SAF'IR EVOLUTION

EVIDENTIAL ANALYSER

Instruction Manual

SAF'IR EVOLUTION

PORTABLE ETHYLOMETRE CERTIFIED

ACCORDING TO THE **OIML R 126**

National approval
This device conforms to the model specifications of DOT

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OIML R126/1998-ES1-09.02
Compliance certification issued by:
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SAF'IR EVOLUTION is a portable ethylometre certified according to the International Recommendation R.126 of the International Organization of Legal Metrology concerning ethylometres, 1998 Edition.

SAF'IR EVOLUTION measures the concentration of ethanol in exhaled breath. Numerous studies carried out worldwide have shown that the ratio of blood alcohol concentration (BAC) to exhaled alveolar breath alcohol concentration (BrAC) is a constant.

SAF'IR EVOLUTION is a self-contained and portable instrument that may be used either indoors or outdoors. The results of the tests performed by SAF'IR EVOLUTION present evidential accuracy and the printed confirmation may be used in court, according to the local regulations.

Terms used in this manual:

BrAC = breath alcohol concentration

BAC = blood alcohol concentration

Legal limit = set according to each country's local regulations

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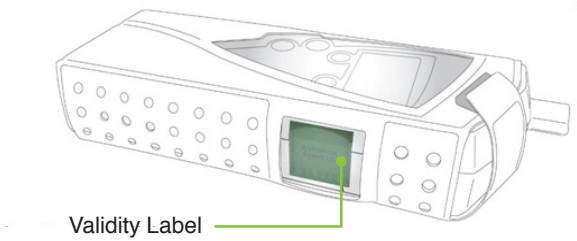
VALIDITY LABEL

The validity label confirms that the initial or periodic verification has been performed by an authorized laboratory and notes the verification expiry date. The label is placed on the right side of the instrument and is to be removed only at an authorized laboratory. No measurement should be carried out if the validity period has expired.



SEAL

The seal affixed to the back of the instrument warrants the proper working order of the instrument and may be removed only by an authorized agency. If the seal is missing or damaged, no measurement should be carried out.

SAFETY AND PRECAUTIONS

Take the following precautions to ensure smooth and uninterrupted use of the SAF'IR EVOLUTION:

- Use the product for its intended purpose only
- Do not open SAF'IR EVOLUTION's case or the printer (when provided). Doing so will void the warranty and may also damage the internal components
- Prior to taking a test, it is highly recommended to follow the instructions displayed on the front label of the instrument

  NOTE: If the subject undergoing the test has ingested alcohol shortly before the test, there may be some trace of alcohol in the upper respiratory tract, causing the results to be misleading. SAF'IR EVOLUTION is designed to detect mouth alcohol and displays a cycle error message in such a case.

- Mouthpieces must be used for the tests. The mouthpieces provided are individually packed in sealed bags. A new mouthpiece has to be used for each test
- It is also advisable to use SAF'IR EVOLUTION with the provided pouch

USING THE SAF'IR EVOLUTION

FIRST USE

Ensure the battery is fully charged before using the instrument for the first time.

Use the AC adapter provided to recharge the battery, as shown below:

POWER UP SEQUENCE

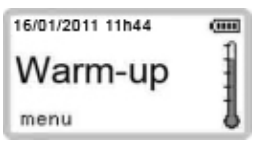
Press the start button

The display illuminates.

The application initializes.

The application initializes.

The application initializes.



The measuring chamber warms up.

The operational check cycle is completed.

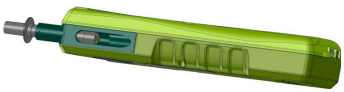
The internal check is confirmed.

Ready to initiate a test sequence.

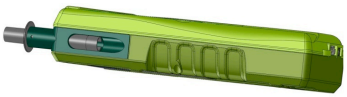
INSERTING THE MOUTHPIECE

When the instrument is ready for the test, remove the mouthpiece from the bag and insert it as shown below:

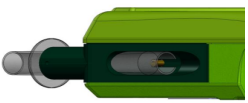
Insert a mouthpiece into the sampling port on the upper left part of the instrument.



Slide the mouthpiece into place and turn it slightly if necessary.



Push the mouthpiece in full lock.



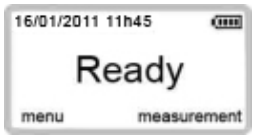
Do a visual check if necessary: the mouthpiece should be fitting the notch.

Each test requires the use of a new mouthpiece. If the subject has to be retested, change the mouthpiece for each test.

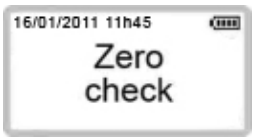
1 MOUTHPIECE = 1 TEST

TEST

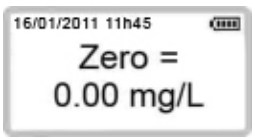
To begin a test cycle, the display must indicate **READY**.



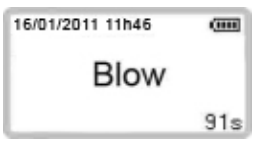
To begin the test, press the start button to select **MEASUREMENT**.



The sampling pump activates to clean the measuring chamber.



The base line is measured.



The instrument is ready for a breath test for the time indicated by the countdown timer before returning to **READY**.

Blow into the mouthpiece with sufficient flow to activate the beep tone and continuously until the tone ends.

If exhalation is interrupted or if the volume is insufficient, the sampling is aborted. To restart the test, press the start button to select **VALIDATE**.

DISPLAY RESULTS

After each measurement, SAF'IR EVOLUTION checks internal components and the validity of the measurement cycle.

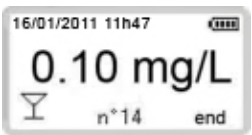
If the breath sample is validated, proper functioning of the instrument is verified.

The test is valid.

Once the validity of the breath sample has been checked, SAF'IR EVOLUTION displays the results. There are two possible outcomes:

Outcome No. 1:

The result is negative: The BrAC value measured is below the legal limit. The test result, the test number and the pictogram of an empty glass are displayed.



Negative result

Press the start button to select **END**.

THIS IS THE END OF A TEST CYCLE.

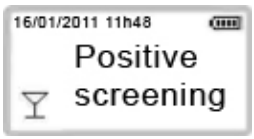
The instrument displays **READY** and the previous measurement alternately.

To begin a new test cycle after a negative result, press the start button to select **MEASUREMENT**

.

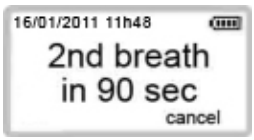
Outcome No. 2:

The result is positive: The BrAC value measured is above the legal limit. The positive screening message and a pictogram of a full glass are displayed.



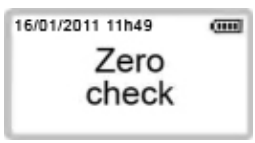
Positive result

When a first breath test is positive, the measurement cycle requests a second test.

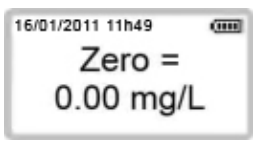


Wait time for second test.

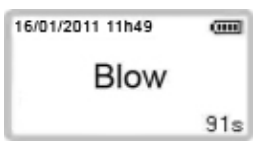
NOTE: To interrupt the test cycle, press the start button to select CANCEL



The sampling pump activates to clean the measuring chamber.



The base line is measured.



The instrument is ready for a breath test for the period of time indicated by the countdown timer before returning to **READY**.

Blow into the mouthpiece with sufficient flow to activate the beep tone and continuously until the tone ends.

If exhalation is interrupted or if the volume is insufficient, the sampling is aborted. To restart the test, press the start button to select **VALIDATE**.

If the breath sample is validated, proper functioning of the instrument is verified.

The test is valid.

Once the validity of the second breath test sample has been checked, SAF'IR EVOLUTION compares the 1st and 2nd tests and displays the final result. There are two possible outcomes:

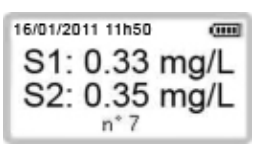
1. The test cycle is not valid:

The two results are not within the range of tolerance. The test cycle must be repeated.

NOTE: The range of tolerance is set according to local regulations.

Press the start button to select **MEASUREMENT**.

2. The test cycle is valid:



The results are within the range of tolerance.

The results are displayed and recorded.

Press the start button to select **END**.

THIS IS THE END OF A TEST CYCLE.

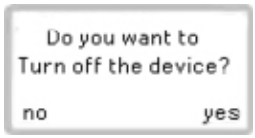
The instrument displays **READY** and the previous measurement alternately.

To begin a new test cycle after a positive result, press the start button to select **MEASUREMENT**.

TURNING OFF

Press the green button to select **MENU**.

Press the start button to select **OK**.



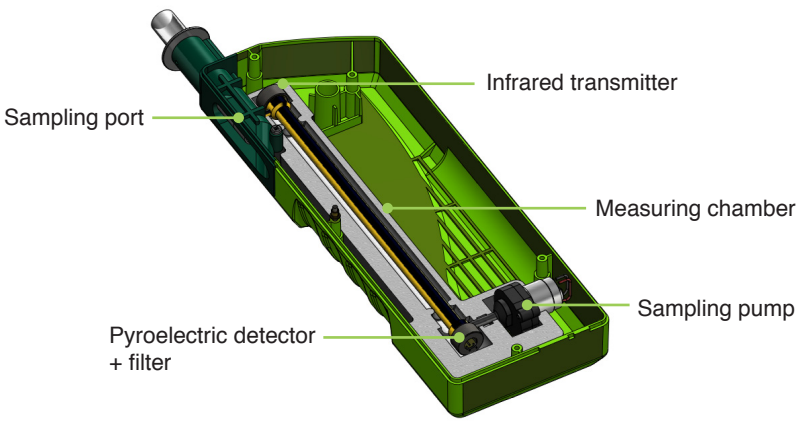
Press the start button to select **YES**.

MEASUREMENT PRINCIPLE

SAF'IR EVOLUTION uses infrared technology to measure the absorption of a monochromatic light by the ethanol molecule. The absorption value is directly proportional to the alcohol concentration, which is used to calculate the BrAC in the breath sample provided.

As soon as the exhalation reaches the minimum flow required, the sampling pump starts. Air exhaled through the mouthpiece is then sampled in the measuring system, which consists of:

- Infrared transmitter
- Pyroelectric detector
- Infrared filter



MONITORING EXHALATION FLOW

A flow pressure sensor, connected to the sampling port, monitors exhaled air pressure. When the flow reaches 7.5 hPa, a tone is heard. The tone stops when the required volume of breath is delivered.

STANDBY MODE

When the instrument is switched off and connected to the main supply, the standby mode is activated.

MENU OPTIONS

RECALLING A TEST RESULT

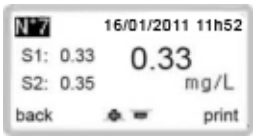
SAF'IR EVOLUTION stores the results of the tests it performs, which may be recalled at any time.

Press the green button ● to select **MENU**.

Scroll down the menu options using the **DOWN** button ▼ and select **HISTORY**.

Press the start button ⏻ to select **OK**.

The result of the most recent test cycle completed is displayed.



Use the **UP** ▲ or **DOWN** ▼ buttons to scroll through the measurement history.

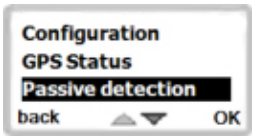
Press the green button ● to select **BACK** and return to the previous screen.

To return to **READY** from the measurement history, press the green button ● twice.

PASSIVE DETECTION

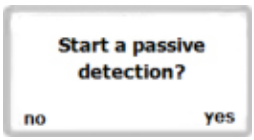
For passive testing, simply hold the SAF'IR EVOLUTION and point the opening on the left side of the sampling port towards the mouth of the subject to be tested (no mouthpiece required). This feature may also be used to test beverages or the ambient environment that potentially contains alcohol.

Press the green button to select **MENU**.

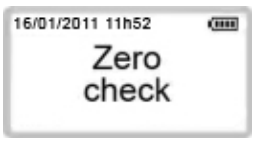


Scroll down the menu options using the **DOWN** button and select **PASSIVE DETECTION.**

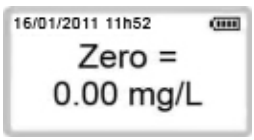
Press the start button to select **OK**.



Press the start button to select **YES**.



The sampling pump activates to clean the measuring chamber.



The base line is measured.

At this point, place the SAF'IR EVOLUTION with the sampling port opening towards the subject to be tested.

Press the start button to select **START**.

Check the result on the display. Press the start button to select **END** and return to **READY**.

MENU CONFIGURATION

Some parameters, which may be accessed via Configuration menu, may be adjusted by the operator.

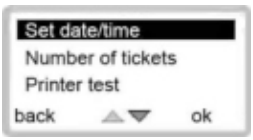
Press the green button ● to select **MENU**.

Scroll down the menu options using the **DOWN** button ▼ and select **CONFIGURATION**.

Press the start button ⏻ to select **OK**.

The **CONFIGURATION** menu allows several adjustments:

DATE AND TIME



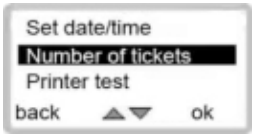
On **SET DATE/TIME**, press the start button ⏻ to select **OK**.

The format used is DD/MM/YYYY for the date and HH/MM for the time.

Use the **UP** or **DOWN** buttons ▲ ▼ to adjust the values accordingly.

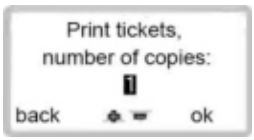
Press the start button ⏻ to save the changes or the green button ● to select BACK and exit without saving.

NUMBER OF TICKETS TO PRINT



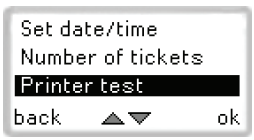
On **NUMBER OF TICKETS**, press the start button to select **OK**.

Use the **UP** or **DOWN** buttons to adjust the values accordingly.

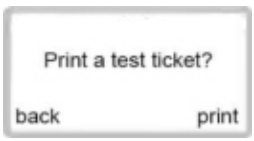


Press the start button to save the changes or the green button to select **BACK** and exit without saving.

PRINTER TEST



On **PRINTER TEST**, press the start button to select **OK**.



Press the start button to print the test ticket or the green button to select **BACK** and exit.

PRINTING THE RESULTS

An optional printer can be purchased to print the BAC results on site. This rechargeable battery operated printer connects to the SAF'IR EVOLUTION using a cable or Bluetooth wireless connection. The printer kit includes:

- Portable printer
- Paper roll
- Power adapter
- Battery pack
- Rubber case

INSTALLING THE PRINTER BATTERY

Before using the printer for the first time:

1. Remove it from the rubber case.
2. Open the battery compartment located in the bottom of the printer.
3. Remove the yellow plastic label from the battery pack/printer.
4. Reinstall the battery and the rubber case.

CHARGING THE PRINTER BATTERY

1. Connect the printer to the power adapter provided.
2. Plug the power adapter to the main supply.

The red LED indicates the battery is being charged. When the battery is fully charged, the LED will turn off.

NOTE: Make sure the yellow plastic label is removed from the battery compartment before charging the battery.

LOADING THE PAPER ROLL

1. Remove the printer from the rubber case and open the printer top cover.
2. Insert the shaft into the new paper roll and place the roll in the paper compartment.
3. Feed enough paper into the slot and close the top cover.

NOTE: Contact the dealer or ACS directly to order paper rolls for the printer.

PRINTER LED STATUS CODE

	Constantly lit	Bluetooth module available
	Flashing	Data transaction via Bluetooth
	Constantly lit	Power on, normal status
	Flashing	Data transaction via USB
	Constantly lit	Charging
	Flashing intermittently with blue LED	Error (see Error codes below)
	Off	Battery fully charged

PRINTER LED ERROR CODE

INDICATOR	DESCRIPTION	ACTION
	Out of Paper	Replace paper roll
	Top Cover Open	Close top cover
	Transmission error	Check the transmission status
	Print head overheated	Wait until the print head cools down
	Battery too low	Recharge the battery

FUNCTIONING

OPERATING ICONS

Indicates the battery level or that the charge is in process. When the level is too low, the icon flashes.

Indicates that SAF'IR EVOLUTION has just been connected to the main. The battery is then charging.

Indicates that the battery is fully charged.

Indicates that SAF'IR EVOLUTION is connected to the data transfer port.

Indicates that the measuring chamber is warming up.

Indicates that SAF'IR EVOLUTION is in standby mode.

Indicates that SAF'IR EVOLUTION is in laboratory mode.

Indicates that the breath alcohol concentration measured is equal or above the legal limit.

Indicates that the breath alcohol concentration measured is below the legal limit.

The UP button is used to scroll up the list.

The DOWN button is used to scroll down the list.

Indicates that the UP button is inactive.

Indicates that the DOWN button is inactive.

Indicates that the UP button allows increments.

Indicates that the DOWN button allows decrement.

ACCESSORIES

SAF'IR EVOLUTION is delivered with the following accessories:

- Carry case
- Handstrap
- AC adapter
- Protective pouch
- Quick guide for operation
- Mouthpieces
- Cigarrete lighter adapter
- Portable printer (optional) – features cable or Bluetooth wireless connection

REPLACEMENT PARTS

Contact the dealer or ACS directly to order replacement parts. Use the part number provided below:

- SAF'IR mouthpieces - bags with 25 units
  ACS part number: *95-000255*
- Printer paper roll
  ACS part number: *59-200032*

TECHNICAL SPECIFICATIONS

STORAGE CONDITIONS

SAF'IR EVOLUTION must be stored between -25 °C and +70 °C, preferably in a dry place.

OPERATING TEMPERATURE

SAF'IR EVOLUTION is designed to operate between 0 °C and 40 °C.

PERIODIC INSPECTIONS

Verification and calibration inspections take place annually and must be done by an accredited laboratory only.

BATTERY LIFE

SAF'IR EVOLUTION is equipped with a rechargeable nickel metal hydride battery pack (NiMH), which may only be replaced by an authorized repair facility. Depending on the ambient temperature, approximately 300 tests can be performed before recharging the battery.

WARM-UP TIME

The warm-up time of the measuring chamber is from 1 to 5 minutes, depending on the ambient temperature.

SIZE AND WEIGHT

Weight: 600 grams

Length x Height x Width: 85 mm x 260 mm x 46 mm

MEASURING RANGE

SAF'IR EVOLUTION is designed to measure concentrations between 0.00 mg/L and 2.00 mg/L of alcohol in exhaled air, using a 0.01 mg/L scale.

RESULTS

Based on the local regulations, the SAF'IR EVOLUTION is set to indicate whether the BrAC value is considered positive (above the legal limit) or negative (no alcohol detected or below the legal limit).

The measurement unit is set at the factory and available in the following formats:

IN BREATH	IN BLOOD
µg/dL	mg/dL
µg/L	g/dL
mg/L	g/L

DATE AND TIME FORMAT

The date and time format is set at the factory and selected according to the standard of the country where the instrument is to be used.

TROUBLESHOOTING

WARRANTY

All ACS products are warranted to be free of defects in workmanship and materials for a period of one year from the date of shipment.

ACS agrees to replace or repair any defective unit, provided the defect was not caused by misuse or mishandling.

Any unit being returned for warranty repair must be properly packaged and shipped prepaid to the authorized dealer's facility.

ALARMS

The battery needs to be recharged.

The volume of breath required has not been reached or the breath was interrupted. Press the start button to select **VALIDATE** and restart the test.

The instrument probably detected mouth alcohol. Restart the test cycle by pressing the start button to select **MEASUREMENT**.

The alcohol concentration measured exceeds the instrument's operating range. Restart the test by pressing the start button to select **MEASUREMENT**.

MAINTENANCE

To clean the SAF'IR EVOLUTION, disconnect all cables and turn it off. Use a soft, lint-free, and slightly damp cloth to clean the instrument. Do not use abrasive cleaners or solvents. Prevent moisture from entering the instrument.

RECYCLING

SAF'IR EVOLUTION contains electronic components and a battery. It must therefore be disposed of separately from household refuse. For more information about disposal and recycling options, contact your local authorities or send the SAF'IR EVOLUTION back to Alcohol Countermeasure Systems.

The mouthpieces used for SAF'IR EVOLUTION are made of recyclable plastic. After the tests, the mouthpieces should be disposed according to the local waste management regulations for recyclable materials.

ACS AND THE ENVIRONMENT

In an effort to reduce its ecological footprint, Alcohol Countermeasure Systems has ecodesigned SAF'IR EVOLUTION to limit the consumption of natural resources and optimize the impact on both the environment and human health throughout its life cycle.

REDUCTION OF ENERGY CONSUMPTION: SAF'IR EVOLUTION uses 15 times less energy than the previous generation of Evidential Breath Analyzers, thanks to optimized management.

USE OF RECYCLABLE MATERIALS: Compliance with the EU RoHS Directive relating to limitations on the use of certain hazardous substances, such as lead, mercury, cadmium and hexavalent chr3omium, as well as polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE) flame retardants, in electrical and electronic equipment.

PREVENTION OF WASTE: Reduction in the number of components and tooling to reduce waste generation. Reduction in packaging by using the case for carrying. Reduction in overall dimensions compared to the previous generation of Evidential Breath Analyzers.

ACS
ALCOHOL COUNTERMEASURE SYSTEMS

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