SLOVENSKI STANDARD
SIST EN 14624:2012

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SIST EN 14624:2005

Lastnosti premičnih javljalnikov puščanja in sobnih nadzornih naprav za halogenska hladila

Performance of portable leak detectors and of room monitors for halogenated refrigerants

Leistung von mobilen Leckdetektoren und Raumüberwachungsgeräten für halogenierte Kältemittel

Performances des détecteurs de fuite portables et des contrôleurs d'ambiance de fluides frigorigènes halogènés

Ta slovenski standard je istoveten z: **EN 14624:2012**

ICS:

27.200	Hladilna tehnologija	Refrigerating technology
71.100.45	Hladiva in antifrizi	Refrigerants and antifreezes

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EUROPEAN STANDARD

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English Version

Performance of portable leak detectors and of room monitors for halogenated refrigerants

Performances des détecteurs de fuite portables et des contrôleurs d'ambiance de fluides frigorigènes halogénés

Leistung von mobilen Leckdetektoren und Raumüberwachungsgeräten für halogenierte Kältemittel

This European Standard was approved by CEN on 19 November 2011.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 14624:2012) has been prepared by Technical Committee CEN/TC "Refrigerating systems, safety and environmental requirements ", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2012, and conflicting national standards shall be withdrawn at the latest by July 2012.

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

This document supersedes EN 14624:2005.

The following changes have been made during revision:

a) Clause 3 "Terms and definitions" has been revised;

b) Clause 11 "Performance tests" has been completely revised;

c) Annex B "Correlation between test gas concentration and leakage rate" has been modified;

d) Annex C "Guideline for monitoring a machinery room or space for gas leaks" has been included.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

The purpose of this European Standard is to qualify the performance of portable sniffing leak detectors and room monitors for halogenated refrigerants. These leak detectors are designed for the detection of CFC, HCFC, HFC and PFC halogenated gases, and their detection limit is checked with a calibration leak or calibration gas.

2 Normative references

Not applicable.

3 Terms and definitions

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

3.1
chloro-fluoro-carbon (CFC)
fully halogenated halocarbon composed only of chlorine, fluorine and carbon

NOTE The hydrogen is completely substituted.

3.2
hydro-chloro-fluoro-carbon (HCFC)
partly halogenated halocarbon composed only of hydrogen, chlorine, fluorine and carbon

3.3
hydro-fluoro-carbon (HFC)
partly fluorinated halocarbon composed only of hydrogen, fluorine and carbon

3.4
perfluoro-carbon (PFC)
fully fluorinated halocarbon composed only of fluorine and carbon

NOTE The hydrogen is completely substituted.

3.5
gas concentration
ratio in weight or in volume of a given gas to the total weight or volume of the gas mixture

NOTE 1 The concentration is dimensionless and is designated either with ppm (m/m) = parts per million (mass) or ppm (V/V) = parts per million (volume).

NOTE 2 ppm: statement of concentration for gases; parts per million expressed in volume per volume ratio.

3.6
leakage rate
gas flow through a fissure, an orifice or aperture of specified size

NOTE 1 The usual leakage rate unit is gram per year (g/a), see Annex A (informative).

NOTE 2 The gas flow channels are some micrometers of diameter and have a large length/diameter ratio.

3.7
room monitor
fixed device, with one or several sensors, permitting the indication or the measurement of concentrations of halogen gases in the atmosphere at one or several points in one room or in several rooms

3.8
locating leak detector
either indicating or measuring portable leak detector with a detector probe capable of localizing a leak by measuring a local gas concentration with short response time

3.9
indicating leak detector
leak detector indicating one or several levels of concentration or leakage rate thresholds, but with no indication of the measured value

3.10
measuring leak detector
leak detector that measures leakage rates or concentrations and displays the respective value

3.11
calibration leak
device with a defined flow rate of a given gas under defined pressure and temperature conditions used to calibrate a leak detector

NOTE Calibration leaks are themselves calibrated according to operation conditions (upstream and downstream pressure) against a primary or secondary standard that is traceable to national standards (standard leak).

3.12
response time
time elapsing from the moment the probe is placed into a concentration or exposed to a calibration gas or in front of a leak until an alarm is triggered

3.13
recovery time
time required for a leak detection system or room monitor to indicate the lower detection limit again after exposure to a specified large leakage rate or concentration without any manual zeroing operation

3.14
zeroing time (for leak detectors)
time from immersion of the probe into a fixed concentration of halogen gas until indicated zero is stable (automatically or after a zeroing action specified by the manufacturer)

3.15
detection limit (lower, upper)
minimum or maximum detectable concentration or leakage rate which can be indicated with specified uncertainty and/or for which an alarm level can be set and is repeatedly triggered

3.16
alarm set points
one or more preset alarm set points/thresholds at which an alarm level(s) can be set and which can be repeatedly triggered by the appropriate concentration

4 Symbols and abbreviations

Table 1 — Symbols and abbreviations

Symbol	Description	Unit
V_{acc}	accumulation volume	m^3
V_{mol}	molar volume	m^3
M	molar mass	g/mol
$\dot{m}$	mass flow	kg/s or g/a
$\dot{v}$	molar mass flow rate	mol/s
$\dot{q}_{pV}$	Leakage rate (pV-throughput)	mbar - l/s or Pa - m^3/s
C	Concentration	V/V or m/m

5 Types of portable leak detectors and room monitors

The types of detectors shown in Table 2 are concerned in this European Standard:

Table 2 — Types of detectors

	Indicating	Measuring
Room monitor	A	B
Locating leak detector	C	D

Both the indicating leak detector and room monitor can be designed with thresholds: either one fixed threshold which is not adjustable or several fixed or adjustable thresholds.

Both the measuring leak detector and the room monitor comprise a scale and permit assigning of a measurement value to a gas concentration in the atmosphere.

6 General requirements for all portable leak detectors and room monitors

6.1 Gas type

The manufacturer shall specify the gas or the gas(es) that the leak detector is able to detect or measure.

6.2 Capabilities

Locating leak detectors or room monitors are single-gas or multi-gas measuring devices. They are selective or non-selective and shall be able to measure or indicate a concentration or leakage rate threshold of halogen gas.

Selective locating detectors or room monitors shall be able to identify a specific halogen gas among other gases. Non-selective locating detectors or room monitors cannot identify a specific halogen gas among other gases but they shall detect all halogen gases present in a gas mixture as a sum value.

6.3 Output signal

The indication or the measurement mode of the leak detector can be instantaneous or continuous and shall generate a signal (audible and/or visual) to indicate that a pre-set alarm level is exceeded (the signal alerts operators in charge of the leak tightness inspection or responsible for the supervision of the system charged with halogen gas).

6.4 Response time

The manufacturer shall specify the response time for the output signal.

6.5 Recovery time (clean up time)

The manufacturer shall specify the recovery time after the portable leak detector probe has been indicating the leakage rate of the largest refrigerant leak (upper detection limit).

6.6 Repeatability

For identical concentration values of a defined halogen gas, the leak detector or the room monitor shall give identical readings at repeated measurements within an uncertainty range specified by the manufacturer.

6.7 Calibration

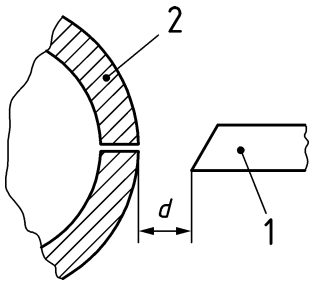
Checks/calibration, at least annually, shall be carried out in accordance with the manufacturer recommendations. For portable leak detectors a calibration leak shall be used. In the case of room monitors, a calibration gas shall be used.

Local regulations or standards may specify the frequency or nature of this check.

7 Specific requirements for locating portable leak detectors

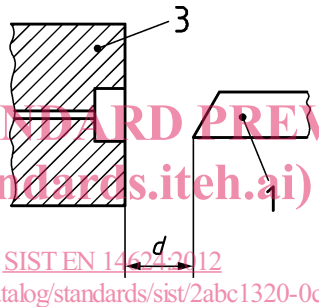
7.1 General

Locating leak detectors shall be able to indicate a halogen leak in two different situations: first, when the detector probe is stationary in front of a leak, second, when the detector probe is moving in front of a leak.



Key
1 sniffer probe
2 test object with leak
d sniffing distance

a) Sniffing distance *d* during leak search on a test object



Key
1 sniffer probe
3 calibration leak outlet
d sniffing distance

b) Sniffing distance *d* during calibration with a calibration leak

Figure 1 — Sniffing distance

7.2 Lowest detectable leakage rate threshold when the leak detector is stationary

The leak detector with the probe held stationary in front of a leak at a distance of 3 mm shall give a visual or acoustical alarm indicating that the threshold value set equal to the leakage rate value has been exceeded. Testing conditions are detailed in 11.1.

7.3 Lowest detectable leakage rate threshold value when the detector probe is moving

The detector probe, when moved across a leak passing at a speed of 2 cm/s and a distance of 3 mm in front of the leak exit, shall be able to repeatedly detect this leakage rate. Testing conditions are detailed in 11.1.

7.4 Leak detection in a contaminated environment

The leak detector shall be able to compensate for a slowly varying contaminating concentration of the halogen refrigerant and retain its detection ability for leak location.