

Accessible Housing by Design— Lifts and Residential Elevators

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 the use of wheelchair users.

Now, people recognize that residential lifts and elevators can benefit many people—particularly seniors who want to remain in their homes despite a loss of mobility, strength or agility. They can also be useful to anyone who frequently moves laundry or groceries between the floors of a house.

UNIVERSAL DESIGN

People who inhabit and visit the houses and homes we live in come in all shapes and sizes, ranging from infants to seniors, with various ever-changing abilities and skills. As we grow up, grow old and welcome new people to our homes, our housing needs change. A house or dwelling that is designed and constructed to reflect the principles of Universal Design will be safer and more accommodating to the diverse range of ages and abilities of people, who live in and visit these homes.

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 it, in European countries *lift* is the word used for what is called an elevator in North America.

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

WHAT ARE LIFTS AND RESIDENTIAL ELEVATORS?

A **lift** is an elevating device that can travel up and down as much as 2,450 mm (8 ft.).

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

*Refer to the Principles of Universal Design on page 8.



Photo by Savaria Concord Lifts inc.

Figure 1 Residential lift

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 (50 ft.).



Photo by Savaria Concord Lifts inc.

Figure 2 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.

TYPES OF RESIDENTIAL LIFTS

There are four main types of residential lifts:

- Vertical platform lift
- Residential elevator
- Inclined platform lift
- Stair-chair lift

A **vertical platform** lift can climb as much as 2,450 mm (8 ft.) and can be equipped with platforms of various sizes.

A vertical platform lift 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.

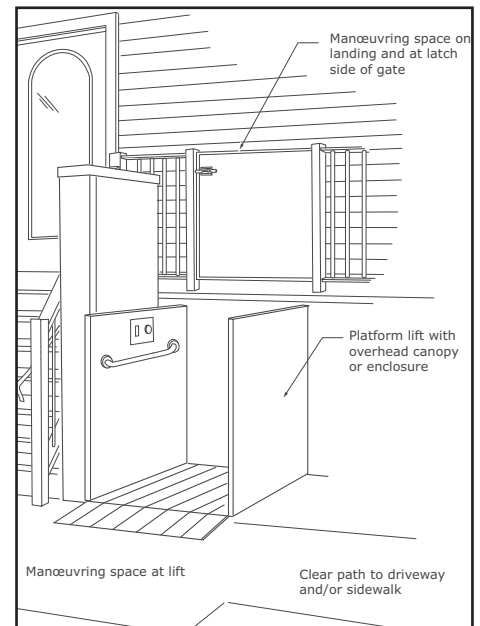


Diagram by Matthew Fleet

Figure 3 Unenclosed vertical platform lift

Residential elevators can move up and down as much as 15 m (50 ft.) and can be equipped with platforms of various sizes. Residential elevator style range from the most basic, unfinished open platform to fully enclosed cabins with safety gates and interior finishes such as hardwood, ceramic tile, marble and granite.



Photo by Savaria Concord Lifts inc.

Figure 4 Enclosed vertical platform lift

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 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 the long side of the platform.

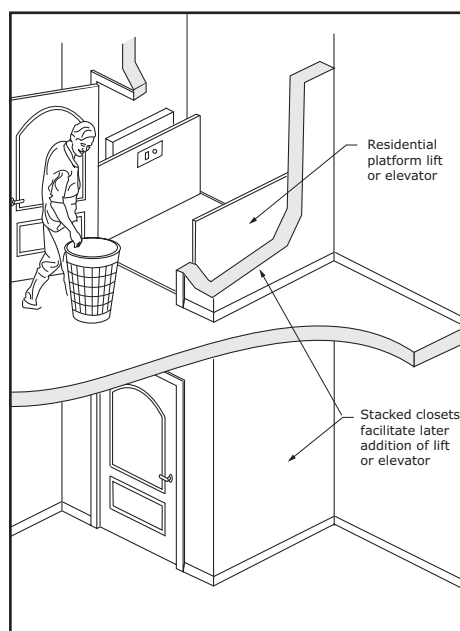


Diagram by Matthew Fleet

Figure 5 Residential elevator

Doors and gates should have a safety interlink so they cannot be opened unless the platform is at the 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. If the closets are suitably sized and incorporate a knock-out floor panel, adding an elevator later can be simple and cost-effective. More ideas on how homes can adapt to life's changes can be found in CMHC's FlexHousing™ program.

Inclined platform lifts consist of a platform that moves up and down over an existing stairway. They are usually called stair lifts. They are usually used 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—an example of the Universal Design Principle of Flexibility in Use.

The platform is typically supported by rails that are mounted to a wall on one side of the stair. Platforms on stair lifts come in various sizes. Ideally, the stair 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 stair, 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 the available headroom. Often, stair headroom clearance is minimal—particularly at the bottom of the stair. Be sure that you have enough headroom.



Photo by Savaria Concord Lifts inc.

Figure 6 Inclined platform lift

Inclined platform lifts are easier to install and are 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 stairs 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 stairs 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 support rails extend beyond the bottom of the last stair, and will become a tripping hazard if they are not protected by a wall or 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 level with the floor finish.

Others incorporate a short ramp for access to the platform. Some models also feature a platform that folds up against a wall when not in use.



Photo by Savaria Concord Lifts inc.

Figure 7 Stair platform lift—note the track extension at the bottom of the stair

Stair-chair lifts consist of a seat which travels up and down a stairway. The seat runs on a track or rails mounted on either 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 for others. 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 stair so the user can get on and off the chair.

Wheelchair users will need a wheelchair on each floor level served by the lift.



Photo by Savaria Concord Lifts inc.

Figure 8 Stair-chair 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.

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 mm² (60 sq. in.) right in front of the platform. An area of 2,100 mm² (84 sq. in.) is preferable, 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.

WHEN SHOULD YOU CONSIDER INSTALLING A LIFT?

Lifts 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 within 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, or if the vertical change is so great that the ramp length would be excessive, or if a resident or caregiver cannot negotiate a ramp.

WHAT ABOUT PLATFORM SIZE?

Vertical and inclined lifts incorporate a platform—the floor surface of the lifting device.

Width	Length
914 mm (36 in.)	1,372 mm (54 in.)
914 mm (36 in.)	1,220 mm (48 in.)
914 mm (36 in.)	1,524 mm (60 in.)
1,067 mm (42 in.)	1,524 mm (60 in.)
Standard platforms sizes for vertical 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.)
Standard platforms sizes for inclined lifts	

Taking into consideration Universal Design Principle 7, evaluate the size and space required for the approach and use of the device.

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 ...and don't forget about your visitors.

SAFETY CONSIDERATIONS

Lifts and residential elevators are a means to enter or leave a house or to move between floors of a house.

They are not exit systems. 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 to an area of greater danger. A lift or residential elevator should never be used in an emergency.

Always plan another way of leaving each level of your home. Strategies might include an alternate ramped exit route or incorporating 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.

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,
- under-platform sensors,
- backup power,
- safety gates at locations where there is a drop-off when the lift/elevator platform is at a different level,
- handrails on platforms,
- proper lighting and
- an emergency telephone or other communication system.

WHAT TYPE OF MAINTENANCE IS REQUIRED?

Hoists and ceiling lifts are mechanical devices that can break down. They need regular servicing. Maintenance is generally complex and should be done by an expert. Purchasing a maintenance contract from a reputable supplier is a very good idea.

DO I NEED A BUILDING PERMIT?

Other than 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 ABOUT COSTS?

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

The following are the approximate costs in 2006 for purchase and installation 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 stair is curved)
Stair-chair lift	\$3,000–8,000 (significantly more if stair is curved)
Lift service contract	\$200–500 per year

These figures are for general budgeting purposes only. They may vary significantly, depending on site conditions, market conditions and inflation, and many 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 environmentally -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 or 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.

Another starting place is an architect, interior designer or other 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.

HEALTHY HOUSING™ CHOICES

Many types of lift and residential elevator installations involve significant construction activities, as well as refinishing and redecorating. Consider the

following to maximize resource efficiency, environmental responsibility and provide a healthier housing environment.

- Use kiln-dried, finger-jointed spruce lumber.
- Minimal use of pressure treated lumber.

- Use water-based paint and stain finishes.
- Use reclaimed or recycled materials for construction and finishing.
- Choose products and finishes that come from renewable resources.

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 infers that the design is appealing to everyone and provides an equal level of safety for all users.

Principle 2—Flexibility in use

This principle infers that the design of the house, home or product has been developed considering the 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 safely and effectively use the elements of the home. Principle 4 encourages the provision of information appealing to all of our senses when interacting with our home environment, using our sight, hearing and touch.

Principle 5—Tolerance for error

Principle 5 incorporates a tolerance for error, minimizing the potential for unintended results. This infers design considerations that include fail-safe features and gives thought to how all users may safely use the space or product.

Principle 6—Low physical effort

Principle 6 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

Principle 7 focuses on the amount of room needed to access space, equipment and controls. This includes designing for the appropriate size and space for all family members and visitors to safely reach, see and operate all elements of the home.

GLOSSARY OF COMMON TERMS

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

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

Door/gate interlock: 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.

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/down a stairway on a track.

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

Pit: The space within a hoistway below the lowest residential elevator stop, which is required to accommodate the platform.

Platform: The floor surface of a lift or residential elevator on which the user stands, or positions their 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.

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

OTHER RESOURCES

Government of Quebec

- Information on stair platform and chairs lifts showing the types of devices to meet your needs and safety issues.

www.rbq.gouv.qc.ca/dirEnglish/general/lift.asp

Wikipedia

- Wikipedia, the free internet encyclopedia. Good information on the different types and models of chair and stair lifts.

<http://en.wikipedia.org/wiki/Stairlift>

Stair lift Co.

- Although the company is located in the UK, this is an excellent site for explaining the different types of lifts and layouts that are possible, in addition to various considerations to be made when deciding on the appropriate lift or elevating device.

www.stairlift.co.uk

Regulatory Information

Government of Nova Scotia

- Nova Scotia Safety Standard for Elevating Devices for the Physically Disabled Regulations
- www.gov.ns.ca/just/regulations/regs/ela3381.htm

Manufacturers

- Concord and Savaria are both dedicated to developing and manufacturing elevator products.

www.concordelevator.com

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.

Priced Publications

<i>Flex Housing™: The Professional's Guide</i>	<i>Order No. 61844</i>
<i>Flex Housing™: Homes that Adapt to Life's Changes</i>	<i>Order No. 60945</i>
<i>Healthy Housing™: Renovation Planner</i>	<i>Order No. 60957</i>

Free Publications

About Your House *fact sheets*

<i>Preventing Falls on Stairs</i>	<i>Order No. 63637</i>
<i>Accessible Housing by Design—Ramps</i>	<i>Order No. 65023</i>
<i>Design Options for barrier Free and Adaptable Housing</i>	<i>Order No. 63909</i>
<i>Measuring the Effort Needed to Climb Access Ramps in a Manual Wheelchair</i>	<i>Order No. 63916</i>
<i>Evaluation of Optimal Bath Grab Bar Placement for Seniors</i>	<i>Order No. 63245</i>

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