

# PHCP SELF-INSTRUCTION PROGRAM

## ***BOOK #13***

- ***WHIRLPOOL BATHTUBS,  
WHIRLPOOL SPAS AND HOT TUBS***
- ***FAUCETS AND ACCESSORIES***

**Specialty Fixtures:  
Whirlpool Bathtubs, Whirlpool Spas, and  
Hot Tubs**

**Series Two Unit 5**

**PHCP Self Instruction Program**

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For a complete list of topics covered, see the index.

## UNIT OBJECTIVES

The information in this Manual has been selected to give you an overview of specialty fixtures: whirlpool bathtubs, whirlpool spas, and hot tubs. It includes definitions of common industry terms, descriptions of the major types of specialty fixtures and information on ordering them.

Some of the products reviewed in this Unit may not be a part of your company's current inventory. Other products which may be stocked by your company may not be discussed in this Unit. Always refer to manufacturers' literature and recommendations on the products your company sells if unsure about a particular product.

To do your job well, it is important that you learn the details about specific items stocked by your company. The most complete and accurate information can be found in manufacturers' catalogs and materials. Be certain to spend time studying these materials.

When completing this Unit, you will be able to

- recognize and use basic terms related to whirlpool bathtubs, whirlpool spas, and hot tubs
- discuss the specifications for different types of specialty fixtures
- identify the support equipment required for each type of specialty fixture
- discuss installation and construction methods for each type of specialty fixture

THESE MATERIALS SHOULD NOT BE USED TO PLAN ACTUAL INSTALLATIONS OR TO INSTALL FIXTURES OR REQUIRED FITTINGS.

### DISCLAIMER

Although the information contained in this Unit is believed to be accurate, the ASA Education Foundation and the American Supply Association disclaim any and all warranties, expressed or implied, regarding both the accuracy of that information and its application.

## STEPS FOR COMPLETING THIS UNIT

1. If your company has purchased the videotape for use with this Series, view the video before you start Unit One.
2. Use the answer mask/book mark to cover the printed answers in the left hand column. Read the information in each Frame carefully.
3. Keeping the answer covered, write your response to the Frame question in the empty column at the right of each page.
4. Move the answer mask to check your response with the answer in the left column.
  - If your response is reasonably close to the printed answer, go on to the next Frame.
  - If your response differs from the answer given, review the material in the Frame to see why the printed answer is considered the best answer for the question.
  - If after reviewing the material in the Frame you still believe that your response is better than the printed answer, circle the printed answer. If you agree that the printed answer is best, mark an "X" through your response.
  - If after several attempts, you cannot understand the Frame or the answer to the Frame question, ask someone in your company for help.
  - If you still feel confused, contact the Foundation, and we will try to find a product knowledge expert to assist you.
5. Answer the questions in the Review at the end of each section. Check your responses with the answers given at the back of the book. Reread the Frames indicated for answers you have missed.
6. When you've completed all Frames, prepare for the Unit Quiz by going over the Review pages and the definitions in the Glossary.
7. Take the Unit Quiz at the end of the Manual.
8. Send the whole book, with the completed Quiz, to the ASA Education Foundation for grading. You and your immediate supervisor will be notified about your completion of the Unit.

**When you have completed all Units in Series Two, contact the ASA Education Foundation to make arrangements to take the Series Two Exam. You will receive a Certificate of Completion for Series Two when you have successfully completed all Units and the Series Two Exam.**

In the previous Unit entitled Bathtubs and Showers you learned about three types of bathing fixtures:

- bathtubs
- showers
- bath-shower combinations

In this Unit, you will learn about a fourth type of bathing fixture--the specialty fixture. These fixtures are used primarily for recreational and therapeutic purposes. They include what are commonly called whirlpools, hot tubs and spas.

*Recreational and therapeutic purposes*

**What are specialty bathing fixtures used for?**

While most people will refer to a whirlpool bathtub, a whirlpool spa, or a hot tub as a "spa" or "whirlpool", there are major differences in these three specialty fixtures.

A whirlpool bathtub is truly a bathing vessel. While it is used for the same purpose as a bathtub or shower, it also offers therapeutic and relaxing whirlpool water action. A whirlpool bathtub is drained and cleaned after use as you would a standard bathtub or shower.

A whirlpool spa or hot tub is solely a recreational fixture where one or more people sit and enjoy the therapeutic values of the water action. These fixtures are not bathing vessels. The temperature of the water is maintained by a built-in heater. The fixture is not drained after each use but rather continuously filtered and cleaned with chemical treatment.

Understanding the differences between these three types of specialty fixtures will help you to service your customers needs better.

*Whirlpool bathtub*

**Which type of specialty fixture is truly a bathing vessel?**

Hot bathing at temperatures above 100 degrees is thought to have therapeutic value. It helps improve the blood flow to the skin. It is also a popular way of relaxing both the body and mind, and can ease muscle aches and pains.

Resort spas in Europe and the United States have promoted their hot natural waters as being therapeutic. Places such as Saratoga Springs, New York and Warm Springs, Georgia have built a tourist and vacation industry around the therapeutic value of their waters.

*It eases muscle aches and pains, increases blood flow to skin, relaxes mind and body*

**What type of therapeutic value does hot bathing have?**

Along with easing muscle aches and relaxing the mind and body, hot water bathing also is used in hydrotherapy. Hydrotherapy is the use of water in the treatment of an injury or disease. The hot water temperatures in combination with the water action maximizes the effect of hydrotherapy.

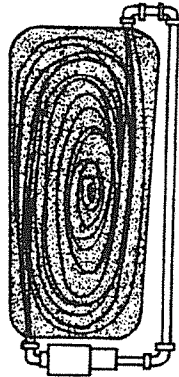
However, you should be aware that there are specific warnings which must be visible on spas and hot tubs cautioning users of the causes, symptoms, and effects of Hypothermia if water temperatures are too hot. Generally, the warning indicates that water temperature should not exceed 104 degrees.

*The use of water in the treatment of an injury or disease*

**What is hydrotherapy?**

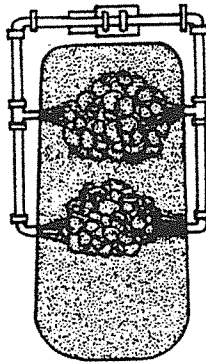
There are two types of water actions that a specialty bathing fixture may produce: whirlpool action or jetting action.

Whirlpool action is the water action created when water circulates in a swirling fashion through jets located at the ends of the fixture. This type of water action is most often found in fixtures designed for commercial installations.



WHIRLPOOL ACTION

Jetting action is the water action created when water shoots through jets located all around the fixture. 99% of all residential specialty fixtures have jetting action.



JETTING ACTION

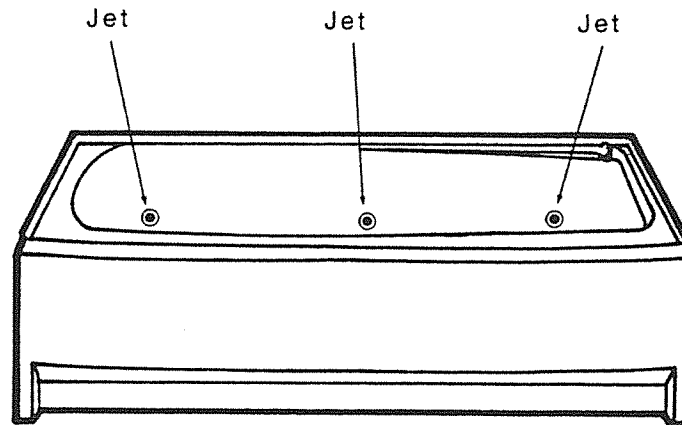
Each specialty bathing fixture: the whirlpool bathtub, whirlpool spa or hot tub uses one of these two types of water actions.

**What two types of water actions may be present in a whirlpool bathtub, whirlpool spa or hot tub?**

*Whirlpool action  
or jetted action*



A whirlpool bathtub is a tub where water and air are pumped and recirculated into the tub causing the water to be agitated. The water is shot out into the tub through hydrojets or "jets". The hydrojets are the openings that allow the air/water mixture into the fixture.



WHIRLPOOL BATH WITH HYDROJETS

Whirlpool bathtubs are used for bathing and hydrotherapy. They have all the features of an ordinary bathtub and more. They are filled and drained with each use. They do not have their own heating system, but use the building's hot water supply.

*Bathing and hydrotherapy*

**What are whirlpool bathtubs used for?**

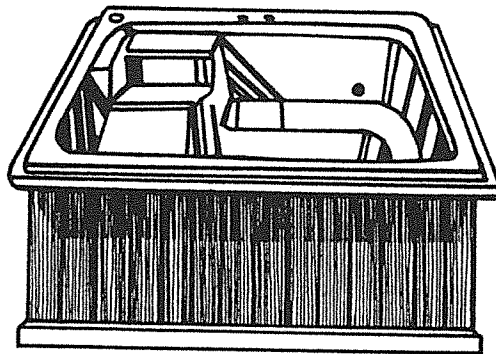
Whirlpool bathtubs have the same components as a regular bathtub. They come in a variety of shapes, sizes and colors. Although most designs are oversized, whirlpool tubs also come in a standard (60" x 32") size.

In addition to the regular tub features, they come with the jets, a pump, motor and electrical wiring. Most whirlpool tubs come both pre-plumbed and pre-wired for easy installation.

*Jets, pump, motor and wiring*

**What features does a whirlpool bathtub have that differs from a regular bathtub?**

A whirlpool spa also has water pumped and recirculated through jets. It is used for recreation and hydrotherapy. Unlike a whirlpool bath, the water in a whirlpool spa remains there and is only drained a few times a year.



WHIRLPOOL SPA

A spa has its own heater, pump, and filter system. It is not connected directly to the water supply and DWV systems.

Spas are larger than whirlpool bathtubs. Although some whirlpool tubs may seat two to four people, spas often accommodate many more.

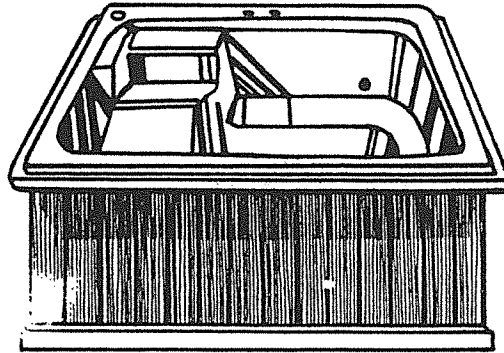
*Whirlpool spa*

**In general, which fixture is larger, the whirlpool bathtub or whirlpool spa?**

Whirlpool spas come in two types of installations:

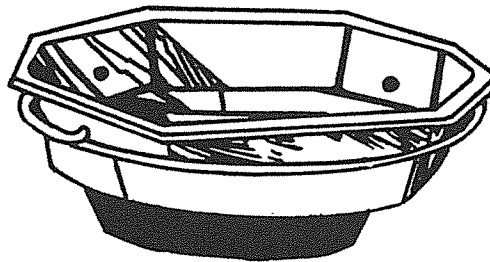
- portable
- in-ground

A portable spa is like a self contained appliance which can be moved around.



PORTABLE SPA

An in-ground spa is a spa placed in a hole in the ground or an above grade surface, such as a deck. It cannot be moved once constructed.



IN-GROUND SPA

*In the ground or  
into an above grade  
surface*

**Where are in-ground spas installed?**

A whirlpool spa is like a small swimming pool. However, instead of exercising, the bather sits and soaks. Spas have a smaller capacity than pools.

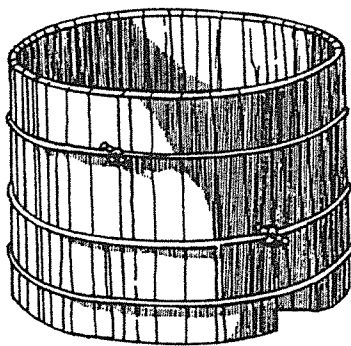
Like a pool, a spa can be installed in or out of doors. Spas require all the auxiliary equipment of a pool: heater, pump, filter, and sometimes will also have an air blower.

Unlike the pool, spas have hydrojets to agitate the water.

*Capacity, purpose  
and spas have  
hydrojets*

**How do swimming pools and spas differ?**

A hot tub is a special type of whirlpool spa made of wood. Hot tubs are usually 4 -10 feet wide and approximately four feet deep.



HOT TUB

Hot tubs also have jets which agitate the water. Like the whirlpool spa, they are only drained a few times a year and require their own heater, pump and filter.

*A special type of  
whirlpool spa made  
of wood*

**What is a hot tub?**

Hot tubs and spas are basically the same in their function and equipment. Hot tubs can have a greater capacity than portable spas, and generally have a smaller capacity than most in-ground installations.

Hot tubs are all somewhat portable in that they can be free-standing or landscaped into the ground.

*The hot tub*

**Which fixture has a greater capacity, a portable spa or a hot tub?**

Whirlpool bathtubs are made from the same materials as regular bathtubs. The most common materials used are cast iron, fiberglass and acrylic.

The cast iron whirlpool bathtub, although durable, is extremely heavy. As the size of the whirlpool bathtub increases, it is less likely to come in cast iron. This is because cast iron presents problems with shipping, handling and structural support. You will find that most cast iron whirlpool bathtubs are standard size.

*It is extremely heavy*

**What is the major disadvantage of a cast iron whirlpool bathtub?**

An alternative is a fiberglass gel coated tub which is light-weight for easy installation. It is also relatively inexpensive compared to most other types of materials.

The thin gel coat surface makes it more susceptible to damage because it scratches easily. Quality of a gel coat tub is determined by the gel coat thickness, which should be at least 10 mil.

Fiberglass gel coated tubs require insulation because the hollow areas behind the tub can cause an echo, making the fixture very noisy. When insulating the tub, care must be taken to keep the insulation away from the motor. Fiberglass gel coated tubs may also be embedded in concrete to reduce sound.

*The hollow areas behind the tub cause an echo, making it noisy*

**Why do fiberglass gel coated tubs require insulation?**

Acrylic whirlpool bathtubs have the appearance of cast iron at a lesser cost. Some advantages of an acrylic tub over a tub made of fiberglass gel coat include:

- superior hardness
- thicker skin layer
- better gloss retention
- higher quality color

As with a tub of fiberglass gel coat, a tub made of acrylic is also lightweight and easy to install.

*Superior hardness, thicker skin layer, better gloss retention, and higher quality color*

**What are the advantages of a whirlpool bathtub made of acrylic over one made of fiberglass gel coat?**

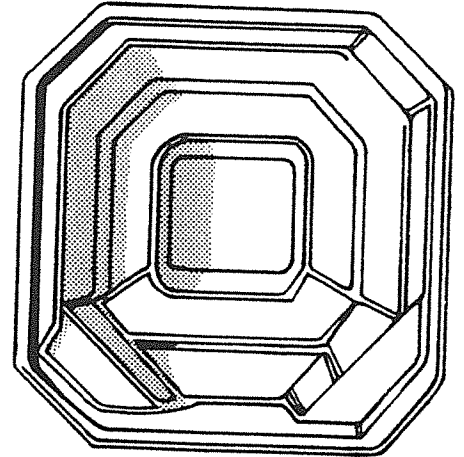
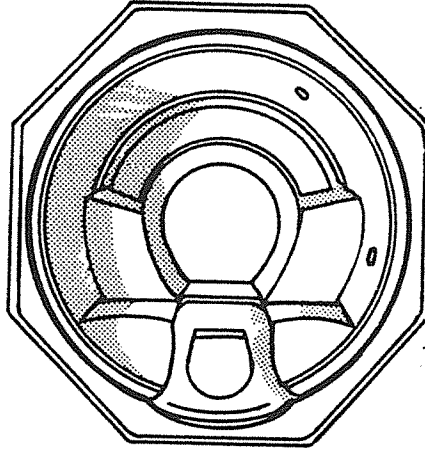
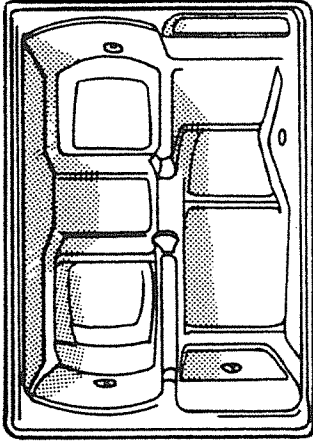
You may find some whirlpool bathtubs made of steel. This tub is least expensive of all materials, but is limited in sizes and shapes. It is a noisy fixture and does not hold the heat in as well as other materials.

You will most likely find steel whirlpool bathtubs in institutional settings.

*Noisy, limited designs, poor heat retention*

**What are the disadvantages of a steel whirlpool bathtub?**

In-ground spas have a shell, or hollowed out portion, which holds the water. The shell may be constructed from concrete, or it may be manufactured from a plastic such as fiberglass reinforced acrylic.



#### PLASTIC MANUFACTURED SHELLS

Plastic shells are manufactured and can be sold as an entire package with all equipment and installation included. Check with your manufacturer to see if you carry full in-ground installation packages.

Shells for portable spas are made with the same material and by the same processes as the manufactured plastic shells for in-ground spas.

*Plastic and  
concrete*

**What two types of materials are in-ground spa shells made of?**

Hot tubs come in a variety of woods. Most are made of softwoods such as redwood and cedar. Hardwoods like teak and oak can also be used.

Other woods may also be used successfully. The main criteria for a wood being used for hot tub construction is its resistance to decay and chemical damage. A smooth surface is also desirable to avoid splintering.

*Redwood and cedar*

**Which types of softwoods are most often used in hot tub construction?**

The installation of a whirlpool bathtub is similar to that of a regular bathtub. The number of aprons will tell you where the tub should be installed.

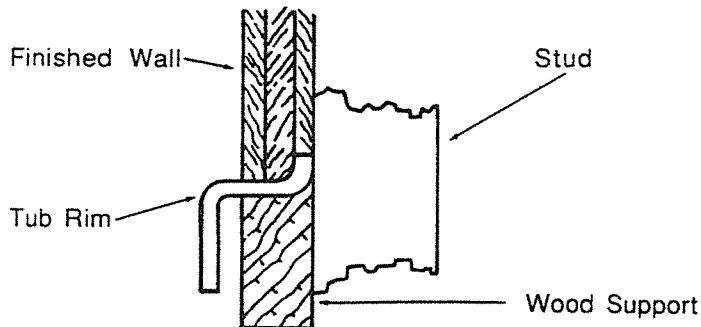
Whirlpool bathtubs which come with one apron are installed in a recess. Tubs with no aprons are sunken in design, and are installed in a raised platform or recess in the floor.

Although less common, whirlpool tubs may come with two aprons and are installed in a corner where two walls meet

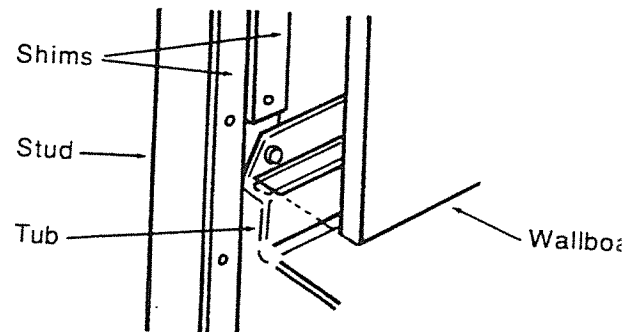
*Where the tub should be installed*

**What does the number of aprons on a whirlpool tell you?**

Recess and corner whirlpool bathtubs require wall supports to keep the tub in place and from pulling away from the wall. Cast iron tubs use wood supports, and plastic tubs use a nailing flange. For detailed information on wood supports or nailing flanges refer back to Unit Two on Bathtubs and Showers.



WOOD SUPPORTS



NAILING FLANGE

Sunken tubs, especially those with capacity for two or more people, may require reinforcement of the floor joists.

Review the floor loading specifications in the manufacturer's literature and then check with the local codes to determine if a floor needs reinforcement.

*Wood supports and nailing flange*

**What two types of supports do recess bathtubs use?**



Unlike the whirlpool bathtub, a portable spa can go anywhere, provided there is a circuit to plug it into. Because it must be drained prior to moving, owners will want to think carefully about where to place the fixture.

Factors a customer will want to consider in spa placement include climactic conditions, space availability, privacy, accessibility and landscaping. Most importantly, the spa must be installed near the power supply.

*Near a power supply*

**Where must a portable spa definitely be installed?**

While the portable spa can be relocated, the in-ground spa cannot be moved once installed. It is extremely important to follow guidelines when choosing a location for the spa.

Before any steps are taken, customers need to check into local zoning requirements. Laws may govern set back requirements, height limitations, water conservation and safety.

The same factors in placement of a portable spa should be considered when installing an in-ground spa. Customers must also determine the grade of their lot and the location of utility lines (water, gas, sewer) which could interfere with spa's construction.

*Local codes, grade of lot and location of utility lines*

**What additional considerations must be made when installing an in-ground spa?**

Lot grade is important when installing a hot tub and in-ground spas. A hot tub installed on a level grade requires only a concrete slab for a base. Hot tubs installed on a hill require a retaining wall for support. An in-ground or hillside hot tub or spa will require the construction of an elevated deck around it.

*It is placed on a concrete slab*

**How is a hot tub installed on a level grade?**

Along with deciding where a spa or hot tub should be installed, is determining what accessories to use with it.

Whirlpool bathtubs come with all the same accessories that are available on a regular tub. Check with your manufacturer to see what accessories your company carries.

Hot tubs and spas have a variety of accessories for comfort, safety and maintenance. Many spa and tub manufacturers even sell decking, benches, steps and shelters.

Yes

**Are accessories on regular bathtubs available for whirlpool bathtubs?**

The type of specialty bathing fixture a customer chooses will depend upon its function. If the purpose of the fixture is primarily for cleansing, then a whirlpool bathtub is the choice. If the purpose is primarily recreation, then a spa or hot tub is the choice.

When choosing between a portable spa, in-ground spa and hot tub, cost may be the deciding factor.

For the residential customer, the choice is often dictated by family needs, structural and financial requirements and individual preferences.

*Purpose or function*

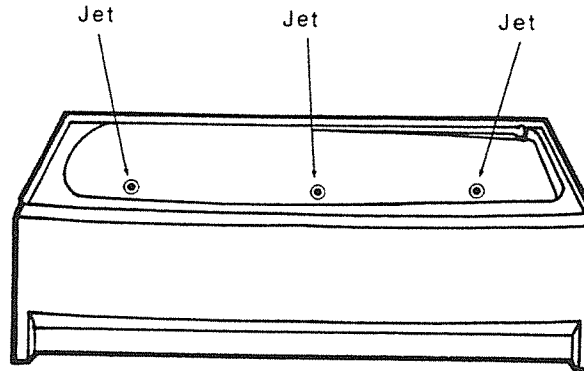
**What is the first consideration when choosing a specialty bathing fixture?**

**DIRECTIONS:** In the space to the left, label each of the following statements "TRUE" or "FALSE".

- \_\_\_\_\_ 1. Whirlpool bathtubs and whirlpool spas are the same in their function and equipment.
- \_\_\_\_\_ 2. Woods used in hot tub construction should only be of the softwood variety.
- \_\_\_\_\_ 3. Sunken whirlpool bathtubs may require reinforcement through the use of floor joists.
- \_\_\_\_\_ 4. The type of specialty fixture a customer chooses will depend upon its purpose or function.
- \_\_\_\_\_ 5. A jetted water action is only found in whirlpool spas and hot tubs.
- \_\_\_\_\_ 6. Hot tubs are filled and drained with each use.
- \_\_\_\_\_ 7. Whirlpool bathtubs are connected to the water supply and DWV systems.
- \_\_\_\_\_ 8. The shell of an in-ground spa is usually made of plastic or concrete.
- \_\_\_\_\_ 9. The first step in planning for an in-ground spa is to check local zoning requirements.
- \_\_\_\_\_ 10. Steel is the best material available for manufacturing whirlpool bathtubs.

Check your responses with the answers given on page 66.

A whirlpool bathtub resembles a regular bathtub in both appearance and shape. The most obvious difference is that a whirlpool bath has jets located on the insides of the tub.



WHIRLPOOL BATHTUB

Most whirlpool bathtubs are larger than standard bathtubs and require larger amounts of water; between 50-200 gallons.

*The jets*

**What feature makes the whirlpool different from a regular bathtub?**

Manufacturers make whirlpool bathtubs for both residential and non-residential markets. Residential installations make up the largest part of the market.

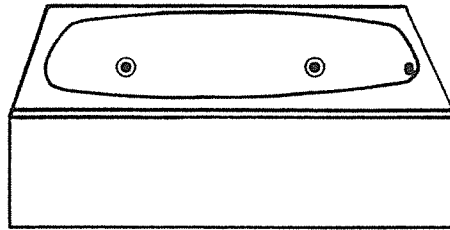
Non-residential applications are in the commercial and institutional areas. Commercial customers include hotels and motels. Hospitals are the primary customers in institutional applications.

*Commercial and institutional*

**In which two non-residential areas might whirlpool bathtubs be found?**

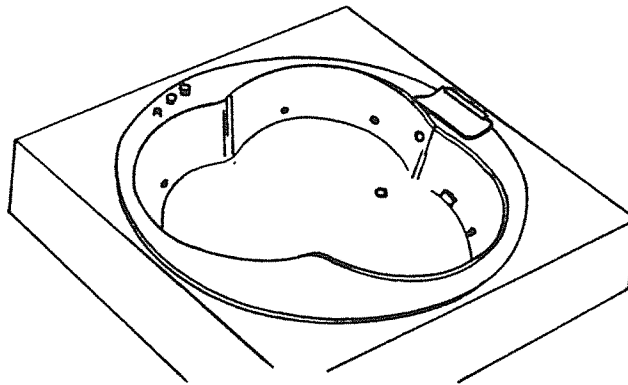
In the previous section, we discussed that whirlpool bathtubs, like regular tubs, can be classified by type of installation.

Recess whirlpool bathtubs tend to be standard size (60"x 32") This type of bathtub is installed in the recess or indentation of a wall.



RECESS WHIRLPOOL BATHTUB

A sunken whirlpool bathtub can be installed either above or below the floor line. If installed above the floor, it must be recessed into a platform, like the one below.

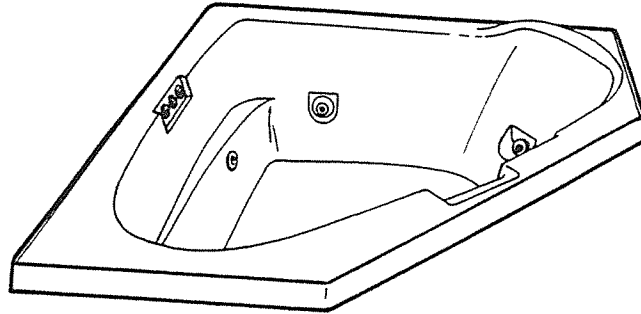


SUNKEN WHIRLPOOL BATHTUB

*Below the floor line  
or recessed into a  
platform*

**Where are sunken whirlpool bathtubs installed?**

Whirlpool bathtubs also come in a corner design, installed where two walls join. Unlike a corner bathtub, which is rectangular in shape, the corner whirlpool has a triangular design.



CORNER WHIRLPOOL BATHTUB

Corner whirlpool bathtubs may come with matching skirts to cover the service panel on the exposed sides. A skirt is a removable apron. Corner whirlpools may also be sunken in design requiring a platform or they may be recessed into the floor.

*Triangular*

**What shape is a corner whirlpool bathtub?**

There are over 75 different sizes for whirlpool bathtubs and eight different shapes. Personal preferences and comfort will be key considerations in a customer's choice.

The two most common shapes you will find are rectangular and oval. You will also find round, triangular, square, double oval, rectangular with an inside oval and octagonal shapes.

*Rectangular and oval*

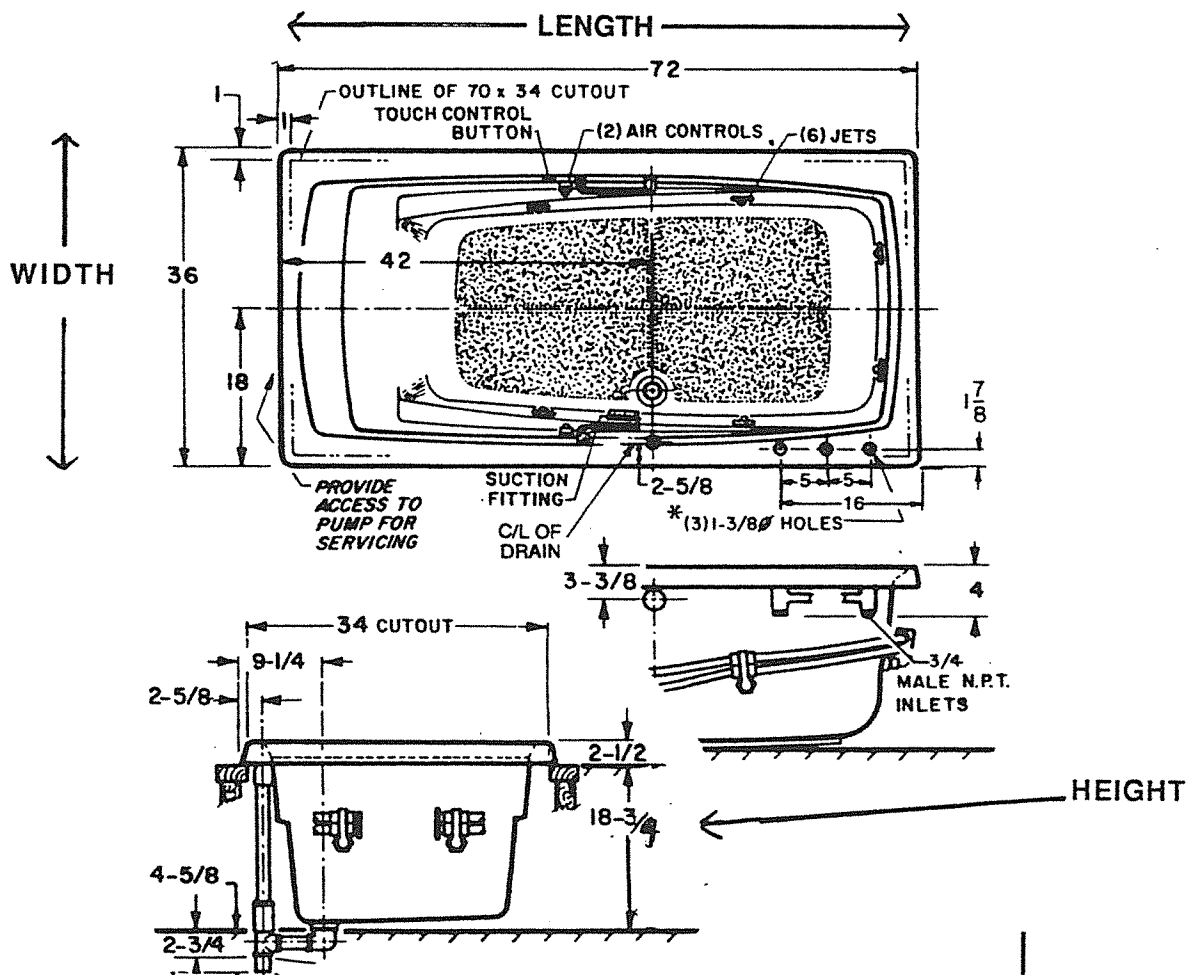
**What are the two most common shapes for a whirlpool bathtub?**

Along with different shapes, the sizes of whirlpool bathtubs vary greatly. The outside dimensions for rectangular, oval, and round shaped tubs are specified just as regular bathtubs. So, like a regular bathtub, whirlpool bathtub dimensions are listed by length x width x height.

Length is calculated as the distance from the drain end of the tub to the opposite end of the tub. Typically this ranges from 60-72 inches, although some whirlpool tubs do come in even larger sizes.

Width is measured from front to back and varies from 32" to greater than 66". Height ranges from 18"-34", measured from the bottom of the apron or skirt to the top of the tub rim.

In the manufacturer's specification below the required dimensions would be 72" x 36" x 18 3/4".

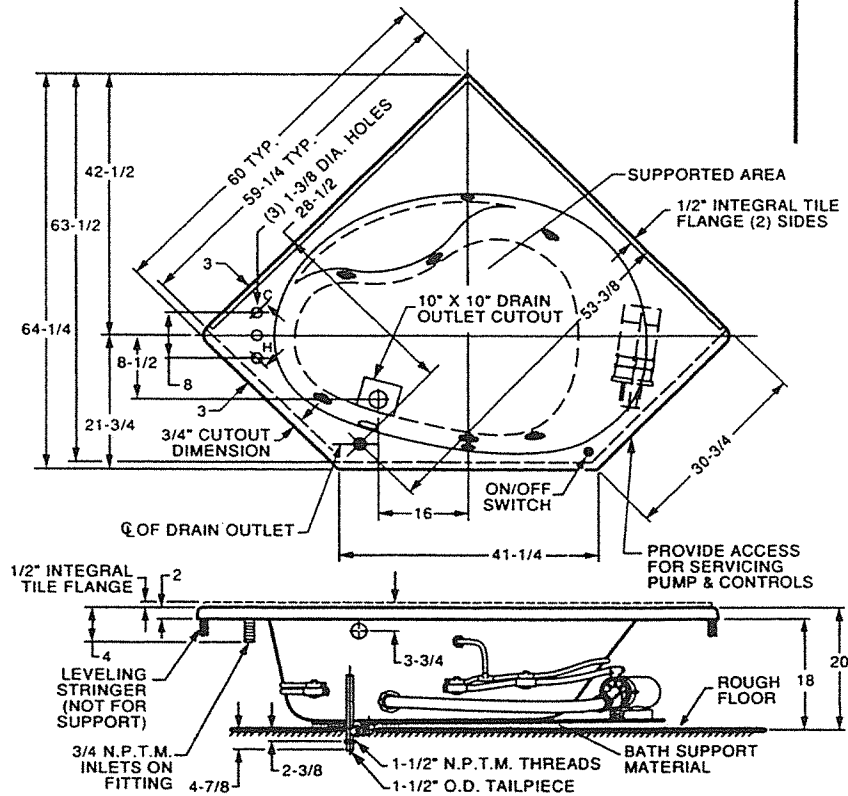


The width

In the specification shown above, what does the second dimension of 36" represent?

Corner triangular shaped tubs will list the length and width as the two sides which abut against the walls. These measurements will always be the same. Height is still measured from the bottom of the skirt or apron to the top of the tub rim.

The specification for the corner whirlpool tub shown below is 60" x 60" x 20".



*By measuring the sides of the tub that abut against the wall*

**How is the length and width determined on a corner triangular shaped whirlpool tub?**



A comfortable bathtub which seats two people should be 48 inches wide on a rectangular design and 42 inches wide on a double oval design with a center drain.

The outside dimensions alone may not necessarily reflect the size of the bathing well. The bathing well is the hollowed out portion of the tub where the bather(s) sit. Bathing wells on whirlpools can accommodate from one to four people. However, you will find that most whirlpool bathtubs comfortably seat only two people side by side.

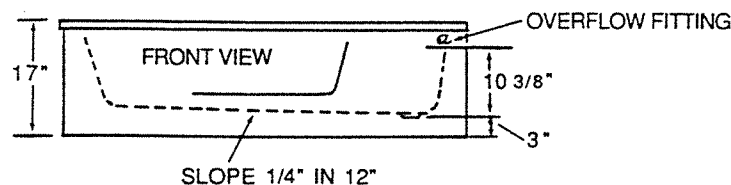
You may find bathing well dimensions in some manufacturers' literature. The bathing well is the length x width measured 4" up from the floor. When provided, the bathing well measurement will give you more information than the outside dimensions about the actual space available inside the tub.

**How are the dimensions in the bathing well calculated?**

*Length x width measured 4" up from the floor*

Another dimension on a whirlpool bathtub is the water depth. The water depth is the measurement from the bottom of the drain to the overflow fitting. This is an important measurement because whirlpool bathtubs require a reasonable depth of water for the jets to be effective in creating the water action. The outside dimensions nor the bathing well dimensions will provide this information.

The water depth for the bathing well shown below is 10 3/8".



Often the slant of a tub toward the drain makes the rear of the tub up to two inches shallower. Jet positioning should be noted since at least two inches of depth are needed above the jets to allow for the proper whirlpool or jetted action.

**How is water depth measured in a whirlpool bathtub?**

*From the bottom of the drain to the overflow fitting*

The most common material used in manufacturing whirlpool bathtubs is acrylic with fiberglass reinforcement. This is because it is a versatile material for color, size and shape, and it is lightweight making it easy to install. It is also a durable plastic.

Other plastic methods for tub manufacturing include fiberglass reinforced process (FRP) also known as gel-coated fiberglass, and fiberglass molding.

New plastics are also being developed which have greater durability, similar to cast iron, while maintaining the advantages of plastic such as weight, ease of cleaning and smoothness of surface.

Manufacturers' literature will indicate the various materials their whirlpool bathtubs are made of. Become familiar with those your company stocks and sells.

*Acrylic*

**What is the most common material used in manufacturing whirlpool bathtubs?**

While the materials of the whirlpool tub are the same as the regular tub, the whirlpool bathtub functions very differently from the regular tub.

As discussed in the previous section, whirlpool bathtubs use jets to cause water action which stimulates the body. Different styles of whirlpool bathtubs will have varying numbers of jets and different jet locations. Even the smallest (standard) tub will come with at least two jets. Oversized whirlpool bathtubs may have between three and eight jets.

Special features in a manufacturer's design or style of a particular whirlpool bathtub may often be in the shape of the tub, and in the number of jets and the water action created.

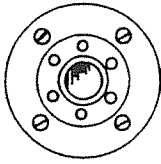
Become familiar, and up to date, with the features of the whirlpool baths your company sells. Styles and features may change often due to the growing popularity of whirlpool bathtubs.

*Between 3 and 8*

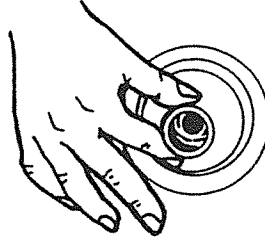
**How many jets are there likely to be on an oversized whirlpool bathtub?**

The jets are located on the sides of the bathing well. The type of water action, either whirlpool or jetting, will determine jet placement. A true whirlpool action will have the jets located at opposite ends of the tub. A jetted action may have jets located on any of the four sides of the bathing well.

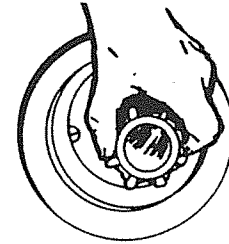
The type of jets equipped on a whirlpool tub may also differ. Most tubs come with adjustable jets. Some can only adjust for direction of the water flow, while fully adjustable jets adjust both the direction and volume of water flow.



NON-ADJUSTABLE  
WHIRLPOOL JET



DIRECTIONALLY ADJUSTABLE  
WHIRLPOOL JET



FULLY ADJUSTABLE  
WHIRLPOOL JET

*Adjust direction  
and volume of water  
flow*

**What do fully adjustable jets do?**

In order for the jets to function, the whirlpool bathtub must be equipped with a recirculating pump.

The recirculating pump mixes water with air and sends the mixture back into the tub through the jets. The air valves on the fixture draw the surrounding air into the pump so it can be mixed with the water.

Code requires that the pump have an access panel. An access panel allows access to the pump, on the tub's exposed side or through a door in a platform, in the event a repair is needed.

*It mixes water with  
air and sends the  
mixture into the  
tub through the jets*

**What does the recirculating pump do?**

Pump/motor systems may vary not only by horsepower, but also by other features. Systems must be self draining. This eliminates water in the lines and avoids bacterial growth.

Pump/motor systems come pre-wired for 115V, 20 amp service. They must be on a permanent, grounded circuit through a ground fault circuit interrupter (GFCI). Because a whirlpool bathtub utilizes electricity, local electrical codes apply to all installations.

It may be helpful to become familiar with the local codes in your area on electrical regulations for residential and commercial installations.

115V, 20 amp

**What are the electrical service specifications for a whirlpool bathtub?**

A whirlpool bathtub can be turned on and off with its controls. The three types of controls you will find are

- a non-electric on/off pneumatic air switch
- an electrical timer
- a digital readout

The air switch allows you to turn the tub on and off from inside the tub. Electric timers must be wired to the wall five feet away from the tub.

Some manufacturers make a "low-level" switch. With a "low level" switch, a sensor automatically shuts off the pump when the water level falls below the jets. This saves the pump from burning out. You will find this feature most popular for commercial installations.

*Automatically  
shuts off the pump  
when the water  
level falls below  
the jets*

**What is the function of a "low level" switch?**

Other specifications you may need are in manufacturers' literature. These specs may include water capacity in U.S. gallons, floor loading, shipping weight and weight when filled.

Consult your manufacturers' literature to see which specifications are included.

*The number of U.S. gallons*

**How is water capacity described?**

A whirlpool bathtub is connected to the water supply and DWV systems in same way as a regular bathtub.

Like other bathing fixtures, the whirlpool bathtub must be installed in the rough-in stage during new construction, before walls and floors are finished.

During remodeling installations for corner and recess whirlpool bathtubs, the wall area surrounding the fixture must be refinished after the fixture is installed.

*During the rough-in stage*

**For new construction, when would a whirlpool bathtub be installed?**

Sunken tubs require the building or installation of a platform to surround the tub, whether it is recessed into the floor or above the floor. Remodeling installations for a sunken whirlpool bathtub may require extending plumbing to a new tub location.

Floor joists may also need to be reinforced because of the added floor loading of a whirlpool bathtub. They may also need reinforcement if plumbing must be re-routed, causing the installer to cut or drill through the joists.

*A platform to surround the tub*

**What is required when installing a sunken tub?**

Whirlpool bathtubs do not come with the waste and overflow fittings installed. They must be ordered separately from the manufacturer to meet the specifications of the tub design. Fittings are ordered to match the tub height and drain size, and may come in a variety of materials, colors or styles such as pop-up or trip lever.

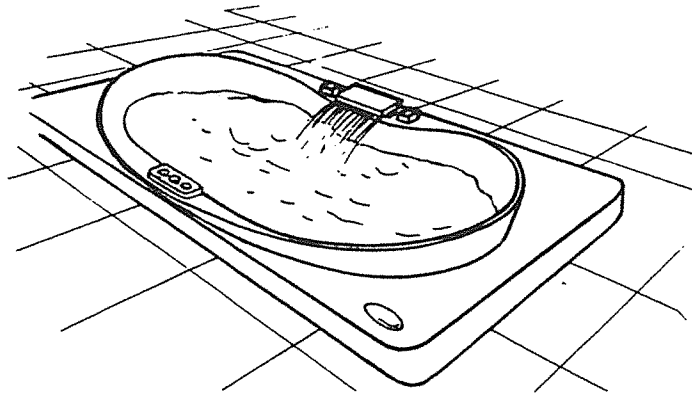
Since a whirlpool bathtub tends to be larger than standard size it will often require a 2" drain outlet. If capacity is less than 80 gallons, it can handle a 1 1/2" drain.

The waste and overflow tailpiece connects to the trap. Like all bathtubs, a whirlpool may use either a p-trap or a drum trap to seal off the DWV system.

*The waste and overflow tailpiece connects to the trap*

**How does the drain connect to the DWV system?**

The bath filler (faucet) for a whirlpool includes the spout and control handles. You will find special spouts made for larger tubs most appropriate for a whirlpool bath. These spouts fill faster than conventional ones since they have a larger opening than the standard 1/2" spout. Many manufacturers refer to faucets for oversized tubs as Roman Tub Faucets.



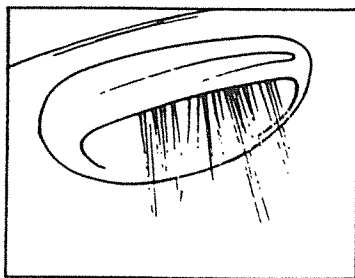
Some whirlpool bathtubs may have more than one spout. These additional spouts can recirculate the water once the bath is filled and the motor turned on. You will usually see recirculating spouts in a waterfall spout design. This design is characterized by a large thin cascade of water flowing down from the spout like a waterfall.

*To recirculate the water once the tub is filled and motor turned on*

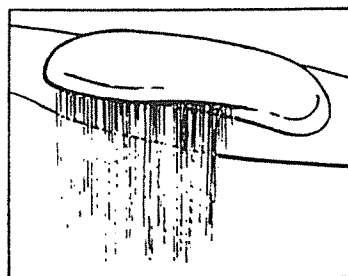
**Aside from filling the tub, what purpose may the spout serve?**

A whirlpool bathtub with a capacity of over 80 gallons should have 3/4" fast filling valves. It is also recommended that instead of the 1/2 inch lines, that 3/4" hot and cold lines be used. This will fill the tub at a rate of 20 gallons per minute. Smaller valves will cause the tub to fill so slowly that it will be difficult to keep the water heated at the proper temperature.

The control valves are usually mounted over the tub rim on a recess tub. Sunken tubs may be deck mounted. Some whirlpool bathtubs come with integral (built-in) spout and control valves. Control valve placement should be where the user does not have to enter the tub to turn it on.



INTEGRAL  
FILLER SPOUT



DECK MOUNTED  
FILLER SPOUT

**Where would you mount the control valves on a whirlpool bathtub?**

*Wall, deck, or valves may be integral to the fixture*

Whirlpool bathtubs come with many accessories or features to improve their therapeutic and relaxation effects.

Some accessories may be built in to the tub. Back supports, contoured seats and arm rests provide comfort for the bather. Recirculating spouts, interior lighting and mirrors or vanities are other features you may also find built into a whirlpool.

Accessories which may be added are numerous. Pillows, grab bars, hand held shower sprays, touch activated timers, radios and even mini-televisions may also be purchased to enhance a whirlpool bathtub.

Consult manufacturers' literature to determine the features and accessories available on each of the whirlpool bathtubs your company sells.

**How can you determine what accessories are available for the whirlpool bathtubs your company sells?**

*Consult manufacturers' literature*

One accessory you will often find is the in-line heater. The in-line heater heats the water as it is drawn into the pump before being released into the tub. This feature keeps the water hot as it recirculates.

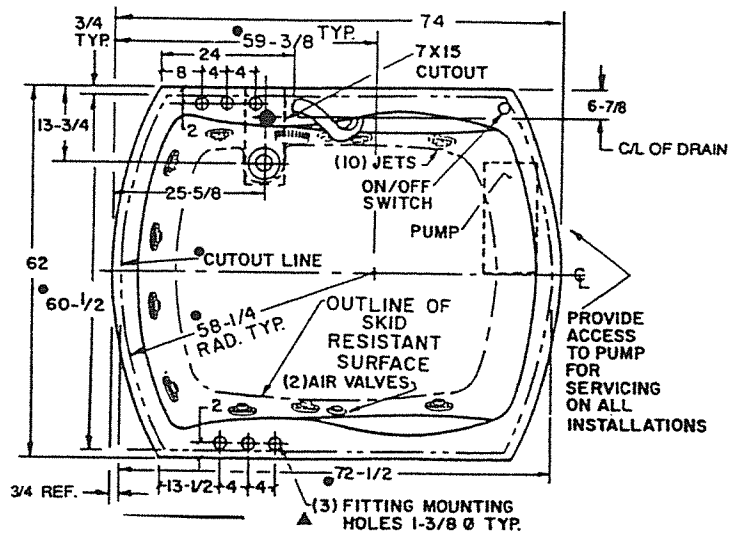
*It keeps the water hot as it recirculates*

**What is the purpose of an in-line heater on a whirlpool bathtub?**

Reading whirlpool rough-in specifications is the same as reading bathtub rough-ins. The only difference is more information is illustrated on the whirlpool since it has more components.

Manufacturers will always provide a top view of the fixture. The top view shows the length and width of the tub. It also illustrates any integral features such as the location of jets, filler spout, air valves, and on/off switch. The top view of pump location, fitting mounting holes and drain location are also illustrated in top view.

Here is one manufacturer's rough-in for a whirlpool.



*The top view*

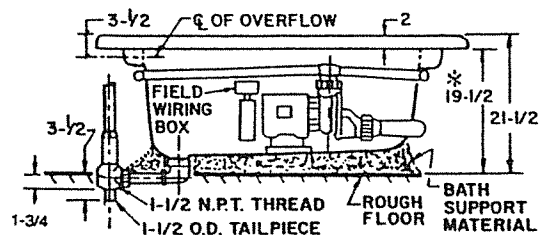
**Which view of a whirlpool bathtub will always be provided by the manufacturers in rough-in specifications?**



The end view of the fixture may also be provided. This view will show the location of the supply connections.

It will also show the fixture in relation to the rough floor. Most whirlpool bathtubs come in a sunken installation. This view will provide the minimum recommended height for a floor installation.

The end view will most often show the pump, wiring box or whirlpool control unit. Like a regular bathtub, it will also illustrate the drain installation.



*Supply connections, rough floor, pump, wiring box, control unit, drain*

**What might you find illustrated on an end view of a whirlpool bathtub?**

There are many considerations customers must take into account when purchasing a whirlpool bathtub. Some of the most common are:

- the proper size for the number of people using the tub
- the area where the tub will be installed
- the amount of hot water needed to fill the tub

If the whirlpool tub is for a remodeling installation, the options may be severely limited by space and plumbing.

*The proper size, the area of installation, and the amount of hot water needed*

**What are the three major customer considerations when choosing a whirlpool bathtub?**

Until now, all the bathing fixtures that have been discussed have the primary purpose of bathing. The primary purpose of a whirlpool spa is recreation.

Spas have been around for quite some time, seen most often in commercial installations. You have probably seen in-ground spas alongside swimming pools at hotels, resorts and health clubs.

A spa is a self contained water system. It is filled from an outside source of water, such as a garden hose.

*Recreation*

**What is the primary purpose of a spa?**

In recent years, spas have grown in popularity in the residential marketplace. As mentioned in the overview section of this Unit, whirlpool spas are available as in-ground or portable installations.

In-ground spas are most popular in areas with warmer climates where swimming and "spaing" can take place year round. While in-ground spas can be installed indoors, most are installed outside.

The invention of the portable spa allows residential customers the enjoyment of this recreational outlet regardless of the weather because it can be moved.

*In-ground and portable*

**What are the two types of spas?**

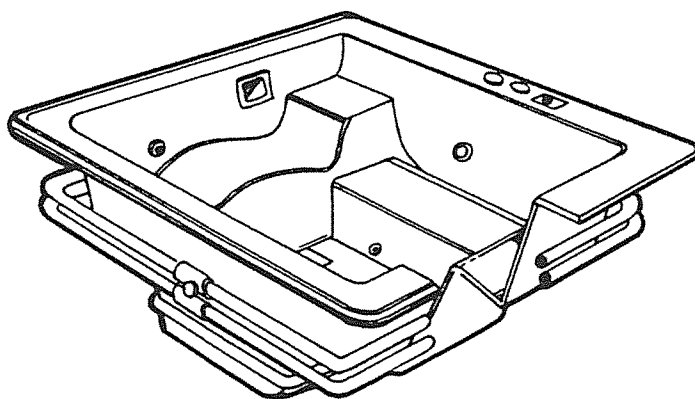
An in-ground spa is any spa permanently set into the ground or an above grade surface. It is constructed on-site by contractors.

The earliest in-ground spas were made of poured concrete or concrete blocks. Today, customers may select a shell made from either concrete or plastic.

*Concrete and plastic*

**What two materials are used for the shell of the in-ground spa?**

Most customers choose a plastic manufactured shell for in-ground spa construction. They may choose from acrylic reinforced with fiberglass or the new thermoplastics. Thermoplastics are manufactured in the same manner as acrylics, but do not require a reinforced backing. Some manufacturers use ABS plastic. This is the same plastic as is used for some plastic plumbing pipe. A shell for an in-ground spa installation is shown below.



*Acrylic reinforced with fiberglass and thermoplastics*

**What are the two types of plastics used in spa shell manufacturing?**

Earlier spas used gel-coat for shell construction. This was found to be deficient in many ways. The gel coat did not hold up under normal use. The high water temperatures from the spa caused blistering of the surface, fading of colors, and delamination. Delamination is the separation into layers of the materials used to construct the spa. This would occur when the highly chlorinated water seeped through the gel-coat lining.

*Surface would blister, color faded, caused delamination*

**Why is gel-coat no longer used in spa shell construction?**

Due to its inferior quality, gel-coat has been replaced by acrylic, which proves to be a better material for use in spa construction. Acrylic's dense, glossy surface makes the spa much more durable.

However, acrylic also has its weaknesses. It will wear over time, showing surface scratches and fading. Acrylic may also show thinning at the corners, a weakness which occurs naturally in the vacuum forming process. If the fiberglass reinforcement is flawed, delamination can occur between fiberglass and acrylic.

*Mistakes in the fiberglass reinforcement process*

**What can cause delamination in acrylic shells?**

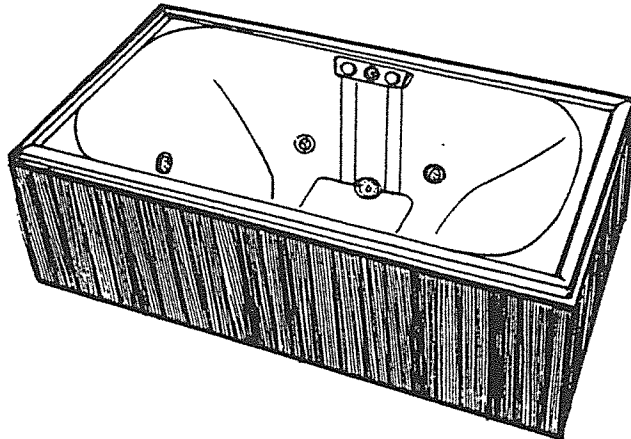
Thermoplastics are the sturdiest of the materials for spa construction. They resist fading, effects of high temperatures, chemical damage, and damage of impact.

Because thermoplastics do not require additional backing or reinforcement, they are not subject to delamination. Surface finishes vary in texture from a leathery texture to smooth. Regardless of the finish, the material will not chip, peel or blister.

*Thermoplastics*

**What is the sturdiest material for plastic shell construction?**

The same materials and processes used to manufacture the shell of an in-ground spa are also used to manufacture the portable spa. The portable spa shell is framed by a cabinet. The cabinet is most often constructed of wood, although high impact plastic may also be used. Some shells come insulated. They tend to retain heat better than the in-ground models because they are insulated.



*The shells are insulated*

**Why do portable spas retain heat better than in-ground models?**

A concrete in-ground spa can be custom designed, therefore it can vary greatly in size. Concrete in-ground spas can accommodate as many people as the customer desires, unlike a portable spa which can only accommodate a small number of people.

Plastic in-ground spa shells usually seat between 2 and 10 people. Specially designed commercial applications can seat larger numbers. Dimensions for a plastic in-ground spa are specified as length x width x height, from the rim to the bottom of the shell.

*Distance from the rim of the shell to the bottom of the shell*

**How is height measured on an in-ground plastic spa shell?**

Unlike in-ground spas, portable spas can only hold from two to eight people. The smallest size portable spa will seat two people and hold about 170 gallons of water. The largest portable models seat eight and will hold up to 500 gallons of water.

Portable spas are shallower than in-ground spas, usually having a depth of three feet or less. The seating style helps the bather to recline and cover the entire body while soaking.

*From two to eight*

**How many bathers can a portable spa accommodate?**

Because of its size, the outside dimensions for a portable spa are specified in the same way as a bathtub is specified: Length x width x height. This specification can be found listed in the manufacturer's literature.

Often the manufacturer will also indicate whether the fixture will fit through a standard doorway.

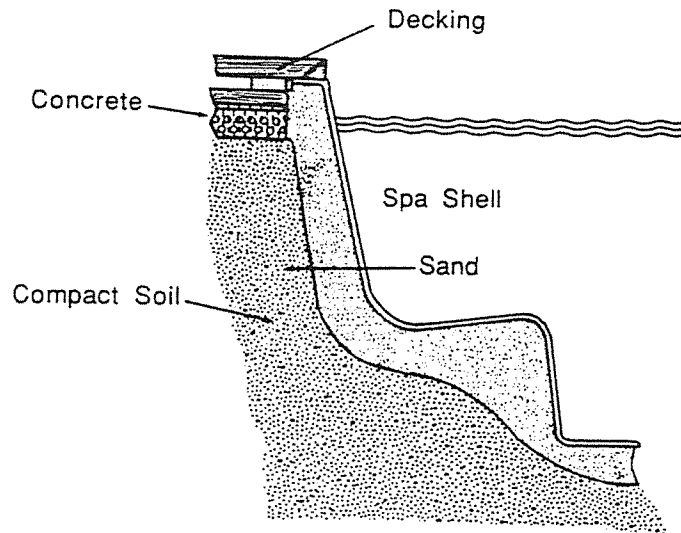
*30"*

**The manufacturer's literature shows the dimensions for a whirlpool spa as 72" x 66" x 30". Which number represents the height of the fixture?**

The plastic in-ground spa shell is installed in an excavated hole or deck opening. The contractor will build a frame based upon the dimensions of the spa. The finished dimensions will then be taken on-site.

These spas may come pre-plumbed with foam placed around the shell at the factory. Or, the plumbing and insulation can be installed on-site.

A spa installed in the ground requires sand supporting it on the bottom and sides. Shells installed in a deck must be supported by a wood frame or concrete slab as shown below.



*Sand supporting  
the bottom and sides*

**What type of support is required when installing a plastic shell in the ground?**

Installation of the portable spa can be either in or out of doors. Because a filled spa is very heavy, proper floor support must be available for indoor installation.

Portable spas can be placed on a concrete pad, or on heavy beams supported by a concrete pier. It is important that the spa's floor loading limit are checked, and a building inspector is consulted to be sure a floor can withstand the spa's total weight.

When setting up a spa, an access to the support equipment is necessary so it can be checked on a regular basis. Portable spas, like whirlpool bathtubs, must have a ground fault circuit interrupter (GFCI) built in the spa's wiring.

*Floor loading limit*

**What specification needs to be checked before an indoor spa installation?**

The support system for the spa, mentioned in Frame 64, circulates, heats and filters the water. In an in-ground spa, this system will be similar to that of a swimming pool. It is positioned separately, but near the in-ground spa.

The component parts of the support system include:

- the pump
- filter and skimmer
- heater
- air blower
- timer/controls
- hydrojets

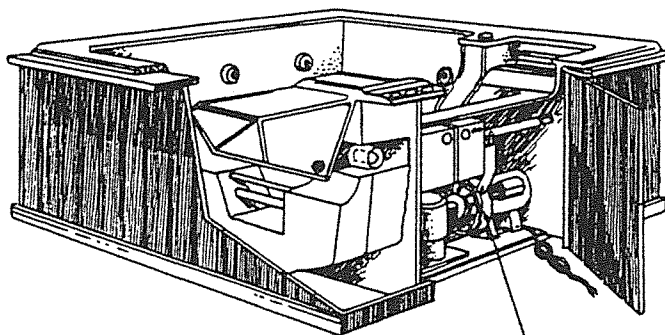
*Circulates, heats, and filters the water*

**What is the function of the spa support system?**



A portable spa has the support equipment built into the fixture.

The components are the same as for an in-ground system, however, they come as part of the fixture in a cluster called a skid pack. The skid pack is the equipment assembly located under the portable spa's skirt.



Skid Pack  
(heater, pump,  
blower, timer)

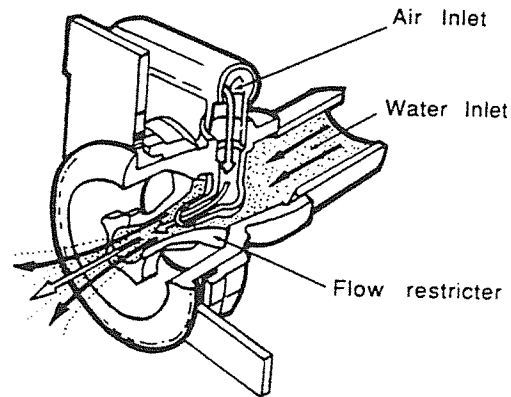
Support equipment is an important customer consideration when purchasing a portable spa since it comes as a unit, and is not purchased by component part.

Become familiar with skid packs that come with portable spas your company stocks and sells.

*The portable spa's support system is built in the fixture*

**How does the support equipment on a portable spa differ from that of the in-ground spa?**

Another important part of the spa are the jets. The jets in a spa function in the same manner as those on a whirlpool bathtub, however, the water action is limited to a jetted action. The number and type of jets will vary by manufacturer and design.



HYDROJET (JET)

A spa hydrojet will emit 12-15 gallons of water a minute per jet. Air intake is regulated by opening or closing the ports near the rim of the spa. Most spa jets are semi-adjustable allowing for change in angle of waterflow, or they may be closed off completely.

Some manufacturers offer special features in their jets, such as the ability to divert flow from one jet to another, or the option of jets which move up and down to provide a massaging action.

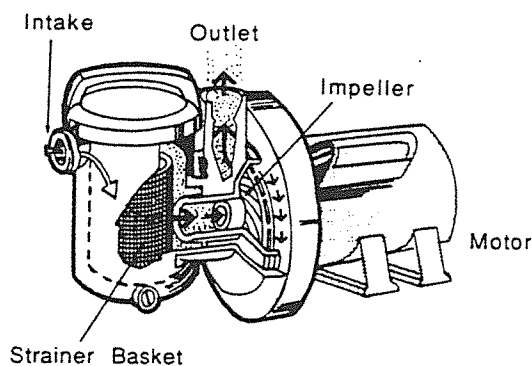
Check manufacturers literature to see what type of special hydrojet features each company offers.

*They can be changed  
in angle or closed  
off completely*

**How can spa jets be adjusted?**

The pump on a spa has the same purpose as that on a whirlpool bathtub: to propel the water through the jets. However, it also does more.

The pump suction water out of the drains and pumps it through the filter and heater before being sending it outward from the jets.



PUMP

*Suctions water out of the drains and pumps it through the filter and heater*

**Besides pumping water through the jets, what does the pump on a spa do?**

In-ground spa pump sizes vary with the size of the spa. A one h.p. pump works well with a four jet spa having a 500-700 gallon capacity. Larger spas may need a 1 1/2 to 2 h.p. pump.

Two pump systems are also available. One pump handles the circulation and a larger pump provides the power to the jets. This system is used for a spa having five or more jets.

Portable spas have the pump as a component of the skid pack. This pump will range from 3/4 h.p. for smaller spas to 1 h.p. for an eight person spa. Often the pump on a portable spa runs at two speeds: a low speed to circulate the water and a high speed to operate the jet.

*On a spa having five or more jets*

**When are two pump systems used?**

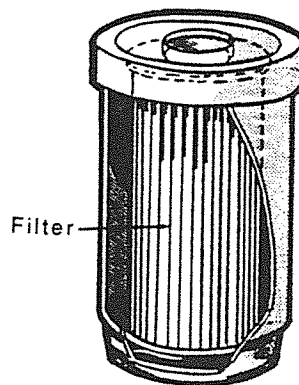
An important part of the pump system is the filter. The filter removes dirt and residue from the spa water. The use of the filter system along with proper maintenance and chemical treatments are essential in keeping the water clean.

Usually, the filter should operate on a cycle of at least two hours. Different manufacturers may recommend different cycling times for their equipment.

*To remove dirt and residue*

**What is the purpose of the filter?**

There are different types of filters to choose from. The cartridge filter is very popular because it is easy to clean. A cartridge filter is a cylindrical filter made of paper, dacron or non-woven polyester and folded in accordion pleats. It is set into a core made of plastic. It traps organic materials such as hair and dirt as the water passes through it.



CARTRIDGE FILTER

*Paper, dacron or non-woven polyester*

**From what materials might a cartridge filter be made of?**

The size of the cartridge filter will determine the volume of water it can handle. Usually, the filter material ranges from 25-50 square feet. Typically, a cartridge filter can handle a gallon of water a minute per square foot of material surface area.

With smaller sized filters, the filter size must be matched with the pump speed so that the two components work together perfectly. If the pump pushes water too fast or slow through the filter, then the filter will not catch all the residue and the spa will not get clean.

Larger filters are available which can handle all pump speeds. These filters tend to be more costly than the average cartridge filter.

*If the pump pushes the water too fast or slow the filter will not catch all the residue*

**Why must filter size and pump speed be matched on smaller sized filters?**

Replacement cartridge filters are ordered by manufacturer model number. The customer should note the number of square feet to the pleats.

Other important dimensions you will need to know in ordering cartridge filters are the cartridge height, outside diameter and inside diameter. The outside diameter is the diameter of the full core, whereas the inside diameter is only the diameter of the inner hole.

Some cartridge filters will come with a handle or MPT (male pipe thread) fitting on top. In this case, it would be noted on the inner diameter dimensions that there is an MPT fitting.

*Cartridge height, outside diameter and inside diameter*

**What are three important dimensions you should know when ordering cartridge filters?**

Larger spas may require a DE filter. A DE, or diatomaceous earth filter traps solids in the diatomaceous earth, which is a fine and chalky substance. Another type of filter, the high rate sand filter functions in the same manner as the DE filter.

These two filters can handle the large volumes of water of an in-ground spa or hot tub. They can also trap a greater amount of dirt than a cartridge filter.

*DE and high rate sand filters*

**What are two types of filters used for large in-ground spas?**

Another filtering item for spas is a skimmer. A skimmer acts as a surface filter by skimming off any large surface residue, such as leaves, using a removable basket. If the spa is located outdoors and near trees, the skimmer is a very important feature.

Although the skimmer is considered standard equipment on a spa, you may find some spas without them. On portable spas, the skimmers are usually combined with the filter.

*Portable spa*

**On which type of spa will the skimmer and filter be combined?**

Filters require adequate maintenance and cleaning in order to operate effectively. Cartridge filters will require cleaning every four to six weeks. They can be cleaned by lifting them out of the cartridge and hosing them down, or by using a special manufacturer recommended cleaner.

Some portable spas using cartridge filters may require draining the spa before checking or cleaning the filter. Front loading cartridges can be easily accessed without draining.

Whether it is a portable or in-ground installation, a well maintained cartridge filter should last between one to three years before needing replacement.

*By lifting it out and hosing it down, or using a manufacturer recommended cleaner*

**How is a cartridge filter cleaned?**

DE and high rate sand filters require a more cumbersome cleaning process. These filters are backwashed by reversing the water flow on the spa. This process will usually cause the spa to drain empty. When the washing is completed, a new coat of DE or high rate sand is applied and the spa can be refilled.

*The water flow on the spa is reversed causing a backwashing which cleans out the filter*

**How is a DE filter cleaned?**

Another important part of the spa is the heater. The spa heater heats the water to the desired level; usually between 100 and 104 degrees.

Heaters must be matched by size to the size of the spa, and frequency and duration of use. The two types of heaters most often used with spas are electric and gas models.

*Electric and gas models*

**What two types of heaters are most often used with spas?**

Electric heaters are usually found on portable spas in the skid pack. By plugging the spa into the house current, the heater is ready for use.

Manufacturers offer heaters in 110 volt or 220 volt models. Many offer a convertible feature; where the heater can convert to either voltage.

The 110 volt heaters are rated at 1.5 kw which is the largest wattage a 20 amp circuit can handle. This means that a 110 volt portable spa heater cannot be run at the same time as the jets and air blower.

*An electric heater*

**What type of heater does a portable spa usually use?**

The 220 volt heaters are rated at 6kw and require a 50 amp circuit. They must be hard wired to a 220 volt circuit with a junction box. Hard wiring means that the spa is permanently connected. This process requires an electrical permit.

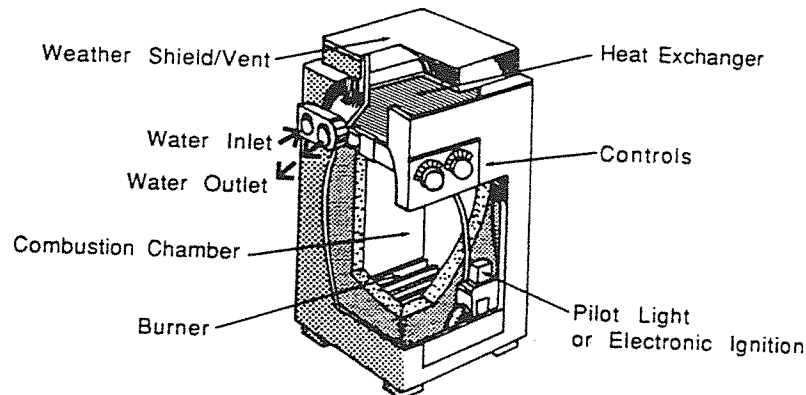
In spite of the portable spa insulation, 110 volt heaters can lose heat quickly during long soaks. The 220 volt heaters are less likely to lose heat during operation because they can be run simultaneously with the jets and air blower. They are also faster in recovering any heat loss from the heater being turned off.

*Because the heater can be run at the same time as the jets and air blower*

**Why is a 220 volt heater less likely to lose heat during operation than a 110 volt heater?**

Although some smaller portable spas may use electric heaters, most in-ground installations use gas. A gas heater may use natural gas or propane depending upon the product's local availability.

Gas heaters are larger than electric ones and heat up the spa water much faster. Another advantage of gas heat is that it is less expensive than electricity.



Gas heaters will require the installation of a gas line. The customer should be aware of safety precautions involved with the use of gas, such as venting the heater.

*Costs less than electricity, and heats the water faster*

**What are two advantages of a gas heater?**



There are other methods for heating spas. Solar energy can be harnessed to help heat the spa. It will also require the use of another heating method since solar energy alone cannot maintain the high spa temperatures. You may also find heaters which use oil, wood or coal.

*Solar energy, oil,  
wood, and coal*

**What are the other methods available for heating a spa in addition to gas and electricity?**

One component run by electricity or gas is the air blower. The air blower is a small electric motor with a fan. Its purpose is to aid the massaging action of the water by creating bubbles. It does this by sucking up air from outside the spa and sending it into the spa through holes in the fixture's floor.

Not all spas come with air blowers since it is not a required support component. Air blowers have two major drawbacks. They can be very noisy and can cause the heat in the tub to decrease quickly if the surrounding air is cool. This can increase heating costs since it will require more work from the heater to maintain the spa temperature.

*They are noisy, and  
can cause the water  
to cool rapidly*

**What are the two main disadvantages of air blowers?**

The spa controls allow the user to operate the support equipment.

Some controls are manual. This involves depressing a button, turning a timer or engaging a switch. Manual controls on most spas are for the pump, blower and lighting.

Automatic controls are those controls which are triggered by the environment. An electric heater is automatically controlled by a thermostat. When the temperature falls below a certain setting, the heater will turn on.

Gas heaters may have a timeclock to control water circulation and heating. The heater will still respond to a thermostat setting, but it also allows the user to set the heater for a specific time or day, i.e. just prior to use.

*Manual controls*

**What type of controls do the air blower use?**

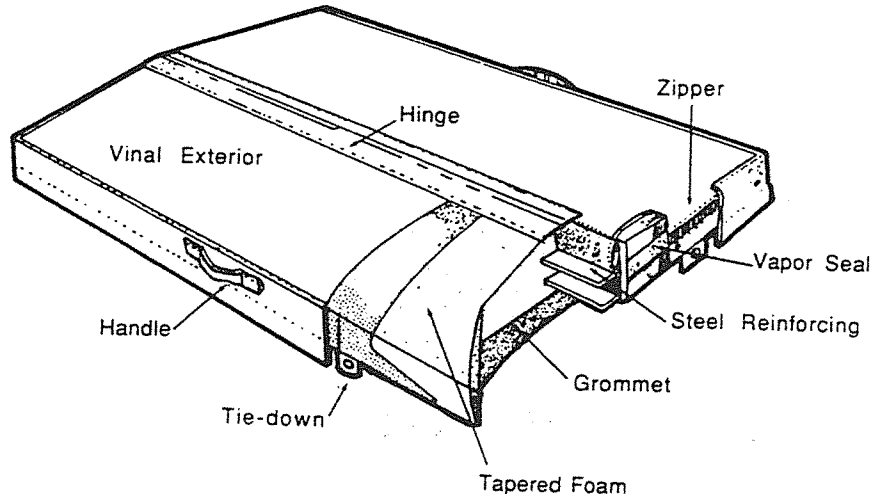
Many manufacturers make spas with other convenient controls. For in-ground spas, a dual control panel can be installed inside the customer's home so he/she will not have to go outside to turn the system on. Digital readouts of temperature, 24 hour and seven day timeclocks are also available.

Regardless of the level of sophistication of the control system, all spas come with a manual override switch to turn the system on or off.

*Dual control panel*

**What system allows a spa to operated from the fixture location or from controls located elsewhere?**

Many accessories can be purchased to assist in protecting and maintaining the spa. Most owners purchase a protective cover for their spas. The covering serves three purposes. It helps retain the water's heat, keeps out debris and serves as protection from intruders.



Many localities have labeled spas and swimming pools as "attractive nuisances" making the owner liable if precautions are not taken to keep intruders out.

*To retain heat, keep out debris and intruders*

**What is the purpose of a protective spa covering?**

Maintenance supplies outside the support system include chemicals such as chlorine or bromine for destroying bacteria and algae to sanitize the spa water. Water chemistry kits can be purchased for measuring the chemical levels in the spa.

Automatic sanitizers can also be purchased. A floating dispenser basket filled with a stick sanitizer will leach the chemical slowly into the water. A more sophisticated automatic feeder can also be used. It adds chemicals to the spa based upon its measurements of free chlorine in the water.

*Chlorine and  
bromine*

**Which two chemicals are used to sanitize spa water?**

Another way of maintaining water chemistry is by using ozone. Ozone is a gas created by nature when oxygen in the air is exposed to ultraviolet rays from the sun. It can be used to help purify water thereby decreasing the amount of chemicals needed.

Ozone generators run independently in conjunction with the support system's filtration cycle. The generator purifies the water by taking in air and converting the oxygen into ozone. The ozone is then distributed into the spa water.

There are numerous advantages to using ozone. It causes the water to be clearer than chemicals do alone. Of particular benefit is the reduction of chemical use since large amounts of chlorine and bromine can cause irritation to eyes and skin. Heavy use of chemicals will also cause wear and tear on the spa shell and equipment.

It is important to remember that generating ozone does not replace the need for chemicals, it reduces the amount needed to maintain sanitary conditions.

*No, it reduces  
chemical use, but  
does not eliminate  
it entirely*

**Can ozone be used without chemicals?**

There are many accessories which add to the comfort of hot soaking. Although many spas already come with built-in lighting, additional lighting may be desired for an outdoor spa.

Floating items such as pillows, trays, thermometers and tape players make a soak even more luxurious.

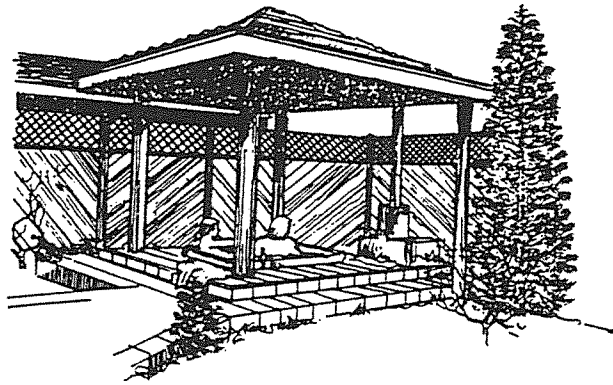
For additional information on the accessories available through your spa manufacturer consult the manufacturer's literature.

*Lights, pillows,  
thermometers,  
trays, tape players*

**Name two spa accessories.**

Outdoor spas can be enclosed in landscaping or shelters to protect them from the elements and promote privacy. Shelters can be custom designed or erected from pre-fabricated kits.

Shelters can range from a gazebo type structure without sides to a totally enclosed structure like the one shown here.



Overhead protection can assist in protecting the spa from sun fading. Enclosed shelters slow heat loss from the water and create a warm and humid climate.

*Enclose them in  
shelters or land-  
scaping*

**What are two ways of protecting outdoor spas?**

The best way to keep a spa operating effectively is to maintain it on a regular basis. In addition to cleaning the filter and skimmer and chlorinating the water, owners need to drain and clean the spa every two to four months depending upon use and the manufacturer's recommendations. After draining, the spa should be cleaned with a mild non-abrasive cleaner or other cleaning agent recommended by the manufacturer.

Proper maintenance of support equipment requires that the pump be run at least two hours every day.

Equipment should also be checked for lubrication, proper housing and proper ventilation.

*Every two to four  
months*

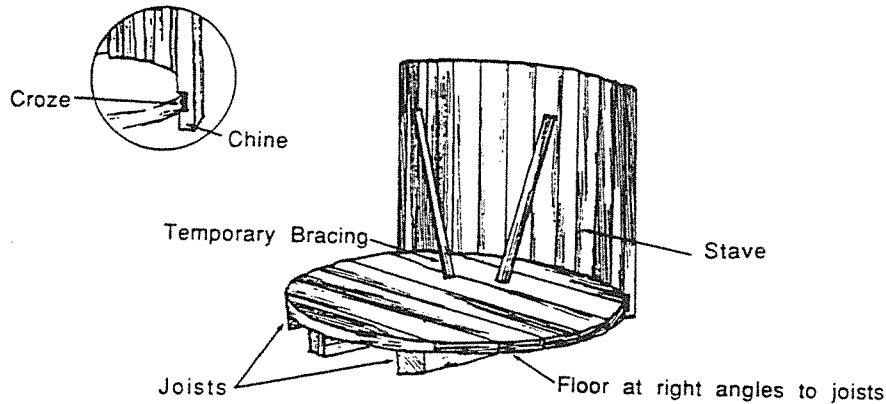
**How often should a spa be drained and cleaned?**

**DIRECTIONS:** In the space provided on the left, write the term described in each of the following items.

- \_\_\_\_\_ 1. The separation into layers of the materials used to construct a spa due to water seepage through the gel-coat lining.
- \_\_\_\_\_ 2. Removes dirt and residue from spa water.
- \_\_\_\_\_ 3. Pump, filter, skimmer, heater, air blower, and timer on a portable spa.
- \_\_\_\_\_ 4. Destroys bacteria and algae in the spa, creating sanitary conditions.
- \_\_\_\_\_ 5. Type of heater required for most in-ground spa installations.
- \_\_\_\_\_ 6. Type of spa which is permanently installed in an excavated hole or above grade surface on-site by a contractor.
- \_\_\_\_\_ 7. Type of cylindrical filter made of paper, dacron or non-woven polyester and folded in accordion pleats.
- \_\_\_\_\_ 8. Spas which hold 2 to 8 people.
- \_\_\_\_\_ 9. A water surface filter for spas.
- \_\_\_\_\_ 10. Sturdies spa material, which is the most resistant to fading, temperature and chemical damage.

Compare your responses with the answers given on page 67.

Unlike the whirlpool spa discussed in the previous section, a hot tub is a vessel which is constructed from staves of wood. A stave is a narrow vertical strip of wood, as you would find on a barrel. The staves are fitted together by the surfaces being angled, or beveled for a tight fit.



A deep notch is made at the bottom of the stave. This notch is called a croze. The croze fits to the floor of the hot tub. When all the staves are in place--beveled to each other and fitted to the croze-- they are held together by two to four steel hoops.

*The croze*

**Which part of the stave fits to the floor of a hot tub?**

Hot tubs are sold primarily in residential markets. In this country, hot tubs arose in the 1960's in California. Ingenuity was used to create the first tubs out of old wine vats and water tanks. As their popularity increased, so did manufacturers' efforts to construct and sell them. The appeal of hot tubs peaked in the 1970's.

A hot tub serves the same purpose as a spa: to provide recreation and hydrotherapy. The difference is really in the customers' preferences. Today, many customers still prefer the hot tub to the spa because of its "natural" appeal. Hot tubs have a distinct musty smell given off by the wood. A tub can blend in well with a yard's natural environment.

*They are natural-made of wood, have a musty smell, and blend into the yard environment*

**Why do some customers prefer hot tubs to spas?**

Many different kinds of woods can be used successfully in hot tub construction. The type of wood used by a manufacturer may depend upon availability in a certain region.

Redwood and cedar are the most common woods used. They are both softwoods. Redwood is found along the west coast. It is resistant to decay and chemical damage and doesn't splinter. Cedar is also a good wood to use, however, it is not as durable as redwood.

*Redwood*

**Which softwood is most durable for hot tub construction?**

Hardwoods may also be used in hot tub construction. Oak is most popular in the Eastern part of the country. It is durable, but must be well maintained to avoid decay.

Teak is another hardwood used. This tub is the most durable, and can last 30 or more years. Its natural oils help protect it from chemical and water damage. However, teak is the most expensive wood used for hot tub construction.

*Oak and teak*

**What two types of hardwoods are often used in hot tub construction?**

Hot tubs are ordered by the diameter or width across the tub. The diameter is the measurement of distance across a circle as measured by a straight line through the center.

Hot tubs range in size from 4 to 8 feet in diameter and 4 to 5 feet deep. These dimensions provide a deeper soak than most spas can offer. Depending upon the tub's size, it can hold from two to eight people.

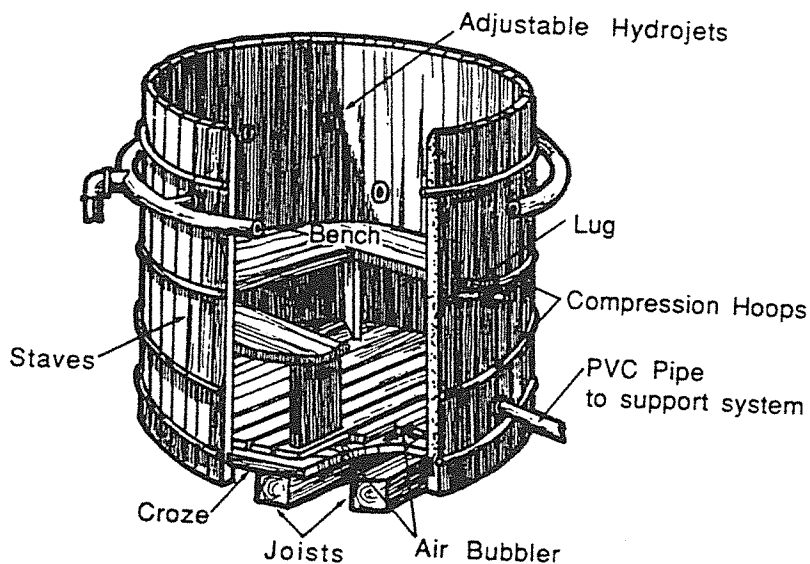
Gallon capacity also varies by size. A small hot tub will hold between 350-500 gallons of water. An eight foot tub can hold over 1,000 gallons.

*Hot tub*

**Which fixture is deeper, a hot tub or a spa?**



Hot tubs are sold as kits that include the flooring, staves and adjustable stainless steel hoops. The hoops are tightened by their lugs. The lugs are projections into which the hoops fit and tighten. This tightening creates the watertightness of the vessel.



When the tub is filled with water, the wood swells from the water tightening the joints and the inside pressure aligning the staves. Upon initially filling the tub there will be some leakage. It takes about one week for the tub to become fully swollen and water tight.

*The wood swells to tighten the joints, and the water pressure aligns the staves*

**How does a hot tub become watertight?**

A disadvantage to a hot tub is that it might develop some slow leaks. Caulking may help this. The manufacturer should be contacted if there are problems.

Another problem with a hot tub is that when it is new, it may leach color from the wood into the water. Leaching occurs when the natural dye in the wood called tannin is drawn into the hot tub water. This is especially common with redwood tubs. It may take numerous fillings and drainings until the tannin disappears.

Some people feel that hot tubs are not as clean and hygienic as spas since the porous wood provides a breeding ground for bacteria. This does not need to be a problem provided proper chemical maintenance is performed. It should be noted though, that wood is more susceptible to chemical damage than plastic and concrete.

*They leak easier,  
may leach color  
into the water,  
more susceptible  
to chemical damage*

**What are the disadvantages of hot tubs compared to spas?**

Hot tubs can be installed in various ways. They can be free standing, inserted into a raised deck, or recessed into a raised section of an interior floor. Since a 6' hot tub will weigh approximately 1,000 pounds when filled, floor or ground supports must be provided. For indoor installation, consult local building codes and manufacturers' recommendations.

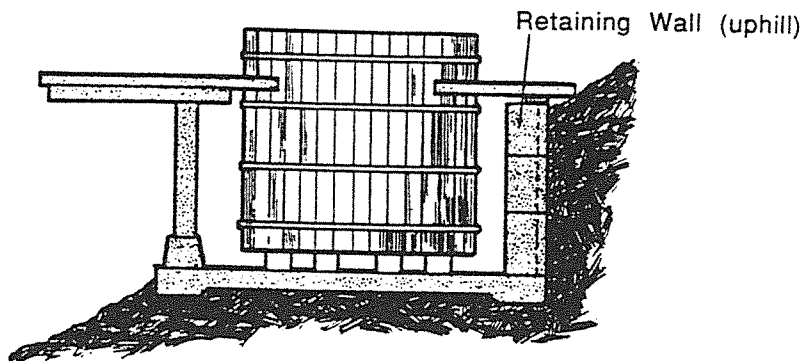
When installing a freestanding tub on a level grade, it is placed on wooden joists. Joists are timbers of wood used to support flooring, or in this case, a tub. The hot tub is then put on a concrete slab for fullest support.

A hot tub generally has some type of decking constructed after installation. At least a 1/2 to 3/4 deck is necessary to enter the tub.

*Free standing on a  
concrete slab,  
installed in a raised  
deck, or recessed  
into a raised section  
of floor*

**Where can hot tubs be installed?**

Installing a tub into the grade of a hill requires special construction. The hill must be cut and a retaining wall made of concrete installed on the uphill side. A concrete slab is poured on the level ground where the tub is set.



*On the uphill side*

**For hot tub installation, where is the retaining wall built?**

In small hot tubs, the users sit on the floor. Larger tubs have benches built in. Benches are removable and may even be adjusted for height depending upon how deep you want to soak.

You will find most benches sold as part of a hot tub kit. The kits include the staves, hoops, flooring, plumbing, and electrical support packages. The tub can be assembled by the owner. Many distributors will also provide on-site assembly and installation.

*On the floor of the smaller tubs, and benches of larger tubs*

**Where do users sit in a hot tub?**

A hot tub uses the same support system as a spa. The size of equipment used will depend upon the size of the hot tub. The manufacturer's literature will indicate the appropriate sized heater, pump and filter for a particular hot tub.

There are some differences you will see between spa and hot tub support equipment. First, hot tubs do not use skimmers. Second, hydrojets on a hot tub are not pre-installed. This means that the customer may choose how many jets he wants and where they will be placed. The jets are installed as the tub is assembled.

*Hot tubs do not use skimmers, jets are not pre-installed*

**What are two differences between support equipment on a spa and hot tub?**

The support system of a hot tub is located near the fixture, but independent from it. Equipment for the hot tub's support system can come in a skid pack for the smaller tubs. Larger tubs will require the components be purchased separately.

*In a skid pack*

**How is the support system packaged on a smaller hot tub?**

Hot tubs come with all the same accessories as spas. As with a spa, covering the hot tub is important for safety and heating conservation purposes.

Some manufacturers have pre-fabricated wooden decks, stairs and shelters which can enhance the visual beauty and comfort of the hot tub. They may come in kit form which the owner assembles, or pre-assembled. As with choosing a wood for the hot tub, owners should choose accessory woods which stand up to the elements. Cedar and redwood are favored since they do not require painting.

*How the wood will stand up to the elements*

**What consideration should a customer make when choosing wood decking?**

Hot tubs must be drained and cleaned every two to three months, depending upon frequency of use. After the hot tub is drained, it should be scrubbed with a manufacturer recommended cleaning agent. Cleaning hot tubs can be difficult because of their depth.

Once drained, the tub needs to be refilled within two days. Waiting longer than that can cause the tub to completely dry out. Once dry, the wood will buckle which will cause leaks. The staves will no longer be swollen and sealed evenly. Once dried out, the tub may not be able to be repaired.

*The tub can dry out causing leaks and irreparable damage*

**Why must hot tubs be refilled within two days after draining?**

Maintenance on a hot tub is extremely important since the wood can easily decay. If the chlorination level is too high, it can damage the wood. Support equipment which is too small for a tub will keep it from being adequately cleaned and may cause problems with bacteria.

When choosing between a hot tub and spa, the customer should know that the hot tub will require more maintenance.

*hot tub*

**Which fixture is more difficult to maintain, a hot tub or spa?**

For customers who want the convenience of a spa and the beauty of a hot tub, a "spa-tub" can be purchased. This fixture looks like a hot tub on the outside. Inside, the tub is fitted with a smooth plastic liner to look like a spa.

Check with the manufacturers who supply the hot tubs sold by your company to see if spa-tubs are available.

*A spa tub*

**What fixture is a combination hot tub and spa?**

**DIRECTIONS:** Match the terms listed on the left with the correct definition listed on the right.

- |                        |  |
|------------------------|--|
| 1. ____ teak           | A. a component of the support system                   |
| 2. ____ croze          | B. where a hot tub is installed on a level grade       |
| 3. ____ diameter       | C. hardwood used in hot tub construction               |
| 4. ____ staves         | D. support system package                              |
| 5. ____ retaining wall | E. softwood used in spa construction                   |
| 6. ____ spa-tub        | F. metal hoops which attach to the lugs                |
| 7. ____ cedar          | G. notch at the bottom of the stave                    |
| 8. ____ concrete pad   | H. distance across the tub measured through the center |
| 9. ____ skid pack      | I. narrow vertical strips of wood                      |
|                        | J. where an in-ground spa is installed                 |
|                        | K. combination hot tub and spa                         |
|                        | L. installed on the uphill side of a hillside tub      |
|                        | M. decking surrounding the tub                         |

Compare your responses with the answers given on page 67.

## REVIEW ANSWERS

### Overview of Specialty Fixtures, page 21

- |     |       |                     |
|-----|-------|---------------------|
| 1.  | FALSE | <i>See Frame 8</i>  |
| 2.  | FLASE | <i>See Frame 18</i> |
| 3.  | TRUE  | <i>See Frame 20</i> |
| 4.  | TRUE  | <i>See Frame 25</i> |
| 5.  | FALSE | <i>See Frame 5</i>  |
| 6.  | FALSE | <i>See Frame 11</i> |
| 7.  | TRUE  | <i>See Fame 6</i>   |
| 8.  | TRUE  | <i>See Frame 17</i> |
| 9.  | TRUE  | <i>See Frame 22</i> |
| 10. | FALSE | <i>See Frame 16</i> |

### Whirlpool Bathtubs, page 36

- |     |  |                         |
|-----|--|-------------------------|
| 1.  | acrylic with fiberglass<br>reinforcement | <i>See Frame 35</i>     |
| 2.  | at opposite ends of the tub              | <i>See Frames 37</i>    |
| 3.  | bathing well                             | <i>See Frame 33</i>     |
| 4.  | the recirculating pump                   | <i>See Frame 38</i>     |
| 5.  | 2"                                       | <i>See Frame 44</i>     |
| 6.  | end view                                 | <i>See Frame 50</i>     |
| 7.  | recess, sunken, and corner               | <i>See Frames 28-29</i> |
| 8.  | on the sides of the bathing well         | <i>See Frame 37</i>     |
| 9.  | 3/4"                                     | <i>See Frame 46</i>     |
| 10. | top view                                 | <i>See Frame 49</i>     |

## Whirlpool Spas, page 57

1. delamination *See Frame 56*
2. filter *See Frame 70*
3. skid pack *See Frame 66*
4. sanitizing chemicals, i.e. chlorine or  
bromine *See Frame 87*
5. gas heater *See Frame 81*
6. in-ground spa *See Frame 54*
7. cartridge filter *See Frame 71*
8. portable spa *See Frame 61*
9. skimmer *See Frame 75*
10. thermoplastics *See Frame 57*

## Hot Tubs, page 65

1. C *See Frame 95*
2. G *See Frame 92*
3. H *See Frame 96*
4. I *See Frame 92*
5. L *See Frame 100*
6. K *See Frame 107*
7. E *See Frame 94*
8. B *See Frame 99*
9. D *See Frame 103*



## GLOSSARY

- access panel** panel on the whirlpool bathtubs exposed side that allows access to the pump for repairs
- acrylic** type of plastic manufactured by the vacuum forming process
- air blower** electric motor with a fan that produces bubbling action in a spa or hot tub
- air valves** openings on a whirlpool bathtub which sucks in air to be mixed with the water in the pump
- apron** the finished side of a bathtub
- bath filler** supply fittings for a tub which consist of valve, control handles and tub spout
- bathing well** the hollowed out portion of the bathtub where the bather sits to take a bath
- beveled** curved; angling of stave surfaces on a hot tub
- cartridge filter** cylindrical filter made of paper, dacron, or non-woven polyester, folded into accordion pleats set inside a plastic core
- controls** devices for a whirlpool bathtub, spa or hot tub which allow the user to turn the support equipment on or off
- corner tub** tub with two aprons which is installed where two walls join
- croze** deep notch on the stave bottom in hot tub construction
- DE filter** type of filter used in in-ground spas, made from diatomaceous earth
- delamination** separation of materials into layers
- diameter** distance across a circle as measured by a straight line through the center
- drain** opening which is used to empty the water from the tub
- filter** removes dirt and residue from the spa or hot tub
- hard wired** wiring of an appliance to a permanent electrical connection
- heater** part of spa and hot tub support equipment which heats the water
- hot tub** special type of whirlpool spa made of wood
- hydrojet** opening in a whirlpool bathtub which emits the air and water mixture into the fixture, causing the water to become agitated
- hydrotherapy** use of water for the treatment of injury or disease
- integral** built into the fixture

**in-ground spa** spa placed in a hole in the ground or an above grade surface, which cannot be removed once constructed

**low-level switch** switch with a sensor that automatically shuts off the pump when the water level falls below the line of the jets

**lugs** projection on a hot tub into which the hoops fit

**MPT** male pipe threads

**ozone** gas created by oxygen in the air exposed to ultraviolet rays from the sun

**portable spa** type of whirlpool spa which can be moved from place to place

**recess whirlpool bathtub** tub with one apron, installed in the recess of a wall

**recirculating pump** pump on a whirlpool bathtub which mixes water with air and then sends the mixture back into the tub through the jets

**rough-in** dimensions of pipe concealed behind walls or under floors

**roughing-in stage** laying the supply and DWV pipe

**shell** hollowed out portion of a spa which holds the water

**skid pack** support system equipment assembly for a portable spa, which is located under the skirt

**skimmer** part of the support equipment which catches large floating debris on the water surface

**skirt** removable apron on a whirlpool bathtub

**stave** narrow vertical strip of wood

**sump** lowest point in the tub

**sunken whirlpool bathtub** tub with no aprons which can be installed above or below the floorline into a platform

**support system** spa and hot tub equipment that circulates, heats and filters the water

**thermoplastics** vacuum molded plastics which do not require fiberglass reinforced backing

**water depth** measurement from the bottom of the drain to the overflow fitting

**waterfall spout** spout design which causes the water to flow in a cascading fashion, like a waterfall; often used as a recirculating spout

**whirlpool bathtub** bathtub where water and air are pumped and recirculated into the tub through hydrojets causing the water to agitate

**whirlpool spa** fixture independent of the DWV system and water supply system where water is pumped and recirculated through jets causing the water to agitate

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# **Faucets and Accessories**

## **Series Two Unit 6**

### **PHCP Self Instruction Program**

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222 Merchandise Mart Plaza Suite 1360  
Chicago, Illinois 60654**

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## **UNIT OBJECTIVES**

The information in this Manual has been selected to give you an overview of faucets and accessories. It includes definitions of common industry terms, descriptions of the most commonly used faucets and how they work.

Some of the products reviewed in this Unit may not be a part of your company's current inventory. Other products which may be stocked by your company may not be discussed in this Unit. Always refer to manufacturers' literature and recommendations on the products your company sells if unsure about a particular product.

To do your job well, it is important that you learn the details about specific items stocked by your company. The most complete and accurate information can be found in manufacturers' catalogs and materials. Be certain to spend time studying those materials.

When completing this Unit, you will be able to

- recognize and use basic terms related to faucets
- discuss the ordering specifications for different types of faucets
- understand which faucet designs are best for a given installation or application.

**THESE MATERIALS SHOULD NOT BE USED TO PLAN ACTUAL INSTALLATIONS OR TO INSTALL PIPE, FITTINGS, OR VALVES, OR ANY PART OF A PIPING SYSTEM.**

### **DISCLAIMER**

Although the information contained in this Unit is believed to be accurate, the ASA Education Foundation and the American Supply Association disclaim any and all warranties, expressed or implied, regarding both the accuracy of that information and its application.

## STEPS FOR COMPLETING THIS UNIT

1. If your company has purchased the videotape for use with this Series, view the video before you start Unit One.
2. Use the answer mask/book mark to cover the printed answers in the left hand column. Read the information in each Frame carefully.
3. Keeping the answer covered, write your response to the Frame question in the empty column at the right of each page.
4. Move the answer mask to check your response with the answer in the left column.
  - If your response is reasonably close to the printed answer, go on to the next Frame.
  - If your response differs from the answer given, review the material in the Frame to see why the printed answer is considered the best answer for the question.
  - If after reviewing the material in the Frame you still believe that your response is better than the printed answer, circle the printed answer. If you agree that the printed answer is best, mark an "X" through your response.
  - If after several attempts, you cannot understand the Frame or the answer to the Frame question, ask someone in your company for help.
  - If you still feel confused, contact the Foundation, and we will try to find a product knowledge expert to assist you.
5. Answer the questions in the Review at the end of each section. Check your responses with the answers given at the back of the book. Reread the Frames indicated for answers you missed.
6. When you've completed all Frames, prepare for the Unit Quiz by going over the Review pages and the definitions in the Glossary.
7. Take the Unit Quiz at the end of the Manual.
8. Send the whole book, with the completed Quiz, to the ASA Education Foundation for grading. You and your immediate supervisor will be notified about your completion of the Unit.

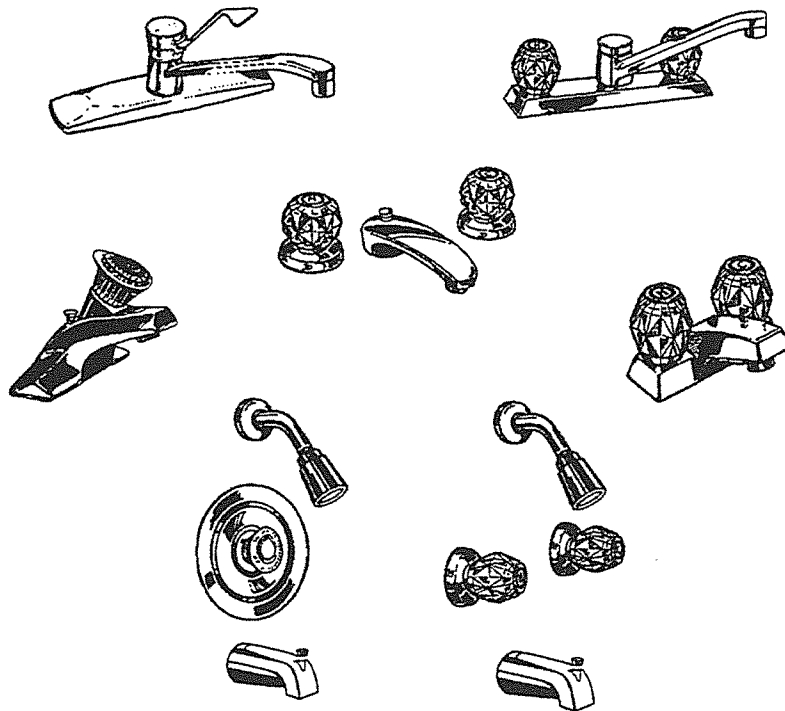
**When you have completed all Units in Series Two, contact the ASA Education Foundation to make arrangements to take the Series Two Exam. You will receive a Certificate of Completion for Series Two when you have successfully completed all Units and the Series Two Exam.**

In previous units you learned that a faucet is a valve located at an outlet in the piping system and is used to control delivery of the water to a fixture. Faucets are used in both residential and commercial installations. In this unit, we will focus only on faucets used in residential applications.

In residential areas, faucets are usually found in the kitchen, bathroom and powder room. Common terms for these faucets are:

- fittings
- trim
- brassware
- tap(s)

Below you can see a variety of common faucets. This unit will identify the characteristics and common installations for each type of faucet.



*Valve located at the outlet in the piping system which controls the water flow into a fixture*

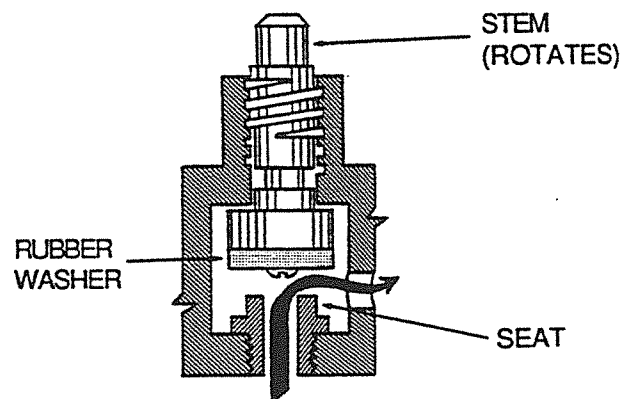
**What is a faucet?**



In general, household faucets come in two designs:

- washer designs
- washerless designs

The washer design faucet is often called a "compression seal" type. The following diagram is a cut-away of a two-handle washer design:



#### COMPRESSION SEAL TYPE

The flow of water is controlled by turning the handle. This turns the stem and moves the rubber washer toward or away from the seat.

*Washer design and  
washerless design*

**What are the two basic designs of household faucets?**

In a washerless design faucet, the flow is controlled with an o-ring, ceramic disc, resilient seal or rubber diaphragm.

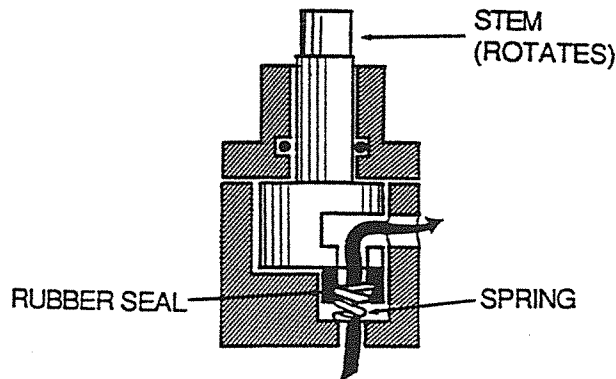
Although there are many variations, washerless faucets come in these three general types:

- rubber seal shearing
- ceramic (disc) shearing
- diaphragm

*Rubber seal shearing; ceramic (disc) shearing; diaphragm*

**What are the three general types of washerless design faucets?**

The drawing below shows a rubber seal shearing type washerless design faucet.



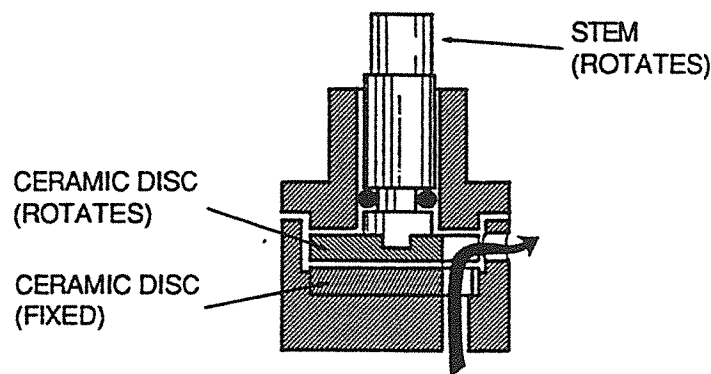
**RUBBER SEAL SHEARING TYPE**

The spring positions the rubber seal in line with the bottom surface of a rotating cylinder. The flow is controlled by rotating the cylinder with the faucet handle. In this type of design, the closing mechanism is the rubber seal. When the opening in the cylinder is in line with the rubber seal, water flows. When a solid portion of the cylinder is in line with the rubber seal, water flow is stopped.

*Rubber seal*

**What is the closing mechanism on a washerless rubber seal shearing type faucet?**

A second type of washerless design is the ceramic shearing type which is illustrated below.



#### CERAMIC SHEARING TYPE

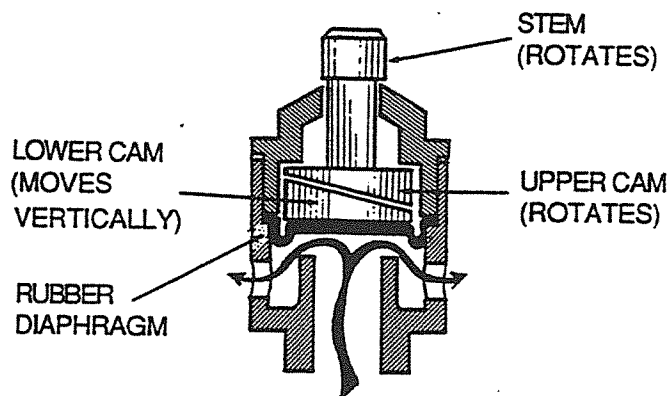
In the ceramic shearing type faucet, water flow is controlled by the position of the upper of two ceramic discs. When the opening in the rotating upper disc is in line with the opening in the fixed lower disc, the valve is open.

The rubber seal and ceramic disc type washerless faucets are called "shearing" because the flow of water is "sliced" or "sheared" off by moving two openings out of line with each other.

*Shearing type*

What term is used to describe rubber seal and ceramic disc washerless faucets?

The third type of washerless design faucet, called a diaphragm type is shown below:



DIAPHRAGM TYPE

In the diaphragm type washerless faucet, the flow of water is controlled by a rubber diaphragm. When the diaphragm compresses, it lifts away from the seat, and the valve is in the "on" position. The amount of flow depends on the position of the diaphragm. The diaphragm is moved by rotating the stem with the handle.

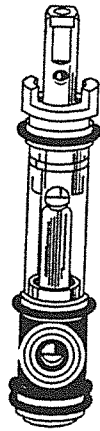
Of the three general types of washerless design faucets, the diaphragm type is the least commonly used.

*rubber diaphragm*

**What mechanism controls the water flow on a diaphragm type washerless faucet?**

A washerless design faucet usually has a single cartridge which holds the operating parts of the valve. (Some manufacturers refer to this unit as a "replacement valve.")

The advantage of a washerless design is that repair is often a matter of simply replacing the cartridge.



VALVE CARTRIDGE

*Easier repair*

**What is the main advantage of washerless design faucets?**

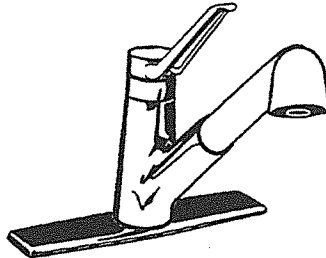
One way of classifying faucets is by how they fit or are installed using the fixture drillings. Some fixtures, such as kitchen sinks, may have up to six drillings. The most common types of faucet according to installation are:

- single hole
- centerset - 4" and 8"
- widespread - adjustable

*Single hole,  
centerset - 4" & 8"  
and widespread*

**What are the most common types of faucets?**

Single hole faucets (also called center mount and post type) require just one hole, or drilling, in the fixture for mounting and for passage of the hot and cold water supply. Usually, this is accomplished by bringing copper tube supply lines up through a surrounding shank.

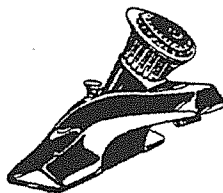


SINGLE HOLE KITCHEN SINK FAUCET

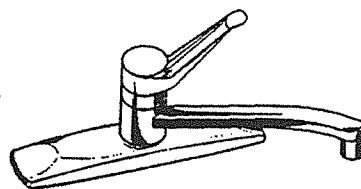
*center mount or  
post type*

**What are two other common terms used to identify a single hole faucet?**

The centerset faucet mounts on top of the fixture with mounting shanks or bolts passing down through holes set 4" or 8" apart, center to center. A centerset faucet measurement is generally abbreviated as "cc".



4" CENTERSET FAUCET



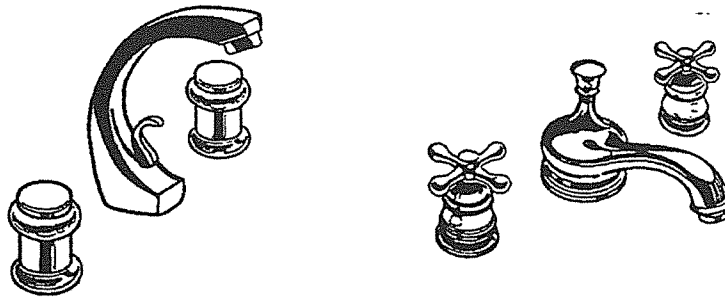
8" CENTERSET FAUCET

The 4"cc faucet is typically used on a lavatory, bar sink, or laundry sink. The "8"cc is typically used on a kitchen sink.

*Lavatory, bar sink,  
laundry sink*

**Name three fixtures that typically use a 4"cc centerset faucet.**

The widespread adjustable faucet adjusts to fit drillings of 6" centers up to 12" centers. These faucets allow the hot and cold water control handles to be positioned at wider intervals than the centerset type will allow.



#### WIDESPREAD ADJUSTABLE

Widespread faucets are commonly used on lavatory and bathtub installations.

*Widespread faucet allows the handles to be positioned at wider intervals*

**How is the widespread adjustable faucet different than the centerset type?**

Another way of classifying faucets is by how the water is mixed. Less common today are the individual hot and cold faucets where each faucet has its own independent spout. The vast disadvantage of this type of faucet is that the water is either too hot or too cold until it is mixed in the receptacle.

This type of faucet is most commonly found in older installations and in some commercial systems.

*Older installations and some commercial systems*

**Where would you most likely find individual hot and cold faucets?**

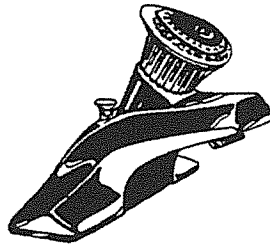
The most common faucet used in residential installations is the mixing type faucet. Mixing type faucets are designed so that the hot and cold water are mixed internally and flow, blended together, out of a single spout.

*Mixing type faucets*

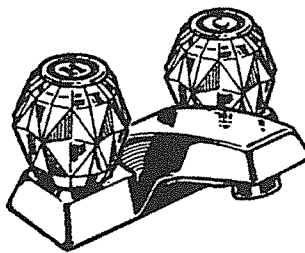
**What type of faucet is most commonly used in residential installations?**

Mixing faucet types vary according to the number of handles or levers used to provide the water mixing function. The two common designs for mixing faucets are:

- single control (called single lever or single handle)
- two handle



SINGLE CONTROL MIXING TYPE FAUCET



TWO HANDLE CONTROL MIXING TYPE FAUCET

*Single control  
and two handle*

**What are the two types of water mixing faucets?**



Single control mixing type faucets are designed so that both the hot and cold water are controlled by one handle. By moving the handle or lever of a single control faucet, it is possible to do three things:

- turn the faucet on or off
- regulate the amount of the water flow
- obtain temperatures that range from all cold to all hot

There is no common direction used in operating a single control faucet. The lever may be operated from side to side, up and down, or may be a combination of the two. Single control faucets are made to fit both single hole and centerset drillings up to 8"cc.

*Turns the water on or off; regulates water flow; and controls water temperature*

**What three functions does the single control faucet provide?**

Two handle faucets, unlike single control faucets, have a separate handle for each water supply. One handle controls the flow of hot water, and the second handle controls the cold water supply. The hot and cold water mix internally before flowing out of the spout.

Two handle mixing type faucets are available in single hole, 4" and 8" centerset and widespread types.

*It has two handles to control the water*

**What makes the two handle faucet different from the single control faucet?**

Besides the differences in styles, faucets vary according to the type of material used in manufacturing them. The most common materials used to produce faucets are:

- brass
- zinc
- stainless steel
- copper
- plastic

Some manufacturers use only one material for all parts of the faucet. Often, though, more than one material will be used in a faucet. For example, the waterways may be made of copper but the faucet valve itself made of brass or stainless steel.

Review information from your manufacturers to determine the materials used in their faucets.

*Brass, zinc,  
stainless steel,  
copper, plastic*

**What are the materials most commonly used to make faucets?**

Brass is an alloy made essentially of copper and zinc. The major advantages of brass is its high resistance to corrosion, its strength, and its ability to be shaped or formed.

Although copper and zinc are the primary components of brass, lead is added to all brass to improve its cutting characteristics.

*corrosion resist-  
ance, strength, and  
its ability to be  
formed*

**What are the major advantages of brass?**

Zinc is a bluish-white metallic element. At high temperatures, zinc is easily molded and shaped. Like brass, zinc also resists corrosion, is strong and durable.

Zinc is always used in combination with other materials, never as a single material.

Zinc is less expensive than brass and is used most often for economically priced faucets. However, zinc is slowly being replaced by plastics because plastic is less expensive than zinc.

*Resists corrosion,  
is strong and durable*

**How is zinc like brass?**

Faucets are most often identified by the material used as the finish of the faucet. This is that material which is most visible to the consumer. The material selected as a finish depends upon the style and type of faucet. Some common faucet finishes are:

- chrome
- brass
- nickel
- gold
- epoxy

A combination of these materials may be used. For example, epoxy is used as a coating to cover nickel, brass or gold.

*The type and style  
of faucet*

**What determines the type of finish to be used on a faucet?**

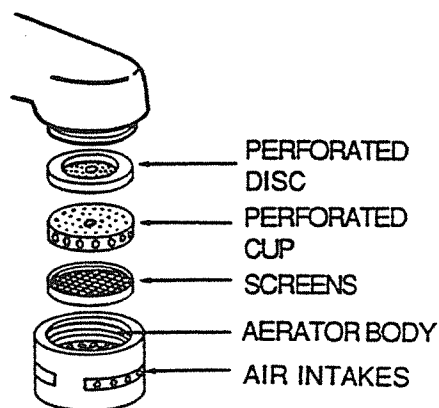
Despite the variety of finishes available, chrome is the most common faucet finish. Chrome is made from a natural element, chromium, which is applied to the surface of the faucet. One reason for chrome's popularity as a faucet finish is that it is very durable. Chrome can be found on all styles and types of faucets.

*Its durability*

**What is one reason for chrome's popularity as a faucet finish?**

There are a few accessories that might be found where ever there is a faucet installation. The most common accessories are aerators and flow control devices.

Aerators are used on kitchen sink faucets, lavatory faucets and some showerheads. Aerators, located in the spout inlet, inject tiny air bubbles into the water flow. This is done by using a perforated disc and cup, which divides the stream of water into thin jets. A pair of small filtering screens change the the hard jets into a gentle flow of bubbly splash-free water.



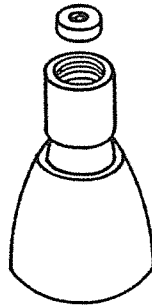
Aerators are primarily used to cut down on splash from the spout although they do reduce water consumption.

*To cut down splash*

**What are aerators primarily used for?**

Another common accessory for faucets is the flow control device, which is found on showerheads. The flow control device reduces water consumption without greatly changing the feel or force of the water. Below is an illustration of a typical flow control device used in a showerhead.

SHOWER CONTROL DEVICE



Since the United States requires that manufacturers equip their products with devices to meet water flow standards (cut down consumption), the flow control device and aerator are important devices in the plumbing industry. Both accessories lower the amount of water being used.

Unfortunately, typical flow control devices and aerators can not be used with some new faucet spout designs. In these situations, a flow control device might be built into the connecting components, usually at the spout inlet or sometimes in the passage of the spout itself.

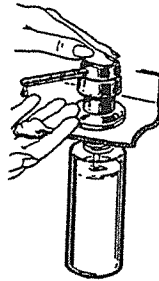
*Reduces water consumption*

**What is the purpose of flow control devices on showerheads and faucets?**

Less common than the two accessories just discussed are dispensers. Soap/lotion dispensers are built-in containers usually found next to the faucet, that dispense liquid soap or lotion.

This type of dispenser is often found in newer lavatory and sink faucet installations. They can dispense either liquid hand soap or in the case of the kitchen, dishwashing liquid.

The soap/lotion dispenser is mounted on the sink or lavatory using one of the fixture drillings. The container that holds the liquid soap is under the sink, out of sight.



BUILT IN SOAP/LOTION DISPENSER

*Mounted on the sink or lavatory using one of the fixture drillings*

**How is the soap/lotion dispenser installed?**

**DIRECTIONS:** Match the terms listed on the left with the correct definition listed on the right.

- |                               |   |
|-------------------------------|---|
| 1. ____ aerator               | a. valves located at outlets in the piping system used to control delivery of the water into fixtures                 |
| 2. ____ chrome                | b. faucet that requires one hole in the fixture when mounted  |
| 3. ____ faucets               | c. faucet that adjusts to fit drillings of 6" centers up to 12" centers   |
| 4. ____ flow control device   | d. faucets designed so that hot and cold water are mixed internally and flow, blended together, out of a single spout |
| 5. ____ mixing type faucet    | e. faucets that use a single handle to control both hot and cold water  |
| 6. ____ single hole           | f. faucets that have a separate lever for each cold and hot water supply  |
| 7. ____ single control faucet | g. a faucet finish made from chromium   |
| 8. ____ two handle faucet     | h. device used primarily to cut down on splash from the the faucet spout  |
| 9. ____ widespread adjustable | i. device used in a showerhead to reduce water consumption  |

Check your responses with the answers given on page 56.

In the previous section, residential faucets in general were introduced. In this section, a closer look will be taken at bathroom faucets, shower valves and accessories.

As discussed in Frame 8, one way of classifying faucets is by how they fit or are installed using the fixture drillings.

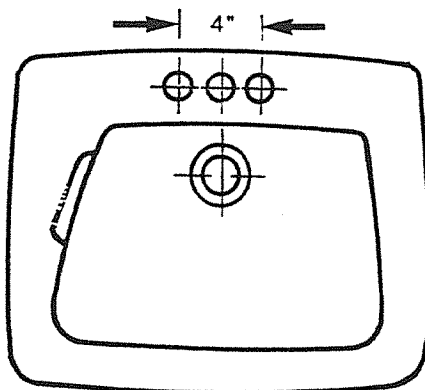
Common center to center measurements for lavatory faucets are 4" and 8". Some lavatories will use widespread models with up to 12" centers.

4" and 8"

**What are the most common measurements for lavatory faucets?**

Typically, lavatory faucets are mounted on top of the fixture with mounting shanks or bolts passing down through holes in the fixture.

The number of holes actually used to mount the faucet will depend on the faucet design. For example, a 4"cc faucet will typically use three holes; however, there are some which use only two holes. On a three hole installation, the middle hole is used for a drain waste control rod.



It is important to know the number of drillings on the lavatory and the requirements of the faucet design to assure the faucet can be properly mounted.

The faucet design

**What will determine the number of holes used to mount a lavatory faucet?**



In the overview section, we discussed how faucets are classified. There is still another classification used in the industry, the faucet style. Faucet style refers to the period of time in history when a particular type of faucet design would have been used.

The three commonly specified faucet styles are:

- standard
- traditional
- contemporary

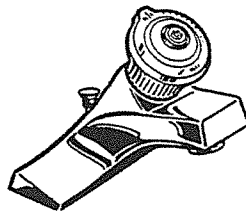
In manufacturers' brochures, traditional and contemporary styles are referred to as "decorative" or "upscale".

In general, all three styles of faucets are available in the common 4"cc and in the widespread types.

*Standard*  
*Traditional*  
*Contemporary*

**What are three styles used to classify faucets?**

The standard style of faucet has been the most common faucet used since the 1950's. It is very basic in design with little detail and is usually made of chrome.

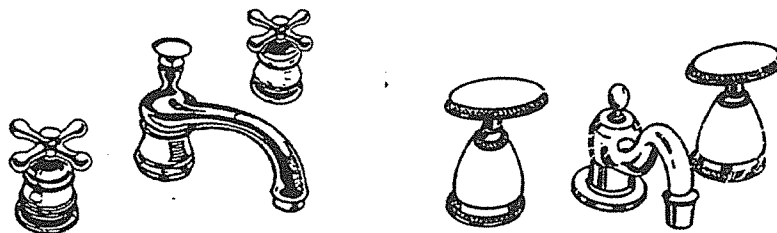


STANDARD STYLE LAVATORY FAUCET

*Standard*

**What is the most common style of faucet?**

Traditional style faucets are reproductions of faucets from different periods of architecture. These types of faucets usually are more detailed than the standard or contemporary styles. Below are illustrations of a two handled traditional style faucets.

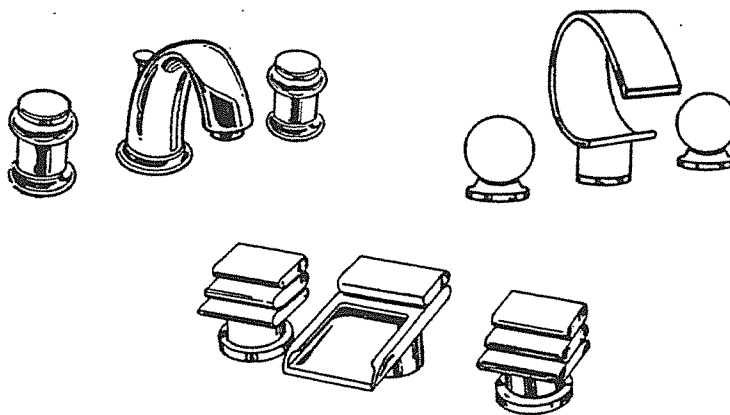


*Traditional style faucets*

**What style of faucets are reproductions of faucets from different periods of architecture?**

Contemporary style faucets are modern in appearance. This type of faucet is usually less detailed and sleeker than the traditional style in order to blend in with today's smoother architecture. Both the spout and handle design are made in a variety of shapes.

Here are illustrations of a manufacturer's contemporary faucet design line.



*Contemporary style*

**What style of faucet is modern in design?**

As discussed in the previous section, faucets are made with a variety of finishes. The most common finishes for lavatory and tub faucets are:

- chrome
- brass
- nickel
- gold

Recall that chrome is the most popular faucet finish. Chrome is used on contemporary, traditional and standard style faucets.

**What are the most common finishes for lavatory and tub faucets?**

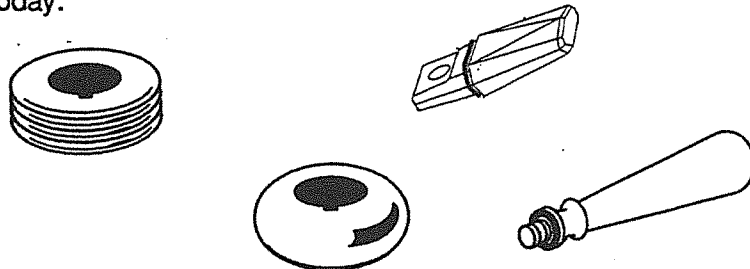
*chrome*  
*brass*  
*nickel*  
*gold*

In addition to a choice of finishes on faucets, manufacturers offer another option in faucets, inserts for faucet handles. Inserts are separate parts made of different materials that can be inserted into the lavatory or tub faucet handle. The insert can be used to coordinate the faucet handle with a particular period, bathroom decor, or individual taste.

Some insert choices include:

- wood
- onyx
- acrylic - clear and colored
- brushed or polished brass, chrome or gold
- brushed nickel
- porcelain
- semi-precious stones

Illustrated below are a few of the types of inserts available today.



**What might be used to coordinate the faucet handle with a bathroom decor or individual taste?**

*Inserts*

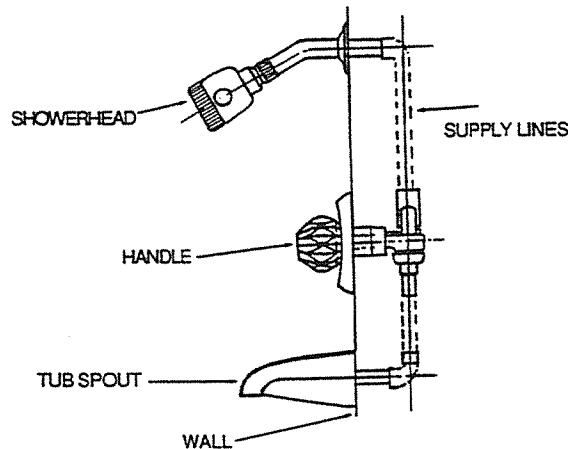
The faucet on a bathtub or shower can be easily coordinated with the lavatory faucet style, since they are very similar. Either two handle or single control valves can be used for a bathtub.

Recall from the unit on valves, the "faucet" in a tub or shower installation is technically called a bath and shower valve. However, manufacturers do not have "valve" catalogues; these products are included with their "line of faucets". In this section, both terms will be used to describe the following bath and shower products.

*Bath and Shower valve*

**What is the technical term for a "faucet" on a tub and shower installation?**

Unlike the faucets discussed so far, tub and shower valves are usually connected to the supply lines behind the wall. As the following drawing shows, the tub spout, handles, and showerhead are generally the only exposed components.



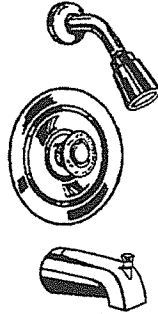
In some cases, a shower valve has an exposed showerhead riser. These are sometimes found in basements and often in institutions or commercial buildings or used for decorative applications.

*In basements, institutions and commercial buildings*

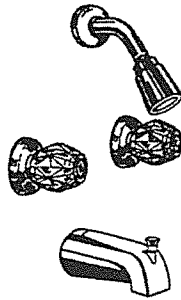
**Where would a shower valve with an exposed showerhead riser usually be found?**

There are three types of valves for the tub and shower: single control, two valve, and three valve styles. The number indicated in the style tells how many handles there are.

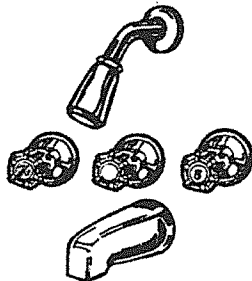
A single control valve has one handle to control both hot and cold water. A diverter used to operate the shower may be located on the tub spout or on the mounting plate near the handle.



Two valve models are two handle valves with separate handles to control the hot and the cold water flow. The shower is controlled by a small diverter knob on the tub spout.



Three valve designs have separate valves for hot and cold water and a third valve called a transfer valve or diverter. This valve is used to direct flow to the showerhead or the tub spout.



**What are the three basic models of valves used for tubs with showers?**

*Single control*  
*Two valve*  
*Three valve*

Better shower valves can provide automatic adjustments to sudden changes in water pressure or temperature. Valves which correct for pressure variations are called pressure balancing valves.

Valves which automatically control the temperature are called thermostatic controls. A few specialized valves provide both pressure and temperature control.

See your manufacturer's literature to learn what types of shower valves your company stocks.

*Thermostatic*

**What word describes controls which automatically regulate water temperature?**

The newest shower valve option is an electronic shower valve. The electronic shower valve is essentially a thermostatic valve which features touch pad activation and a digital readout.

When turned on, the valve resets and delivers water at an initial 90 degrees Fahrenheit. By pressing a button, the temperature can be adjusted up or down to suit the individual user.

In addition to the temperature control, the valve also has a hot limit device built in (automatic shut off at 112 degrees) and an integral pressure-balancing control.

*Hot limit device  
and an integral  
pressure-balancing  
control*

**What are two features of the electronic shower valve other than the temperature control?**

A variety of shower output devices are available today that fall into three general types:

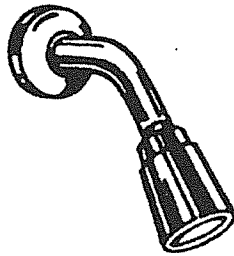
- fixed showerheads
- hand-held personal showers
- body showers

The installation method will depend on the type of output device used.

*Fixed showerhead;  
hand-held personal  
shower; body  
showers*

**What are three types of output devices available?**

The fixed showerhead is installed either on the wall or sometimes in the ceiling. Like the installation discussed in Frame 34, only the shower components are exposed outside the wall. This is the most common type of shower device and installation.

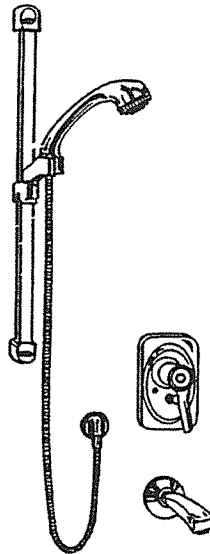


*Fixed shower head*

**What is the most common type of shower device?**

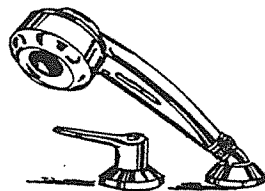
Gaining in popularity is the hand-held personal shower. The hand-held personal shower allows users to hold the shower in their hand and direct the spray in the desired direction.

One way the hand-held personal shower may be mounted is by using a vertical wall bar (sliding bracket). The bracket is attached to the wall and the personal shower slides onto the bracket as shown below.



HAND HELD SHOWER WITH BRACKET

Another type of hand held shower is deck mounted with the bath faucet and diverter. The hose retracts into the wall and is not visible until used.



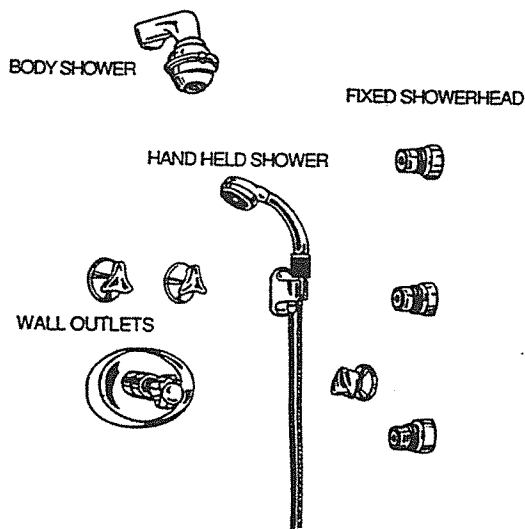
DECK MOUNTED HAND HELD SHOWER

*Vertical wall bar  
and deck mounted*

**What are two ways the hand-held shower can be mounted?**



The third type of shower device is the body shower. This type differs from other shower devices because it provides the bather with water spraying from several angles at the same time.



The body shower is customized for a particular installation and may be as simple as having one outlet on each wall, or may combine wall outlets, ceiling showerhead, hand-held showers and fixed showerhead into one shower for extra pampering.

*Sprays water from several angles at the same time*

**How does the body shower differ from other types of shower devices?**

Newer types of shower devices offer several options including:

- spray adjustment from fine to coarse
- pulsation
- aeration
- mechanical massage
- brush
- rain bar

Not all showerheads offer all the available options. Review manufacturers' literature to determine the options for the showerheads you sell.

Bathroom accessories are items that may be installed or used in the bathroom for convenience or for decoration. Faucet manufacturers now make bathroom accessories that coordinate with the bathroom decor, faucet styles and colors. Standard accessories include items such as:

- towel bars
- paper holders
- soap dish
- tooth brush and tumbler holder
- robe hook

*Towel bars,  
paper holders,  
soap dish,  
tooth brush and  
tumbler holder,  
robe hook*

**What items might standard accessories include?**

In addition to the accessories mentioned in the previous frame, the modern bathroom might also have these accessories:

- magazine rack/paper holder combination
- built in scales
- shelves
- two and three tier towel bars
- freestanding towel stands
- towel rings
- grab bars
- mirrors
- soap dispensers

Like lavatory and tub faucets, bath accessories are available in a variety of finishes and colors. The most common finishes are:

- chrome
- brass
- epoxy (various colors)

*Chrome, brass, and  
epoxy (colors)*

**What are the most common finishes for bathroom accessories?**

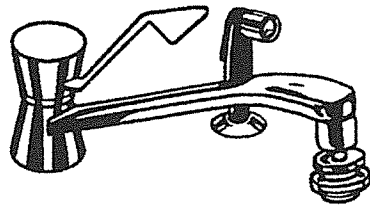
**DIRECTIONS:** In the space to the left, label each of the following statements "TRUE" or "FALSE."

- \_\_\_\_\_ 1. The most common lavatory faucet is 12" cc.
- \_\_\_\_\_ 2. Traditional style faucets are reproductions of faucets from different periods of architecture.
- \_\_\_\_\_ 3. Inserts are separate parts used to coordinate faucet handles with the bathroom decor.
- \_\_\_\_\_ 4. Bathtub and shower faucets are found in manufacturers' valve catalogs.
- \_\_\_\_\_ 5. Electronic shower valves control only the water temperature.
- \_\_\_\_\_ 6. A deck mounted hand-held shower hose is visible when not in use.
- \_\_\_\_\_ 7. Bathroom accessories are items that may be installed or used in the bathroom for convenience or for decoration.

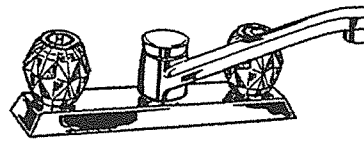
Compare your responses with the answers provided on page 56.

We have just examined bathroom faucets, shower valves, and accessories. This next section introduces another common type of residential faucet--kitchen sink faucets and accessories.

Two popular types of faucets used with kitchen sinks are the single lever style and the two handle 8" center design.



**SINGLE LEVER STYLE**



**TWO HANDLE 8" cc DESIGN**

*Single hole, single lever; two handle 8" center*

**What are the most common types of faucets used with kitchen sinks?**

Almost all kitchen faucets have one characteristic in common, a swing spout. A swing spout moves from the far left of the sink to the far right and back. This is important because, unlike lavatory sinks, the kitchen sink is larger and usually has two separate sink compartments. The swing spout allows water to reach all areas of the sink.

*A swing spout*

**What is one characteristic almost all kitchen faucets have in common?**

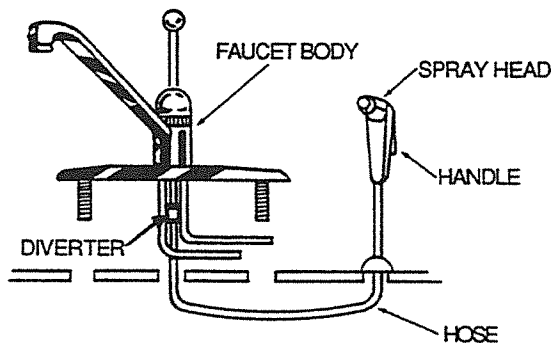
Most kitchen sink faucets have standard 8" spouts, but faucets are available with spouts from 5" to 12"

Most sink faucets also have aerators at the spout outlet to reduce splash and lower water consumption.

8"

**What is the measurement for most kitchen faucet spouts?**

Kitchen faucets are also available with hose spray attachments. These faucets have a diverter valve located in the faucet body, under the spout pivot. The hose is connected to the main faucet body under the diverter.



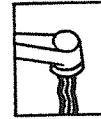
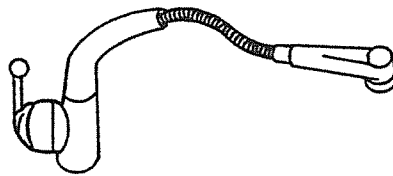
Normally, water flows through the faucet spout. When the spray valve handle is depressed, the diverter valve switches the flow from the faucet spout to the hose spray. Whenever the faucet is turned on, pressure is exerted on the hose, which should be replaced when it becomes worn.

*Switch flow from faucet to hose spray*

**What does a diverter in a faucet with a hose spray do?**

Note that the hose spray in the previous frame is a separate attachment that uses one of the mounting (drillings) holes in the sink. Some newer faucets have a retractable hose spray built into the faucet spout.

The retractable hose spray acts as the regular outlet on the spout. The hose of the spray is inside the faucet body and swing spout. When in use, the hose spray (nozzle) is detached from the spout and pulled out. The water flow is changed from a stream to a spray by a switch on the nozzle.



AERATED STREAM



SPRAY OPTION

In some areas, there are codes relating to this type of hose spray. Become familiar with codes in your area.

*A switch on the nozzle*

**How is the water flow changed on a retractable hose spray?**

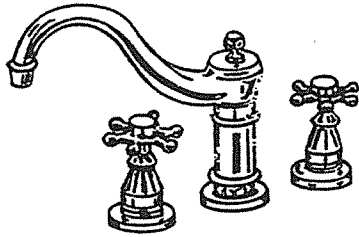
Like lavatory faucets, kitchen faucets are generally mounted on a top of the fixture with mounting shanks or bolts passing down through holes in the fixture.

Also like lavatory faucets, the number of mounting holes actually used to mount the faucet will depend on the faucet design. However, a common 8"cc faucet with a spray will typically use four mounting holes.

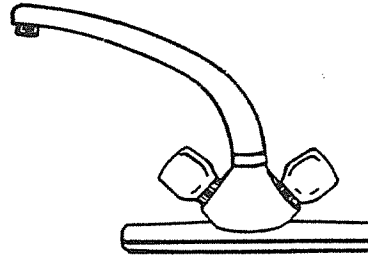
*four*

**How many mounting holes will a common 8"cc faucet with a spray use?**

Another similarity between kitchen sink faucets and bathroom faucets are the way they are classified. In addition to the standard faucet, sink faucets are available in contemporary and traditional styles. Below are illustrations of a traditional style kitchen sink faucet and a contemporary style kitchen sink faucet.

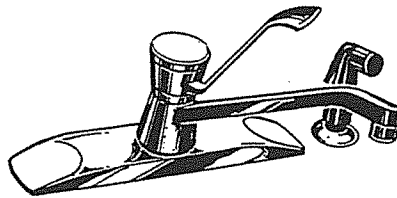


TRADITIONAL



CONTEMPORARY

Despite the popularity of traditional and contemporary style kitchen faucets in some market segments, most consumers still choose a standard kitchen faucet, like the one shown here.



STANDARD

*Standard style*

**What style of kitchen faucet do most consumers use?**

Today, most manufacturers make sink faucets in a variety of finishes including:

- chrome
- brass
- epoxy - variety of colors
- nickel

Chrome is also the most common finish used on kitchen sink faucets.

Along with various finishes, manufacturers offer a choice of handle inserts and color caps to coordinate with contemporary and traditional style faucets, kitchen decor, and individual taste.

*Chrome*

**What is the most common finish used on kitchen faucets?**

Sink and faucet manufacturers now make kitchen sink accessories that coordinate with the fixture and faucet. Some of the more common sink accessories are:

- cutting boards
- colander bowls
- vegetable baskets
- meat draining trays
- dish drainers

In general, the difference between these accessories and similar generic accessories is the custom fit. For example, cutting boards are designed to fit snugly over the sink basins. Baskets and bowls are also designed to fit a particular sink bowl size and shape.

*The custom fit*

**What is the difference between these accessories and generic accessories?**



Today's modern kitchen may have one or more of the less common sink accessories available such as:

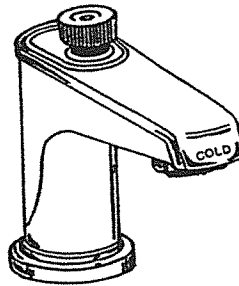
- chillers (cold water dispensers)
- hot water dispensers
- soap/lotion dispensers
- purification systems

Chillers, hot water dispensers, and soap/lotion dispensers require mounting drillings for installation. Purification systems work through the faucet or water supply system.

**Name four sink accessories you might find in the modern kitchen.**

*chiller; hot water dispenser; soap & lotion dispenser; purification system*

Chillers (also called cold water dispensers) provide instant cold water from a spouted faucet usually mounted in drillings beside the regular faucet. Chillers can be found on both kitchen and bar sinks in a variety of models. The compact models are most commonly used with sink installations. The chiller unit fits inside the sink cabinet or under the sink. Some chillers can be installed beneath the basement ceiling directly under the sink.



Above is an example of one manufacturer's chiller. It is connected to the supply using tubing; water is chilled as it flows through coils in the dispenser and flows through the chiller faucet.

Some chillers have adjustable thermostats but are pre-set to always deliver water at a specified temperature, such as 40 degrees Fahrenheit.

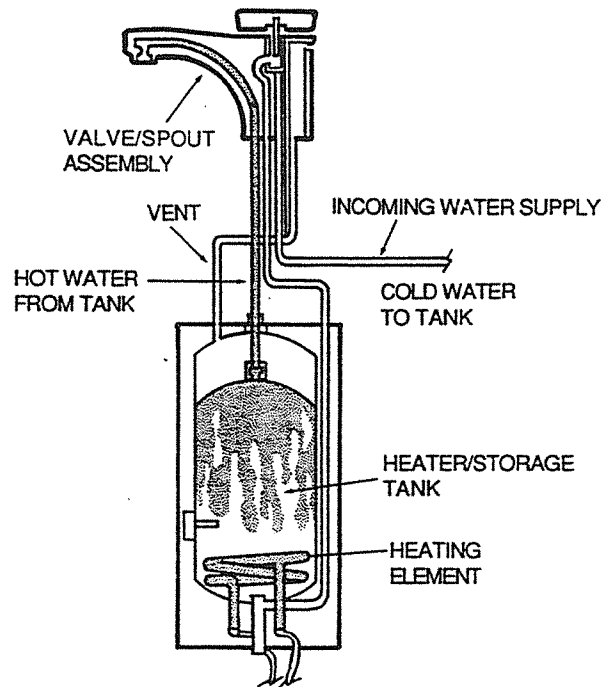
**How does the chiller deliver the water to the user?**

*A short spouted faucet usually mounted beside the regular faucet*

The hot water dispenser (also called an instant hot water heater) is another new accessory for the kitchen sink.

The hot water dispenser provides instant hot water of temperatures usually ranging from 140 to 190 degrees Fahrenheit. Like the chiller, the hot water flows from a short spouted faucet usually mounted near the regular faucet on the kitchen sink. Goose neck styles of this dispenser are available for bar use.

The heater functions like a full scale water heater except this one is installed under the kitchen sink. Tubing connects the heater to the water supply; water is drawn in, heated, and stored in a storage tank. The size of the storage tank varies, but most store about one gallon of hot water.

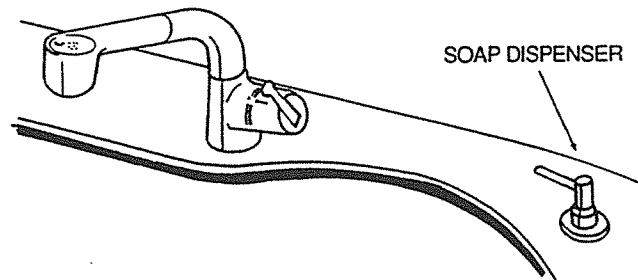


HOT WATER DISPENSER

140 to 190  
degrees Fahrenheit

What is the usual temperature range for a hot water dispenser?

In the overview section of this unit, soap dispensers were introduced. Often manufacturers of this accessory refer to it as a soap/lotion dispenser. This type of dispenser mounts on the sink using one of the sink drillings and can be used for dispensing dish soap, liquid soap or lotion.



It is important to know the number of drillings needed on a sink in order to properly mount certain accessories, such as dispensers.

*The number of drillings needed on the sink*

**What information is important to know to properly mount certain accessories on a sink?**

Unlike dispensers, water purifiers do not require drillings on the sink. Water purifiers (also called filtration products) are used to filter out particles and chemicals in the water that might cause cloudiness or discoloration and bad odor or taste. Purifiers are also used to filter out iron.

*By filtering out particles or chemicals in the water*

**How do water purifiers improve the taste and appearance of water?**

Most purifiers (filtration products) are designed to be located where drinking water is most frequently drawn, the kitchen sink. There are two common types of purifiers used on the sink:

- above the counter type
- under the counter type

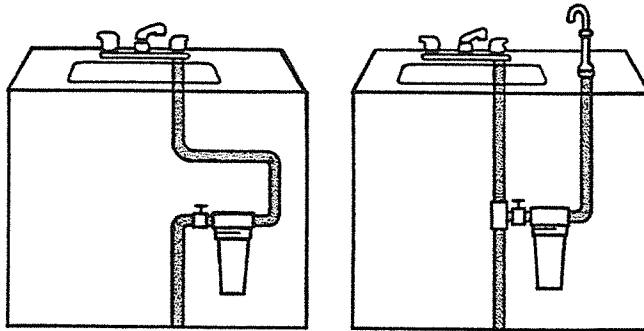
Above the counter types of filters are the easiest to install and are used most often.

This type of purifier replaces the aerator at the end of the faucet spout or the spray head on the hose. Although easiest to install, these filters provide limited filtration capacity because of their small size.

*Above the counter;  
under the counter*

**What are two common types of purifiers used on the sink?**

The under the counter type of purifier is located under the sink and is connected to the cold water supply. The filtered water then flows through the cold supply inlet of the regular faucet. In some installations, a separate drinking faucet is mounted specifically for the filtered water.



An advantage of the under the counter purifier is its greater filtering ability because of its larger size.

*Through the  
regular faucet or  
a separate drinking  
faucet*

**What are two ways the under counter purifier delivers filtered water to the user?**

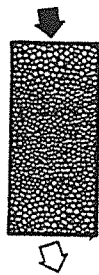
There are three general types of filter construction available in under the counter models:

- bed type
- spool type
- pre-coat type

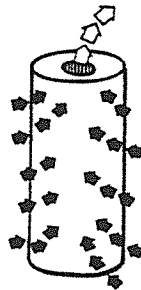
The bed type filter has a column of granular material, usually graded in size from fine on top to coarse on the bottom. Water enters the top, filters down through the granular material and exits out the bottom. The primary filtration surface is the area of the top of the bed.

The spool type filter looks like a spool of twine or coarse cloth. Water flows from the outside of the spool through the material and out the core. Spool designs often offer the option of filtering sediment only, or a combination cartridge designed to handle taste and odor also. The combination cartridge typically uses granulated carbon in addition to the spool of fiber. Filtering capacity in the spool type is greater than the bed type because the filtering area is the total perimeter of the element.

The pre-coat type of filter looks like a sandwich folded up inside a canister. Water passes through the outer walls on both sides of the sandwich, enters into a space between the layers, then exits at the top of the filter structure. The pre-coat type has the largest filtration area of the three types. All types have replaceable cartridges.



BED TYPE



SPOOL TYPE



PRE-COAT TYPE

*Bed type; spool  
type; pre-coat type*

**What are the three styles of filter construction available in under the counter models of purifiers?**

**DIRECTIONS:** Fill in the blanks with the word or words which best complete each statement.

1. Kitchen faucets have one characteristic in common, a \_\_\_\_\_ spout.
2. Some newer faucet designs have a \_\_\_\_\_ built into the faucet spout.
3. To coordinate kitchen faucets with the faucet style and kitchen decor, manufacturers offer handle \_\_\_\_\_ and \_\_\_\_\_.
4. Three accessories that require mounting holes on the kitchen sink are \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.
5. Water purifiers filter out \_\_\_\_\_ and \_\_\_\_\_ in the water.
6. The \_\_\_\_\_ purifier is connected to the cold water supply.
7. The \_\_\_\_\_ type filter looks like a spool of twine or coarse cloth.
8. The \_\_\_\_\_ type filter has the largest filtration area of the three types.

Compare your responses with the answers given on page 56.

In this section, we will look at some special faucets and accessories your company may stock:

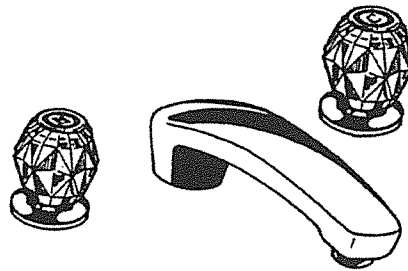
- roman tub faucet and accessories
- bar sink faucet and accessories
- faucets for the handicapped and elderly
- accessories for the handicapped
- bidet faucet
- laundry faucet

The roman tub faucet is a large tub faucet most commonly used on whirlpool and oversized bath tubs. The primary difference between this faucet and a regular tub faucet is its size. The handles are larger, the spout is usually longer, from 8 1/2" up to 12", and the waterway is larger. The larger waterway allows a greater volume of water to flow through to fill a tub quicker than with a regular faucet.

*Whirlpool tubs and oversized bath tubs*

**Where would you most commonly find a roman tub faucet?**

Roman tub faucets are available in deck mounted types (the most common type) and wall mounted styles. Like other faucets discussed in this unit, these types are made to match and coordinate with the other bathroom faucets by using the same finish and/or insert options.



DECK MOUNTED ROMAN TUB FAUCET

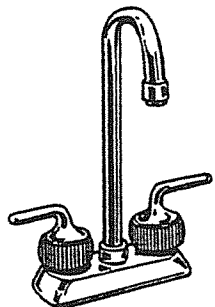
Some manufacturers make hand held showers as an integral part of the roman tub faucet. Others offer the hand held shower as a separate accessory. Read manufacturers' literature to learn about the types your company stocks.

*Deck mounted*

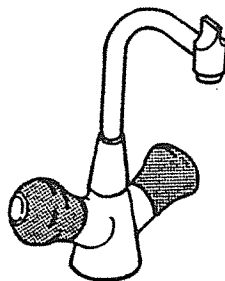
**What is the most common way to mount a roman tub faucet?**

Another type of special accessory is the bar sink. The bar sink is smaller than a kitchen sink and used for making drinks and entertaining. Because of its small size, the sink requires a special type of faucet.

Bar sink faucets generally have a higher, longer spout than a kitchen sink faucet. There are two common types of spouts for the bar sink, the gooseneck and the hi arc. The spout may be a swing (swivel) or rigid type.



GOOSENECK



HI ARC

*Gooseneck and  
hi arc*

**What are the two common types of spouts used on the bar sink faucet?**

Bar sink faucets are available in single hole, centerset, and widespread. They may be two handle or single lever types. The most common is a 4" cc, two handle model.

Some manufacturers offer bar sink faucets in a variety of finishes and styles to match and coordinate with their line of kitchen sink faucets. Review manufacturers' literature for the types and styles of bar sink faucets your company stocks.

*4"cc, two handled  
model*

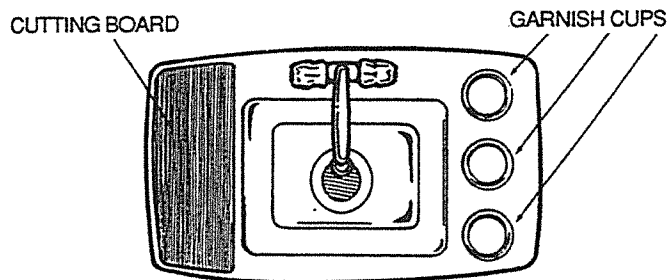
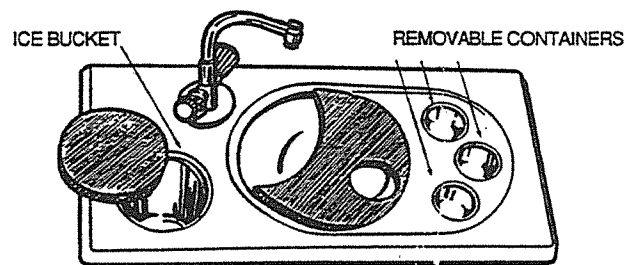
**What is the most common bar sink faucet model?**



Today's modern bar sink may have one or all of the following accessories:

- removable garnish cups
- removable ice bucket
- cutting boards
- trays that fit over the basin with movable containers

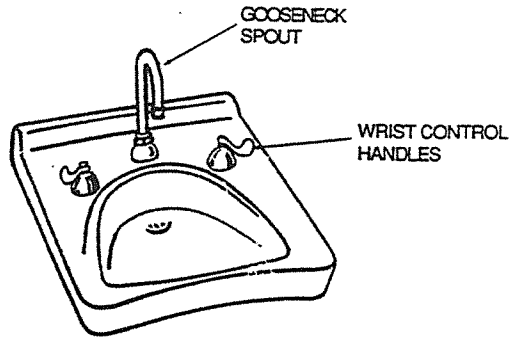
Usually, these accessories are designed to fit a particular style of bar sink and may not be interchangeable with other styles. It is important to know the type of bar sink before ordering accessories to go with it.



*Garnish cups;  
removable ice  
bucket; cutting  
boards; trays that  
fit over the basin  
with movable  
containers*

**What are four types of accessories you might find on a modern bar sink?**

An important special faucet is the type used for handicapped people. Single lever faucets and two handled faucets with wrist control handles each with a gooseneck spout are two types of faucets generally used in handicapped installation. The gooseneck spout is frequently used in combination with wrist control handles to make it easy to operate the faucet with your elbows. Both types of faucets are available for bathroom fixtures and kitchen sinks.

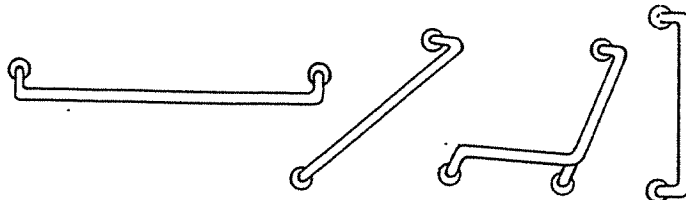


*Single lever; two handled wrist control handles with a gooseneck spout*

**What types of faucets are generally used in a handicapped installation?**

The most common accessory used in bathroom installations for the handicapped is the grab bar. The grab bar is used to provide safety and support for the disabled person. The grab bar is a bar usually made of stainless steel and chrome, and range in length from 9" up to 48". They are generally attached to the wall using molly bolts or directly into a wall stud. Bars may be placed at any angle and in multiple locations for additional support.

Some manufacturers make special shower models that have grab bars built in to them.



*Provide safety and support for the disabled bather*

**What are grab bars used for?**

A less common type of special fixture is the bidet. The bidet is a basin-like fixture used for washing the genital area. To understand bidet faucets, you need to become familiar with the two basic types of construction for bidets:

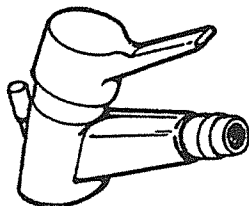
- over-rim
- rim fill

The style of the bidet determines the type of faucet used.

**What are the two basic types of construction for bidets?**

*over rim  
rim fill*

Over-rim bidets use a faucet mounted on the bidet ledge. The faucet spout is horizontal and delivers a horizontal spray or stream of water over the rim. The spout usually has a swivel aerator.

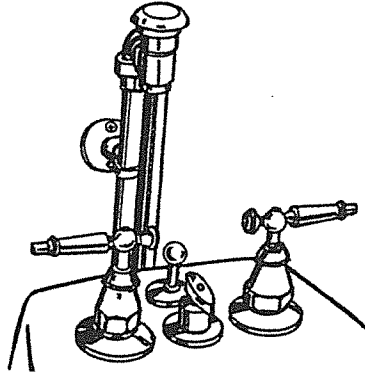


OVER RIM BIDET FAUCET

**How does an over rim bidet faucet deliver the water?**

*Horizontal spray  
or stream over the  
rim*

Rim-fill bidets fill through openings in the rim. Rim-fill types also have a spray in the center of the basin. A diverter is used to direct the water from the rim to the spray.

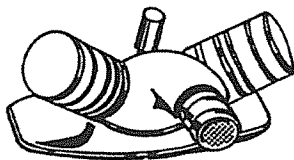


RIM FILL BIDET FAUCET

*Openings in the rim  
and the center  
spray*

**What are the two ways water might be delivered in a rim-fill bidet?**

Bidet faucets are available in the centerset or widespread types. In general, the over-rim bidet uses the centerset faucet with a horizontal spout. Below is an illustration of an over-rim centerset faucet with a horizontal spout.



*Centerset and  
widespread*

**What two types of faucets are generally used on a bidet?**

Wide spread faucets with the spray option are usually used on rim-fill bidets. The construction of the bidet determines the type of faucet that can be used.

Many codes require a vacuum breaker for bidets with a vertical spray. Recall from the unit on valves that a vacuum breaker is a device used to prevent dirty water from back-filling into the supply lines.

*The bidet's construction*

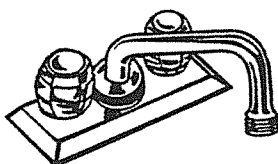
**What determines the type of faucet that can be used on a bidet?**

Like the other faucets we have discussed, bidet faucets come in single control and two handle types. They are also available in traditional and contemporary styles

Yes

**Are bidet faucets available in the same types and styles as other faucets?**

A more common special faucet found in the home is the laundry faucet. The laundry faucet spout is generally 6" to 8" long, swings, and has hose threads. The most common type of laundry faucet is a deck-mounted, two handle, 4" centerset model.



LAUNDRY FAUCET

*Deck mounted, two handle, 4" centerset model*

**What is the most common type of laundry faucet?**

The most common material used in making laundry faucets is chrome. However, laundry faucets are not offered in a variety of styles and colors like other residential faucets we have discussed.

*Chrome*

**What is the most common material used in making laundry faucets?**

**DIRECTIONS:** In the space to the left, label each of the following statements "TRUE" or "FALSE."

- \_\_\_\_\_ 1. The roman tub faucet is a faucet used on a standard recess bathtub.
- \_\_\_\_\_ 2. Bar sink faucets generally have a higher, longer spout than do kitchen sink faucets.
- \_\_\_\_\_ 3. Bar sink faucets are not available in two handle models.
- \_\_\_\_\_ 4. Faucets with a gooseneck spout are frequently used in installations for the handicapped.
- \_\_\_\_\_ 5. The most common accessory for handicapped installations in the bath is the grab bar.
- \_\_\_\_\_ 6. Over-rim bidets use faucets with a vertical spray.
- \_\_\_\_\_ 7. Widespread faucets with the spray option are generally used with rim-fill bidets.
- \_\_\_\_\_ 8. Bidet faucets are available in single control and two handle types.
- \_\_\_\_\_ 9. A laundry faucet has hose threads and can be up to 8 inches long.

Compare your responses with the answers given on page 57.

## REVIEW ANSWERS

### Overview of Faucets and Accessories, page 23

1. h *See Frame 22*
2. g *See Frame 21*
3. a *See Frame 1*
4. i *See Frame 23*
5. d *See Frame 13*
6. b *See Frame 9*
7. e *See Frame 15*
8. f *See Frame 16*
9. c *See Frame 11*

### Bathroom Faucets, Shower Valves and Accessories, page 35

1. FALSE *See Frame 25*
2. TRUE *See Frames 29*
3. TRUE *See Frame 32*
4. FALSE *See Frame 33*
5. FALSE *See Frame 37*
6. FALSE *See Frame 40*
7. TRUE *See Frame 43*

### Kitchen Sink Faucets and Accessories, page 46

1. swing spout *See Frame 46*
2. retractable hose spray *See Frame 49*
3. inserts, color caps *See Frame 52*
4. chillers, hot water dispensers, and  
soap/lotion dispensers *See Frame 54*
5. particles and chemicals *See Frame 58*
6. Under the counter *See Frame 60*
7. spool *See Frame 61*
8. pre-coat *See Frame 61*



**Special Faucets and Accessories, page 55**

- |    |       |                     |
|----|-------|---------------------|
| 1. | FALSE | <i>See Frame 62</i> |
| 2. | TRUE  | <i>See Frame 64</i> |
| 3. | FALSE | <i>See Frame 65</i> |
| 4. | TRUE  | <i>See Frame 67</i> |
| 5. | TRUE  | <i>See Frame 68</i> |
| 6. | FALSE | <i>See Frame 70</i> |
| 7. | TRUE  | <i>See Frame 72</i> |
| 8. | TRUE  | <i>See Frame 74</i> |
| 9. | TRUE  | <i>See Frame 75</i> |

## GLOSSARY

- arm carrier** supports for wall hung lavatories; may be exposed or concealed type of arm carrier; typically used in commercial installations
- above the counter filter** type of filter used as a water purifier which generally replaces the aerator at the end of a kitchen faucet spout or the sprayhead on a hose; provides limited filtration capacity because of its small size
- aerator** fitting used on a faucet to cut down on water splash from the faucet spout and to reduce water consumption
- bar sink** type of sink used for entertaining and making drinks; generally smaller than a kitchen sink
- bar sink faucet** type of faucet which is required for a bar sink; generally has a higher, longer spout than is found on a kitchen sink faucet spout; a gooseneck or hi arc design faucet
- bathroom accessories** items which are installed and used in the bathroom for convenience or for decoration such as towel bars, soap dishes, toilet paper holders, etc.
- bed type filter** type of filter used in under the counter water purifiers which uses granular materials to filter the water
- bidet** basin like fixture used for washing the genital area
- body shower** customized shower installation which provides the bather with water spraying from several angles at the same time
- brass** alloy made essentially of copper and zinc; varying amounts of lead is added to improve its ability to be cut
- centerset faucet** type of faucet which mounts on the top of the fixture with mounting shanks or balls passing down through drillings set 4" or 8" apart, center to center
- ceramic shearing type faucet** washerless design faucet in which the water flow is controlled by the position of the lower of two ceramic discs
- chiller** a kitchen accessory which provides cold water instantly at the point of use; usually mounted at the kitchen sink (*also called cold water dispenser*)
- chrome** the most common finishing surface used for faucets; made from the natural element of chromium
- cold water dispenser** See CHILLER
- contemporary style faucet** faucet which is modern (today's style) in appearance. Both the handle and spout may be made in a variety of shapes
- diaphragm type washerless faucet** type of washerless faucet in which the water flow is controlled by a rubber diaphragm
- diverter** valve used to direct the flow of water from one area to another such as a tub spout to a showerhead

**electronic shower valve** valve used for both temperature and pressure regulation, usually activated by a touch pad and has a digital readout

**faucets** valves located at outlets in piping systems which are used to control the delivery of water

**faucet style** term which relates to a period of time in history in which a type of faucet was most commonly used such as standard, traditional, or contemporary

**filtration product** See WATER PURIFIER

**fixed showerhead** type of showerhead installed either on the wall or in the ceiling in which only the shower components are exposed outside the wall

**flow control device** fitting used on a showerhead and on some types of faucet spouts to cut down the water consumption without changing the feel or force of the water stream

**grab bar** accessory installed in the bathroom shower or tub to provide safety and support; usually installed for the disabled bather

**hand-held personal shower** type of shower where the user holds the showerhead in their hand and manually directs the spray of the water in the desired direction

**hot water dispenser** See INSTANT HOT WATER HEATER

**inserts** changeable part of a faucet handle which is used to coordinate the faucet handle with a particular period, decor, or individual's taste

**instant hot water heater** provides instant hot water at the source with temperatures ranging from 140 to 190 degrees Fahrenheit (*also called hot water dispenser*)

**laundry faucet** type of faucet used with a laundry tray which has a spout 6" up to 8" long, swings from side to side, and has hose threads at the outlet of the spout

**lotion dispenser** accessory mounted on a sink or lavatory which dispenses hand lotion or liquid soap

**mixing type faucet** faucet designed so that hot and cold water are mixed internally and flow, blended together, out of a single spout

**over rim bidet** type of bidet design in which the faucet is mounted on the ledge of the bidet; a horizontal faucet spout delivers a horizontal spray or stream of water over the rim into the bidet bowl

**post type faucet** See SINGLE HOLE FAUCET

**pre-coat type filter** used in under the counter water purifiers. This type looks like a folded up sandwich inside the canister of the purifier and has the largest filtration area of the filter types commonly used today

**pressure balancing valve** type of valve used on showerheads to correct variations in water pressure

**retractable hose spray** hose which is integrated into the faucet itself moving in and out through the faucet body and the swing spout

**rim fill bidet** bidet design in which water flows through openings in the rim of the basin. Some also have an additional spray in the center of the basin

**roman tub faucet** large tub filler commonly used on whirlpools and oversized bath tubs; handles, waterway and spout are larger than other types of faucets

**shearing** another name used for the rubber seal and ceramic disc type washerless faucets

**single hole faucet** faucet which requires one hole in the fixture for mounting and for the passage of the water supply lines. *(also called center mount or post type)*

**single control faucet** faucet design in which hot and cold water supply are both controlled by a single mechanism *(also called single lever)*

**single lever faucet** See SINGLE CONTROL FAUCET

**soap dispenser** accessory mounted on a sink or lavatory which dispenses liquid soap or lotion

**spool type filter** type of filter used in under the counter water purifiers. This type of filter looks like a spool of twine or coarse cloth which sometimes uses granulated carbon in addition to the spool of fiber

**swing spout** faucet spout that moves from side to side

**thermostatic control** valve used to control temperature variations

**traditional style faucets** reproductions of faucets from different periods of architecture

**two handle faucet** style of faucet which has separate mechanisms to control the water supply; one handle controls the cold water supply and another handle controls the hot water supply

**under the counter purifiers** type of water purifier which is mounter under the sink and is connected to the cold water supply

**vacuum breaker** device used to prevent dirty water from back filling into the supply line

**washer design faucet** faucet design in which the flow of the water is controlled by turning the handle which turns the stem and moves a rubber washer toward or away from from the seat; considered a "dripless" faucet *(also called a compression seal type faucet)*

**washerless design faucet** faucet design in which water flow is controlled with an O-ring, ceramic disc, resilient seal or rubber diaphragm. See also SHEARING, DIAPHRAGM TYPE WASHERLESS FAUCET, and CERAMIC SHEARING TYPE FAUCET

**water purifier** used to filter out particles and chemicals in the water that may cause cloudiness, discoloration, odor, bad taste, or a high content of iron *(also called filtration products)* See UNDER THE COUNTER PURIFIER and ABOVE THE COUNTER FILTERS

**widespread adjustable faucet** type of faucet which adjusts to fit drillings of 6" up to 16" centers; type of faucet which allows the handles to be placed a wider intervals than a centerset type faucet will allow

**wrist control handles** faucet handles that can be operated without gripping with the hands; frequently specified for handicapped installations.

**zinc** a bluish white metallic element often used in the manufacture of faucets

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