



# SLOVENSKI STANDARD

## OSIST prEN 54-21:2004

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**Sistemi za odkrivanje in javljanje požara ter alarmiranje – 21. del: Oprema za usmerjanje alarma in opozoril o napakah**

Fire detection and fire alarm systems - Part 21: Alarm transmission and fault warning routing equipment

Brandmeldeanlagen - Teil 21: Übertragungseinrichtungen für Brand- und Störungsmeldungen

Systemes de détection et d'alarme incendie - Partie 21: Equipement de transmission d'alarme et de dérangement

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EUROPEAN STANDARD  
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ICS

English version

## Fire detection and fire alarm systems - Part 21: Alarm transmission and fault warning routing equipment

Brandmeldeanlagen - Teil 21: Alarm- und Störungsübertragungseinrichtungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 72.

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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## Foreword

This document (prEN 54-21:2004) has been prepared by Technical Committee CEN/TC 72 "Fire detection and fire alarm systems, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

For products which have complied with the relevant national standard before the date of withdrawal (dow), as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until [dow + 36 months].

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

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**prEN 54-21:2004 (E)****1 Scope**

This European Standard specifies requirements, test methods and performance criteria against which the effectiveness and reliability of routing equipment capable of transmitting fire alarm and/or fault warning signals for use with fire detection and fire alarm systems installed in buildings can be assessed (see EN 54-1:1996).

**2 Normative references**

The following referenced documents are indispensable for the application 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 54-1:1996, *Fire detection and fire alarm systems — Part 1: Introduction.*

EN 54-2:1997, *Fire detection and fire alarm systems — Part 2: Control and indicating equipment.*

EN 54-4:1997 + Corr: 1999, *Fire detection and fire alarm systems — Part 4: Power supply equipment.*

EN 50130-4:1995 + A1: 1998, *Alarm systems — Part 4: Electromagnetic compatibility — Product family standard: Immunity requirements for components of fire, intruder and social alarm systems.*

EN 50136-1-1:1998 + A1: 2001, *Alarm systems — Alarm transmission systems and equipment — Part 1-1: General requirements for alarm transmission systems.*

EN 50136-1-2, *Alarm systems — Alarm transmission systems and equipment — Part 1-2: Requirements for systems using dedicated alarm paths.*

EN 50136-1-3, *Alarm systems — Alarm transmission systems and equipment — Part 1-3: Requirements for systems with digital communicators using the public switched telephone network.*

EN 50136-2-1:1998, *Alarm systems — Alarm transmission systems and equipment — Part 2-1: General requirements for alarm transmission equipment.*

EN 60068-1:1994, *Environmental testing — Part 1: General and guidance.*

EN 60068-2-1:1993 + A1: 1993 + A2: 1994, *Environmental testing — Part 2: Tests — Tests A: Cold.*

EN 60068-2-6:1995, *Environmental testing — Part 2: Tests — Test Fc: Vibration (sinusoidal).*

EN 60068-2-47:1999, *Environmental testing — Part 2-47: Test methods — Mounting of components, equipment and other articles for vibration, impact and similar dynamic tests.*

EN 60068-2-75:1997, *Environmental testing — Part 2-75: Tests — Test Eh: Hammer tests.*

EN 60068-2-78:2001, *Environmental testing — Part 2-78: Tests — Test Cab: Damp heat, steady state.*

EN 60529:1991 + Corr: 1993, *Degrees of protection provided by enclosures (IP code).*

EN 60721-3-3:1995, *Classification of environmental conditions — Part 3: Classification of groups of environmental parameters and their severities — Section 3: Stationary use at weatherprotected locations.*

### 3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 54-1:1996, EN 54-2, EN 54-4 and EN 50136-1-1:1998 + A1: 2001, 4.7 apply.

### 4 General requirements

#### 4.1 General

If an optional function with requirements is included, all the corresponding requirements shall be met.

If functions other than those specified in this European Standard are provided, they shall not jeopardize the compliance with any requirements of this European Standard.

#### 4.2 Compliance

In order to comply with this standard the routing equipment shall meet the requirements of this clause, which shall be verified by visual inspection or engineering assessment, shall be tested as described in clause 5 and shall meet the requirements of the tests.

### 5 Functional requirements

The routing equipment shall be capable of transmitting and/or receiving and processing at least the following signals, as specified in Table 1.

**Table 1 — Mandatory signals for routing equipment**

	Alarm transmission routing equipment (E)	Fault warning routing equipment (J)
CIE to routing equipment	Fire alarm	Fault warning
Routing equipment to CIE	Fault warning (power supply)	Fault warning (network, power supply)
Network to routing equipment	Fault warning (network)	Fault warning (network)
Routing equipment to network	Fire alarm	Fault warning (CIE power supply)
Network to routing equipment	Acknowledgement	
Routing equipment to CIE	Acknowledgement	

The following shall be indicated either at the CIE or the routing equipment by separate light-emitting indicators for A and B:

- A) the received acknowledgement as defined in EN 50136 2-1:1998, 5.5.
- B) the following fault warnings common:
  - B.1) the missing of acknowledgement (which means missing for longer than 100 s after the start of the alarm transmission according to EN 54-2: 1997, 7.9) from the alarm transmission network as a fault warning;

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B.2) a fault warning indicating a failure within the routing equipment (e.g. power supply failure), required to be indicated in accordance with this standard;

B.3) a fault warning indicating a failure within the used alarm transmission network.

**6 Alarm transmission and fault warning systems requirements**

The performance requirements of transmission system shall be as specified in Annex A.

The verification of this performance is detailed in Annex B.

**7 Design requirements****7.1 General requirements and manufacturer's declarations**

The routing equipment shall comply with the design requirements of 7.3 relevant to the technology used. Some requirements can be verified by testing. Others (e.g. long-term reliability of the routing equipment) can only be verified by inspection of the design and its accompanying documentation (product or system specification, reports ec.)

In order to assist the process of design inspection, the manufacturer shall declare the following in writing:

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- a) that the design has been carried out in accordance with a quality management system, which incorporates a set of rules for the design of all elements of the routing equipment;
  - b) that all the components of the routing equipment have been selected for the intended purpose and are expected to operate within their specification when the environmental conditions outside the enclosure of the routing equipment comply with class 3K5 of EN 60721-3-3:1995.

**7.2 Documentation**

**7.2.1** The manufacturer shall prepare installation and user documentation, which shall be submitted to the testing authority together with the routing equipment. This shall comprise at least the following.

- a) A general description of the equipment, including:
  - optional functions with requirements of this European Standard;
  - functions relating to other parts of EN 54;
  - ancillary functions not required by this European Standard.
- b) Technical specifications of the inputs and the outputs of the routing equipment, sufficient to permit an assessment of the mechanical, electrical and software compatibility with other components of the system (as described in EN 54-1), including where relevant:
  - the power requirements for recommended operation;
  - the maximum and minimum electrical ratings for each input and output;
  - information on the communication parameters employed on each transmission path;
  - recommended cable parameters for each transmission path;



- fuse ratings.
- c) Installation information, including:
- the suitability for use in the various environments specified in accordance with Annex A (e.g. the supplier specifies the performance parameters of the routing equipment in a data sheet, and it is these parameters together with the different parameters of the alarm transmission system have to fulfil the requirements of Annex A)
  - mounting instructions;
  - instructions for connecting the inputs and outputs.
- d) Configuring and commissioning instructions.
- e) Operating instructions.
- f) Maintenance information.

**7.2.2** The manufacturer shall also prepare design documentation, which shall be submitted to the testing authority together with the routing equipment. This documentation shall include drawings, parts lists, block diagrams, circuit diagrams and a functional description to such an extent that compliance with EN 54-21 may be checked and that a general assessment of the mechanical and electrical design is made possible.

### 7.3 Mechanical design requirements

**7.3.1** The enclosure of the routing equipment shall be of robust construction, consistent with the method of installation recommended in the documentation. It shall meet at least classification IP30 of EN 60529:1991 + Corr. May 1993 at access level 2.

**7.3.2** All light emitting indicators shall be clearly labelled to indicate their purpose. The information shall be legible at 0,8 m distance in an ambient light intensity from 100 lux to 500 lux.

**7.3.3** The terminals for transmission paths and the fuses shall be clearly labelled.

### 7.4 Electrical and other design requirements

**7.4.1** The processing of signals shall give the highest priority to the transmission of fire alarms (E of EN 54-1) or fault warning (J of EN 54-1).

**7.4.2** The availability of the power supply for the routing equipment shall be as a minimum on the same level as the availability of the power supply for the CIE required by EN 54-4.

**7.4.3** The loss of power has to be indicated at least on the CIE.

**7.4.4** Transitions between the main and the stand-by power sources shall not change any indications and/or the state of any outputs, except those relating to the power supplies.

**7.4.5** If the routing equipment has provision for disconnecting or adjusting the main or the stand-by power source, this shall only be possible at access level 3 or 4.

### 7.5 Integrity of transmission paths

**7.5.1** A fault in any transmission path between the routing equipment and the alarm transmission system (as defined in EN 50136 1-1) shall not affect the correct functioning of the routing equipment or any other transmission path.

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**7.5.2** If the routing equipment is designed to be used with a power supply (L of EN 54-1) contained in a separate enclosure, then an interface shall be provided for at least two transmission paths to the power supply, so that a short circuit or an interruption in one does not prevent the supply of power to the routing equipment.

**7.6 Accessibility of indications and controls (see EN 54-2:1997, Annex A)**

Access levels shall be provided on the routing equipment, from access level 1 (most accessible) to access level 4 (least accessible). Manual controls and other functions shall be grouped on the appropriate access level, as specified in EN 54-2, 12.6.

**7.7 Indications by means of light-emitting indicators**

**7.7.1** Mandatory indications from light-emitting indicators shall be visible in an ambient light intensity up to 500 lx, at any angle up to 22,5 from a line through the indicator perpendicular to its mounting surface:

- at 3 m distance: the indication of the supply of power;
- at 0,8 m distance: other indications.

**7.7.2** If flashing indications are used, the on- and/or the off-periods shall be not less than 0,25 s, and the frequencies of flash shall be not less than:

- 1 Hz for fire alarm indications,
- 0,2 Hz for fault indications.

**7.7.3** If the same light-emitting indicators are used for the indication of faults and disablements, fault indications shall be flashing and disablement indications shall be steady.

**7.8 Colours of indications**

The colours of the general and specific indications from light-emitting indicators shall be yellow for indications of fault warnings and red for the indication of the acknowledgement.

**7.9 Testing of indicators**

All mandatory visible indicators at the routing equipment shall be testable by manual operation at access level 1 or 2.

**7.10 Additional design requirements for software-controlled routing equipment**

If the routing equipment contains elements that are controlled by software in order to fulfil the mandatory requirements of this European Standard, these elements of the routing equipment shall comply with the requirements of the relevant clauses of EN 54-2, clause 13 and Annex J.

**8 Marking**

The routing equipment shall be marked with the following information, which shall be legible at access level 1.

- a) The number of this part of the standard (EN 54-21).
- b) The name or trade mark of the manufacturer or supplier.

c) The model designation (type or number).

It shall be possible to identify the code or number that identifies the production period of the routing equipment at access level 2 or 3.

## 9 Power supply

The routing equipment shall be powered by the fire alarm system power supply (L of EN 54-1 as specified by EN 54-4) or by a separate power supply (L of EN 54-1 as specified by EN 54-4).

## 10 Test requirements

### 10.1 General test requirements

#### 10.1.1 Standard atmospheric conditions for testing

Unless otherwise stated in a test procedure, the testing shall be carried out after the test specimen has been allowed to stabilize in the standard atmospheric conditions for testing as described in EN 60068-1:1994 as follows:

Temperature: 15 °C– 35 °C

Relative humidity: 25% – 75%

Air pressure: 86kPa – 106kPa

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The temperature and humidity shall be substantially constant for each environmental test where the standard atmospheric conditions are applied.

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#### 10.1.2 Specimen configuration

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The specimen configuration shall include the connection to the transmission path to the CIE and the network as specified by the manufacturer.

#### 10.1.3 Mounting and orientation

Unless otherwise stated in a test procedure, the specimen shall be mounted in its usual orientation by the normal means of mounting indicated by the manufacturer, except where required for functional testing the equipment shall be in the condition of access level 1.

#### 10.1.4 Electrical connection

If the test procedure requires the specimen to be in the operating condition, it shall be connected to or powered by a power supply according to EN 54-4.

Unless otherwise required, the power supply shall be in the nominal operating condition.

All transmission paths shall be connected to cables and equipment or to dummy loads. Equipment other than the routing equipment may be kept in the standard atmospheric conditions during the tests.

**prEN 54-21:2004 (E)****10.2 Functional test****10.2.1 The object of the test**

The object of the functional test is to demonstrate the operation of the equipment before, during and/or after the environmental conditioning.

**10.2.2 Test schedule**

A test schedule shall be drawn up which ensures that during the functional test each type of input function and each type of output function is exercised.

If the routing equipment has the functionality of transmitting alarm signals then the following tests shall be carried out:

**Test 1**

- Initiate and reset a fire alarm signal via a control panel (CIE) or other means.
- Check if the fire alarm signal is sent to the network.
- Initiate an acknowledgement signal within 100 s.
- Check, if the correct indication is given.

**Test 2**

- Initiate and reset a fire alarm signal via a control panel (CIE) or other means.
- Check if the fire alarm signal is sent to the network.
- Initiate an acknowledgement signal after 100 s.
- Check, if the correct indication is given.

**Test 3**

- Short-circuit the network.
- Check, if the correct indication is given.

**Test 4**

- Disconnect the network.
- Check, if the correct indication is given.

If the routing equipment has the functionality of transmitting fault-warning signals then the following test shall be carried out:

**Test 5**

- Initiate and reset a fault-warning signal to the fault warning routing equipment via a control panel (CIE) or other means.