BOOTHS FOR SIMULTANEOUS INTERPRETATION

GENERAL CHARACTERISTICS AND EQUIPMENT

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International standards is normally carried out through ISO technical committees. each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75% of the member bodies casting a vote.

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International Standard ISO 2603 was prepared by ISO/TC43, *Acoustics*, Subcommittee SC2, *Building acoustics.*

This third edition cancels and replaces the second edition (ISO 2603:1983).

ISO 2603 was first issued in 1974; it was revised in 1983 and extended in scope to cover facilities for more than six languages. It is based on facilities built since then and evaluated by the Technical Committee of the International Association of Conference Interpreters (AIIC) and the Joint Service Interpretation-Conferences (JSIC) of the European Commission (EU). The present edition aims to bring the text into line with modern practice and technology as well as to clarify and simplify it for the user.

Annex A of this International Standard is for information only.

Introduction

Interpreters' booths are designed to meet three requirements:

a) acoustic separation between different languages spoken simultaneously, without mutual interference between languages interpreted or with the speaker in the hall;

b) efficient two-way communication between the booths and the conference hall;

c) a comfortable working environment enabling interpreters to maintain the intense effort of concentration required by their work.

Existing facilities, built in compliance with ISO 2603-1983 are still acceptable.

In addition to architects, project engineers, suppliers, etc., it is essential to consult conference interpreters experienced in technical consultancy, from the earliest stages of planning.

1. Scope

This International Standard lays down basic specifications to be considered when initial plans are prepared for building or renovating built-in booths for simultaneous interpretation in new or existing buildings.

It is applicable to all types of built-in booths with built-in or portable equipment.

NOTE 1: Mobile booths for simultaneous interpretation are specified in ISO 4043,

In designing new buildings, booths should be optimally integrated into the structure so that the conference room and the booths constitute a well-balanced unit. Design should also provide daylight for the conference hall and booths.

The requirements of clauses 4 and 5 apply to booths with built-in equipment, as defined in 3.1, and booths with portable equipment, as defined in 3.2.

The dimensional requirements apply equally to semi-permanent booths, as defined in 3.3, for which all other requirements should apply as far as is possible.

In addition to structural and design specifications, this International Standard specifies those components of typical conference facilities, which form the interpreters working environment.

NOTE 2: Clause 12 gives indications concerning the use of public address systems in conjunction with simultaneous interpretation systems.

2. Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 140-4:1998, *Acoustics - Measurement of sound insulation in buildings and of building elements - Part 4: Field measurements of airborne sound insulation between rooms.*

ISO 3382:1997, *Acoustics – Measurement of the reverberation time of rooms with reference to other acoustical parameters*.

IEC 60914:1988, - *Conference Systems - Electrical and audio requirements.*

3. Definitions

For the purposes of this International Standard, the following definitions apply:

3.1 **booth with built-in equipment**: booth intended for simultaneous interpretation containing built-in interpretation equipment

3.2 **booth with portable equipment**: booth intended for simultaneous interpretation, but not containing built-in interpretation equipment (see 3.4)

3.3 **semi-permanent booth**: booth not structurally integrated or which is intended to be moved within the building.

3.4 **interpreter's control panel**: panel containing all controls for listening and speaking.

NOTE The panel is normally a built-in fixture in the booth; if mounted on its own free-standing box, it is known as a console (the usual form for portable equipment).

4. Structural and design requirements for booths

4.1 Siting in relation to the building

Booths shall be located away from any outside sources of disturbance, such as: kitchens, public passages, halls, etc. (see 4.4).

4.2 Siting in relation to the conference hall

4.2.1 General

Booths shall be located at the back and/or sides of the hall, making sure there is good visual contact between all booths and with the control booth. They shall be raised no further above the floor of the hall than is necessary for a clear view (see 4.7) of all proceedings in the hall, i.e. all participants, lecturers, the chairman, etc., as well as all visual aids (projection screen, etc.). The view from the booths into the hall shall not be obstructed by persons standing. Thus, the booth floor should be at least 1,00 m above the hall floor assuming a level floor. Steep viewing angles shall be avoided (particularly with regard to projection screens). In larger halls the furthest distance from booth to rostrum, projection screen, etc. shall not exceed 30 m (see 4.6).

The booths shall be grouped to facilitate visual contact (see 4.7) as well as cabling between them.

4.2.2 Sound control booth

The sound control booth shall be placed close to the interpreters' booths to facilitate access and visual communication between them and provide the operator with a clear view of all proceedings, speakers, projection screen, etc. The operator shall have safe, quick and easy access both to the booths and to the hall.

4.3 Doors

Doors shall provide satisfactory acoustic insulation (see 4.8) and operate silently. They shall not interconnect booths through side-walls. An observation port-hole (no less than 0,20 m x 0,22 m) in the booth door and/or a light outside the door, indicating an active microphone within, are recommended.

Assigned languages and channels should be indicated on or adjacent to doors.

Curtains or baffles shall not be used instead of doors.

4.4 Access

The booths shall have easy access through a separate entrance from outside the hall, to avoid the interpreters disturbing the meeting when coming and going. The access corridor to the booths shall be at least 1,50 m wide to allow for safe and quick passage. Stairs, if any, shall be safe and easy to negotiate, bearing in mind emergencies, disabled persons, the need for quick distribution of documents (often on trolleys) and the transport of equipment. Emergency exits shall be readily accessible and escape routes clearly marked. There shall be rapid access from the booths to the hall.

4.5 Size of booths

4.5.1 General

Each booth shall be wide enough to accommodate the required number of interpreters seated comfortably side by side, each with sufficient table space to work conveniently on several documents spread alongside each other. The booth shall be high and deep enough to provide sufficient volume of air to enable adequate temperature control and draught-free air renewal (see 4.9) as well as sufficient space for the occupants to enter and leave without disturbing one another.

4.5.2 Minimum dimensions (see figure 1)

The size of a booth is governed by the need to provide sufficient work space and air volume per interpreter. The minimum number of interpreters per booth being two, the following minimum dimensions are required:

- width : 2,50 m
- depth : 2,40 m
- height : 2,30 m

NOTE 1 Where feasible, additional height can be an advantage for draught and temperature control.

For conference halls with up to six booths, one or more should be 3,20 m wide (to cover the need for the continuous presence of three interpreters).

For conference halls with more than 6 booths, all booths shall be at least 3,20 m wide.

NOTE 2 There is a growing trend for conferences using six or more languages. For a number of languages, this means at least three interpreters working on a booth; hence the need for so many booths to be at least 3,20 wide.

To avoid resonance effects, the three dimensions of the booth should be different from one another and, to avoid standing waves, the two side walls should not be exactly parallel.

4.6 Visibility

A direct view of the entire conference room, including the projection screen, is essential (see 4.2.1). In very large halls, where the rostrum or projection screen is more than 30 m away, visual support may be used, either in the form of one or more enlarged video display screens, or of video/data display panels in or immediately outside the booth.

4.7 Windows

Front windows shall be across the full width of the booth. The height of the pane shall be at least 1,20 m from the working surface upwards. Its lower edge shall be level with the working surface of the table, or lower (see figure 1).

Side windows, of at least the same height, shall be provided and shall extend from the front window for a length of 1,10 m along the partition between booths.

To ensure an unobstructed maximum range of view from the booths, vertical supports shall be avoided.

Front and side windows shall consist of untinted anti-glare glass satisfying the sound insulation requirements (see 4.8 and ISO 140-4). Panes shall be mounted in such a way as to avoid vibration, glare from hall lighting and mirror effects from inside the booth.

NOTE In the present state of glass technology, good results are obtained by using one vertical pane of laminated glass of adequate thickness in combination with work-lighting in the form of overhead spotlights.

Depending on the type of work lighting used (see 5.2), front panes may have to be slightly inclined.

4.8 Acoustics

The booths shall open onto an area not normally used by delegates, members of staff or the public. It shall not be adjacent to any noise source. Floors and walls in booths and corridors hall in any case be covered with sound-absorbent material.

NOTE Fabric, of sufficient thickness, on walls and perforated ceiling panels (see note in 4.9) have produced good results. It is recommended to use material with a weighted absorption coefficient (according ISO 11654) of $a_w \leq 0,6$.

Where flooring is hollow, care should be taken to prevent sounding-box effects from footsteps.

Particular attention shall be given to sound-proofing:

- between the interpreters' booths;
- between the interpreters' booths and the control booth;
- between the booths and the conference hall.

The following values shall apply (including air ducts, cable ducts, etc.):

- hall/booth : R'w = 48 dB
- booth/booth : R'w = 43 dB
- booth/corridor : R'w = 41 dB

R'w is defined in ISO 717-1; for measurement see ISO 140-4.

Air ducts (see 4.9) shall be properly sound-proofed to prevent noise transmission from booth to booth. The A-weighted sound pressure level generated by the air-conditioning system (see 4.9), lighting (see 5.2) and other sound sources shall not exceed 35 dB.

Reverberation time (see ISO 3382) inside the booth shall be between 0,3 s and 0,5 s measured in the octave bands from 125 Hz to 4000 Hz (booth unoccupied).

4.9 Air conditioning

As booths are occupied throughout the day, adequate ventilation is required.

The air supply should be 100% fresh (i.e. not recycled). The air-conditioning system shall be independent from that of the rest of the building and of the conference hall.

Air renewal shall be seven times per hour and the carbon dioxide concentration shall not exceed 0,1 %. The temperature shall be controllable between 18°C and 22°C by means of an individual regulator in each booth. Relative humidity shall be between 45% and 65%.

Air velocity shall not exceed 0,2 m/s. Air inlets and outlets shall be placed in such a way that interpreters are not exposed to draughts.

NOTE Good results have been obtained by introducing the air through a perforated ceiling and extracting it through vents at the rear of the booth, in the floor or the rear wall.

Air ducts shall not transmit sound from booth to booth or from other sources (see 4.8). They shall not pass through walls separating booths. To comply with acoustic requirements, noise-generating appliances such as expansion chambers, fireshutters, etc. shall be located outside the booths.

4.10 Cable ducts

Ducts suitable for looping control cables and associated connectors from booth to booth shall be provided. After insertion of cables, the openings shall maintain the sound insulation values of the walls they cross.

Access to ducts should be made easy and should not require the use of special tools.

5. Booth interior

5.1 General

Booth surfaces shall be non-reflecting, fire-resistant and non-toxic. They shall be appropriately sound absorbent (see 4.8) and shall neither attract nor harbour dust (pile carpeting on walls should be avoided) and be easy to clean.

5.2 Lighting

The lighting in the booth shall be independent of that in the hall, as the latter may have to be darkened for the projection of films or slides.

The booths shall be provided with two different lighting systems: one for work and the other for general purposes.

The work light source, which shall be non-fluorescent, is that lighting the working surface. Other lighting is required for various general purposes, for which a switch should be available by the booth door. Dimmer switches, for both systems, should be within reach of the interpreter working. No light source shall cause reflections on booth windows. Both systems, including dimmers and transformers shall be free of magnetic interference and audible noise.

The working surface available to each interpreter (see 4.5.1 and 5.4) shall have an individual adjustable compact table lamp or overhead light source of a least 300 lx, connected to a low voltage circuit. Its switch, within easy reach of the interpreter, should give continuous intensity control over a range from 100 lx to 350 lx, or else provide two levels: one, in the range between 100 lx and 200 lx and the other, between 300 lx and 350 lx (all values to be achieved at working surface level).

Table lamps and the range of tilt of their reflectors shall be so designed as to avoid glare in adjacent working positions or into the hall. The combined work-lighting shall provide coverage of the required intensity over the whole working surface of the booth. All light sources shall generate as little heat as possible and be of a suitable colour.

Lighting systems, including dimmers, shall cause no inductive electrical interference in neighbouring microphone circuits. Switches should be mechanically silent.

Where overhead work-lighting is provided, it shall be so positioned as to avoid shadows being cast by the working interpreter, on the working surface: on documents, equipment, fixtures, etc..

A spare mains outlet with two sockets shall be provided on each side wall. Connections for data transmission are desirable.

5.3 Colours

The colour scheme in the booth shall be appropriate for the restricted working space. Matt finishes should be used for all surfaces and equipment in the booth.

5.4 Working surface and document storage

See figure 1.

The working surface shall be firm enough for use as a writing table and for studying documents, reference books, etc..

It shall be horizontal and covered with shock-absorbent material to deaden noise that would otherwise be picked up by the microphones. The underneath surface shall have a smooth finish.

The characteristics of the working surface shall be as follows:

a) position: at the front of the booth across the full width, affording the seated interpreter an unobstructed view of the proceedings in the hall, care being taken to avoid transmission of vibration through booth walls;

b) height: 0,73 m ± 0,01 m from the floor level of the booth;

c) useable depth (i.e. clear of equipment, fixtures, etc.): 0,45 m in relation to the interpreters' angle of vision into the hall;

d) leg room: minimum depth 0,45 m, minimum height 0,66 m and should not be obstructed by working surface supports.

Document storage:

- shelving or trays for documents should not be placed under the working surface, but should be located towards the rear of the booth, within easy reach of the interpreter;

- light-weight trolleys for documents are recommended.

5.5 Seating

For each interpreter and technician, there shall be a comfortable chair with the following characteristics:

- five legs;
- adjustable height;
- adjustable back-rest;
- arm-rests;
- castors producing no perceptible noise;
- upholstery of heat-dissipating material.

Independent, movable foot-rests should be available.

6. Facilities for interpreters

6.1 Toilets

Separate toilets should be available within easy reach of the booths.

6.2 Interpreters' room

It is desirable to provide an interpreter's room near the booths, which interpreters and operators may use when not on immediate duty. It shall be sufficiently large to accommodate at least as many persons as there are working positions in the booths. It should have a private entrance and daylight.

It is preferable to divide this room into two areas serving the following purposes:

a) study of documents and posting of notices;

b) relaxation and stand-by.

The following equipment and furnishings are required:

- easy chairs, chairs and tables;
- cloakroom or coat-rack;
- telephone (inside and local outside lines);
- notice board (for posting assignments, etc.);
- individual pigeon-holes, or space to deposit personal belongings, documents, etc.

A separate outlet for a data modem is recommended. A photocopy machine should be available nearby.

7. Sound equipment in the interpreters' booths

7.1. General

The full specifications (numerical data included) for this purpose are given in IEC 60914. The following outline is given as a general indication, but equipment used should always comply with the latest version of IEC 60914.

7.2 Frequency response

The overall system (comprising microphone input at the speaker's position, amplifier stages, level controls, output terminals and interpreters' control panel for headphones), shall correctly reproduce audio-frequencies between 125 Hz and 12500 Hz. A gradual roll-off at the lower end of the frequency response is recommended in order to improve speech intelligibility.

7.3 Amplitude non-linearity

The system shall be free of perceptible distortion.

7.4 Noise and hum

Noise and hum shall not noticeably affect speech intelligibility.

7.5 Cross-talk between channels

Cross-talk from other channels (at the terminals for the interpreter's headphones) is to be avoided.

7.6 Level control

Level control of the floor channel should be manual. When automatic level control is used, compressor-limiters shall conform to IEC 60914.

8. Interpreters' control panel/console (see 3.4)

8.1 General

There shall be one control panel/console for each interpreter, containing individual controls for listening and speaking, including the relevant indicators. However, where there is no alternative, dual control consoles may be used by no more than two interpreters per booth, each interpreter having a full set of controls.

The control panel (see 3.4) may be on a free-standing console, but is normally fitted into the working surface at a convenient ergonomic angle (see IEC 60914) without obstructing the view of the room. It should be mounted in the interpreter's direct line of vision into the hall, leaving at least 0,45 m clear to the edge of the table in front of the interpreter (see 5.4), so as not to encroach on the available work space.

NOTE 1 If consoles are installed for permanent use, they should be sunk appropriately in the working surface.

Control panel/console dimensions shall be: (width x height x depth):

- maximum: 0,40 m x 0,15 m x 0,21 m;
- minimum: 0,30 m x 0,05 m x 0,125 m.

NOTE 2 For fitted control panels, the height above the working surface should not exceed 0,10 m.

The surface of the control panel shall be matt and non-reflecting.

Indicator lights shall be confined to active functions (microphone "ON", channel selected, channel occupied, etc.) and shall be in the immediate vicinity of the corresponding controls. The microphone "ON" light shall be evident to anyone present in the booth, without disturbing the occupants. In addition, a ring-shaped luminant on the microphone itself is recommended.

8.2 Controls

The status of all selector controls and switches shall be clearly recognisable.

On each control panel, controls shall be arranged according to ergonomic criteria into distinct areas as follows:

a) the listening area containing:

- an incoming channel selection device,
- a preselector for relay listening,
- a volume control,
- a separate tone controls for treble and bass;

b) the monitoring area, containing:

- monitoring loudspeaker with volume control and channel selector (if requested);

c) the microphone area, containing:

- an "ON/OFF" switch, with associated indicator light (automatically reverting the channel to the speaker (floor channel) in the "OFF" position),
- a muting device, whereby the channel is not returned to the floor channel, but which switches off the microphone indicator light;

d) the outgoing channel selection area, containing:

- the outgoing channel selection device and relevant displays and indicators;

e) the call facility area (optional), containing:

- call channel key to chairman/lecturer/control booth (optional),
- an incoming call facility (flashing indicator lights),
- call-line key.

Where a "system-ready" indicator is provided, it should be unobtrusive.

9. Functions of controls

9.1 Incoming channel selection device

Incoming channel selectors shall enable direct selection of any channel, without delay. These shall cause no mechanical or electrical noise. No short-circuiting shall occur between two channels when operating these controls.

9.2 Incoming channel pre-selection device

Incoming channel pre-selection shall be provided for at least one incoming language channel and the original channel.

Interpretation systems with more than eight language channels (plus one floor channel) shall provide for pre-selection of at least two incoming channels and the original channel.

9.3 Volume control

For adjusting listening levels, potentiometers with logarithmic progression shall be used which are audibly effective throughout their full range. Potentiometers shall be of high quality.

A hearing-damage warning, incorporated in the volume control is strongly recommended.

9.4 Tone controls

A stepless bass control shall be provided to attenuate lower frequencies. A stepless treble control shall also be provided to enhance higher frequencies. Bass and treble controls should be independent of each other throughout their respective ranges.

9.5 Headphone/headset terminals

For each interpreter work position, one headphone/headset connector socket is required, to the left of each work position, suitably fitted under the free-edge of the working surface, so that connector leads/cables to the control panel/console pass under the table and do not get in the way of the working interpreter or trail on the floor.

NOTE For the left-handed, it us useful to provide a second socket to the right of at least one work position per booth.

Where portable equipment is to be used (see 3.2), the connector lead/cable should be fitted with a plug to connect with the headphone/headset socket in the console.

9.6 Monitor loudspeakers

The function of the monitor loudspeaker(s) is to allow interpreter(s) to remove their headphones temporarily and continue to follow proceedings or to hear a channel different from that received on the headphones while the booth is silent.

This loudspeaker shall normally reproduce the floor channel and shall be muted automatically as soon as one of the microphones in that booth is activated; it shall have its own volume control and channel selector, if included, which should be independent of the incoming channel selector for the headphones.

9.7 Microphone controls

A control switch and a red indicator light shall be provided. The indicator light shall be more visible than any other indicator and evident to anyone present in the booth. If more than one microphone is activated in the same booth or on the same outgoing channel, the indicator light of the microphones concerned should flash, or interlocking should be used.

The status of the switch should be clearly recognisable by touch.

A self-releasing muting key to cut out the booth channel only, without switching back to the floor channel, shall be provided to allow the interpreter to cough or to clear his/her throat. Pressing of this key shall extinguish the "microphone ON" indicator light.

Switching the microphone ON or OFF shall make no mechanical or electrical noise perceptible by the delegates.

When the interpreter's microphone is OFF, the floor channel shall be automatically linked to the outgoing channel concerned.

9.8 Outgoing channel selection device

In addition to the assigned channel, each control panel shall have provision for selecting at least two other outgoing channels, independently of other panels in the same booth. The channel selected shall be clearly indicated, close to the selector, giving channel numbers and languages in intelligible form, i.e. alphanumerically.

Depending on practice, it should be possible to interlock outgoing channels, in order to prevent microphones in different booths from being connected to the same channel.

As a warning that another microphone is active on a given channel, when a second one is activated on the same channel, the "microphone ON" indicators should flash on the control panels/consoles concerned.

9.9 Call channel (to chairman/lecturer/control booth)

In the event of breakdown (for example a delegate starting to speak without a microphone or other emergency), interpreters should be able to warn the chairman and/or lecturer and technician discreetly via a special audio-link.

Where this link is operated from the control panel, a special key shall activate it, regardless of the microphone switch position.

9.10 Call-line key (messenger)

Provision should be made for a key by which a light or bell may be activated to call for documents, etc., from the usher.

9.11 Colour code for indicator lights

The following colours shall be used for indicator lights or light-emitting diodes (LEDs):

Colour	Function
red	microphone ON

red	outgoing channel engaged (busy/live)
yellow/amber/green	for all other functions

No luminant should be used for indicating “microphone OFF" status

10. Interpreters’ headphones

One set of headphones per interpreter shall be provided. Headphones shall have the following characteristics:

a) two earphones per set. Health requirements should be borne in mind when choosing the material and shape of headphones (earphones with earpieces inserted into the ear, or which fully enclose the ear are not acceptable). Where foam padding is provided, for hygienic reasons, it should be replaceable and the headphones wearable without it.

b) frequency range: 125 Hz - 12500 Hz;

c) mass: $\leq$ 100 g for headphones, $\leq$ 200 g for headsets, excluding the cable and connector;

d) ear contact pressure : $\leq$ 2,5 N;

e) headband: adjustable in length and sufficiently flexible to adapt to individual ear pressure requirements. It should not provoke perspiration;

f) connection to the socket at table edge by a lead approximately 1,50 m long and terminating in a non-locking plug (see 9.5).

NOTE Where free-standing consoles are used, the lead length should be adapted accordingly (see 9.5).

11. Booth microphones

There shall be one microphone for each interpreter. The directional characteristics of microphones shall be such that the interpreter can speak into it at a convenient distance while in a comfortable position. Microphones shall be mounted so as to avoid transmission of noises of mechanical origin. Headset combinations may be used, but do not suit all interpreters.

12. The use of public address systems in conjunction with simultaneous interpretation systems

Acoustic feedback and echoes in the hall may impair simultaneous interpretation and, in extreme cases, block the memory processes and/or damage hearing.

Moreover, part of each audience depends on headphone reception, which may be drowned by loudspeakers when operated at their normal level. Indeed some public address systems, which are not compatible, will cause interference. Therefore, every precaution shall be taken both, in the design and the volume control of the public address system, to avoid echo and feed-back from loudspeakers to microphones in the hall.

When the use of speech reinforcement cannot be avoided (for example, the majority of participants listening to conference proceedings in the original language), public address systems should be operated at their lowest level.

In order to provide for effective control in such situations, simultaneous (multi-channel) systems and public address (single channel) systems should:

- be fed from a single microphone system;

- have separate volume controls allowing individual level adjustment for each system, independently, so that lowering the public address level does not reduce the signal strength available to interpreters.

Level controls of the two systems should be located close to each other to enable both levels to be monitored in the same room, preferably by the same operator.

Annex A
(informative)

Bibliography

[1] ISO 717-1:1996, *Acoustics - Rating of sound insulation in buildings and of building elements – Part 1: Airborne sound insulation*.

[2] ISO 4043:1998, *Mobile booths for simultaneous interpretation – General characteristics and equipment.*

[3] ISO 11654:1997, *Acoustics – Sound absorbers for use in buildings – Rating of sound absorption.*