

TECHNICAL REPORT

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Building construction — Needs of disabled people in buildings — Design guidelines

iTeh STANDARD PREVIEW
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*Construction immobilière — Besoins des handicapés dans les
bâtiments — Lignes directrices pour la conception*

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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.

The main task of technical committees is to prepare International Standards, but in exceptional circumstances a technical committee may propose the publication of a Technical Report of one of the following types:

- type 1, when the required support cannot be obtained for the publication of an International Standard, despite repeated efforts;
- type 2, when the subject is still under technical development or where for any other reason there is the future but not immediate possibility of an agreement on an International Standard;
- type 3, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example).

Technical Reports of types 1 and 2 are subject to review within three years of publication, to decide whether they can be transformed into International Standards. Technical Reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

ISO/TR 9527, which is a Technical Report of type 3, was prepared by Technical Committee ISO/TC 59, *Building construction*, Subcommittee SC 1, *Dimensional coordination*.

It must be emphasised that the provisions of this Technical Report are guidelines and not standardized requirements. A number of sources of information have been drawn on in setting out the guidance contained in the publication, and it is recognized that further work is necessary to validate some of the criteria that it contains. The material is based on research carried out up till the mid-1980s. New research and national regulations or laws (such as the ANSI standard, regulations in response to the Americans with Disabilities Act, Canadian and Japanese standards) may provide for sizes which differ from those given in this Technical Report. Nevertheless, it is substantially correct.

Introduction

The problems of the handicapped, in as far as they present practical challenges to designers and architects, are the particular concern of a working group of the International Organization for Standardization. This group, set up by ISO's technical committee on building construction, has felt it appropriate - particularly in view of the prominence given this subject in 1981 - to draw up some guidance for planners and for the formulation of local regulation, standards, recommendations, etc.

This document provides that information; not in the form of a standard, though it may be drawn upon by anyone concerned with describing the functional needs of the handicapped, but in the form of a general account of basic and particular needs.

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Building construction — Needs of disabled people in buildings — Design guidelines

Background

In planning the environment, disabled people should not be treated as a group requiring special treatment. Special measures should be avoided in favour of a more general approach. Any action should be based on the concept that disabled people are to be given opportunities to participate in normal social life. This means, among other things, that people should be able to find employment, to go to ordinary schools, go shopping, visit friends, enjoy holidays and take advantage of neighbourhood facilities. For many people, this participation is impossible because of environmental barriers such as steps, narrow doors, high kerbs and the absence of lifts.

Today a very large proportion of the population in industrialized countries is handicapped as a result of age, illness or accident. It has been estimated that at least 10 % of the population has some kind of functional disability affecting movement, vision or hearing, or suffers allergic reactions.

Approach

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Basic accessibility in the environment would ensure that there are no barriers between handicapped people and participation in ordinary activities. Its advantages are felt not only by the disabled but also by elderly people and by children.

Accessibility will be influenced by requirements mainly from wheelchair users and people with impaired vision, but also to some extent by the needs of those with impaired hearing or allergy.

Even though basic accessibility may be achieved, a particular dwelling or workplace may need some further adaptation to specific individual requirements.

It is realistic to assume that provision for handicapped people in new buildings will be easier to implement than in the adaptation of existing and older buildings. It can also be expected that a higher standard of provision may be needed in buildings specially designed for handicapped people.

It is important that the intended accessibility really can be applied in planning and construction. The scale of provision for the handicapped in a building should be realistic and economic, and seen in relation to other demands and to the type of population it will serve. Consequently it may be better to comply with some reasonable requirements on a short term basis and aim, in the long run, at a gradual development towards better accessibility. Too high a requirement can mean in practice that nothing is implemented.

To summarize, the aim should be to meet some basic needs in the entire ordinary environment and to match more specific individual requirements by flexible and adaptable solutions.

Applications

Requirements put forward by handicapped people to achieve basic accessibility are relatively few, they can be met easily at the planning stage of a building and many of them can be instituted during reconstruction. Moreover, many of these requirements can be satisfied by rearranging facilities without making extensive alterations and adaptations. However, in order to achieve this implementation practically and economically, requirements should be identified and taken into consideration at an early stage of planning and construction.

Accordingly, standardization work is of great significance in this field, and the needs of the handicapped should be considered when ISO standards are drafted. By this means standards would contribute to gradual development towards better accessibility in the environment.

Fundamental needs of disabled people

People with impaired mobility

Wheelchair users

The main problems of wheelchair users are, obviously, moving about and working from a sitting position; thus many requirements are associated with the dimensions and other aspects of wheelchairs. The characteristics of people using manually propelled or electric indoor wheelchairs have been used as a basis for the following guidelines. They do not cater for electric outdoor wheelchairs which customarily require larger spaces.

The length of wheelchairs varies generally between 1100 mm and 1200 mm. The user's feet add approximately 50 mm to the overall length.

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The width of wheelchairs varies generally between 600 mm and 700 mm. To propel a chair manually by operating the rims of the main wheels a clearance of not less than 50 mm, and preferably 100 mm, is needed. Over longer travel distances additional space is needed.

Space requirements for manoeuvring are always related to the activities to be performed. Different users act in different ways, depending on individual performance and the type of chair used.

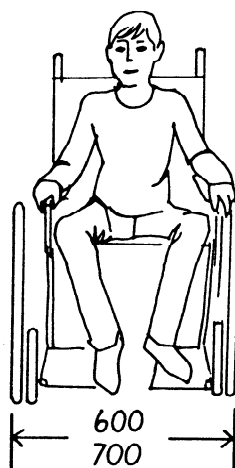


Figure 1

The width of wheelchairs generally varies between 600 mm and 700 mm.

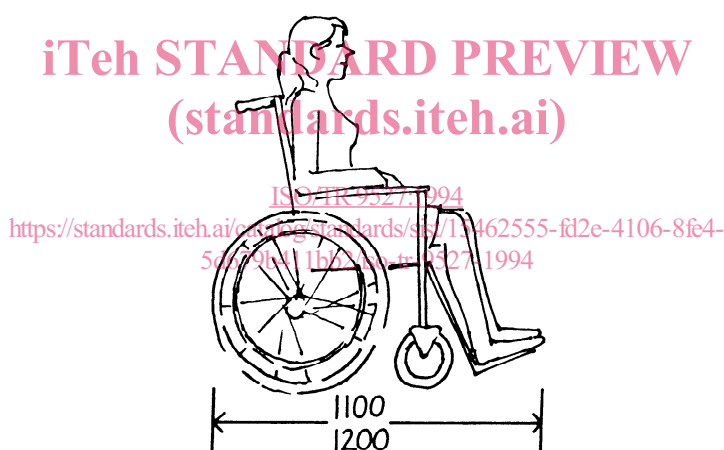


Figure 2

The length of wheelchairs generally varies between 1100 mm and 1200 mm. The user's feet add approx. 50 mm to the length.

When planning spaces in buildings to cater for wheelchair turning, a guide is to impose on the plan a circle of 1500 mm diameter. If this space is clear, the plan arrangement will normally be satisfactory. However, spaces in doorways, niches and under work-tops, desks or furniture can often be used when turning. Where a high degree of accessibility is required, such as in hospital buildings, spaces should be more generous.

Considerable energy is needed to propel a wheelchair manually up ramps, over changes in level or over soft or uneven surfaces. Thresholds and changes in level should be avoided. Ground and floor surfaces should be hard and even.

Most wheelchairs have a seat height of about 500 mm. The reach of a wheelchair user is constrained by his seated position. Access to room corners, work benches with base units, etc., is limited by the wheels of the chair and the footrest extension.

The reach of a wheelchair user is confined to a zone 700 mm to 1200 mm above floor level and not less than 400 mm from room corners.

For wheelchair access to a work bench, wash basin or table, a clear space for knees and footrests is needed. This should be at least 800 mm wide, 600 mm deep and 650 mm to 700 mm high. For wheelchair users the convenient height of worktops is between 750 mm and 850 mm; flexible provision is preferred.

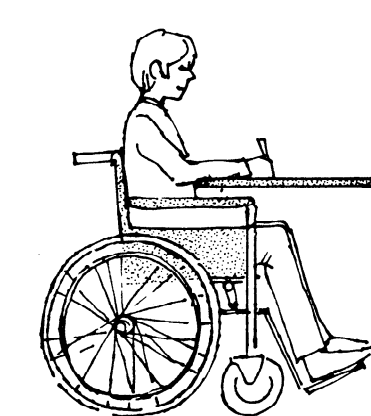


Figure 3

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A clear space for knees and footrests is needed under worktops, wash basins, etc.

Ambulant disabled people

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For ambulant disabled people to move securely, ground and floor surfaces should be even and slip-resistant. Handrails should be provided on stairs and ramps. Resting places, such as benches, should be provided along travel routes.

Where there is a change of ground or floor surface, these should have similar friction, to decrease the risk of stumbling.

Benches and chairs should have a seat height of approximately 450 mm and they should have armrests approximately 700 mm above floor level.

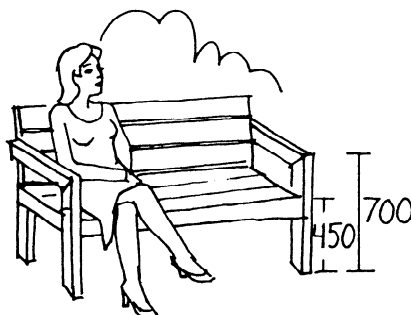


Figure 4

Benches, with a seat height of approx. 450 mm and with armrests approx. 700 mm above ground level, should be provided along travel routes.

People with impaired vision

For people with impaired vision, orientation can be aided by marking with the use of colour, illumination and, in certain cases, the texture of material. Design and plan arrangements should be simple and uncomplicated.

Contrasting colours should be used to aid the identification of doors, stairs ramps, passage ways, skirting boards, etc. Surfaces can be varied to indicate passage ways, changes of direction, etc. Orientation cues should be specially illuminated. Handrails can be used as a locational aid.

To minimize the risk of falls and injuries, hazards such as posts, single steps and projections from walls should be avoided wherever possible. Hazards should be emphasized by means of illumination and by contrasting colours and materials.

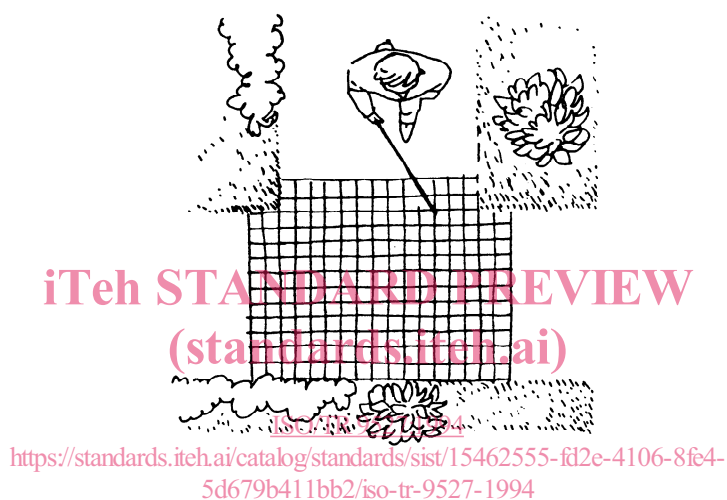


Figure 5

To indicate passageways, changes of direction, etc., varied surfaces should be used.

People with impaired vision are often sensitive to glare. Unwanted mirroring effects and reflections may be avoided by attention to the location of windows and illumination, and the choice of floor and wall surfaces.

People with impaired vision often have difficulty reading signs and other printed information. Blind people are restricted to tactile reading. Visual information in, for example, railway stations and airports should be supplemented with audible information.

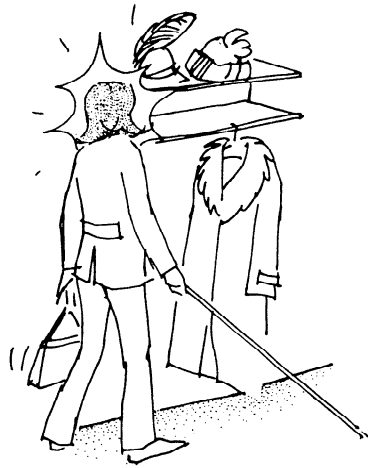


Figure 6

For people with impaired vision, projections from walls should be avoided.

People with impaired hearing

People with impaired hearing have particular difficulty in comprehending sounds and words in noisy environments. Rooms should be acoustically well insulated.

In public buildings loudspeaking systems should be clearly audible. Supplementary visual information should be provided, for example, in railway stations and airports.

People with impaired hearing may rely on lip reading; this is helped if there is good overall lighting which is non-reflective.

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They may have difficulty using telephones, etc. Audible signals may in certain cases be supplemented with visual signals.

Induction loops may be installed in auditoria, theatres, meeting rooms, etc., to improve sound reception for people using hearing aids. Infra-red sound reinforcement systems may also be provided in multiplex auditoria to avoid sound overspill from one area to another.

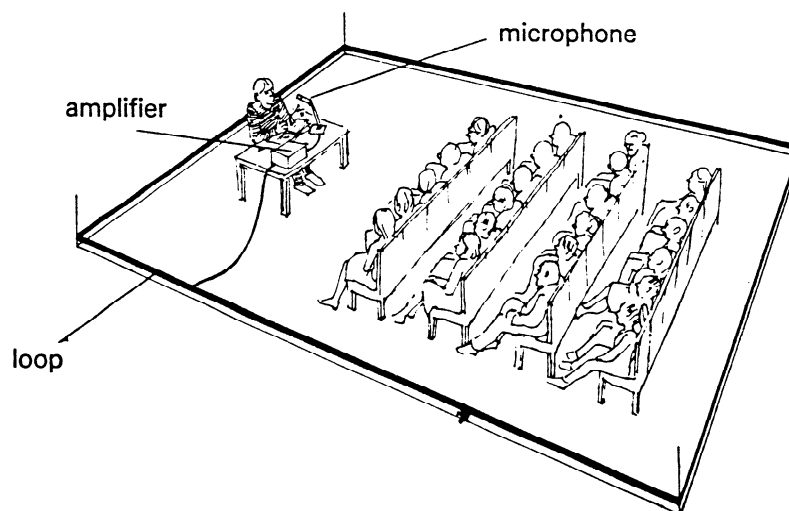


Figure 7

Principles of an induction loop system which improves sound reception for people using hearing aids.

Other groups of handicapped people

People with allergies

People with allergies may be sensitive to dust, mildew, pollen, animal hair, formalin, turpentine, etc. Some are sensitive to contact with substances and materials such as nickel, chromium and rubber. Equipment and materials causing allergic reactions should as far as possible be avoided in dwellings and buildings.

People with heart and lung diseases

People with heart and lung diseases may only be able to walk short distances and may be unable to climb stairs. The requirements of these people are similar to those with impaired mobility.

People with epilepsy, haemophilia, etc.

The requirements of those with epilepsy, haemophilia, etc. are related primarily to the design of dwellings and the need to minimize the risk of injury caused by falling or encountering obstacles.

People with incontinence, enterostomy operations, etc.

The requirements of people with incontinence and enterostomy operations (colostomies, ileostomies and urostomies) are mainly related to bathroom provision. In certain circumstances, for example in public WC compartments, it may be desirable to provide a special sink e. g. for emptying urine bags.

Mentally handicapped people

Mentally handicapped people form a very heterogeneous group and they have diverse environmental needs. Simple and uncomplicated solutions are preferred with clear and unambiguous signposting, etc.

Building components and spaces in buildings

Doors

Door width

To enable wheelchair users to pass through doors, the minimum width should be 760 mm, i.e. a 9M door. In certain cases the clear width should be 850 mm to 900 mm; for example if the wheelchair has to be turned in the doorway, where there is a door closer or threshold, or at entrance doors to public buildings and in other situations where there is considerable traffic.

Wheelchair manoeuvring space

To enable wheelchair users to approach doors, manoeuvring space is needed as shown in the figure. A corridor should have a width of at least 1200 mm to allow a 90° turn to be made through a 9M door. In narrow spaces sliding doors may be preferable.

Side-hung doors

To facilitate wheelchair manoeuvring, doors should be hung with the hinges in room corners. Doors opening out into corridors or circulation spaces should be avoided where possible.

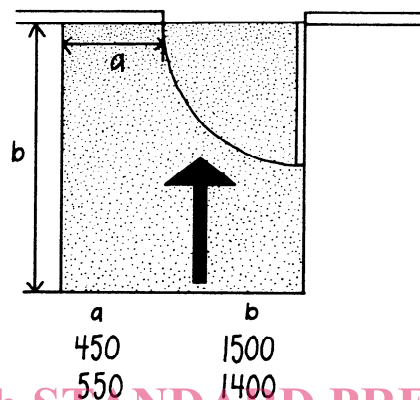


Figure 8

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Manoeuvring space needed for wheelchair users to approach doors. Depending on the free space beside the opening side of the door (450 mm or 550 mm), the depth of the free space should be 1300 mm or 1400 mm.

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Self-closing doors

Wheelchair users and others with impaired mobility have difficulty using self-closing doors. The force required to open them should be reduced as far as possible. Public buildings should preferably have sliding automatic doors.

Door identification

To help people with impaired vision to see doors, the door and frame should be in a colour which contrasts with the adjoining wall. Glass or glazed doors should be marked with a coloured band or frame, a little below eye-level.

Handles

Door handles and locks should be easy to manipulate. To facilitate the closing of a door by wheelchair users (for example to a WC compartment) the door should have a horizontal handle approximately 800 mm from the floor.

Self-closing doors should be equipped with an easily gripped vertical pull-handle with a length of at least 300 mm, and with the lower end approximately 800 mm above floor level. For many people, and especially those with impaired vision, it is helpful to make clear whether doors are to be pulled or pushed.

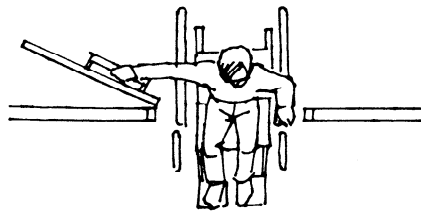


Figure 9

A horizontal handle facilitates the closing of doors from a wheelchair.

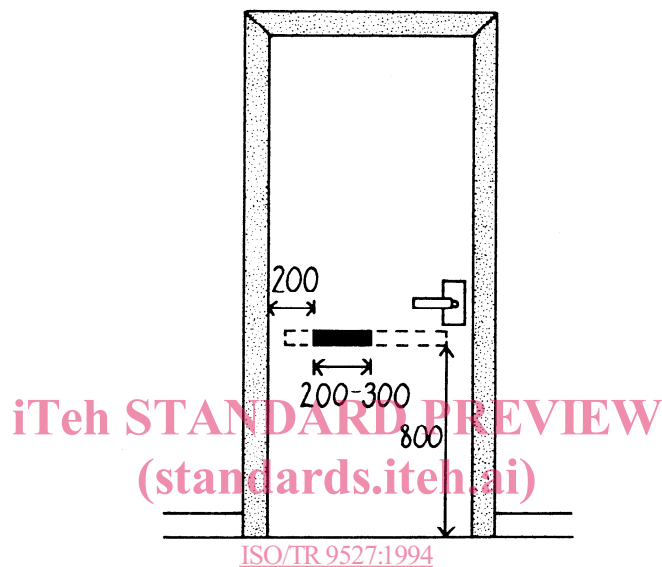


Figure 10

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This support handle should be placed 800 mm from the floor.

Thresholds

Raised thresholds should be avoided, but where this is not possible their height should not exceed 25 mm. Rubber thresholds are advantageous for wheelchair users.

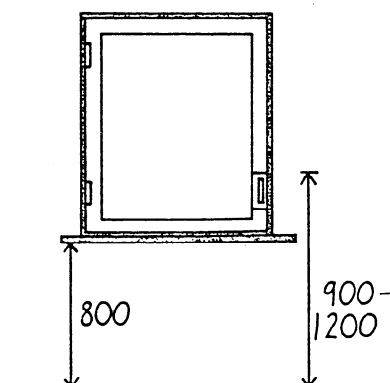


Figure 11

The sill should not be higher than 800 mm above floor level and the window controls should be located in the zone 900 mm to 1200 mm above floor level.