together with a documented plan of action on how the goals should be fulfilled. The action plan describes how the policy is to be put into effect, e.g. time schedules or allocation of responsibilities. It should also take into consideration the individual employees sense of integrity and job security. The measures undertaken through the plan could for example involve information campaigns, training and instruction programmes in connection with the introduction of alcohol interlocks, or stipulating the use of alcohol interlocks in future procurements. A policy with the plan of action is a powerful tool to gain approval of all the employees for the companies intentions and it makes it easier to understand what the company wants in this matter.

These activities aim to qualify employees and employers for constructive collaboration when encountering the challenges of alcohol and drug issues in the workplace. This will also include agreements between the company and the employees and/or their unions, as well as defined steps to be taken in case of alcohol interlocks going into blocking state after testing of drivers.

Monitoring and evaluation

Monitoring and evaluation is a necessary part of a systematic work method to show whether the objectives of the policy have been achieved. This could be done for example by the monitoring of:

- the events of the alcohol interlock memory (such as manipulation attempts or positive tests),
- regular calibration of the alcohol interlocks,
- traffic and work accidents,
- illness times of employees.

6.4 Dialogue with unions or other representatives

When a company plans to install alcohol interlocks for quality assurance, it will directly influence the working environment of the users. An alcohol interlock could be considered as an intrusion into the personal environment. It is important to initiate an early dialogue between the company management and the union representatives or other legally relevant bodies concerning the prospective use of alcohol interlocks as a quality assurance tool. Moreover, it is preferable that this dialogue is supported by a policy document and action plans formulated within the framework of a quality assurance programme. Based on experience, it has been found that information and discussion available at an early stage increases the chance of success of mutual understanding.

The obligation to inform and negotiate with the union when installing an alcohol interlock may vary from country to country depending on national laws and the contract between the employer and the employee.

It is suggested that the dialogue should be centred around the use of alcohol interlocks as a quality assurance tool which improves the working environment in companies and organisations, and creates safer and more reliable conditions. This applies both to those out on the road as well as to those who procure or provide transport services.

The use of alcohol interlocks will also have impact on the employee's health and safety, which gives an opportunity of the mutual understanding between the employer and the employee. The experiences from companies implementing alcohol interlocks show that a proper dialogue with the employees and unions before installing the alcohol interlocks can help to gain acceptance.

6.5 Dealing with alcohol problems

Alcohol interlocks installed in all of the companies vehicles will facilitate the detection of alcohol problems and strengthen the preventive measures of a company's alcohol and drug policy. Alcohol interlocks can be used simply to stop someone from drink-driving in real-time, or in a stronger policy the data from the interlock can be used for a more in-depth objective for the working environment.

Alcohol abuse by an employee is often a long-term hidden problem. Alcohol interlocks may be used to raise awareness of alcohol related problems in companies, and can be a signal to deal with the problems at an early stage. There are advantages to identifying and solving alcohol-related problems early. When an ongoing problem is revealed, taking action is often difficult and expensive. There is also a greater risk of accidents due to employees' alcohol problems.

A company/organization policy for preventing alcohol-related incidents and offering help and specialist care for employees who already have alcohol problems is highly recommended. A step-by-step action plan for how to handle emerging problems before they get out of hand is also recommended.

An action plan provides help in assisting employees back to work through different steps when a problem is identified. This may include:

- support from the company and its management during treatment and in getting back to work, when problems occur;
- medical examinations;
- advice and counselling, for example from health care centres;
- treatment or programmes (outpatient or inpatient).

7 Alcohol interlocks in drink-driving-offender programmes

7.1 Overview

The application of alcohol interlocks in drink-driving-offender programmes always has a more or less mandatory character. Participation in an alcohol interlock programme is ordered by the court or by an administrative body for drink-driving offenders.

Since the first drink-driving offender programmes with alcohol interlocks were introduced in the United States of America in the mid-1980s, alcohol interlock programmes have become an increasingly common approach for dealing with convicted impaired drivers. Backed by evaluation studies demonstrating strong positive effects, alcohol interlock programmes have spread throughout North America, Australia and several European countries, for example Sweden, Finland, Netherlands, and Belgium. Additionally further European countries are developing drink-driving offender programmes.

Among the numerous alcohol interlock programmes that have been implemented throughout the world, there are many variations in how they are structured and operated. The alcohol interlock programmes require more than just the installation of an alcohol interlock instrument in the vehicle of a convicted impaired driver for a set period of time.

A very important part is a clear set of rules and regulations pertaining to the eligibility and/or requirements for programme participation, the length of participation, the extent of monitoring and reporting, the agency responsible for monitoring, the consequences of repeated high alcohol readings and/or non-compliance. All these factors may play a role in determining the success of the programme.

The basic steps of a drink-driving-offender programme together with questions to be considered and decided are described in Annex D.

7.2 Participation rate

To achieve a significant impact on road safety, a high participation rate among offenders who are eligible for a drink-driving-offender programme is essential. The following factors contribute to a high participation rate:

- all persons caught for drink-driving, regardless of the number of prior violations of law should be required to participate in an alcohol interlock programme as a condition of continued driving privileges and/or licence reinstatement;
- participation in a drink-driving-offender programme shall commence as soon as possible following the offence. A double punishment by setting a ban of driving and late start of the programme should be avoided. Best practices show that the motivation to start will decline the longer the participant shall wait to start the programme;
- feedback on the data stored in the alcohol interlock can be used to educate and to change behaviour of the participant;
- it is recommended to allow drivers with all European driving licence categories for participation in a drink-driving-offender programme and not to restrict to passenger cars only. By allowing multiple categories the participation rate will increase, and conflicts in job related factors can be avoided. For example, a driver can be depending for income on his/her driver license. When allowed to participate the driver can maintain the job and the income and can avoid social embarassment;
- it is recommended to look at the cost for the total programme, and to look for a balanced cost rate.
 This is to ensure that a participant can afford to take part in the programme;
- duration of the period of participation should be determined by individual success in the programme, such that a release from the programme would require participants to demonstrate that they no longer require the alcohol interlock to prevent driving after drinking.

8 Criteria for selection

8.1 Approvals and performance testing

8.1.1 EMC legislation

An accessory such as an alcohol interlock may only be installed in a vehicle when it fulfils the relevant legal technical requirements with regard to electromagnetic compatibility (EMC). For the European Union, the Directive 72/245/EEC is repealed by Commission Regulation (EU) 2015/166 of 3 February 2015. Hence, the UN Regulation No. 10 and its last amendment are giving the legal requirements. This ensures that an alcohol interlock does not have any influence concerning radio suppression or radio interference on the vehicle in which it is installed.

Approved instruments are required to have an approval marking as shown in Figure 1 or Figure 2.

e 1 03 0148

Figure 1 — Example of an approval marking according to the European Directive

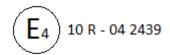


Figure 2 — Example of an approval marking according to the UN Regulation

The approval mark shows an "e" or an "E" followed by a number of the issuing country, surrounded by a rectangle or a circle, and the approval number. Instruments with these approval marks may be safely installed in a vehicle. The instrument so labelled meets the legal requirements.

NOTE Additional national requirements may apply.

8.1.2 Performance standards

Test methods and performance requirements specifically for alcohol interlocks are given in the European Standards EN 50436-1 for alcohol interlocks in drink-driving offender programmes and EN 50436-2 for alcohol interlocks for general preventive use. It is recommended or it may be a national requirement that the performance of alcohol interlocks is tested in accordance with EN 50436-1, EN 50436-2 and/or other relevant European Standards.

NOTE Revisions of these European Standards may affect certain details in this document.

The alcohol interlock should be type tested according to EN 50436-1 or EN 50436-2 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".

Purchasers, decision makers and users of alcohol interlocks may not possess the technical knowledge to understand the background for, and the significance of these standards. Therefore, the following list shows the main items which are required in the standards:

- measurement accuracy for the alcohol concentration;
- environmental tests with varying ambient temperature and humidity;
- tests of the warm-up time;
- durability tests including vibrations and dropping;
- measures against tampering, manipulation and circumvention;
- influence of exhaled gases other than alcohol;
- long term behaviour;
- electrical tests for supply voltage and resistance to damage due to short circuiting;
- electromagnetic compatibility and electrical disturbances:
- content of the instructions for installation and use.

8.2 Breath alcohol measurement techniques

8.2.1 General

Presently alcohol interlocks use two different techniques of alcohol measurement: electrochemical sensors and semiconductor sensors. In future other sensors, for example optical sensors, may also be used.

It is not intended, by means of this document, to discourage the use of alcohol interlocks using measuring principles other than those described here, or to inhibit the development of new detection principles. However, it is of primary importance that the capabilities of the detection principle should be such that the performance of the alcohol interlock is appropriate for the intended application. Assessment of the devices against the performance requirements specified in EN 50436-1, EN 50436-2 and/or other relevant European Standards may provide a basis for decisions in appropriate circumstances.

8.2.2 Electrochemical sensors

In an alcohol interlock containing an electrochemical sensor, a breath sample of a precisely defined volume is delivered to the sensor.

The sensor contains a catalyst layer which supports the electrochemical reaction of alcohol. Electrons are released by the reaction in proportion to the alcohol concentration. The entire number of electrons generated during the electrochemical reaction is then measured. The nature of the reaction provides the sensor with a high degree of accuracy and long-term stability.

The electrochemical sensor reacts with a high degree of specificity to alcohol. As a result, acetone, for example, which may be found in the breath of diabetics and those on starvation diets, cannot distort the measurement result because the ketone group does not react at the sensor's electrodes.

Electrochemical sensors are very sensitive. However, since the sensitivity may gradually degrade over time, the electrochemical sensor requires periodic calibration and adjustment or its replacement at suitable time intervals.

Low temperature operation (below approximately -5 °C) may be precluded by electrolyte properties, unless the electrochemical sensor is heated.

8.2.3 Semiconductor sensors

These sensors are solid-state devices composed of sintered metal oxides which detect gas through an increase in electrical conductivity when reducing gases are adsorbed on the sensor surface. They are reactive when heated to 350 °C to 400 °C. Their sensitivity and accuracy depends upon ambient conditions of temperature and humidity. They also depend upon the concentration of oxygen in the breath which, in turn, is influenced by the way the breath sample is delivered. Their long term stability may be limited.

While chemical formulation of the metal oxide and operating temperature of the sensor will result in some improvement in selectivity of response to target gases, semiconductor sensors are generally non-specific in response to reducing gases such as hydrocarbons and volatile organic compounds.

Semiconductor sensors have been used extensively in low cost breath alcohol testers in which lower levels of accuracy are acceptable. However, in an automotive environment cross sensitivity with hydrocarbons from fuel and vehicle exhaust renders the application problematic.

8.2.4 Optical sensors

Alcohol sensors based on infrared light absorption are used widely in instruments for evidential measurement of breath alcohol concentrations by the police.

Like most organic molecules, alcohol has a unique absorption fingerprint in the infrared wavelength region of light. Light from a source passes along an optical path and, after filtering, reaches an optical detector. The detector measures the attenuation of the light by the alcohol molecules in the optical path. The optical path may have a length of some centimetres or more and may be elongated by multiple reflections.

The optical system shall be heated to avoid the condensation of breath humidity. Possible sensitivity to vibrations and temperature changes can be prevented by proper design. A high degree of long term stability is characteristic for this measurement technology.

8.3 Quality demands and choice of products

The decision to purchase alcohol interlocks should include thoughtful planning to avoid technical and practical problems. Quality and service questions are important, likewise the routines that are set for the use of the alcohol interlocks. The investment in the alcohol interlocks shall be seen as a part of the organisations safety and work routines.

European Standards

An important criterion for the quality of an alcohol interlock is whether it fulfils the European Standards EN 50436-1, EN 50436-2 and/or other relevant European Standards. These standards provide the important basic requirements for alcohol interlocks (see also 8.1.2).

The main differences between the European Standards EN 50436-1 (instruments for drink driving offender programmes) and EN 50436-2 (instruments for general preventive use) are the following:

- EN 50436-1 requires a broader ambient temperature range than EN 50436-2 in which the alcohol interlock shall operate with uncompromised functionality;
- EN 50436-1 requires a data memory where all relevant events regarding the use of the alcohol interlock and the vehicle are stored. In EN 50436-2 a data memory is optional;
- EN 50436-1 requires a retest function which is optional in EN 50436-2.

Selecting an alcohol interlock not meeting the requirements of the relevant European Standards may have consequences in terms of:

- accuracy in alcohol concentration measurement;
- measures against manipulation and circumvention;

- immunity to interfering substances from the breath;
- reliability;
- ruggedness to environmental influences;
- electromagnetic compatibility (EMC);
- long term stability of the alcohol concentration measurement.

Costs:

A further consideration in the choice of an alcohol interlock is the total cost of ownership. Cost considerations include the following:

- purchase price of the alcohol interlock;
- installation;
- user training and technical support;
- simplicity and costs of data downloads;
- regular mouthpiece replacement;
- periodic maintenance and calibration;
- periodic sensor replacement;
- manufacturers warranty period;
- support for installation;
- network and quality of service workshops.

User friendliness

The purchaser and users should decide, before the purchase, which features the alcohol interlocks should have and how user friendly they are. There are several options of alcohol interlocks on which the purchaser should decide, for example:

- user guidance and display language;
- data memory and data evaluation;
- operational temperature range;
- warm-up time;
- power consumption;
- removability of the handset;
- possibility to pre-heat the alcohol interlock through activation by the door locking system of the vehicle;
- retest option and restart period;

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- possibility to connect an external LED indicator to signal when an operation as a retest is required while driving for the cases where the driver is hard of hearing and may not hear the handset internal buzzer;
- override function (for single use or for multiple use);
- possibility to request a new breath test after change of driver;
- possibility to set parameters;
- automatic adjustment of the time for regions that has daylight savings time (summer and winter time);
- installation and removal considerations;
- technical support.

Implementation

In order to implement an effective alcohol interlock programme it is necessary to gain better understanding of the alcohol interlock either by experience with field trials or through discussions with external experts, who help to ensure that an appropriate alcohol interlock is chosen.

Typical items to be considered when selecting an alcohol interlock are summarized in Annex B.

8.4 Parameter settings

8.4.1 Alcohol concentration limit

There are presently no harmonized European limit values of breath alcohol concentrations in road traffic. The permitted levels vary in the different European countries and for different kinds of drivers.

Alcohol interlocks should be configured with a specific limit of the alcohol concentration in accordance with the national legislation or the requirements of the users. However, this limit should not be higher than the applicable legal limits in the respective country. If the vehicle with an alcohol interlock is driven in different countries the driver should be aware that the legal limit of the actual country applies even if the setting of the limit in the alcohol interlock is higher.

For persons participating in a drink-driving offender programme or an alcohol rehabilitation and treatment programme with a restricted driving licence, they may not be allowed to drive in any other country than their home country.

For physiological and technical reasons it is required in EN 50436-1 and EN 50436-2 that the nominal breath alcohol concentration limit of the alcohol interlock shall be at least 0,09 mg/l.

To make sure that an alcohol interlock does not permit starting the vehicle motor with an alcohol concentration at or above the legal limit, it is important that it will perform precise and reliable measurements and offers high long term stability.

8.4.2 Other parameters

Several parameters may be set differently for the use of the alcohol interlocks in vehicles according to national regulations, requirements of drink-driving offender programmes or depending on special applications and user requirements.

Display of the breath alcohol concentration:

It is recommended that the alcohol interlock does not display the measured breath alcohol concentration, but simply states whether the measured concentration is above or below the set limit value. This is to prevent a driver from using the alcohol interlock to drink up to the concentration limit.

Breath volume:

The available lung volume for delivering a breath sample varies considerably from person to person. For the vast majority of persons it should be possible to deliver the breath volume requested by the alcohol interlock. Therefore, in EN 50436-1 and EN 50436-2 a breath volume between 0,7 I and 1,2 I is required. Within this range a minimum breath volume of 1,0 I is recommended to be set in the alcohol interlock.

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

Start period:

After a breath sample has been accepted, the vehicle motor may be started within a defined start period. According to EN 50436-1 and EN 50436-2 the start period shall not be less than 1 min, unless it is ended intentionally, and should not be more than 5 min.

Restart period:

For a period of time after the motor has been switched off, the vehicle can be started again without the need for a breath sample. In EN 50436-1 and EN 50436-2 it is required that this restart period is at least 1 min, unless it is ended intentionally. This is in the interests of road safety, allowing the vehicle to be immediately re-started if the motor stalls in a critical situation or, alternatively, after brief stops.

The restart period should not be more than 30 min.

An overview of the basic parameter settings is given in Annex C.

8.5 Circumvention, manipulation and tampering

The use of alcohol interlocks is often imposed upon persons as a restriction or as a condition of employment. Some of these users may attempt to circumvent the alcohol interlock, to manipulate the delivery of the breath sample or to tamper with the instrument.

A circumvention technique could, for example, be to use artificial air sources or to filter the alcohol from the breath. Therefore, the use of tools to circumvent the alcohol interlock, such as pumps or filters, shall be detected by the alcohol interlock and the motor shall be prevented from starting. This is a requirement in EN 50436-1 and EN 50436-2.

Any attempt to start the vehicle without first having given an accepted breath sample may also be recorded in a data log.

A commonly cited argument against alcohol interlocks is the possibility of a sober person providing a breath sample on behalf of a drinking driver. Because of the specific way in which the breath sample may be delivered, this person may have had first to practice how to do this. Furthermore, at least one sober person needs to be in the vehicle throughout the journey to provide acceptable breath samples whenever the retests are activated. Finally, it is extremely unlikely (and may even be an offence) that a sober person would willingly provide a breath sample to enable a drink driver to drive a vehicle.

A further way to avoid using the alcohol interlock is to drive another vehicle in which no alcohol interlock is installed. However, if a person has been ordered to use an alcohol interlock as a condition for being permitted to drive, this is exactly the same as driving a vehicle without a driving licence. As this is always possible even if a person has been banned from driving, an alcohol interlock cannot prevent it from happening.

However, experience with alcohol interlocks fulfilling the requirements of EN 50436-1 or EN 50436-2 concerning all the different methods of circumvention and manipulation indicates that tampering is rare. Therefore, it is essential that alcohol interlocks fulfil the requirements of these European Standards and that all anti-circumvention measures necessary to fulfil the respective clauses of these European Standards are activated because alcohol interlocks with reduced technical design could more easily be manipulated and circumvented.

Alcohol interlocks cannot absolutely guarantee resistance to circumvention. However, alcohol interlocks are only one part of prevention programmes to avoid drink driving and their use shall be accompanied by the implementation of other contributions such as training and rehabilitation.

8.6 Data memory, download and analysis

The analysis of the data memory may be a valuable part of an alcohol interlock programme or policy. While the vehicle is in use, all relevant incidents may be recorded in the alcohol interlocks data memory. The data, recorded with date and time, include submission of or refusal to submit a breath sample, measured alcohol concentration, motor starts and stops, attempts to start the motor under the influence of alcohol, electrical bypassing of the alcohol interlock and tampering with the device.

If desired, an authorized person, using special software, may download the data, compile a data record and print it out. When the alcohol interlock is used in drink-driving offender programmes, this record may be sent to the supervising body for analysis, allowing the proper use of the vehicle fitted with the alcohol interlock to be monitored.

Having a data memory in the alcohol interlock may be a benefit to allow the possibility of evaluating the behaviour of the drivers with alcohol interlocks and to clarify the circumstances of possible blockings of the vehicle. However, the data from the alcohol interlock is highly sensitive from the stand-point of national data privacy and data protection regulations (see also EN 50436-6). The storage and use of the data shall comply with the integrity and security requirements of these regulations. The handling will be under scrutiny of the national data security authorities.

The company/organization therefore shall have a coherent and comprehensive system to handle the data, as well as the follow up actions.

9 Installation in vehicles

9.1 General

During installation of the alcohol interlock, the connection between the vehicles ignition switch or button and the starter is interrupted. The alcohol interlock is fitted into the interrupted circuit and subsequently releases the voltage supply to the starter system only when a breath sample below the limit value has been given. In this European Standard it includes also the provision of an output signal from the alcohol interlock to the vehicle to enable the starting, operation or movement of the vehicle.

This installation procedure ensures that an alcohol interlock can only intervene with the motor starting process but can never influence a running motor, i.e. while the vehicle is moving. This is an important provision for the operational safety.

The installation of an alcohol interlock should be performed by a qualified installer according to the relevant regulations and approved procedures of the installation instructions supplied by the alcohol interlock manufacturer. The documentation including instructions for check and service should be requested by the purchaser and customer from the alcohol interlock manufacturer.

NOTE Additional national requirements may apply.

The mounting and installation should be made in a manner such as not to impede safety. In particular, it should not block the correct functioning of safety devices such as airbags. It should also not cause more damage to the vehicle interior than necessary, for example holes remaining after removal.

9.2 Instructions for installation

According to EN 50436-1 and EN 50436-2 the manufacturer shall prepare and provide, on request, 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 combustion
 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;

- 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) instructions for removal of the alcohol interlock and returning vehicle wiring to safe conditions;
- i) information on proper disposal of the alcohol interlock at the end of its service life.

9.3 Criteria for placement

Should the handset of the alcohol interlock or any of its accessory require mounting in the passenger compartment, the following items should be considered:

- the handset should be installed in such a way as not to impede the proper operation and safety of the vehicle. Nor should it pose any form of risk in the event of an accident;
- if the retest function is activated the handset should be placed within easy reach of the driver;
- for collision safety reasons none of the parts of the alcohol interlock should lay loose in the vehicle
 if they are not small enough to be put in the glove compartment;
- the handset should be securely mounted so that it will not be dislodged when the vehicle travels over rough roads or is performing abrupt manoeuvres;
- the cable of the handset should be routed in such a way that it cannot interfere with the safe operation of the vehicle;
- the mounting materials should be able to withstand the vibration, shock and temperatures that the vehicle will encounter and should be flame-resistant;
- the handset should not obstruct other vehicle features such as speed indicators, warning indicators or vehicle controls;
- air bag deployment should be taken into account as improper placement may cause the handset to become a hazard;
- the handset should not be placed in front of a ventilation grill, or in direct sunlight, which may cause the temperature to rise above the maximum operating range of the handset.

Should the alcohol interlock require the installation of a control unit or any other accessory devices the following items should be considered during mounting:

- the control unit should be securely mounted so that it will not be dislodged when the vehicle travels over rough roads or is executing abrupt manoeuvres;
- the cable of the control unit should be routed in such a way that it cannot interfere with the safe operation of the vehicle. Extra precaution should be taken if the wires are routed near the steering wheel or accelerator, clutch and brake pedals;
- the mounting materials should be able to withstand the vibration, shock and temperatures that the vehicle will encounter;
- the control unit should not be placed in front of the passenger compartment heater if such placement will cause the temperature to rise above the maximum operating range of the control unit;
- the control unit, if it requires venting in order to keep it within its operating range, should be installed in such a fashion that will allow it to vent adequately.

10 Use

10.1 Education and information for the user

A driver training programme should be designed to ensure understanding and familiarity with the alcohol interlock. Training sessions can be proposed as well as audio-visual or other educational tools.

This training should include:

- basic knowledge on physiology of alcohol in the body;
- residual alcohol concentration in the morning after drinking in the evening;
- education concerning the risks involved in drink-driving;
- reasons for using an alcohol interlock;
- operation of the alcohol interlock;
- actual breath alcohol concentration limit of the alcohol interlock and its meaning;
- operating temperature range and warm-up time;
- lung capacity;
- influence of substances containing alcohol, for example food, drinks or medicines;
- ambient contamination by windscreen fluids, hand washing solutions or like products;
- management of interfering substances and the procedures to avoid false positive detection through food and beverages before testing;
- if applicable, details of a mandatory programme and the possible sanctions if not conforming;
- retest function and the safe way to deliver a retest breath sample, for example by stopping the vehicle;
- how to request a new breath test after a change of drivers;

- information about the use of the event data;
- how to make visual and functional checks, and whom to contact if the alcohol interlock is believed to be malfunctioning;
- reference to the instructions for use;
- periodic calibration;
- use of qualified service workshops;
- legal issues and additional national requirements.

10.2 Instructions for use

According to EN 50436-1 and EN 50436-2 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 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 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 substances other 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.

10.3 Environmental conditions

The sensors, batteries, displays and electronics of an alcohol interlock work correctly within a defined operating temperature range. Outside this range a correct measurement of the breath alcohol concentration cannot be ensured. This temperature range is given in the information documents of the alcohol interlock.

It is important when choosing an alcohol interlock to consider the temperature range of the instrument in order to ensure that it meets the specific user requirements. The European Standards EN 50436-1 and EN 50436-2 require that the alcohol interlock will function correctly within the specified temperature range.

Most of the alcohol interlocks have an internal heater to achieve the correct working temperature. This leads, at low temperatures, to a longer warm-up time.

If the operating temperature is outside the specified range, the driver should remove the handset of the alcohol interlock and should, if possible, take it with him or her, when leaving the vehicle. When being outside the operating temperature range specified by the manufacturer the alcohol interlock may no longer work correctly or may give false concentration results.

Alcohol interlocks are normally designed to be installed in the passenger or luggage compartment. However, the installation in the passenger compartment of roadsters or convertibles, in cars with moveable roof-panels or in motor cycles may require a higher degree of protection against water and dust as referenced in the European Standards EN 50436-1 and EN 50436-2.

10.4 Override function

10.4.1 Override function for emergency situations

In some situations it may be necessary to be able to start the vehicle quickly without having to deliver a breath test. Therefore, an override function for alcohol interlocks is optional.

According to EN 50436-1 and EN 50436-2 the use of the override function shall be indicated. Additionally, it may be recorded in the data memory and may be restricted to single use only within one service period.

However, the override function should only be used in emergency situations. The highest effectiveness of the alcohol interlock may be achieved by not permitting an override function.

In mandatory programmes the use of an override function may be subject to national regulations.

10.4.2 Override function for technical service

An override function may be used for technical or service reasons, for example if an alcohol interlock is blocked due to the expiration of the calibration interval, or to permit the movement of the vehicle in a car repair workshop for servicing or repairing without delivering a breath sample.

It may also be possible to override the alcohol interlock for a certain period of time by, for example, entering a code number.

10.5 Retest function

To ensure that the driver's breath alcohol concentration remains under the limit during longer journeys, alcohol interlocks, following the successful completion of an initial test and starting of the vehicle motor, may optionally be set to request retests at random intervals. This is to ensure that the driver is

maintaining an alcohol level below the concentration limit. The retest function is normally activated in drink-driving offender programmes and is usually not activated for general preventive use.

When the retest request is engaged, the driver is requested to provide a breath sample, usually within 5 min to 10 min. Within this period of time, the driver should be able to safely deliver the breath sample. For safety reasons national regulations may also require that the driver stops the vehicle before providing the breath sample.

If the retest is not conducted or if the retest results in a measured breath alcohol concentration above the limit value, then according to national regulations, a visual and/or audio warning may be provided.

However, if the breath sample is not successful, the motor will not be stopped and the proper operation of the vehicle will not be impaired. Instead, the alcohol interlock data log will record or otherwise indicate that a breath sample has not been provided or that the alcohol concentration measured was above the limit value. This allows the data to be subsequently analysed and such incidents to be detected. Additionally, the alcohol interlock may be configured to block from starting after switching off the ignition (a lockout).

10.6 Change driver function

When a vehicle is used by several drivers the alcohol interlock should have a change driver function. Following the change of drivers, for example in a public transport bus, the new driver should deliver a breath test before starting the vehicle, even if the restart function is active. In this case the alcohol interlock could be manually activated to request a new breath test by, for example, pressing a button.

For this application working routines need to be defined and included in the company policy.

10.7 Effects of mouth alcohol and environmental contamination

If alcohol from a recent consumption of alcoholic food, drink, mouth spray or medicines is present in the mouth and throat at the time that a breath sample is being delivered, then an elevated alcohol concentration may be measured and the alcohol interlock may block the starting of the vehicle motor. The elevated alcohol concentration may not originate from deep lung air.

Therefore, drivers are advised not to consume anything within at least 10 min prior to the delivery of a breath test. Within that time mouth alcohol will disappear (see Figure A.1).

If the air in the passenger compartment of the vehicle is contaminated with alcohol from liquid, aerosol, hand washing solutions or the use of windscreen washer fluid immediately prior to the delivery of a breath sample, then an elevated alcohol concentration may also be measured and the alcohol interlock may block the starting of the vehicle motor.

In the event of suspected environmental contamination, the driver is encouraged to open the windows of the vehicle to flush the vehicle compartment prior to conducting a breath test.

Because of the same reasons a cleaning of the mouthpiece by using alcohol containing liquids is not recommended.

Following a retest resulting in an alcohol concentration above the limit value, it is recommended that the driver requires an additional test (if possible) after 5 min to 10 min in order to check whether the measured value resulted from mouth alcohol or environmental contamination.

An administration or employer evaluating the data records of an alcohol interlock should be aware of these possibilities for elevated alcohol concentrations and may request additional information from the driver for reasons of high alcohol concentrations. The driver should be well trained accordingly and should be held responsible for the records in the data memory and for additional information within the recorded data.

10.8 Interfering substances

A person delivering a breath sample may also exhale substances other than alcohol which may interfere with the measurement result of the alcohol interlock.

Alcohol interlocks that comply with the European Standards EN 50436-1 or EN 50436-2 will not respond above a relevant influence to hydrocarbons or substances such as acetone that may be present in the breath from endogenous production in the body. Such production may occur, for example, in the case of specific diseases. Likewise, these alcohol interlocks will not react with medicines or psychoactive substances other than those which contain alcohol.

Some medicines may contain a high concentration of alcohol. When ingested, they may cause elevated breath alcohol concentrations because, as with the consumption of alcoholic drinks, the alcoholic medicine will raise the alcohol content in the body. For details the instructions of the medicine should be consulted.

11 Maintenance

11.1 Training

Maintenance training should be made available for those charged with instrument maintenance. It should include details of how to perform calibration and how to download the data.

11.2 Periodic inspection, functional tests and calibration

Routine maintenance of the alcohol interlock is an important factor affecting the reliability of the instruments. Optimum performance and reliable operation will only be achieved through a defined maintenance programme.

The alcohol interlock should be inspected, tested and calibrated periodically by a qualified person. This should be done in accordance with the service and maintenance instructions of the manufacturer. The intervals may be specified by the manufacturer or by regulations of the responsible authorities. If different intervals are defined then the shortest time period should be observed.

Instructions for checking the instrument and testing its function should be obtained from the manufacturer. The manufacturer's instructions should be followed.

If disposables or replacement parts (i.e. mouthpieces or cables) are required, these parts should meet the specifications and tolerances of the original items. It is highly recommended to use parts delivered by the alcohol interlock manufacturer to maintain the approval specifications.

Maintenance procedures should be undertaken only by qualified personnel trained in the operation, maintenance and repair of alcohol interlocks.

The results of the inspection, functional tests and calibration should be documented.

NOTE Additional national requirements may apply.

11.3 Instructions for service

According to EN 50643-1 and EN 50436-2 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.

12 Removal

An alcohol interlock should be removed according to the legislation or regulations by a qualified person. It should be ensured that the vehicle remains in a safe condition after removal.

At the end of its service life, the alcohol interlock should be disposed of in accordance with national waste disposal regulations. For disposal of the instrument, a local environmental agency, a suitable disposal contractor or the manufacturer may be contacted.

13 Conclusion

In addition to being a measure for compliance monitoring in drink-driving offender programmes the alcohol interlock has moved into the area of general prevention to enhance the safety of transport of goods and of passengers in buses and taxis. It may also enter into the field of public health, as it may be utilized to reduce the burden of alcohol problems within the transport system.

From this expanded use of alcohol interlocks employers, employees and society may benefit. With the correct use of its data memory, combined with the human resources policy of the company/ organization it may also be possible to make an early engagement with persons having an alcohol problem.

The purpose of this European Standard is to give practical guidance for selection, installation, use and maintenance of alcohol interlocks. This document points towards a set of options that may be used as guidelines for the use of alcohol interlocks. Alcohol interlocks may become an element of a company's/organisation's alcohol and general quality assurance policies, which are based on concern for social, economic, medical and safety conditions in the field of work.

Annex A

(informative)

Questions and answers

This annex summarizes typical questions often asked concerning alcohol interlocks and gives respective answers.

A.1 What is an alcohol interlock?

It is a breath-alcohol measuring instrument with a vehicle immobiliser. It normally consists of a handset and a control unit. It requires from the driver a breath sample with an alcohol concentration under a certain limit before a vehicle can be started. The main purpose of alcohol interlocks is to prevent persons with alcohol concentrations exceeding a set limit value from driving a vehicle (see Clause 1). An alcohol interlock may also be used to restrict the access to machinery or certain restricted areas (see Clause 5).

A.2 Where are alcohol interlocks used?

There are several areas in which alcohol interlocks may be used: in a vehicle as a general preventive measure for traffic safety, in vehicles as ordered by a court or an administrative authority as part of a drink-driving offender programme or in alcohol rehabilitation and treatment programmes, for certain kinds of transport (e.g. dangerous goods or public transport), or as a control measure for the access to machinery or certain restricted areas (see Clause 4 and Clause 5).

A.3 Is it difficult to install an alcohol interlock?

No, in most vehicles (including hybrid cars) it is possible for a qualified installer to install an alcohol interlock.

A.4 Is it possible to install an alcohol interlock in motorcycles?

Alcohol interlocks have also been installed in motorcycles (see 4.2).

A.5 Can an alcohol interlock be circumvented?

Alcohol interlocks that comply with the European Standards EN 50436-1 or EN 50436-2 are required to have specific anti-circumvention features. For example, the use of balloons, air pumps or filters is detected by the alcohol interlock which prevents starting the motor (see 8.5).

A.6 Can a sober person blow into the alcohol interlock to allow an impaired person to drive?

In principle another sober person can deliver a breath sample for an impaired driver. However, a sober passenger will normally not be willing to deliver the breath test for an impaired driver because he or she endangers himself or herself. Furthermore, it may be illegal or contrary to specific regulations or procedures.

Should a second person perform the test on behalf of the driver then, unless that person travels on the vehicle for the duration of the journey, the driver would not be able to successfully perform a required re-test. This fact would occur in the data memory of the alcohol interlock.

Additionally to the above, the required volume of the breath sample is greater than most children would be able to provide (see 8.4.2). This fact would prevent a child from being coerced into providing the sample.

Under certain circumstances, e.g. drink-driving-offender programmes, the registered user is responsible for all samples delivered. Persuading a second person to perform the test may be an illegal act.

A.7 Do alcohol interlocks detect tampering or attempts to bypass them?

Yes, and all such events may be recorded in the data memory or may be detected by visual inspection (see 8.5 and 8.6).

A.8 Can any person use a car with an alcohol interlock?

Yes, as long as the person delivers a breath sample with an alcohol concentration below the limit value and with the required volume of the breath sample.

For persons with special medical conditions it may be necessary to reduce the required volume of the breath sample (see 8.4.2). Only very few persons are not able to deliver this reduced volume.

A.9 Is it necessary to deliver a breath test after a short stop?

No, it is possible to start the motor again for several minutes after the ignition has been switched off without the delivery of a breath test (see 8.4.2).

A.10 What is a retest?

After an initial breath test that allows the vehicle to be started, additional tests may be required at random intervals during the course of the journey (see 10.5). A retest is not always used in general preventive use and quality assurance.

A.11 Is it dangerous to deliver a retest during driving?

Delivering a retest may distract the driver. Therefore, it is recommended to find a safe place to stop the vehicle in order to deliver the retest. Usually the driver is required to provide the breath test within 5 min to 10 min of the request (see 10.5).

A.12 Should an alcohol interlock be calibrated regularly?

Yes, an alcohol interlock should be checked regularly and, if necessary, be calibrated according the instructions of the manufacturer. This should be done at least once per year (see 11.2).

A.13 What happens if the alcohol interlock is defective? Can the motor then be started?

As is the case with any technical equipment an alcohol interlock may at some point become defective, however it is unlikely. With a completely defective alcohol interlock the motor cannot be started.

However, some alcohol interlocks offer an override function for emergency situations which is recorded in the data memory (see 10.4). Unfortunately, this function could also offer the possibility of misuse.

A.14 What happens if the alcohol interlock becomes defective while the motor is running?

An alcohol interlock has no influence on a running motor (see 9.1).

A.15 Can a sober person have a positive test result?

If alcohol from a recent consumption of alcoholic food, drink, mouth spray or medicines is present in the mouth and throat at the time that a breath sample is delivered, an elevated alcohol concentration will be measured. This is due to the detection of residual mouth alcohol and would cause the alcohol interlock to block the starting of the vehicle motor. Therefore, drivers are advised not to consume any food, drink or medicines for a period of 10 min before delivering a breath sample (see 10.7).

If the air in the passenger compartment of the vehicle is contaminated with alcohol from liquids, aerosols, hand washing solutions/gels or windscreen washer fluids and this air is inhaled immediately prior to the delivery of a breath sample, then an elevated alcohol concentration may be measured (see 10.7).

Alcohol interlocks that comply with the relevant European Standards will not respond to possible interfering substances such as acetone that may be present in the breath in case of specific diseases (see 10.8).

A.16 How long does it take until residual mouth alcohol disappears?

Residual mouth alcohol is completely eliminated within approximately 5 min to 10 min as the remaining alcohol in the mouth is taken up by the saliva or absorbed into the body (an example for alcohol containing mouth spray is shown in Figure A.1; see also 10.7).

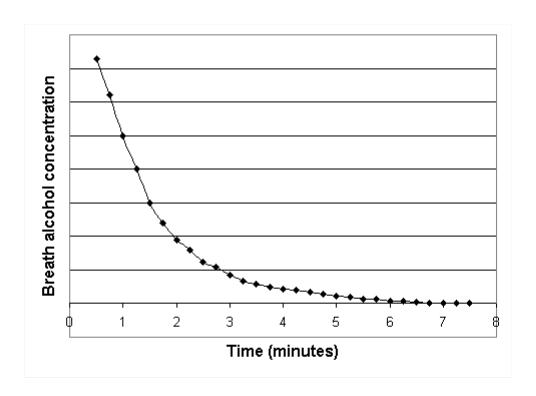


Figure A.1 — Decrease of residual mouth alcohol concentration over time due to a mouth spray containing alcohol¹

A.17 What happens if a person has taken medicines containing alcohol?

Alcohol is alcohol whether it comes from beer, wine or medicine. If the alcohol concentration in the body is too high, then the alcohol interlock will block the starting of the motor, as it is unable to differentiate between recreational and medical alcohol (see 10.7).

A.18 How effective are alcohol interlocks in preventing (repeat) drink-driving?

Evaluations of offender programmes in North America and Sweden showed that the re-offence rates of offenders with an alcohol interlock were 60 % to 95 % lower than those of offenders with suspended or revoked licenses (see Bibliography). Also driving without a licence after a drink-driving offence is reduced by the imposition of the use of an alcohol interlock instead of a licence suspension.

A.19 Can alcohol-dependent drivers benefit from alcohol interlocks?

Experiences, for example in Sweden, show that alcohol interlocks -when used by alcohol-dependent drivers - can help with achieving better control of alcohol consumption.

A.20 Are there further beneficial effects apart from road safety?

As was experienced in Sweden, the number of hospitalisations and absences from work may be decreased by the use of alcohol interlocks (see Bibliography, Clause 1).

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¹ A.Slemeyer, in: Blutalkohol, Vol. 37, p. 85, 2000

Annex B

(informative)

Items to be considered when selecting an alcohol interlock

This annex summarizes typical items for consideration.

- Approvals and test certificates (see 8.1)
- Alcohol measurement technique (see 8.2)
- Costs of alcohol interlock, mouthpieces, support, maintenance, data management, services (see 8.3)
- Ease of delivery of a valid breath sample and general user friendliness of the alcohol interlock (see Clause 10)
- User guidance and displayed language (see 8.3)
- Operational temperature range (see 8.3, 10.2 d) and 10.3)
- Warm-up time (see 10.2 d))
- Supply voltage: 12 V or 24 V (see 9.2 f))
- Data memory: size, content and data management (see 8.3 and 8.6)
- Retest function: option and time variables (see 8.4.2 and 10.5)
- Measures against circumvention, manipulation and tampering (see 8.5)
- Sensitivity to interfering substances (see 10.8)
- Parameter settings (see 8.4)
- Alcohol threshold level and unit of measurement [e.g. mg/l or ‰] (see 10.2 d))
- Start period (see 8.4.2)
- Restart period (see 8.4.2)
- Change driver function (see 10.6)
- Retest function (see 10.5)
- Override function for emergency or technical services (see 10.4)
- Availability of qualified service workshops and customer support (see 8.3)
- Ease of installation (see Clause 9)
- Regular maintenance interval (see 9.2 h) and 11.2)
- Manufacturer's warranty period (see 8.3)

Annex C (informative)

Description of basic parameter settings

This annex summarizes typical parameter settings of alcohol interlocks.

NOTE National regulations may require specific parameter settings.

Table C.1 — Summary of typical parameter settings of alcohol interlocks

No.	Parameter	Description	Example (for drink-driving- offender programmes)	Example (for general preventive use)
1	Language	The language(s) that all messages are displayed on the handset (see 8.3).	English	English
2	Minimum sample volume	The minimum volume of exhaled air for an accepted breath sample (see 8.4.2).	1 200 ml	1 000 ml
3	Alcohol concentration unit	The units of the alcohol measurement result that are recorded in the memory (see 8.4.1).	mg/l	mg/l
4	Initial test BrAC limit	The initial test limit is the BrAC at which the alcohol interlock is set to disable the starting of the vehicle motor. A breath test result below this limit allows the vehicle motor to be started. A breath test result equal to or above this limit inhibits the starting of the vehicle motor (see 8.4.1).	0,10 mg/l (depending on national regulations)	0,10 mg/l (depending on national regulations)
5	Initial test temporary lockout	Temporary lockout is a condition in which the alcohol interlock will not accept a breath test and thereby prevents the user from starting the vehicle motor for a predetermined period of time. The initial test temporary lockout period is activated once the maximum number of consecutively failed initial tests has been reached.	Maximum number of failed initial tests: 1 Lockout period: 5 min No violation	Maximum number of failed initial tests: 1 Lockout period: 5 min No violation
6	Restart period	The period after the ignition is switched off during which the vehicle motor may be started without the presentation of another breath sample. This restart period is intended to ensure the ability to restart the vehicle after a stall situation (see 8.4.2 and 10.6).	5 min	30 min

No.	Parameter	Description	Example (for drink-driving- offender programmes)	Example (for general preventive use)
7	Event data	Record of occurrences of device operation and vehicle activity (see 8.6).	YES, recording of event data	YES, recording of event data
8	Memory overwrite	Enables the collection of event data when data memory capacity has reached its limit. When ON the collection of events is continued above the data memory absolute size by writing over earlier data on a "first in first out" basis. When OFF no further data are collected once the data memory has reached its capacity. The service interval in days may be reduced when the data memory has reached for example 90 % of its capacity.	OFF, no data memory overwrite Reduced service interval: 5 d	ON
9	Calibration interval	The period in days during which the alcohol interlock can operate before the handset shall be calibrated (see 11.2).	90 d	360 d
10	Service interval	The period in days during which the alcohol interlock can operate before the device shall be serviced, for example performing a download of data.	30 d	360 d
11	Grace period after normal service interval	The number of days allowed after the service interval has expired in which the device will still operate and hence, enable access to the vehicle. This allows an additional "grace" time for the drivers to be able to return the device to the service provider if they are unable to return within the allowed service period.	7 d	14 d
12	Violation recall interval	The period in days to which the service period is reset to an earlier date as a result of one or more violations being committed by the driver. There is normally no grace period after a violation recall.	7 d	No violation recall
13	Device lockout	Prevents the starting of the vehicle motor after the service interval and the grace period have expired by not allowing the driver to present an initial breath test until the alcohol interlock has been serviced.	ON	ON

No.	Parameter	Description	Example (for drink-driving- offender programmes)	Example (for general preventive use)
14	Retest	Subsequent breath test(s) that shall be conducted according to the pre-set conditions of the alcohol interlock, either on the basis of a fixed or random time duration from the previous test and may be completed while the vehicle is in operation (see 10.5).	Retests requested	No retests
15	Retest BrAC limit	The allowed BrAC limit for all retests (first retest and subsequent retests). With a breath test result below this limit the retest is passed. With a breath test result equal to or above this limit, the retest is failed.	0,10 mg/l (depending on national regulations)	No retests
16	Retest random time	A random time period after the previous test in which a retest will be	First retest within 5 to 10 min	No retests
		requested.	Following retests within 15 to 45 min	
17	Retest cycle time	The period of time in which a breath sample shall be presented after a retest request.	15 min	No retests
18	Maximum retest refusals	The maximum number of retests not presented permitted within a service period before the device is put into violation recall mode.	1	No retests
19	Maximum failed retests	The maximum number of failed retests permitted within a service period before the device is put into violation recall mode.	1	No retests
20	Maximum number of bypasses	The maximum number of bypasses permitted within a service period before the device is put into violation reset mode (see 8.5).	1	No violations recall
21	Control unit power loss time limit	Time interval within which the disconnection of the control unit of the alcohol interlock from the power supply is allowed.	30 min	OFF
22	Maximum number of control unit power losses	The maximum number of control unit power losses permitted within a service period before the device is put into violation recall mode.	1	OFF
23	Vehicle audible warning device	The vehicles audible warning device may be used as an additional signalling method to warn the driver or other drivers. This is generally used in situations where violations have occurred.	Depending on national regulations	No activation

No.	Parameter	Description	Example (for drink-driving- offender programmes)	Example (for general preventive use)
24	Vehicle lights / Vehicle hazard warning signal	The vehicles lights / vehicle hazard warning signal may be used as an additional signalling method to warn to the driver or other drivers. This is generally used in situations where violations have occurred.	Depending on national regulations	No activation
25	Override function	Allows the over-ride of the alcohol interlock (access to vehicle starts without a breath test), for example by using a unique code that is entered in the handset menu (see 10.4).	Yes, for 24 h Multiple times within a service period possible	Yes, for 24 h Multiple times within a service period possible

Annex D

(informative)

Basic steps of a drink-driving-offender programme

This annex summarizes typical steps of a drink-driving-offender programme and respective questions to be considered and answered when designing such a programme.

Table D.1 — Summary of typical steps of drink-driving-offender programme

No.	Step	To be considered
1	Legislation	Designation of an agency with
		 clear authority and responsibility for management of the programme, including establishing programme rules and regulations, including administrative procedures, having the necessary resources.
		Conditions for the offender programme entry and duration should be defined very clear, for example:
		 - alcohol concentration range; - first or multiple offenders (recommended: all offenders); - novice drivers; - professional drivers; - duration of programme (e.g. one or two years).
		Voluntary or mandatory programme.
		Alternatives instead of participation:
		 longer driving licence suspension; no reinstatement of driving licence without participation; elimination of options that allow offenders to avoid participation.
		Responsibility for the programme:
		the driving licence administration (recommended);the courts (not recommended from experience).
		Collection of event data in the data memory of the alcohol interlock:
		data privacy and security laws;clearly established data ownership.
		See also: - NHTSA Model Guideline - Legislation - NHTSA Model Guideline - Program Administration - NHTSA Model Guideline - Ignition Interlock Data
2	Education	Information about the programme to
		 driver licensing agencies, criminal justice community, including law enforcement, prosecutors, judiciary, probation and those involved in treatment.

No.	Step	To be considered
		Education should include:
		 introduction to alcohol interlocks, alcohol interlock programme including administrative rules, legislation, benefits of alcohol interlocks, driver licensing, event data, reporting and monitoring, consequences for failure to participate in the programme, violations of the programme.
		See also: NHTSA Model Guideline - Education
3	Driving under the influence of alcohol	
4	Control and alcohol test by police: measurement above national legal alcohol limit	
5	Driving license suspension	First information to the offender by police on the road about alcohol interlock programme (e.g. leaflet).
6	Information by police to local administration	In parallel a procedure as court case?
7	Information to the offender about possibility to apply for participation in an alcohol interlock programme	Responsible for the decision if and when a driver is eligible for participation in an alcohol interlock program: - court; - judge; - police; or - driver licensing authority.
		If a convicted drunk driver is allowed to install an alcohol interlock on his/her car very soon after the conviction, the chance that he/she will start to drive without a license is significantly reduced.
		Participation rate is higher when early installation is possible.
		Conditions for programme entry and duration should be defined very clear, for example:
		voluntary or mandatory;first conviction: 1 year with alcohol interlock;second conviction: 2 years with alcohol interlock.
8	Contact by offender to local alcohol interlock provider	The alcohol interlock service provider shall be certified by the authority as an authorized service provider. To be defined, for example:
		 certifying authority; conditions for certification; quality assurance; number, density and location of service stations; qualification and training of service technicians; site inspections; information for the offender about the certified service providers.

No.	Step	To be considered
		Driver might want to inform himself of for example distance to the next alcohol interlock service station and prices, before coming to the decision to apply for the interlock programme.
		See also: NHTSA Model Guideline - Vendors and Service Providers
9	Application of the	To be considered:
	offender for the alcohol interlock programme	 handling authority; conditions; contract between authority and offender about rules, data handling, etc.; for professional drivers: contract between employer and offender; participation fee of the offender to the authority.
10	Start of treatment programme in	A treatment programme in parallel is highly recommended. This will reduce the recidivism rate considerably.
	parallel to achieve long term change in	To be considered:
	drinking behaviour	 design of the treatment programme, responsibility for the treatment programme, operator of the treatment programme, certification of the treatment programme operator, costs of the treatment programme.
11	Approval and issue of "Alcohol interlock restricted" driving license	The code 69 according to Commission Directive (EU) 2015/653 defines the restriction and shall be marked in European driving licences from the beginning of 2017.
		The driver is now allowed to drive only with an alcohol interlock equipped car.
		Consequences for non-compliance shall be known by all convicted offenders.
		Sanctions for driving a car not equipped with an alcohol interlock shall be defined and should be strong, to support the alcohol interlock programme.
12	Contract between offender and	Contract partner is the alcohol interlock service provider or the local alcohol interlock service station.
	alcohol interlock provider	Renting or buying may be offered.
	,	All costs are to be borne by the offender.
13	Installation of alcohol interlock into the offenders car by local alcohol interlock service station	Alcohol interlocks that are allowed to be installed shall fulfil the European Standard EN 50436–1 and shall be type approved.
		Type approval by whom?
		Special sticker on the instrument (for example "Approved for the national interlock programme").
		The parameter settings (defining the behaviour) of the alcohol interlock shall be defined, for example the alcohol concentration limit.
		The manufacturer of the alcohol interlocks shall be certified by the authority. To be defined, for example:
		certifying authority,conditions for certification.

No.	Step	To be considered
		To ensure the quality of the local service station is a task of the alcohol interlock service provider.
		Training requirements for the local technicians shall be defined.
		To avoid manipulations the driver should not get detailed knowledge how the alcohol interlock is connected to the specific electrics of his/her vehicle.
		It shall be considered by whom the invoicing and payment will be handled, for example by the local service station.
		Training of the alcohol interlock user about
		alcohol interlock programme,use of the alcohol interlock,programme violations and sanctions,service requirements.
		Is a final check of the installation for example by the official car inspection necessary?
		See also: NHTSA Model Guideline - Education NHTSA Model Guideline - Program Administration NHTSA Model Guideline - Ignition Interlock Devices
14	After a fixed period a service at a local service station	Period shall be defined, e.g. every 2 month.
		Operations:
		 inspection of installation; checking for tampering attempts; download of data from the alcohol interlock; calibration/adjustment of alcohol interlock.
		It shall be considered by whom the invoicing and payment will be handled, for example by the local service station.
		What should be considered a not allowed event and force the offender to the service earlier than the regular service to download the data?
15	Transfer of data to a central database, accessible for local	Database will automatically check all data coming in and send reports to the persons responsible for evaluation of the data.
	administration	To be considered:
		 installer of the database, for example alcohol interlock service provider or authority; operator of the database; data privacy, data security, data encryption (see 8.6).
		Responsible persons to be defined:
		police;driving licence authority; ororganization of treatment programme;locally or centrally.
		Reports:
		- for which events (installation, not allowed events, missed service,); - receiver of the reports.

No.	Step	To be considered
		A login by the local administration with user name and password (on the internet) should be possible to access all data of the assigned offenders and to search for specific events.
16	Assessment of event data and	Review of the reports received from database and, if needed, login to database and look into the details.
	reports	Action in case of non-compliance:
		by local administration;by police; orby treatment organization.
		Conditions for non-compliance shall be defined:
		type and number of not allowed events;missed services;using another car without alcohol interlock;failure to participate in treatment sessions.
		Consequences of non-compliance shall be defined:
		 no driving licence for a certain period; more frequent service centre visits; extension of time required to drive a vehicle with an alcohol interlock.
		See also: NHTSA Model Guideline - Program Administration NHTSA Model Guideline - Ignition Interlock Data
17	End of participation in the alcohol	Conditions for leaving the alcohol interlock programme shall be defined:
	interlock programme	- duration fixed or flexible; - participation in treatment programme.
		Offenders should only be released from the alcohol interlock programme when they can demonstrate they no longer need an alcohol interlock to prevent driving after drinking.
		For example, several months of data with no BrAC above the limit value in the event record of the alcohol interlock.
		Issue of an unrestricted driving license.
		It is recommended that the alcohol interlock remains in the car after completion of the alcohol interlock programme.
		The alcohol interlock could be offered to the offender for purchase and stay in the car (with adjusted parameter settings, for example no data recording).
		See also: NHTSA Model Guideline - Program Administration

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