



SLOVENSKI STANDARD

SIST EN 14624:2020

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Nadomešča:
SIST EN 14624:2012

Lastnosti premično lociranih javljalnikov puščanja in fiksnih detektorjev plina za vsa hladilna sredstva

Performance of portable locating leak detectors and of fixed gas detectors for all refrigerants

Leistung von mobilen Leckdetektoren und Raumüberwachungsgeräten für halogenierte Kältemittel

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

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EUROPEAN STANDARD

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Performance of portable locating leak detectors and of fixed gas detectors for all refrigerants

Performances des détecteurs de fuites portables et des détecteurs de gaz fixes pour tous les fluides frigorigènes

Leistung von mobilen Leckdetektoren und stationären Gasmeldern für alle Kältemittel

This European Standard was approved by CEN on 3 February 2020.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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EN 14624:2020 (E)**European foreword**

This document (EN 14624:2020) has been prepared by Technical Committee CEN/TC 182 “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of an identical text or by endorsement, at the latest by September 2020, and conflicting national standards shall be withdrawn at the latest by September 2020.

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

This document supersedes EN 14624:2012.

The following changes have been made during revision:

- a) the document has been restructured and divided into two parts: Portable locating leak detectors and fixed gas detectors;
- b) the document covers all types of refrigerants;
- c) Annex C “Guidelines for application of Fixed Gas Detectors” has been modified;
- d) Annex D “Calculation of gas concentration from kg/m³ to ppm” has been added;
- e) Annex E “Selectivity, cross interference and potential contaminants” has been added.

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This document recognizes the unique nature of leak detection and gas detection for refrigerating systems, air condition systems and heat pumps and is intended to address the specific needs of the refrigeration and heat pump industry. This document should be read in conjunction with the EN 378 series.

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EN 14624:2020 (E)

1 Scope

1.1 General

This document specifies the requirements for portable locating leak detectors and fixed gas detectors for all refrigerants.

Locating detectors used in factories for manufacturing processes are not included in the Scope of EN 14624.

1.2 Product application

This document applies to different applications and environments such as plant and machine rooms, production rooms, cold rooms, supermarkets, occupied spaces like offices and hotels.

1.3 Product performance

This document specifies minimum requirements for sensitivity, operating range, response time, environmental conditions and cross sensitivity from interference gases.

1.4 Product installation

This document gives guidance of suitable technology, location of detection points, interconnection with secondary equipment (e.g. initiation of mechanical ventilation, personnel warning, and equipment shutdown).

1.5 Service and maintenance

This document gives guidance for service and maintenance: Sensors and mechanical equipment have a limited operating life and require regular performance verification to ensure conformity.

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2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 378-1:2016, *Refrigerating systems and heat pumps — Safety and environmental requirements — Part 1: Basic requirements, definitions, classification and selection criteria*

EN 378-2:2016, *Refrigerating systems and heat pumps — Safety and environmental requirements — Part 2: Design, construction, testing, marking and documentation*

EN 378-3:2016, *Refrigerating systems and heat pumps — Safety and environmental requirements — Part 3: Installation site and personal protection*

EN 378-4:2016+A1:2019, *Refrigerating systems and heat pumps — Safety and environmental requirements — Part 4: Operation, maintenance, repair and recovery*

EN 45544-1:2015, *Workplace atmospheres — Electrical apparatus used for the direct detection and direct concentration measurement of toxic gases and vapours — Part 1: General requirements and test methods*

EN 45544-3, *Workplace atmospheres — Electrical apparatus used for the direct detection and direct concentration measurement of toxic gases and vapours — Part 3: Performance requirements for apparatus used for general gas detection*

EN 60079-29-1, *Explosive atmospheres — Part 29-1: Gas detectors — Performance requirements of detectors for flammable gases (IEC 60079-29-1)*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1 refrigerant

fluid used for heat transfer in a refrigerating system, which absorbs heat at a low temperature and a low pressure and rejects heat at a higher temperature and a higher pressure usually involving changes of the state of the fluid

3.2 gas concentration

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

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

3.3 leakage rate

gas flow through a fissure, an orifice or aperture

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Note 1 to entry: The usual leakage rate unit is gram per year (g/a). For other measuring units see Annexes A and B (informative).

3.4 fixed gas detector

electrical device which permits the indication or the measurement of concentrations of refrigerant gases in the atmosphere at one or several points

3.5 indicating fixed gas detector

electrical device indicating that one or several levels of pre-set concentration thresholds have been exceeded, but with no indication of the measured value

3.6 measuring fixed gas detector

electrical device that measures concentration and displays the respective value and/or gives a proportional output

Note 1 to entry: The device may also indicate when pre-set concentration thresholds have been exceeded.

Note 2 to entry: Measuring detectors can be aspirated devices with one or more channels which sequentially sample air for the target gas

EN 14624:2020 (E)**3.7****portable locating leak detector**

electrical device, either indicating or measuring leak detector with a detector probe capable of localizing a leak by measuring a local gas concentration with short response time

Note 1 to entry: This type of detectors is used for service and maintenance to search for leaks on refrigeration systems.

3.8**portable indicating leak detector**

electrical device indicating one or several levels of concentration or leakage rate thresholds, but with no indication of the measured value

3.9**portable measuring leak detector**

electrical device that measures leakage rates or concentrations and displays the respective value or gives a proportional output signal

3.10**detector probe**

flexible tube connected to portable locating leak detector that either has a sensor attached at the end of it or is used to carry a sample to the sensor in the body of the portable locating leak detector

3.11**calibration gas**

gas consisting of the target gas in a suitable carrier gas and at a specified concentration and accuracy traceable to national standards, e. g. R404A at 1 000 ppm in air

Note 1 to entry: Refer to product manufacturer regarding suitable carrier gas.

Note 2 to entry: Calibration gases are readily available in cylinders or may be produced in test chambers by injection of the target gas by syringe or using calibrated mass flow controllers or equivalent.

3.12**calibration leak**

device with a defined flow rate of a given gas under defined pressure and temperature conditions used to calibrate/test a portable leak detector

Note 1 to entry: 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).

3.13**response time for an indicating detector**

time elapsing from the moment the detector in normal operation is exposed to a defined gas concentration or a leak rate above pre-set threshold until an indication occurs

3.14**response time for a measuring detector**

time elapsing from the moment the detector in normal operation is exposed to a defined gas concentration or a leak rate until it reaches pre-defined percentage of its final reading, e. g. 90 % is referred to as t_{90}

3.15**recovery time for portable locating leak detectors**

time required for a locating leak detector to indicate the lower detection limit again after exposure to a specified large leakage rate without any manual zeroing operation

3.16**zeroing time for portable locating leak detectors**

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

3.17**lower detection limit for portable locating leak detectors**

minimum detectable leakage rate which can be indicated with specified uncertainty and/or for which an indication threshold can be set and is repeatedly triggered

3.18**upper detection limit for portable locating leak detectors**

maximum detectable leakage rate which can be indicated with specified uncertainty and/or for which an indication threshold can be set and is repeatedly triggered

3.19**indication thresholds**

one or more pre-set values which can be set and repeatedly triggered by the appropriate gas concentration or leakage rate

3.20**selectivity**

ability to identify a specific gas or group of gases among other gases

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Note 1 to entry: Portable locating leak detectors and fixed gas detectors can be selective or non-selective.

Note 2 to entry: Non-selective detectors cannot identify a specific gas among other gases but the gases they can detect and that are present in the mixture will output a common value.

3.21**measuring range**

range of measured values of gas concentration over which the accuracy of the apparatus lies within specified limits

4 Symbols and abbreviations

For the purposes of this document, the symbols and abbreviations given in Table 1 apply.

Table 1 — Symbols and abbreviations

Symbol	Description	Unit
V_{acc}	accumulation volume	m ³
V_{mol}	molar volume	m ³ /mol
M	molar mass	g/mol
\dot{m}	mass flow	kg/s or g/a
\dot{v}	molar mass flow rate	mol/s
q_{pV}	Leakage rate (pV-throughput)	mbar l/s or Pa m ³ /s
$C_{V/V}$	Concentration (volume)	V/V
$C_{m/m}$	Concentration (mass)	m/m
C_{ppm}	Concentration in parts per million (V/V)	ppm
C_{LFL}	Concentration in percent of lower flammable limit	%LFL
<i>Gas flow</i>	Gas flow in litres per minute	l/min

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5 General requirements for all portable locating leak detectors and fixed gas detectors — Refrigerant gas type (informative)

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Refrigerants are defined in different groups as stated in Table 2 — Refrigerant types.

Table 2 — Refrigerant types

	Non-toxic	Toxic
Higher flammability	A3	B3
Flammable	A2	B2
Lower flammability	A2L	B2L
No flame propagation	A1	B1