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Building intercom systems -
Part 1-1: System requirements - General

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Building intercom systems - Part 1-1: System requirements - General

FOREWORD

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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 62820-1-1:2016. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

IEC 62820-1-1 has been prepared by IEC technical committee 79: Alarm and electronic security systems. It is an International Standard.

This second edition cancels and replaces the first edition published in 2016. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) addition of IEC 61000-6-8 and IEC 62368-1:2023 as normative references;
b) update of ISO 12233 to the latest version and addition of this reference as a normative reference;
c) modification of the light source colour temperature from 3 100 K ± 100 K to 6 500 K ± 100 K;
d) addition of TE84 test chart and update of the focus test chart.

The text of this International Standard is based on the following documents:

Draft	Report on voting
79/738/FDIS	79/741/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 62820 series, published under the general title *Building intercom systems*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

– reconfirmed,
– withdrawn, or
– revised.

INTRODUCTION

IEC 62820-1-1 specifies the technical requirements for building intercom systems and equipment used for building entry. Building intercom systems can function independently and ~~may~~ can be ~~extendable~~ extended to support building security management functions, e.g. extendable with security management unit (SMU) operated by security staff (door-man, concierge, security-guard, porter, etc.), or in conjunction with other systems as per the security requirements of the building. It ~~may~~ can consist of: Visitor call unit (VCU), User receiver unit (URU), SMU, power supply, auxiliary device, as well as interface-unit to other security-systems.

The IEC 62820 series of standards sets out the technical requirements for the composition, functions, performance, test methods of building intercom systems for building entry and application guidelines and consists of five parts:

Part 1-1: *System requirements - General*

Part 1-2: *System requirements - Building intercom systems using the internet protocol (IP)*

Part 2: *Requirements for advanced security building intercom systems*

Part 3-1: *Application guidelines - General*

Part 3-2: *Application guidelines - Advanced security building intercom systems*

IEC 62820-1-1 is based on Chinese standard GB/T 31070.1-2014 and European standard EN 50486:2008.

1 Scope

IEC 62820-1-1 specifies the technical requirements for the composition, functions, performance, and test methods of general building intercom systems.

This document is applicable to the general intercom systems for building entry in residential or commercial buildings.

Door-Entry-System (DES) is a simple kind of convenient Building-Intercom-System (BIS) mainly for user's comfort. This document has classified the general building intercom systems into two grades in IEC 62820-1-1. Grade 1 adopts lower requirements to cover DES not used for relevant security applications while grade 2 adopts higher requirements for building intercom systems for security applications. Each grade ~~may~~ can adopt different functional and performance requirements, test methods and normative references.

NOTE The different requirements between grade 1 and grade 2 are summarized in Table C.1 of Annex C.

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.

IEC 60065:2014, *Audio, video and similar electronic apparatus - Safety requirements*[1]

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*
IEC 60529:1989/AMD1:1999
IEC 60529:1989/AMD2:2013

IEC 60950-1:2005, *Information technology equipment - Safety - Part 1: General requirements*[2]

IEC 61000-6-1, *Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity standard for residential, commercial and light-industrial environments*

IEC 61000-6-3, *Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for equipment in residential~~, commercial and light-industrial~~ environments*

IEC 61000-6-8, *Electromagnetic compatibility (EMC) - Part 6-8: Generic standards - Emission standard for professional equipment in commercial and light-industrial locations*

IEC 62262, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)*

IEC 62368-1:2023, *Audio/video, information and communication technology equipment - Part 1: Safety requirements*

IEC 62599-1, *Alarm systems - Part 1: Environmental test methods*

IEC 62599-2, *Alarm systems - Part 2: Electromagnetic compatibility - Immunity requirements for components of fire and security alarm systems*

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1 This publication was withdrawn.

2 This publication was withdrawn.

ISO 12233:~~2014~~2024, ~~*Photography – Electronic still picture imaging –*~~ *Digital camera - Resolution and spatial frequency responses*

ITU-T P.50, *Artificial voices*

~~ITU-T P.51-1996, *Artificial mouth*~~

ITU-T P.79-2007, *Calculation of loudness ratings for telephone sets*

ITU-T P.501, *Test signals for use in ~~telephonometry~~ telephony and other speech-based applications*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

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

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

– IEC Electropedia: available at https://www.electropedia.org/

– ISO Online browsing platform: available at https://www.iso.org/obp

3.1.1
2-way speech
speech between any two units (VCU, URU or SMU) in each direction which ~~may~~ can be simultaneous or non-simultaneous

3.1.2
acoustic distortion
distortion of signals at the receiving terminal of the system as a result of system transmission non-linearity and ground noise, expressed as a ratio percentage of the harmonic signal and ground noise at the receiving terminal in proportion to the overall sound pressure

3.1.3
acoustic pressure level
measurement of the acoustic pressure level generated by the equipment under test (EUT) in normal conditions

3.1.4
artificial ear
device used to calibrate the receiver and containing an acoustic coupler and a calibrated microphone used to measure sound pressure

Note 1 to entry: Its overall acoustic impedance within a given frequency band is similar to that of the average human ear, and its characteristics comply with the requirements of type 1 provided by Clause 6.1 of ITU-T P.57-2021 or type 3.2 provided by ~~Article 5~~ Clause 6.3.2 of ITU-T P.57-~~2011~~2021.

3.1.5
artificial mouth
analogue device the sound characteristics of which are similar to the directivity and radiation pattern of the average human mouth

Note 1 to entry: It conforms to the requirements set forth in Clause 5 of ITU-T P.51-1996.

3.1.6
auxiliary device
device which extends or facilitates additional functions and interfaces of a building intercom system, such as communications, remote control, 3rd party devices interfaces ~~etc.~~

3.1.7
building intercom system
BIS
system designed for entry communication in residential or commercial buildings which provides addressing calls, speech and optional video function and is equipped with an electronic unlocking device

3.1.8
channel S/N
sound pressure ratio between signal and ground noise at the receiving terminal under excitation of the nominal sound pressure at the transmitting terminal, expressed in dB

3.1.9
handset unit
device typically coupled to the ear by hand as can be a handset URU or handset SMU

3.1.10
hands-free unit
device that does not need to use the hand during the communication as can be a VCU, hands-free URU or hands-free SMU

3.1.11
idle channel noise
noise expressed in dB(A) which is received in the terminal after the channel connection is established when no signal is transferred

3.1.12
loudness rating guard-ring position
LRGP
fixed position in which the handset of the URU or SMU is used to measure the rating of system loudness

[SOURCE: adapted from ITU-T P.64:~~2007~~2022, Annex C]

3.1.13
overall loudness rating
OLR
measurement of the loudness in the entire channel from the reference point of the mouth at the transmitting terminal to the ear reference point (ERP) at the receiving terminal, expressed in dB

Note 1 to entry: The source definition is adapted to align with the test methods.

[SOURCE: adapted from ITU-T P.~~79:2007~~10:2017, definition 6.191]

3.1.14
overall sensitivity
gain of the sound pressure at the reference point of the ear at the reception terminal relative to the excitation sound pressure at the mouth reference point (MRP) at the transmitting terminal, expressed in dB

Note 1 to entry: It is a function of frequency.

3.1.15
security management unit
SMU
device which can be addressed from the call unit (VCU, URU or SMU), provides the means of addressing the calling signal to the desired receiver unit(s) which can be URU or SMU, 2-way speech, the activation of the audio ~~and/~~or video connection with the VCU and the means to initiate remote unlocking of the controlled entrance

3.1.16
sidetone masking rating
STMR
measurement of sidetone loudness after factoring in the masking effects of the human head on sidetone, expressed in dB

Note 1 to entry: The source definition is adapted to align with the test methods.

[SOURCE: adapted from ITU-T P.~~79:2007~~10:2017, definition 6.240]

3.1.17
user receiver unit
URU
addressable user device which provides 2-way speech with optional video, and a means to initiate remote unlocking of the controlled entrance

3.1.18
visitor call unit
VCU
device installed outside a controlled entrance which provides the means of addressing the calling signal to the desired URU or SMU and 2-way speech with optional video capture

Note 1 to entry: The device can also provide the means of unlocking the controlled entrance and other function(s) or these function(s) can be contained within a separate associated device normally located within the controlled premises and which can also contain the system power supply.

3.2 Abbreviated terms

BIS building intercom system
DES door entry system
ERP ear reference point
EUT equipment under test
~~Lpm level (sound) pressure mean~~
LRGP loudness rating guard-ring position
MRP mouth reference point
OLR overall loudness rating
PIN personal identification number
SMU security management unit
STMR sidetone masking rating
TVL television lines
URU user receiver unit
VCU visitor call unit

4 Functional requirements

4.1 Basic functional requirements

4.1.1 General

A building intercom system shall meet the following requirements. The different requirements between grade 1 and grade 2 are summarized in Table C.1 of Annex C.

a) Call function

The VCU shall be able to address the desired URU. The VCU shall be able to produce a visible ~~and/~~or audible call alert signal. The URU shall be able to produce a response prompt signal that can be visible- or audible~~, etc~~.

b) Speech function

2-way speech shall be provided, which can be either non-simultaneous or simultaneous. It ~~may~~ can be of limited duration controlled by a system timer such that the speech channel cannot be accidentally occupied for an unlimited time.

c) Unlocking function

The unlocking function shall be provided with an electric or electronic signal to an electric or electronic locking device for securing a building entrance. This function shall be controlled by URU at the user's discretion. In grade 2 the URU shall be in communication with the VCU to perform the unlocking function.

The unlocking function could also be activated by other means:

1) The VCU ~~may~~ can be provided with a means for authorized users to directly activate the unlocking function, such as by PIN code or secure proximity card or other security grade dependent means.
2) Request to exit button or switch located inside the controlled area and normally adjacent to the controlled entrance. According to the security requirements of the installation this button or switch ~~may~~ can be a simple switch or require a PIN or other secure means of operation.
3) Other system signal such as an activated fire alarm signal, a building evacuation signal ~~etc~~.

d) Nighttime operability

Grade 1: No requirement;

Grade 2: The VCU shall provide illumination or visible prompts to facilitate the visitor's operations at night.

e) Video and image recording and replaying function

When a URU is equipped with a video function it shall be able to display images captured by the VCU. The functions of storing, replaying the visitor's images are optional.

f) Operational indication

The system shall provide the operating and operational information to the visitor. The VCU should provide a comfort indication that the call is being processed, such as a low-level audible tone ~~and/~~ or visible indication. The VCU should also give audio ~~and/~~or visible indication when the lock has been released and that entry to the premises is permitted.

NOTE The VCU can give clear indication or prompts to the visitor on how to address the desired URU.

g) Anti listen-in

Grade 1: No requirement.

Grade 2: After connecting the VCU with the URU, the audio information shall not be monitored by other URU connected to the system.

4.1.2 Requirements for building intercom system with SMU

A building intercom system with SMU shall meet the following requirements:

a) The SMU shall be able to address and initiate calls to selected URU. The VCU and the URU shall be able to initiate calls to the SMU. If multiple SMU are connected to the system, they shall be able to call each other. All the calls shall be able to produce call alert and response prompt signals. The signals can be visible or audible~~, etc~~.

b) The SMU shall be capable of 2-way speech with the VCU or the URU. If multiple SMU are connected to the system, they shall be capable of 2-way speech with each other.

c) The SMU shall be able to control the VCU or auxiliary device to perform electrical or electronic unlocking.

d) When a SMU is equipped with a video function it shall be able to display images captured by the VCU. The URU shall be able to display images captured by SMU equipped with a video camera.

e) For grade 2: After connecting the SMU with the VCU or the URU, the audio and video information shall not be monitored by other URU connected to the system.

f) For grade 2: The SMU shall be able to address and communicate to selected VCU.

4.2 Additional functions

A building intercom system can also provide the following functions:

a) If the unsecured state of the controlled entrance lasts beyond the configured time, the SMU ~~may~~ can be able to receive a warning message.

NOTE Unsecured state: the door opened for too long, the tamper switch triggered, etc.

b) The system ~~may~~ can have the possibility of transmitting images and texts to the URU.

c) The SMU ~~may~~ can have a timed and dated event log with security graded access and recording access events at the VCU.

   1) URU's called and if unlocking function operated by the URU.
   2) VCU unlocking carried out directly at the VCU, identifying the authorized user.
   3) Programming events such as adding or subtracting users and URU's.
   4) Identification of the operator accessing the event log.

d) SMU ~~may~~ can intercept incoming calls from a VCU directed to an URU and then redirect the call to desired URU.

e) If a SMU operator is not available, SMU ~~may~~ can record details of URU which called the SMU in order to allow the operator to call back the URU.

5 Performance requirements

5.1 Audio characteristics

5.1.1 Acoustic pressure level

Grade 1: The acoustic pressure level shall meet the following requirements:

a) Acoustic pressure level value generated by hands-free unit:

   1) For discrete measurement, it shall be ≥ 70 dBSPL.
   2) For continue measurement, it shall be ≥ 70 dB(A).

b) Acoustic pressure level value generated by handset unit:

   1) For discrete measurement, it shall be ≥ 77 dBSPL.
   2) For continue measurement, it shall be ≥ 77 dB(A).

Grade 2: ~~No requirement~~Not applicable.

5.1.2 Overall loudness rating (OLR)

Grade 1: No requirement.

Grade 2: The OLR shall meet the following requirements:

At the VCU: 20^{+10}_{-5} dB.

a) At the hands-free URU and hands-free SMU: 23^{+10}_{-5} dB

b) At the handset unit: (15 ± 5) dB.

5.1.3 Overall sensitivity

Grade 1: No requirement.

Grade 2: The typical curve and its tolerance range of overall sensitivity between 500 Hz and 3 400 Hz shall meet the following requirements:

a) At the hands-free unit: The typical curve is the dotted line shown in Figure 1 and its tolerance range is the solid line shown in Figure 1.

b) At the handset unit: the typical curve is the dotted line shown in Figure 2 and its tolerance range is the solid line shown in Figure 2.

NOTE Best fit or floating mask are referred to Figure 1 and Figure 2.

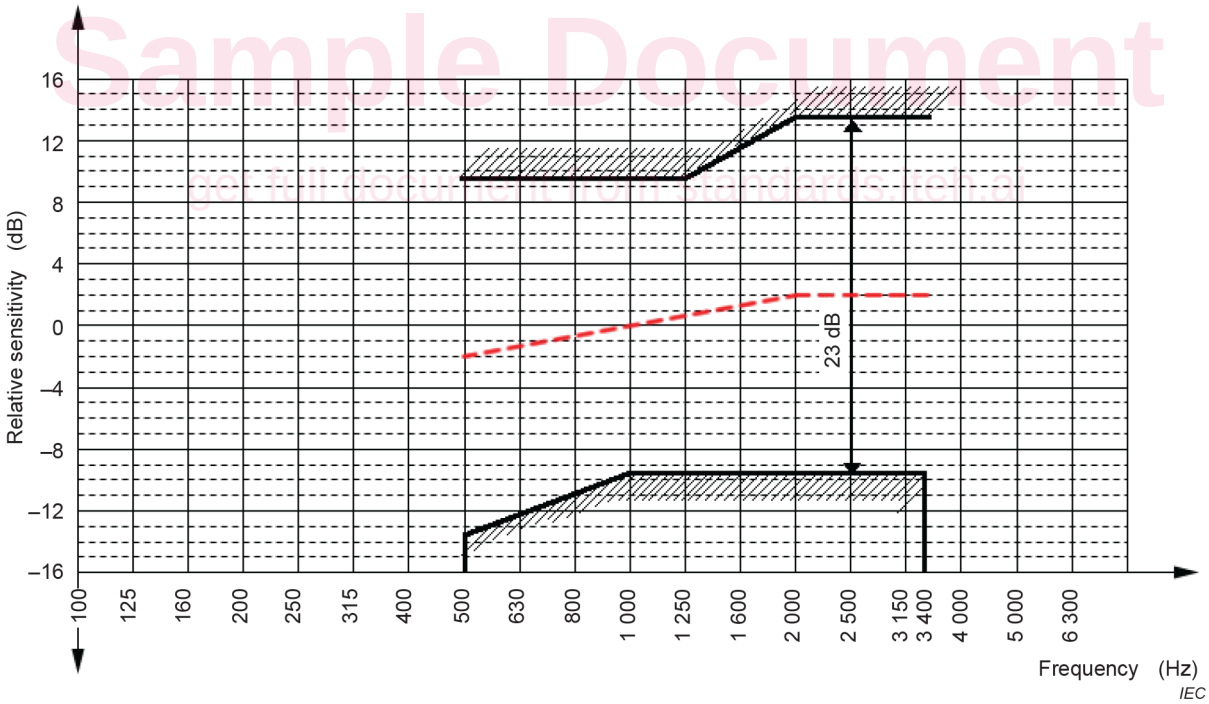

Figure 1 – Overall sensitivity at the hands-free unit