SLOVENSKI STANDARD
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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 halogénés

Ta slovenski standard je istoveten z: **prEN 14624**

ICS:

27.200	Hladilna tehnologija	Refrigerating technology
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English Version

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

Leistung von mobilen Leckdetektoren und Raumüberwachungsgeräten für Kältemittel

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 182.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 14624:2018) has been prepared by Technical Committee CEN/TC 182 “Refrigerating systems, safety and environmental requirements”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 14624:2012.

The following changes have been made during revision:

a) the standard has been restructured and divided into two parts: Portable locating leak detectors and fixed gas detectors;

b) the standard 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/m^3 to ppm ” has been added;

e) Annex E “Selectivity, cross interference and potential contaminants” has been added.

Introduction

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

1 Scope

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 prEN 14624.

1.1 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.

1.2 Product performance:

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

1.3 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, equipment shutdown).

1.4 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.

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

EN 378-4:2016, *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 45544-2, *Workplace atmospheres - Electrical apparatus used for the direct detection and direct concentration measurement of toxic gases and vapours – Part 2: Performance requirements for apparatus used for exposure measurement*

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)*

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

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 http://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

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

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
remote sensor head of a portable locating leak detector, which is typically in the end of a flexible tube

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 t90

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

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

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
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
Gas flow	Gas flow in litres per minute	l/min

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

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

Table 2 — Refrigerant types

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

6 Specific requirements for portable locating leak detectors

6.1 Detection limits

6.1.1 General

Portable leak detectors shall be able to indicate a leak in the following situations: first, when the detector probe is stationary in front of a leak, and/or second, when the detector probe is moving in front of a leak.