ABOUT YOUR HOUSE

CE 63b

Accessible Housing by Design—Appliances

UNIVERSAL DESIGN

People who inhabit and visit our houses come in all shapes and sizes, range in age from infants to seniors, 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 built to reflect the principles of universal design is safer and more accommodating to everyone who lives or visits here, regardless of age or physical ability.

Appliance designers have increasingly taken into consideration the principles of universal design, realizing that this increases the usability of appliances, making them simpler to use, quieter and safer, equipped with dials and controls that are easier to operate and read.

SELECTING AN APPLIANCE

Many factors need to be considered when selecting an appliance, whether it is a toaster or a washing machine, a rice cooker or a can opener. The most important consideration is that it suit your needs, as well as the needs of your family. Make sure the appliance is compatible with your lifestyle and individual requirements concerning safety, usability, cost, storage, cleaning, programming and ease of installation.

Safety

The first consideration in selecting any appliance is safety. The CSA certification mark on electronics and appliances provides assurance that these products have been tested and certified to meet applicable Canadian standards for performance and safety.

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.

Be sure to look for the CSA mark when purchasing any appliance (see Figure 1).

Here are some personal safety issues to consider when selecting an appliance:

- Is it easy to operate?
- Are the controls easy to read?
- Is it easy to install?
- Is it too heavy to handle?
- Is it equipped with a fail-safe feature, such as an automatic shut-off?





- Is it equipped with a lockout feature to prevent turning it on inadvertently?
- Does it pose a burning hazard?

Automatic shut-off is a design feature available with some appliances, such as kettles, irons and even stoves. This feature builds in a tolerance for error that can prevent fires and injuries. Some stoves incorporate a motion detector feature that automatically shuts off the stove if no movement is detected within a pre-set amount of time. Selecting an appliance with an automatic shut-off is



Diagram by: Canadian Standards Association

Figure I CSA certification marks

sensible for everyone, but is especially useful in homes where there are children and/or aging relatives.

Operating smaller appliances, such as waffle irons and toaster ovens, can pose a safety hazard if the exterior of the appliance heats up. Look for appliances with a **cool touch** feature that prevents the exterior surfaces from becoming extremely hot. Cool touch appliances are especially appreciated by people who are blind or have low vision who may orient themselves by "feeling" their way around the kitchen.

Selecting stoves or countertop ranges with controls at the side or in front, rather than at the back is a good idea. This will increase safety for everyone, especially anyone who operates a stove from a wheelchair, in that it eliminates the need to reach over the burners.

However, side or front controls such as knobs and buttons can also be misused by children who can reach them. Limiting access to appliances, such as stoves, can be achieved by installing an **override switch** that must be activated prior to operating the appliance. The placement of the override switch should be carefully

Considerations When Purchasing an Appliance

- What safety issues do I need to consider?
- Will I have sufficient manoeuvring space?
- What features does it offer?
- Are the controls intuitive and easy to use?
- What programming options do I want?
- Can I set it up myself, or do I need to hire a professional?
- Do I have an appropriate place to store the appliance?
- Will it be easy to clean?
- Is cost a factor?
- How energy-efficient is it?
- Can I test it before I purchase it?
- Where do I find more information for comparing similar appliances?

considered so that it is protected against use by those at risk but still easily accessible to others. While this feature is an important consideration for households with children, it should also be considered in

households with people with cognitive disabilities and people with dementia.

Safety hazards can result from the inadvertent use of an appliance, particularly children climbing into a washer, dryer or oven. Some appliance manufacturers offer a **lock-out feature** that can be set to prevent doors from being opened.

Choose appliances that incorporate duplicate alert systems and/or safety features (also known as redundant cueing features) that reinforce the safe use of the appliance for everyone. For example, a

toaster-oven that emits a sound when the food is ready, but also shuts itself off, or a microwave oven that "beeps" when the time is up but also flashes a text message on the control panel.

Manoeuvring space

When it comes to kitchens and laundry rooms, manoeuvring space around appliances is a key consideration, as space may be required for a walker or a wheelchair. A clear manoeuvring space of at least 1,500 mm x 1,500 mm (59 in. x 59 in.) should be provided for people who use a manual wheelchair and 2,100 mm x

2,100 mm (83 in. x 83 in.) for people who use a larger power wheelchair or a scooter.

It is always important to consider how work is going to be done. Planning for clear floor space around all appliances in the kitchen is an important design consideration (see Figure 2).

Ease of use

There is a wide range of choice available to us when purchasing an appliance. Appliances come in a variety of colours, styles, speeds and with various levels of complexity of operation. Refer to the "Considerations When Purchasing an Appliance" text box for important issues to

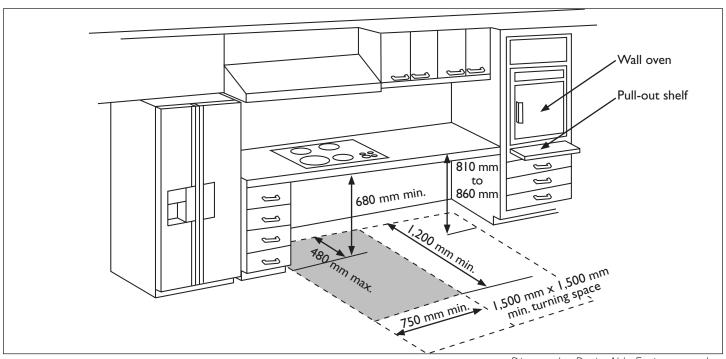


Figure 2 Clear floor space requirements around appliances

Diagram by: DesignAble Environments Inc.

consider when assessing the ease of use of an appliance.

A mixer that is too heavy to lift will remain in the cupboard; a dishwasher with too many programming options will be run at only one speed; a vacuum that is too heavy or awkward to carry will not be used, and a refrigerator that is too difficult to clean will become unsanitary. Before buying an appliance, test out different models with various features to make sure your choice of appliance meets everyone's needs.

Appliances such as coffee machines, microwaves, refrigerators, etc., are available in a variety of sizes, shapes, costs and degrees of complexity. Programming the appliance may require that you read an instruction manual. When selecting an appliance, think about the usability and complexity of the appliance and its instructions. Choosing a simple and intuitive appliance is a good idea whether the appliance is for you or a gift for someone else.

Some appliances have a small LED screen that provides programming instructions.

The size and location of the screen, as well as the colour and size of the on-screen characters, should be considered to ensure that they will work for you.

Consider appliances that provide information in a mixture of different modes, including audible, visual and tactile operational information.

Dual signalling appliances that alert you visually as well as audibly are recommended. People who are deaf or hard of hearing will be able to see the visual signal and people who are blind or visually impaired will hear the signal. This is a universal design approach that works for everyone.

Legibility

The exterior and interior of the appliance should have sufficient lighting to enable people to see and safely operate the appliance. The instruction text and controls should contrast in colour to the background area. In addition, some manufacturers allow the customer to program the size of letters and characters to maximize readability, a feature appreciated by many customers.

The control area should also be free of glare and non-reflective. The surface materials offered by manufacturers vary from glass, to enamel, to stainless steel, some of which make controls more difficult to see and operate. Legibility of operating controls and instructions is an especially important issue for persons with reduced vision.

Controls

Controls should be easy and intuitive to operate for everyone, regardless of language, cognitive ability, ability to grasp and use of fine motor skills (see Figure 3). Also, since the controls will be used by different people, they should be clearly visible and within the reach of both seated and standing persons.

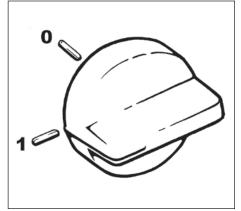


Diagram by: DesignAble Environments Inc.

Figure 3 Tactile control with high-contrast text

Controls that are easy to operate:

- incorporate good colour contrast for instructions and other characters (either dark text on a light-coloured background or light text on a dark-coloured background)
- are located on non-reflective and non-glare surfaces
- do not require too much strength to operate
- provide information for people who rely on sight, hearing or touch
- have tactile features and colour-contrasting markings to clearly indicate the on-off positions, for safety.

Storage

Designing storage space for various appliances is often left to the last minute. Careful consideration of the storage requirements for small appliances will increase efficiency and usability, as well as reduce the likelihood of home accidents. For example, storing a heavy mixer at the bottom of a cupboard will likely mean it is seldom used. There are a number of storage systems available to homeowners that assist in the efficient use

of space, such as a swing-up shelf for a heavy appliance, which will eliminate the need for heavy lifting (see Figure 4).

Cleaning

The ability to easily clean an appliance is an important health and safety consideration and can also be a factor in the proper functioning of the appliance itself. A self-cleaning feature in an oven is not only convenient and labour-saving, but also enhances safety by limiting the need for using chemical cleaners and removing the need to bend and reach into the oven for cleaning—an advantage for all users.

Check that racks, drawers and shelving in refrigerators, stoves, toaster-ovens, etc., can be easily removed for cleaning. Some small appliances incorporate removable parts that can be put in the dishwasher for cleaning. Be sure to investigate all the options when choosing your appliance.

Cost

Cost is always an important factor. Sometimes the convenience offered by a household appliance will outweigh the higher cost. Refrigerators, stoves, dishwashers, washers and dryers are all available with a variety of different door swing and shelving configurations. It usually costs no more to purchase an appliance that offers the configuration that suits your needs best.

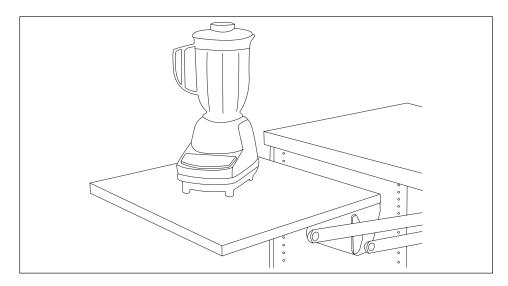


Figure 4 Swing-up shelf for small appliances

Cost savings can result from carefully comparing the potential energy consumption of different models or types of appliances. Look for the EnerGuide and ENERGY STAR® labels when shopping for appliances (see Figures 5 and 6).

WASHERS And Dryers

Front-loading washers and dryers are preferred by many people, including people who use wheelchairs. Top-loading machines may be preferred by someone who finds it difficult to bend comfortably. Whichever model is selected, front-mounted controls are preferable as they are easier for everyone to see and operate. Stacked washer and dryer units are often used when there are space limitations; however, they may not be a good design option for people who use wheelchairs, as these appliances can be difficult to operate and see into.

Pedestal base units are available for many models of front-loading washers and dryers making them easier to reach into (see Figure 7). Careful consideration should be given to the location of the soap dispenser, as it may be located

on the top of the machine, making it inaccessible to people who use wheelchairs. Also check the location of the lint catcher.

Choose washers and dryers that offer multiple modes of

Canada

ENERGUIDE

Energy consumption / Consommation énergétique

460 kWh
per year / par année
bar modal (Gr moda)

1372 kWh

Uses least energy /
Consomme le plus
d'énergie

Entitur modal
16,5 = 18,4

Modal Reinerge

Diagram by: Natural Resources Canada

Figure 5 EnerGuide certification mark

information on the status of the laundry cycle, including visual, tactile and audible alerts. Such features will maximize accessibility for people with a variety of different capabilities.



Diagram by: Natural Resources Canada

Figure 6 ENERGY STAR® certification mark

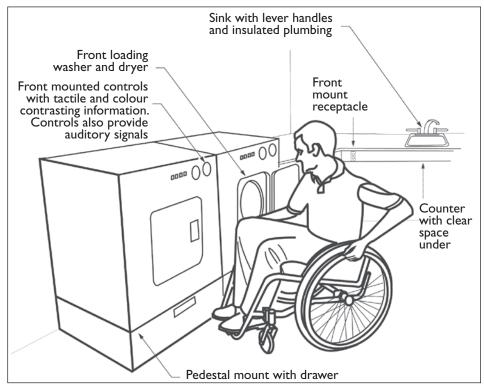


Diagram by: DesignAble Environments Inc.

Figure 7 Wheelchair user at laundry

The location of the washer and dryer in the home should be designed to be easily accessible and free of hazards. Wellplanned storage will increase the efficiency as well as the safety of the laundry area. Manoeuvring space in front of the appliances should be at least 1,500 mm x 1,500 mm (59 in. x 59 in.), in addition to the area where dirty clothes are stored. Storage of soap and other supplies should be located nearby, at a maximum height of 1,200 mm (47 in.).

A laundry sink and an area for folding clothes should be located within close proximity to the washer and dryer. If clothes are to be ironed within the laundry area, an easily accessible electrical outlet should be incorporated and a fold-down ironing board should be considered. Also, do not forget to plan a space to store the iron.

REFRIGERATORS And Freezers

Side-by-side refrigerators and freezers are preferred by some people since they are easy to see into and are accessible to people who use wheelchairs. However, they offer limited storage for large amounts of

food. Some people may prefer the freezer to be located in the upper compartment of a splitlevel refrigerator, making it is easier to see into, while others may prefer the freezer compartment at the bottom.

Whichever model is selected, pull-out shelves and a self-defrost feature increase the ease of reach and cleaning—both important considerations.

The kitchen layout and appliance placement should permit easy access to refrigerator drawers and pull-out shelves. Refrigerators can be purchased with your preferred door swing direction, providing more flexibility to the kitchen designer and homeowner. Also remember that, although ice makers and cold water dispensers are convenient, they may reduce the amount of storage space inside the refrigerator and freezer.

DISHWASHERS

Kitchen designers usually locate the dishwasher close to the sink. As a result, manoeuvring space around an open dishwasher is an important design consideration, especially for people who use mobility devices such as walkers or wheelchairs. If you are a wheelchair user, try to provide knee space under one of the cabinets immediately adjacent to the dishwasher—this will allow you to get closer to the dishwasher for loading and unloading.

Single-drawer dishwashers can be purchased with finishes that match the design of the kitchen cabinets. Having small twodrawer dishwashers can eliminate the need to store dishes elsewhere and, while more expensive, may suit the needs of some people.

Dishwasher controls are sometimes found on the top of the door. Such a configuration usually results in limited legibility, which may not suit some people, especially those with visual impairments.

Controls on dishwashers should be easy to see and should comply with the requirements for controls outlined earlier on page 4. Additionally, they should incorporate good colour contrast, be intuitive and easy to use, as well as simple to program. Ease of loading and unloading the dishwasher will depend on the configuration of the racks and pull-out baskets.

Look for a dishwasher with a "quiet feature;" this is appreciated by everyone, but it is especially important in households that include someone who has a hearing impairment. Background noise from an appliance such as a dishwasher can reduce their ability to hear and communicate effectively.

OVENS AND COOK TOPS

Wall ovens offer flexibility, as they can be installed at any height to suit the needs of the household. Wall ovens that open sideways are preferred by many people who find them easier for removing food. A pull-out shelf under the oven and a counter on the open side of the oven are practical design features that enhance safety (see Figure 2).

Lock-out or override switch features are excellent options for preventing unintentional use of the appliance. Some cook top manufacturers offer control panels that can be detached, shutting off access

and the potential danger of inadvertent use by others. There are also cooking appliances that feature a control panel that is separate from the oven or cook top unit, thereby allowing custom placement of controls to meet the needs of the user.

Manoeuvring space in front of an open oven must be considered when designing a kitchen space. A clear floor space of at least 1,500 mm x 1,500 mm (59 in. x 59 in.) is recommended. People who use scooters or larger wheelchairs may require turning space of 2,100 mm x 2,100 mm (83 in. x 83 in.).

A counter-mounted cook top with clear knee space underneath is an excellent approach when designing for someone who uses a wheelchair. The knee space should be at least 750 mm (30 in.) wide, 680 mm (27 in.) high x 480 mm (19 in.) deep. Additional toe-space at least 300 mm (12 in.) high should be provided beyond the knee space (see Figure 2).

MICROWAVES

Microwaves are useful for everyone, but particularly for some people with activity limitations because they are easy to operate and can quickly defrost and heat up preprepared meals. Microwaves should be located at an appropriate height for easy access to the controls and interior space, with a clear counter space beside, so that food can be removed from the microwave and slid along the counter, eliminating the need to carry hot food items.

As with all operational controls, microwave controls should have good colour contrast, and be simple and easy to operate.

EMERGENCY SITUATIONS

Access by all members of the household to the water shut-off valves for washers and dishwashers, as well as emergency controls for other appliances, should be planned during the design and installation process.

ADDITIONAL RESOURCES

Websites

American Council for an Energy-Efficient Economy—Consumer Guide to Home Energy Savings Online (October 2010) http://www.aceee.org/consumer

Association of Home Appliance Manufacturers— Safety First (April 2010) http://www.aham.org/ consumer/ht/d/sp/i/1071/ pid/1071

The Center for Universal Design (April 2010) http://www.design.ncsu.edu/cud/

Consumer Union of US— Consumer Reports (April 2010) http://www.consumerreports. org/cro/index.htm

IDEA: Center for Inclusive Design and Environmental Access (April 2010) http://www.ap.buffalo.edu/idea/ Natural Resources Canada:
Office of Energy Efficiency—
EnerGuide (April 2010)
http://oee.nrcan.gc.ca/
energuide/index.cfm

Natural Resources Canada:
Office of Energy Efficiency—
ENERGY STAR® in Canada
(April 2010)
http://oee.nrcan.gc.ca/
residential/energystar-portal.cfm

Trace Center at the University of Wisconsin-Madison (April 2010) http://trace.wisc.edu/

Glossary

Automatic shut-off: Automatic shut-off is a feature that is either factory programmed or programmable by the user which automatically shuts off an appliance.

Cool touch: The exterior surface of the product remains at room temperature and is "cool to the touch."

Dual signalling: Two distinct means of transmitting information to the user, which are separate and not reliant upon each other—an audio and a visual signal for example.

Fail-safe: The ability of the device to safely operate or fail without danger to people or other devices.

Lock-out feature: A feature designed to prevent unsupervised or inadvertent use or entry.

Override switch: a lock-out feature that prevents accidental activation or entry into an appliance. Deactivating the lock-out feature does not, in and of itself, activate the device—it simply enables the user to take the normal steps for activation or entry.

Tactile feature: A feature that allows a person to use the sense of touch to read or receive information.

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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