

Accessible Housing by Design—Lifts and Residential Elevators

UNIVERSAL DESIGN

People who inhabit and visit our houses come in all shapes and sizes, range in age from infant to senior and possess various ever-changing abilities and skills. As we grow up, grow old and welcome new people into our homes, our housing needs change. A house that is designed and constructed to reflect the principles of universal design will be safer and more accommodating to everyone who lives or visits there, regardless of age or ability.

Consistent with the philosophy of universal design, residential lifts and elevators provide an appropriate and equitable means of access for many people.

Traditionally, an elevator or lift in a private residence has been viewed as an expensive luxury exclusively for wheelchair users.

Now, people recognize that residential lifts and elevators can benefit many people—particularly seniors who want to remain in their homes despite loss of mobility, strength or agility.

This *About Your House* tells you about the types of residential lifts and elevators that are commonly available in Canada. It also tells you about some of the things you should consider when you choose and install an elevator or lift.

A WORD ABOUT TERMS

The words used when discussing “lifts,” “elevating devices,” “elevators” and “hoists” can be confusing as the terms are often used interchangeably. To further complicate things, in European countries “lift” is the word used for what is called an “elevator” in North America.

An overview of the key concepts of universal design is provided in “The Principles of Universal Design” text box on page 11.

Bolded terms throughout this fact sheet are defined in the “Glossary” text box on page 10.

This *About Your House* uses the terms **lift** and **residential elevator**.

LIFTS

A **lift** is an elevating device that can travel up and down as much as 2,450 mm (96 in.).

Lifts are typically used to provide access between different floors of a house, or from the ground level outside the house to an inside floor level.

There are three main types of lifts:

- Vertical platform lift
- Inclined platform lift
- Stair-chair lift

Vertical platform lift

A **vertical platform lift** can be equipped with **platforms** of various sizes and must be securely mounted on a solid and stable base (typically a poured-concrete slab), sheltered to protect users from rain and away from areas where drifting snow can accumulate. An unenclosed lift can become unusable if tight-packed snow and ice accumulate under the lift platform. A grounded, 110-volt electrical supply on a dedicated circuit is typically required.

Vertical platform lifts are often enclosed to prevent falls and to stop children or animals from getting under the platform. The manufacturer can provide a lift enclosure or an enclosure can be custom built.

If the lift is not enclosed, there should be a safety gate at the upper level to prevent falls when the lift platform is at the lower level (see Figure 1).

Inclined platform lift

Inclined platform lifts consist of a platform that moves up and down over an existing stairway (see Figure 2). They are often called **stair lifts**.

They are usually employed by people who use wheelchairs, but some models incorporate a fold-down seat for people who do not use a wheelchair but have difficulty using stairs.

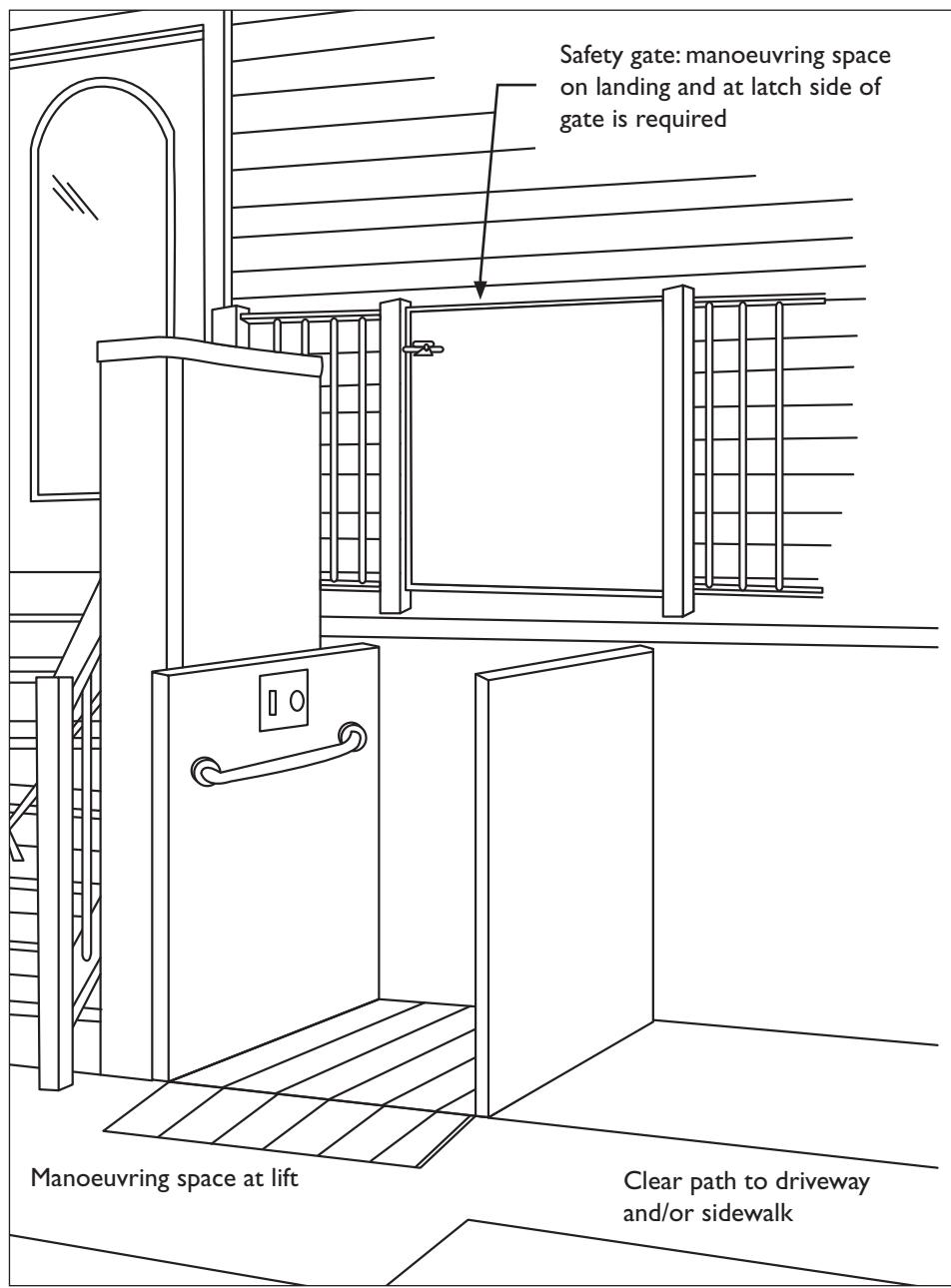


Diagram by: DesignAble Environments Inc.

Figure 1 Unenclosed vertical platform lift

The platform is typically supported by rails that are mounted to a wall on one side of the staircase. Platforms on stair lifts come in various sizes (see Table 1 on page 6). Ideally, the staircase should be at least 915 mm (36 in.) wide, although some models are available for stairs as narrow as 865 mm (34 in.). Remember that the narrower the staircase, the narrower the platform. Ensure that the platform you choose is large enough to fit your wheelchair or scooter (and any wheelchair or scooter that your family or visitors may have). A grounded, 110-volt electrical supply on a dedicated circuit is typically required.

One of the greatest barriers to installing an inclined platform lift in an existing stairway is available headroom. Often, headroom is minimal—particularly at the bottom of the staircase. Be sure that you have enough clearance.

Inclined platform lifts are easier to install and less expensive if the staircase is a single, straight run. There are platform stair lifts available that will turn corners on curved staircases, but they require wider staircases

to accommodate the platform as it turns and are far more expensive.

Inclined platform lifts need a clear floor space at the top and bottom of the staircase to allow the user to get on and off the platform. More space is required at the bottom of the stairs because the platform has to travel beyond the end of the last stair to reach the floor level. Remember that the rails extend beyond the bottom of

the last stair and will become a tripping hazard if they are not protected by a wall or some other barrier.

Some inclined platform lifts require a depression in the floor at the lower level so that the surface of the lift platform is levelled with the floor finish. Others incorporate a short access ramp. Some models also feature a platform that folds up against a wall when not in use.

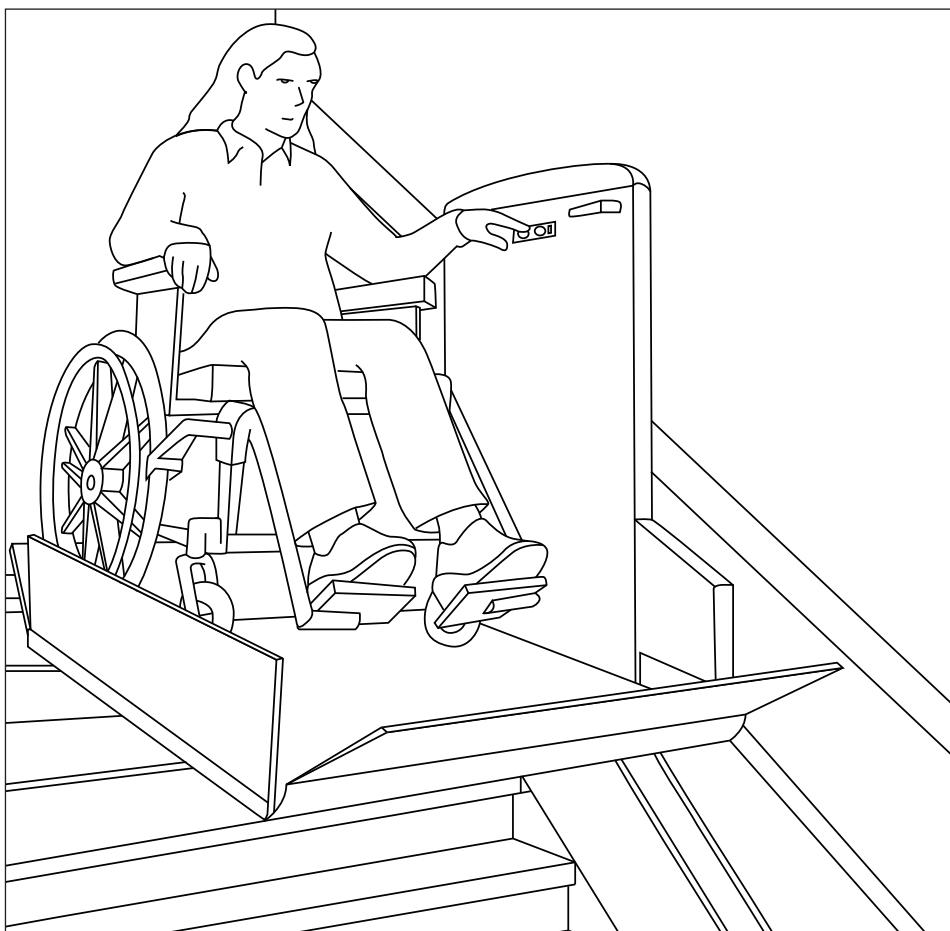


Figure 2 Inclined platform lift

Stair-chair lift

Stair-chair lifts consist of a seat that travels up and down a stairway (see Figure 3). The seat runs on a track or rails mounted either on the surface of the stairs or on an adjacent wall. If a stair-mounted track is used, it reduces the usable width of the stairs. This is of particular concern on narrow stairs.

The person using the stair-chair lift can be seated sideways to the stairs or facing

down the stairs. In addition, there are models with chairs that swivel to make it easier to get on and off the seat. More stairway width is required to sit sideways across the stairs.

Stair-chair lifts are easier to install and are less expensive if the staircase is a single straight run. There are stair-chair lifts available that can turn corners on curved staircases.

Stair-chair lifts require a clear floor space at the top and bottom of the staircase so the

user can get on and off the chair. Wheelchair users will need a wheelchair on each floor level served by the lift.

A concern about stair-chair lifts is getting off the chair at one of the most dangerous places in a house—the top of a flight of stairs. A stair-chair lift may not be the safest solution for people with transfer, balance or visual limitations.

RESIDENTIAL ELEVATORS

Residential elevator is the commonly used term for a lift that is enclosed in a shaft and can travel vertically as much as 15 m (49 ft.). They can be equipped with platforms of various sizes. Residential elevator styles range from the most basic, unfinished platform to fully enclosed cabins with safety gates and interior finishes such as hardwood, ceramic tile, marble and granite.

Residential elevators must be securely mounted on a solid and stable base (typically a poured-concrete slab), as well as braced to the structure of the house. There must also be a depression in the floor below the lift shaft—typically



Figure 3 Stair-chair lift

200–350 mm (8–14 in.) below the floor level of the lowest stop. A grounded, 220-volt electrical supply on a dedicated circuit is typically required.

The elevator platform and drive mechanisms are enclosed within a shaft, with access to the platform through a door or gate, which can be either at the narrow end or on the long side of the platform.

Doors and gates should have a safety **interlock mechanism** so they cannot be opened unless the platform is at their floor level. Doors can be manually operated or linked to the lift control system to open automatically when the lift arrives at a floor.

In new home construction, consider planning for the addition of a residential elevator by stacking closets above each other on the various floor levels. This space can later serve as a **hoistway** (see Figure 4). If the closets are suitably sized and incorporate a knock-out floor panel, adding an elevator later can be simple and cost-effective.

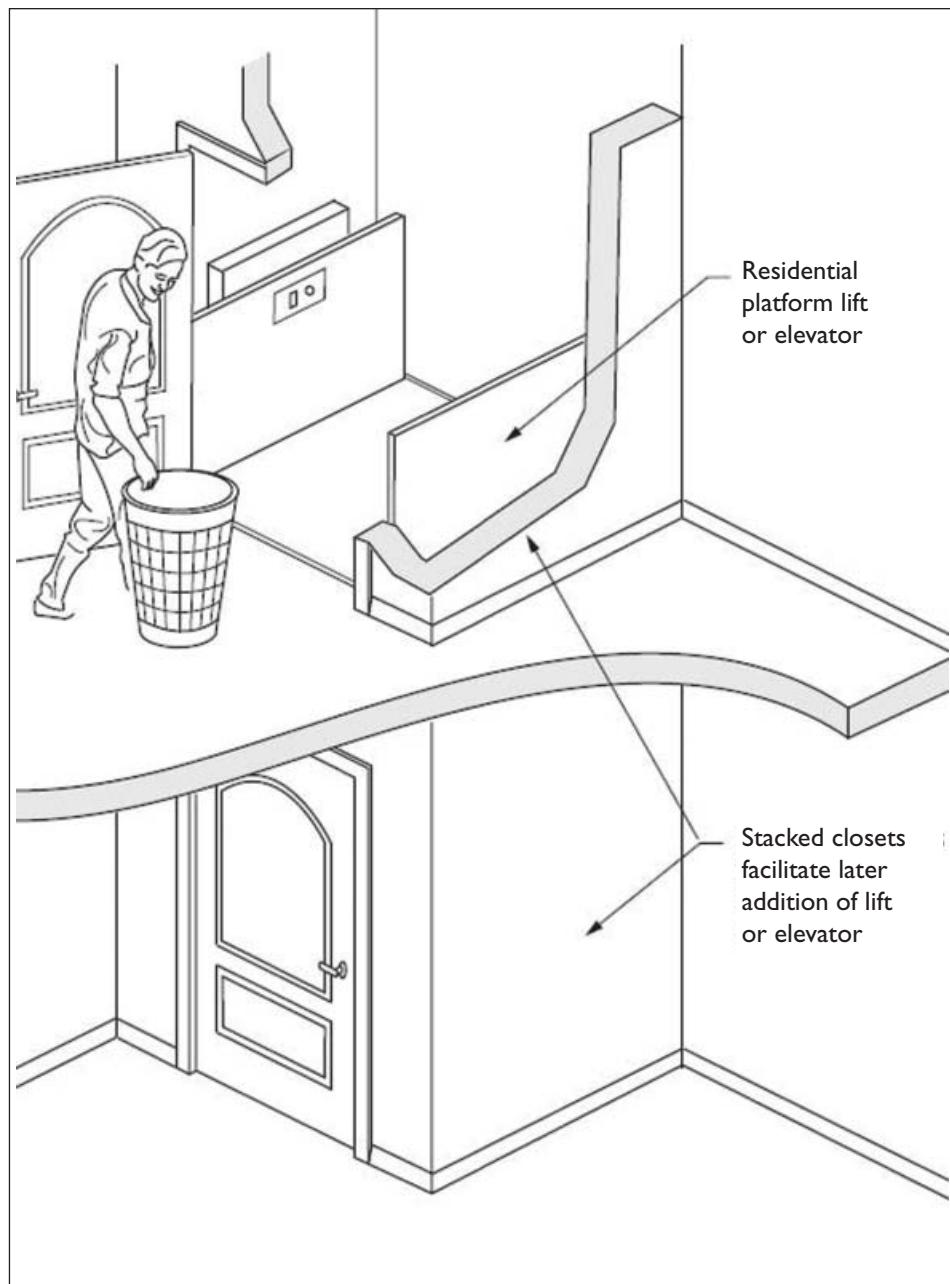


Diagram by: DesignAble Environments Inc.

Figure 4 Residential elevator

Is a residential elevator the same as a commercial elevator?

A residential elevator is less complex (and less expensive) than an elevator in an office or high-rise apartment or condominium building.

Commercial elevators are regulated provincially and must be licensed and regularly inspected. Residential lifts and elevators do not need licences.

THE ACCESS ROUTE

Regardless of the type of lifting device chosen, careful consideration should be given to the route used to reach the platform. There should be a clear and level area at least 1,525 x 1,525 mm (60 x 60 in.) in size right in front of the platform. Preferably, this area should be 2,100 x 2,100 mm (83 x 83 in.), particularly for scooters and larger wheelchairs. Ideally, there should be at least 600 mm (24 in.) of clear floor space adjacent to the latch side of the door or gate.

Table 1 Standard platform sizes for vertical lifts

Width	Length
914 mm (36 in.)	1,220 mm (48 in.)
914 mm (36 in.)	1,372 mm (54 in.)
914 mm (36 in.)	1,524 mm (60 in.)
1,067 mm (42 in.)	1,524 mm (60 in.)

Table 2 Standard platform sizes for inclined lifts

Width	Length
710 mm (28 in.)	914 mm (36 in.)
760 mm (30 in.)	1,120 mm (44 in.)
760 mm (30 in.)	1,524 mm (60 in.)

THE PLATFORM SIZE

Vertical and inclined lifts incorporate a **platform**—the floor surface of the lifting device. Tables 1 and 2 provide standard platform sizes for vertical or inclined lifts.

Taking into consideration the needs of all family members and visitors will help you decide on the device size and floor space required.

If you use a wheelchair or scooter, you should carefully measure the length and width of your mobility device and choose the platform size accordingly. If you use your wheelchair in a reclined position or if you use footrests, be sure to measure the chair while you are seated in a comfortable position. Remember also to include space for your caregiver or assistant if you require one.

SAFETY CONSIDERATIONS

Recommended safety features for lifts and residential elevators include:

- **interlock mechanisms** on doors and gates
- a manual system in case of a power outage or a mechanical malfunction
- sensors that prevent the lift or elevator platform from crushing objects that may be underneath it
- a **backup system**
- safety gates at locations where there is a drop-off when the lift or elevator platform is at a different level
- handrails on platforms
- proper lighting
- an emergency telephone or other on-device communication system.

A lift or residential elevator should never be used in an emergency. In an emergency, there may be a loss of power to the device, the elevator shaft may become contaminated with smoke, or the lift may take you into greater danger.

Always plan another way of leaving each level of your home. Strategies might include ramped exit routes or areas of refuge—areas of relative safety for use in an emergency situation, where people with limited mobility can await evacuation. In a residence, an outdoor balcony, deck or patio can be an area of refuge, as long as there is an accessible route to get there from inside the house. See the *About Your House* fact sheet *Accessible Housing by Design—Fire Safety for You and Your Home* for more information.

FREQUENTLY ASKED QUESTIONS

When should you consider installing a lift or residential elevator?

Lifts and residential elevators are typically used when the vertical change between two or more floor levels is significant and there is not enough space to construct a ramp. It is usually impossible to find space for a ramp inside a house if the change in floor levels is more than 200 mm (8 in.). See CMHC's *About Your House: Accessible Housing by Design—Ramps*, for more information about household ramps.

Lifts are also frequently used outside residences and in garages for access from the exterior ground level into the house. Again, lifts are typically used if there is not enough space for a ramp, if the vertical change is so great that the ramp length would be excessive or if a resident or caregiver cannot negotiate a ramp.

Do I need a building permit?

Other than for the simplest stair lift installations, you will likely need a building permit. It is important to note that a building permit is necessary whenever the installation of a lift or residential elevator requires structural changes to the house or affects safety systems such as stairs, fire separations, guardrails and so on.

Are there standards, licences and inspections?

Lifts and residential elevators should be regularly inspected and serviced.

Lifts in residences do not have to meet any specific safety standards. They do not need a licence and there is no legal requirement that they be inspected.

Residential elevators may have to meet specific safety standards. They may need a licence and they may need an inspection. Call your municipal office and ask a building inspector about safety standards, licensing and inspection for residential elevators.

Lifts and residential elevators should comply with the latest Canadian Standards Association (CSA) standards.

CSA standards for lifts and residential elevators:

- CAN/CSA-B355-00
Lifts for Persons with Physical Disabilities
- B355S1-02 Supplement #1 to CAN/CSA-B355-00,
Lifts for Persons with Physical Disabilities
- CAN/CSA-B613-00 Private Residence Lifts for Persons with Physical Disabilities

What type of maintenance is required?

Lifts and residential elevators are mechanical devices that can break down and therefore need regular servicing. Maintenance is generally complex and should be done by an expert.

Table 3 Approximate purchase and installation cost of various types of lifts

Type	Cost
Unenclosed vertical platform lift	\$5,000–8,000
Enclosed vertical platform lift	\$15,000 and up
Residential elevator	\$20,000 and up
Inclined platform lift	\$10,000–12,000 (significantly more if staircase is curved)
Stair-chair lift	\$3,000–8,000 (significantly more if staircase is curved)
Lift service contract	\$200–500 per year

Purchasing a maintenance contract from a reputable supplier is a very good idea.

What about cost?

As with all construction, cost can vary significantly depending on the equipment, materials and finishes that you choose, as well as the configuration of the existing house.

Table 3 provides cost estimates for general budgeting purposes only. Cost may vary significantly, depending on site conditions, market conditions and inflation, among other factors.

To make your dollars go further, consider buying from a company that sells refurbished equipment. Residential lift and elevator equipment is frequently recycled, providing a reliable, cost-effective and environment-friendly solution.

Where do I start and who can help me?

The design of a lift or residential elevator installation is typically complex, involving architectural, structural and electrical elements. It is not a project to be tackled by a handyman.

One starting place is lift and residential elevator manufacturers or local medical equipment suppliers. A home visit is always required, at which time the supplier makes recommendations about the feasibility of different types of lifts and residential elevators. It is always a good idea to have a health professional, such as an occupational therapist, present for the site visit, to ensure that the type of device being recommended will meet your current and future needs.

You can also start by consulting an architect, an interior designer or another design professional who is familiar with the design of accessible residences. During the design, work with the designer and a knowledgeable health professional to determine the best type of lift or residential elevator to meet your needs.

ADDITIONAL RESOURCES

For more ideas on how homes can adapt to life's changes, consult CMHC's publication *FlexHousing™: Homes that Adapt to Life's Changes*.

Websites

Régie du bâtiment du Québec—Lifts for Persons with Physical Disabilities
(April 2010)
[http://www.rbq.gouv.qc.ca/
dirEnglish/general/lift.asp](http://www.rbq.gouv.qc.ca/dirEnglish/general/lift.asp)

Glossary

Backup system: A system that provides electricity to a lift or residential elevating device when the primary power source is not available, such as during a blackout.

Hoistway: The clear space within which the residential elevator platform and related equipment are located.

Inclined platform lift: A lift device consisting of a platform which travels up and down a stairway on a track.

Interlock mechanism: A safety mechanism which locks a door or gate, preventing access to a lift or residential elevator platform unless the platform is at the floor level of the door or gate.

Lift: A mechanical device used to overcome changes in floor and ground level.

Platform: The floor surface of a lift or residential elevator on which the user stands, or positions his/her wheelchair or scooter.

Residential elevator: A commonly-used term for a vertical platform lift that is enclosed within a shaft.

Stair lift: A commonly-used term for an inclined platform lift.

Stair-chair lift: A lift device consisting of a seat which travels up and down a stairway on a track.

Vertical platform lift: A lifting device consisting of a platform which travels up and down.

The Principles of Universal Design

Universal design is defined as:

“The design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.”

The concept is an evolving design philosophy.

Principle 1: Equitable use

This principle focuses on providing equitable access for everyone in an integrated and dignified manner. It implies that the design is appealing to everyone and provides an equal level of safety for all users.

Principle 2: Flexibility in use

This principle implies that the design of the house or product has been developed considering a wide range of individual preferences and abilities throughout the life cycle of the occupants.

Principle 3: Simple and intuitive

The layout and design of the home and devices should be easy to understand, regardless of the user's experience or cognitive ability. This principle requires that design elements be simple and work intuitively.

Principle 4: Perceptible information

The provision of information using a combination of different modes, whether using visual, audible or tactile methods, will ensure that everyone is able to use the elements of the home safely and effectively. Principle 4 encourages the provision of information through all of our senses—sight, hearing and touch—when interacting with our home environment.

Principle 5: Tolerance for error

This principle incorporates a tolerance for error, minimizing the potential for unintended results. This implies design considerations that include fail-safe features and gives thought to how all users may use the space or product safely.

Principle 6: Low physical effort

This principle deals with limiting the strength, stamina and dexterity required to access spaces or use controls and products.

Principle 7: Size and space for approach and use

This principle focuses on the amount of room needed to access space, equipment and controls. This includes designing for the appropriate size and space so that all family members and visitors can safely reach, see and operate all elements of the home.

To find more *About Your House* fact sheets plus a wide variety of information products, visit our website at www.cmhc.ca. You can also reach us by telephone at 1-800-668-2642 or by fax at 1-800-245-9274.

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Order No. 63245

Measuring the Effort Needed to Climb Access Ramps in a Manual Wheelchair

Order No. 63916

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