7 Room Planning—Sleeping Area and Bath Facilities

Objectives

After studying this chapter, you will be able to:

- Discuss factors that are important in the design of bedrooms.
- Plan the size and location of closets for a typical residence.
- Plan a furniture arrangement for a room.
- List requirements to make a bedroom accessible to the disabled.
- Implement important design considerations for bathrooms.
- Plan a bathroom that follows solid design principles.
- List the requirements to make a bathroom accessible to the disabled.

Key Terms

1/2 Bath
3/4 Bath
Full Bath
Ground Fault Circuit Interrupter (GFCI)
Living Area
Ribbon Windows
Service Area
Sleeping Area
Split Bedroom Plan

Areas of a Residence

A residential structure can be divided into three basic areas: the sleeping area, living area, and service area, Figure 7-1. The ***sleeping area*** is where the family sleeps, rests, and bathes. The ***living area*** is where the family relaxes, entertains guests, dines, and meets together. The living area is discussed in detail in Chapter 8. The ***service area*** is the part of the house where food is prepared, clothes are laundered, goods are stored, the car is parked, and equipment for upkeep of the house is stored. The service area is discussed in Chapter 9.

These three basic areas are generally divided into rooms. Rooms provide privacy and help to separate and contain various activities. A house designer must understand the purpose for each room if a functional plan is to be developed.

In addition to the purpose of the room, the designer must know how the room will be used and by whom. According to the report *Americans with Disabilities, 1997 P70-73* issued in February 2001 by the US Census Bureau, 2.2 million people age 15 and older use a wheelchair and another 6.4 million use a cane, walker, crutches, or other aid. AARP, formerly called The American Association of Retired Persons, reports that there were 76 million Americans over the age of 50 in 2000; 35 million over the age of 65 according to the US Census. These numbers are projected to double in the next few years. Therefore, it is important to consider how all areas of the home can be made accessible to people with special needs, including the disabled and elderly.

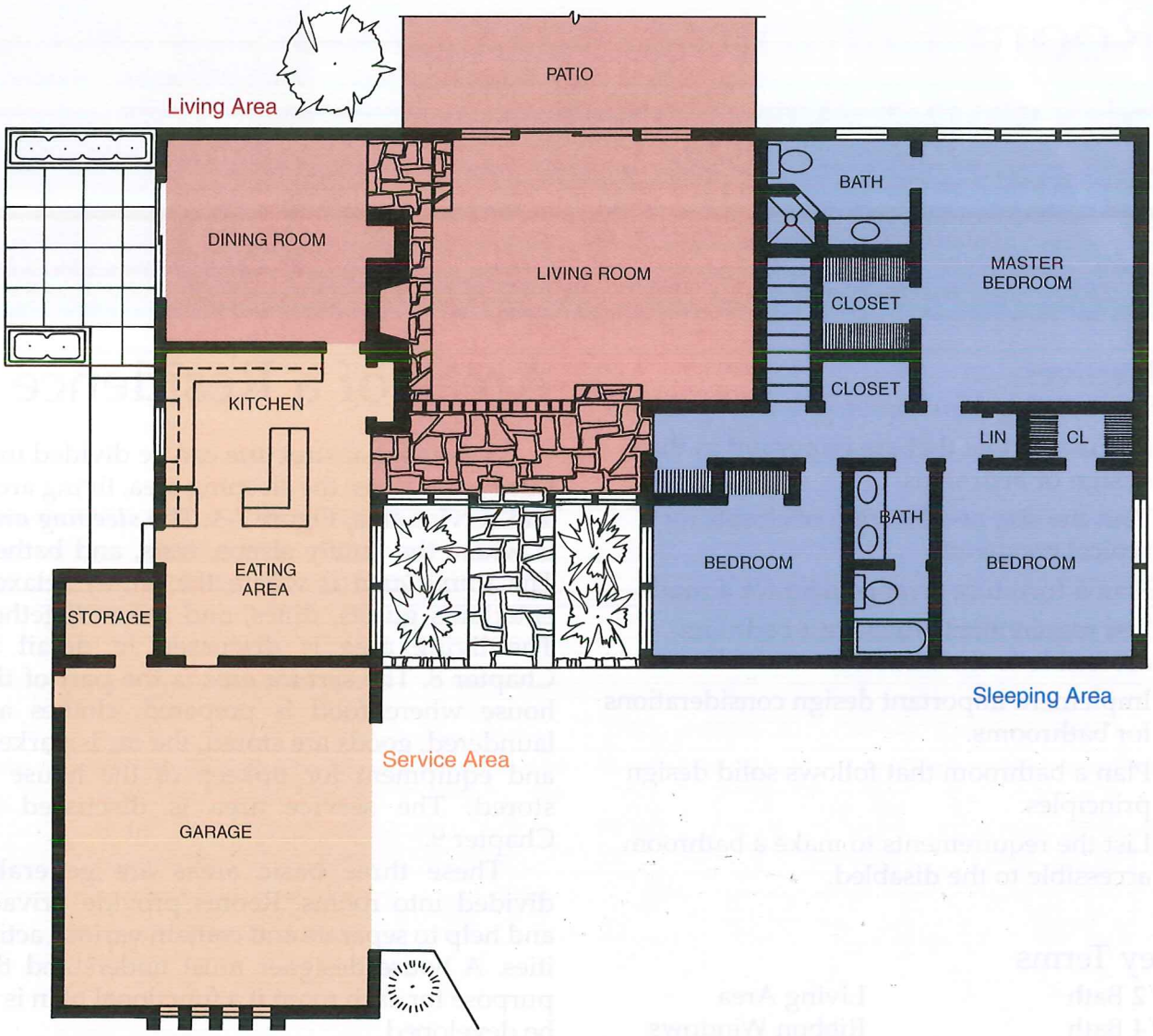

Figure 7-1. A residence can be divided into three basic areas: the sleeping area, living area, and service area.

Designing with CADD

The design of bedroom and bathroom spaces may be developed easily and rapidly using modern CADD systems. Many of the elements used in the design of these rooms and furniture arrangements are commonly available as symbols. Often, manufacturers can supply CADD symbols of their specific products. Custom symbols can also be developed for use when needed. In addition, proposed designs can be rendered and shown to clients. Figure 7-2 shows a CADD-generated rendering of a large bathroom.

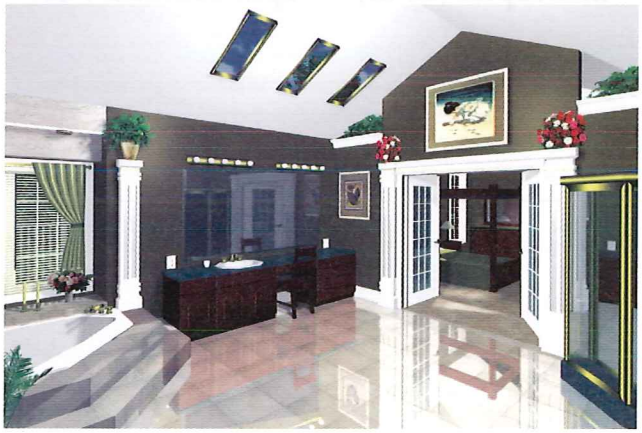

Figure 7-2. This CADD-generated presentation drawing demonstrates the usefulness of computer-generated images to describe a design idea. (SoftPlan Systems, Inc.)

Sleeping Area

Usually about one-third of the house is dedicated to the sleeping area. This area includes bedrooms, baths, dressing rooms, and nurseries. Normally, the sleeping area is in a quiet part of the house away from traffic and other noise. If possible, the sleeping area should have a south or southwest orientation so that it may take advantage of cool summer breezes, which usually prevail from this direction.

Bedrooms

Bedrooms are so important that houses are frequently categorized by the number they contain, such as "two-bedroom," "three-bedroom," or "four-bedroom." The size of the family usually determines the number of bedrooms needed. Ideally, each person would have their own bedroom. In the case of a couple with no children living at home, at least two bedrooms are desirable. The second bedroom could be used as a guest room and for other activities when there are no guests, Figure 7-3. A home with only one bedroom may be difficult to sell. Three-bedroom homes usually have the greatest sales potential. A three-bedroom home can provide enough space for a family of four. It may be wise to include an extra bedroom in the plan that can be used for other purposes until needed, Figure 7-4. It is usually more economical to add an extra room at the outset rather than expand later.

Grouping bedrooms together in a separate wing or level of the house affords solitude and privacy, Figure 7-5. A plan called the ***split bedroom plan*** separates the master bedroom from the remaining bedrooms to provide even greater privacy. Another plan might have a bedroom in another area of the home for an employee, live-in relative, or overnight guests. Each bedroom should have its own access to the hall. An attempt should be made to place each bedroom close to a bathroom. Some bedrooms may have their own private baths. A bedroom used by an older or handicapped person is more convenient if it contains its own bath.

Figure 7-3. This personalized bedroom provides mirrored doors so the young ballerina can practice. (Stanley Hardware)

Figure 7-4. An extra bedroom may be used as a den or for guests. (E. Uecker, Radiant Heat, Inc.)

Size and Furniture

One of the first problems in designing a bedroom is determining its size. How big is a "large" bedroom? How little is a "small" bedroom? The Federal Housing Administration (FHA) recommends 100 square feet as the minimum size. A small bedroom is shown in Figure 7-6. It has 99 square feet and the bare essentials in furniture. An average-size bedroom contains between 125 and 175 square feet, Figure 7-7. Such a room provides ample space for a double or twin bed, chest of drawers,

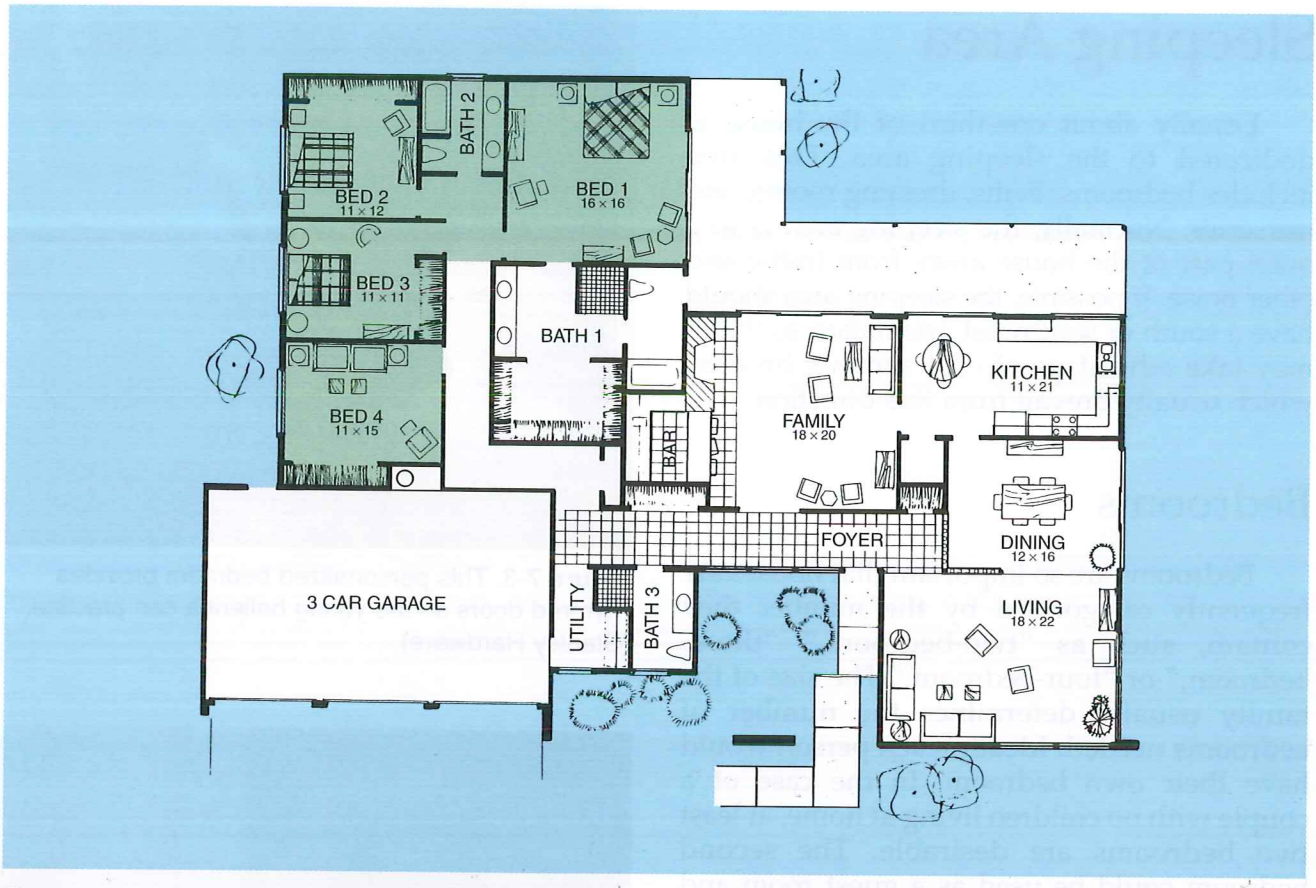

Figure 7-5. Bedrooms should be clustered together in a wing or level of the house away from noise and other activities.

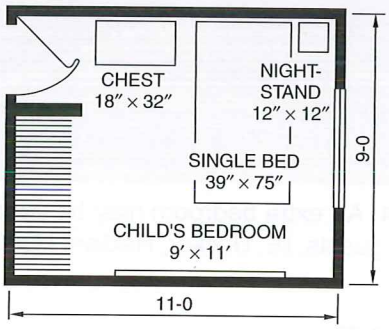

Figure 7-6. A small bedroom with the minimum: single bed, night stand, and chest of drawers.

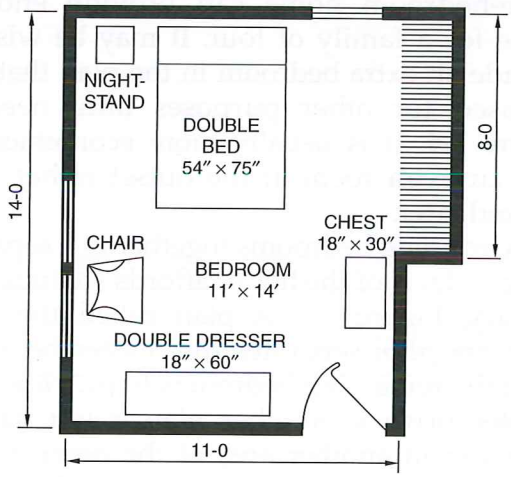

Figure 7-7. A medium-size bedroom contains room for a double bed, chest, chair, double dresser, and nightstand.

dresser, and other small pieces of furniture. A large bedroom has over 175 square feet of floor space, Figure 7-8. A room of this size provides space for additional furniture. A desk, chair, or television set may be included as bedroom furniture. The largest bedroom is usually considered to be the master bedroom. It may have its own private bath.

Bedroom design is directly related to furniture size and arrangement. First, determine common furniture sizes, Figure 7-9. Then, design the bedroom with a specific arrangement in mind. Figure 7-10 shows using CADD to plan a bedroom based on a specific furniture arrangement. The steps are simple: (1) Determine the size of furniture to be used; (2) Draw or insert an appropriate symbol to

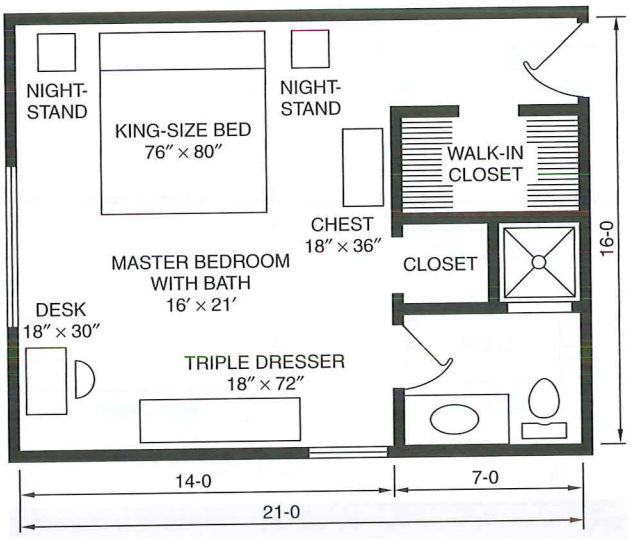

Figure 7-8. An arrangement for a large master bedroom with private bath.

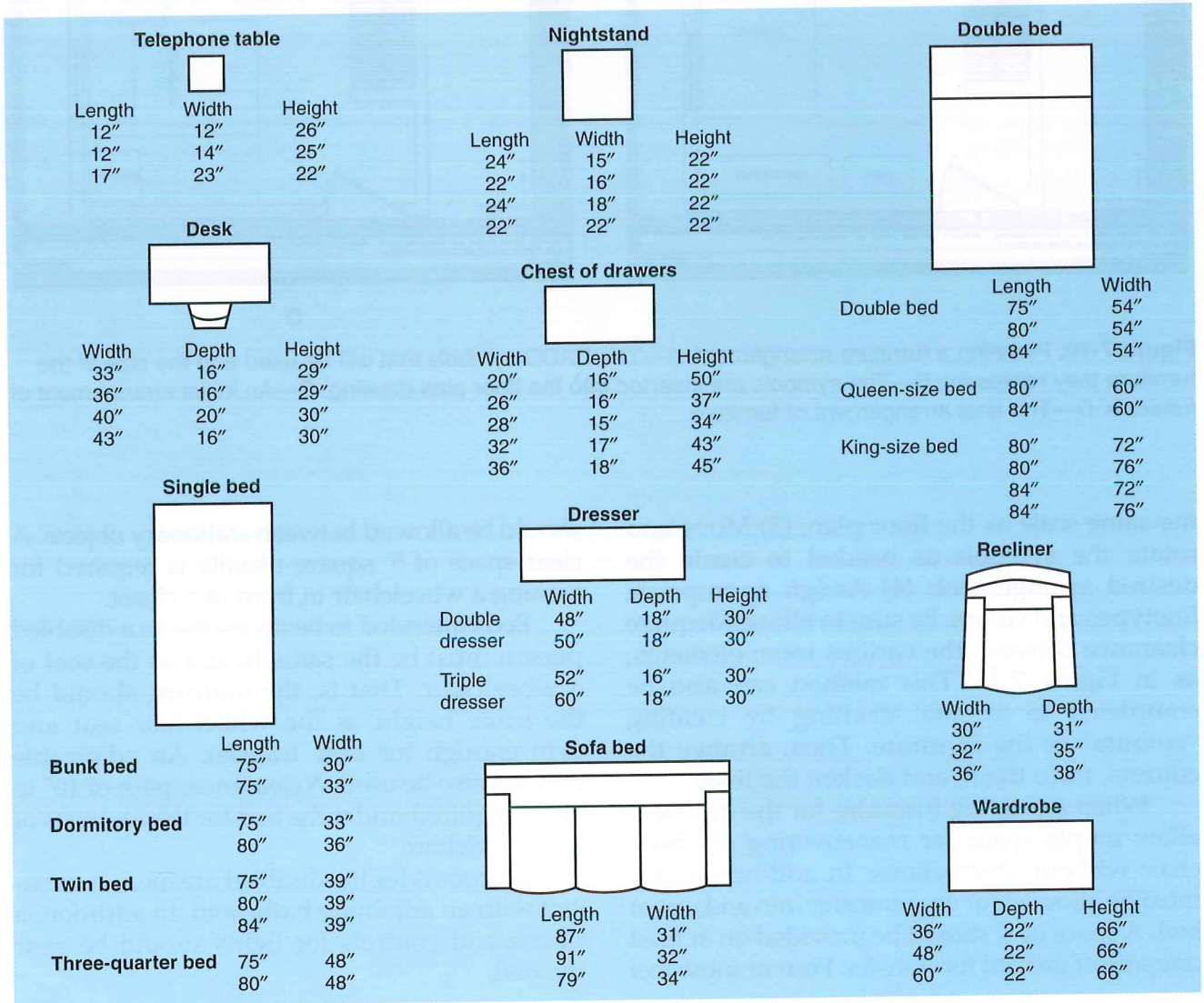

Figure 7-9. Common sizes of standard bedroom furniture.

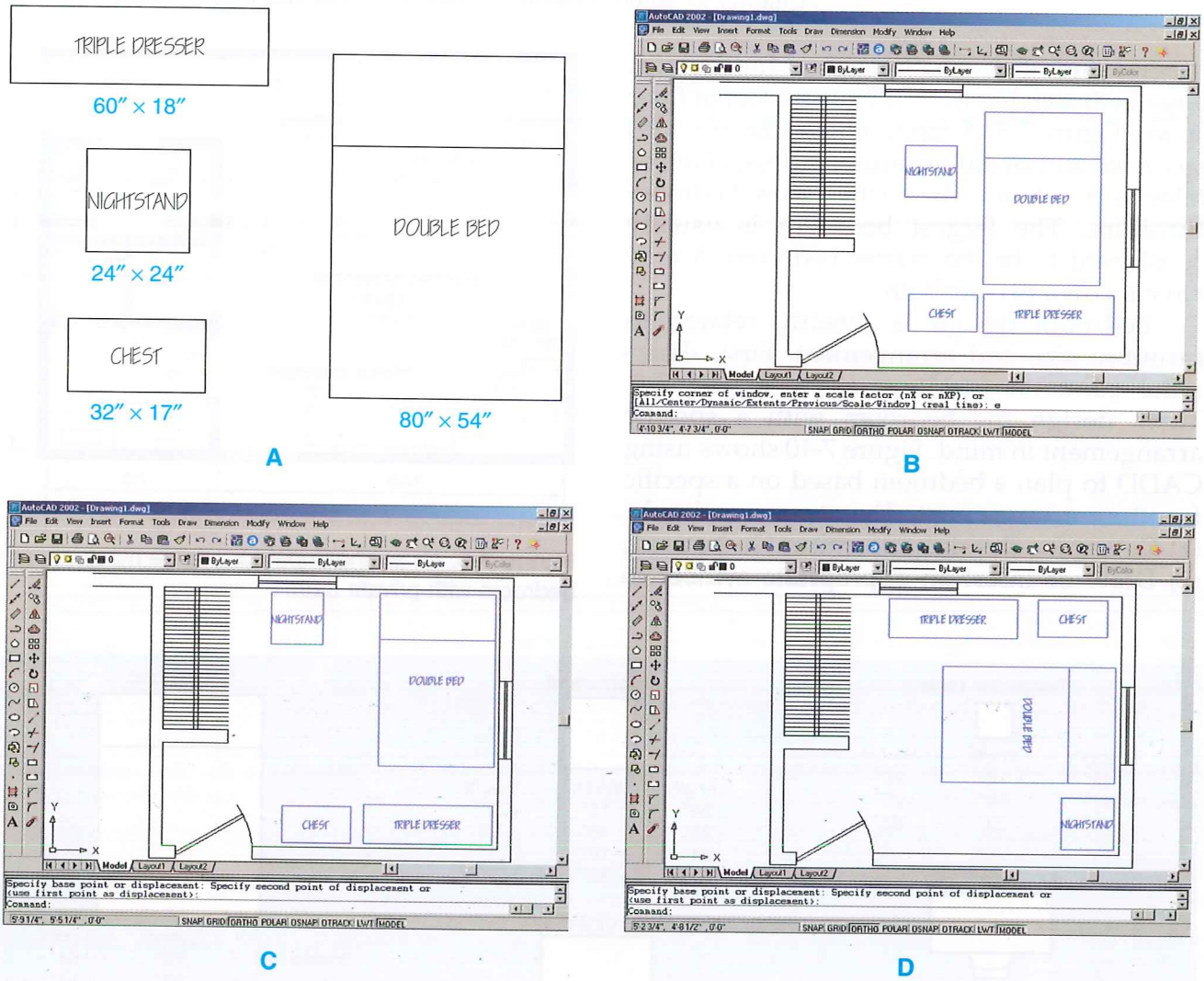

Figure 7-10. Planning a furniture arrangement. A—The CADD symbols that will be used and the size of the furniture they represent. B—The symbols are inserted into the floor plan drawing. C—An initial arrangement of furniture. D—The final arrangement of furniture.

the same scale as the floor plan; (3) Move and rotate the symbols as needed to create the desired arrangement; (4) Assign appropriate linetypes and colors. Be sure to allow adequate clearance between the various room elements, as in Figure 7-11. This method can also be completed in manual drafting by creating "cutouts" of the furniture. Then, arrange the cutouts, trace them, and darken the lines.

When arranging furniture for the disabled, allow ample space for maneuvering a wheelchair without obstructions. In addition, space must be allowed for easy transfer into and out of bed. A space of 3′ should be provided on at least one side of the bed for transfer. Four or more feet should be allowed between stationary objects. A clear space of 5′ square usually is required for turning a wheelchair in front of a closet.

Beds intended to be accessible to a disabled person must be the same height as the seat of a wheelchair. That is, the mattress should be the same height as the wheelchair seat and firm enough for easy transfer. An adjustable bed can also be used. A clearance space of 10″ to 13″ is required under the bed for the footrests of the wheelchair.

Bedrooms for the disabled are more convenient with an adjoining bathroom. In addition, a phone and controls for lights should be near the bed.

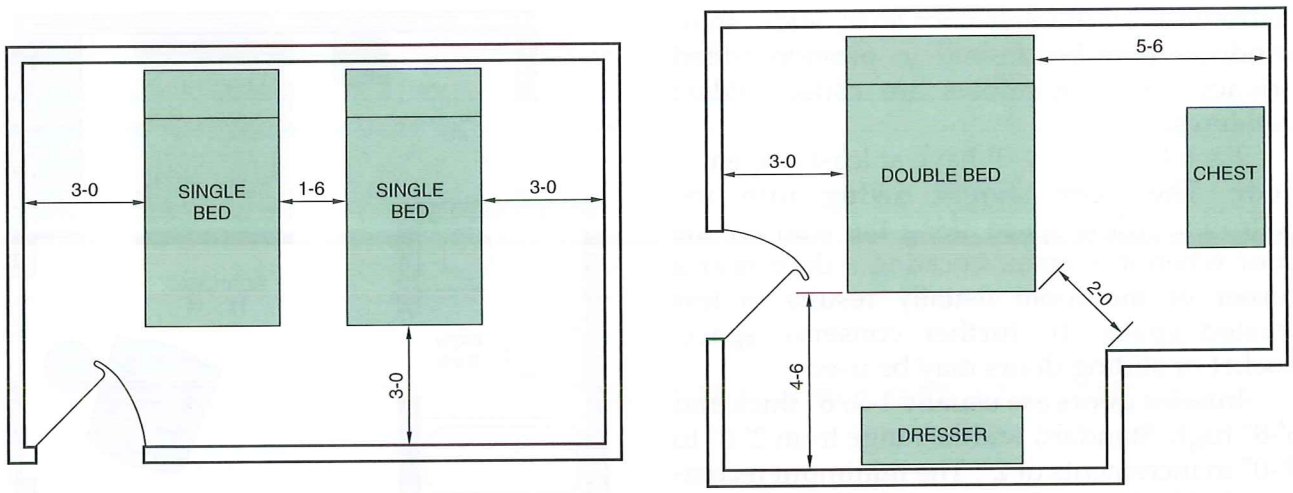

Figure 7-11. Examples of minimum space clearances for bedroom furniture.

Closets

Each bedroom must have a closet, Figure 7-12. The FHA recommends a minimum of four linear feet of rod space in a closet for a man and six feet for a woman. The minimum depth of a clothes closet is 24″. If space is available, a 30″ depth is desirable. When possible, closets should be located along interior walls. This provides noise insulation between rooms and does not reduce exterior wall space. A bedroom normally has no more than two exterior walls. The use of one for closets will reduce the chance of cross ventilation through windows. In addition, closets should be located near the entrance of the room for easy access.

Figure 7-12. A neat closet arrangement provides a place for each item as well as easy access. (Schulte Corporation)

Access to the closet should receive serious consideration. Closets with full front openings are more accessible. A variety of doors may be selected: sliding, bifold, accordion, or flush. The usual height of a door is 6′-8″, but most doors are also available in 8′-0″ heights. Using doors that provide easy accessibility yet require little space is desirable. Good lighting is also a necessity. Fixtures may be placed inside the closet.

Bifold, accordion, or sliding doors generally allow for partial entry by wheelchair users. To be accessible to the disabled, clothing rods should be located 40″ to 48″ from the floor. Adjustable shelves provide greater accessibility and may be placed at various heights from 18″ to 45″ above the floor. The depth of shelves should not exceed 16″. Clothes hooks should not be more than 40″ from the floor.

Doors and Windows

Windows and doors are important bedroom features. An ideal bedroom will have windows on two walls. Window location and spacing is important. They should be located so that a draft will not blow across the bed. If the

bedroom is on the first-floor level, wide, short windows may be desired to provide added privacy. These windows are called ***ribbon windows.***

Each bedroom will have at least one entry door. The door should swing into the bedroom. Allow space along the wall for the door when it is open. Locating a door near a corner of the room usually results in less wasted space. To further conserve space, pocket or sliding doors may be used.

Interior doors are usually 1-3/8″ thick and 6′-8″ high. Standard widths range from 2′-0″ to 3′-0″ in increments of 2″. The minimum recommended bedroom door width is 2′-6″. A wider door, 2′-8″ or 2′-10″, provides for easier movement of furniture, especially adjacent to a hall. To accommodate a wheelchair, doorways should be at least 3′-0″ wide.

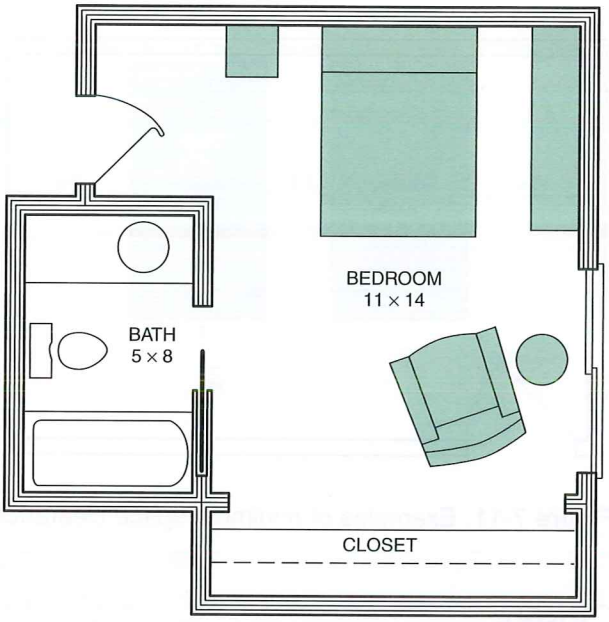

Figure 7-13. A quite versatile, average-size bedroom with a small private bath.

Colors and Finishing

A well-planned bedroom is a cheerful, but restful, place. Carefully select colors that help to create a quiet and peaceful atmosphere.

Figure 7-13 shows an average size bedroom. This bedroom could function as a master bedroom, guest room, or regular bedroom. There is adequate ventilation through the large sliding windows. A private bath and large closet are assets. The lounge chair and small table provide a comfortable place to read or relax. Furniture is arranged in such a way that all pieces are easily accessible.

Figure 7-14 shows a bedroom with 156 square feet plus closet and bath. It is a functional arrangement. Adequate space is provided for traffic by the furniture arrangement. Ventilation

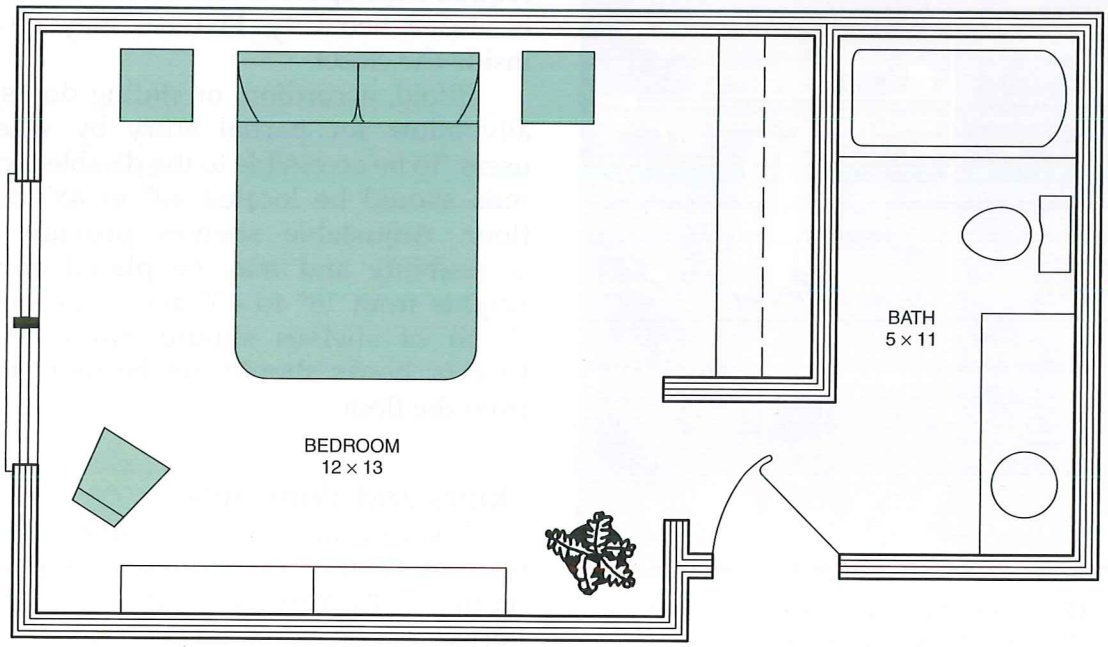

Figure 7-14. A bedroom with a private bath that can be shared with other rooms if needed.

is sufficient, but could be improved with additional windows if this is a corner room. The private bath is positioned in such a way that it can be shared with other rooms if desired.

Bathrooms

The small, drab bathroom of a few years ago is almost a thing of the past, Figure 7-15A. Modern homes today have larger, more pleasant baths, Figure 7-15B. Today's homes also have more bathrooms than were used in the past. All homes require at least one bathroom. Most modern homes have two or more baths. Ideally, every bedroom should have its own bath, though this is often impractical.

Bathrooms may be simple with only the necessary fixtures or elaborate in design and function. A dressing or exercise area may be incorporated in the bath. See Figure 7-16. These activities require more space and added facilities. Plan the bath around the functions to be provided.

Number, Location, and Size

Often the design of the house will indicate the minimum number of baths needed. If the house is very small, one bath may be sufficient. In this case, locate the bathroom where it is most convenient. See Figure 7-17.

A two-story house requires at least 1-1/2 baths—a full bath on the second level near the bedrooms and a 1/2 bath on the first floor near the living area. A ***full bath*** contains a lavatory, water closet, and tub or tub/shower combination. A ***1/2 bath*** is one that typically has only a water closet and lavatory.

A split-level house also requires at least 1-1/2 baths. Since the bedrooms are located on the upper level away from the living area, there is a need for another bath on a lower level.

A large ranch house requires a minimum of 2 baths. The bedrooms are usually located in a wing of the house away from the living area. Convenience dictates a second bath in the living area.

A B

Figure 7-15. A—This small bath wastes no space and contains no frills. B—This large, attractively decorated bathroom illustrates the use of functional planning for convenience. (Photo courtesy of Kohler Co.)

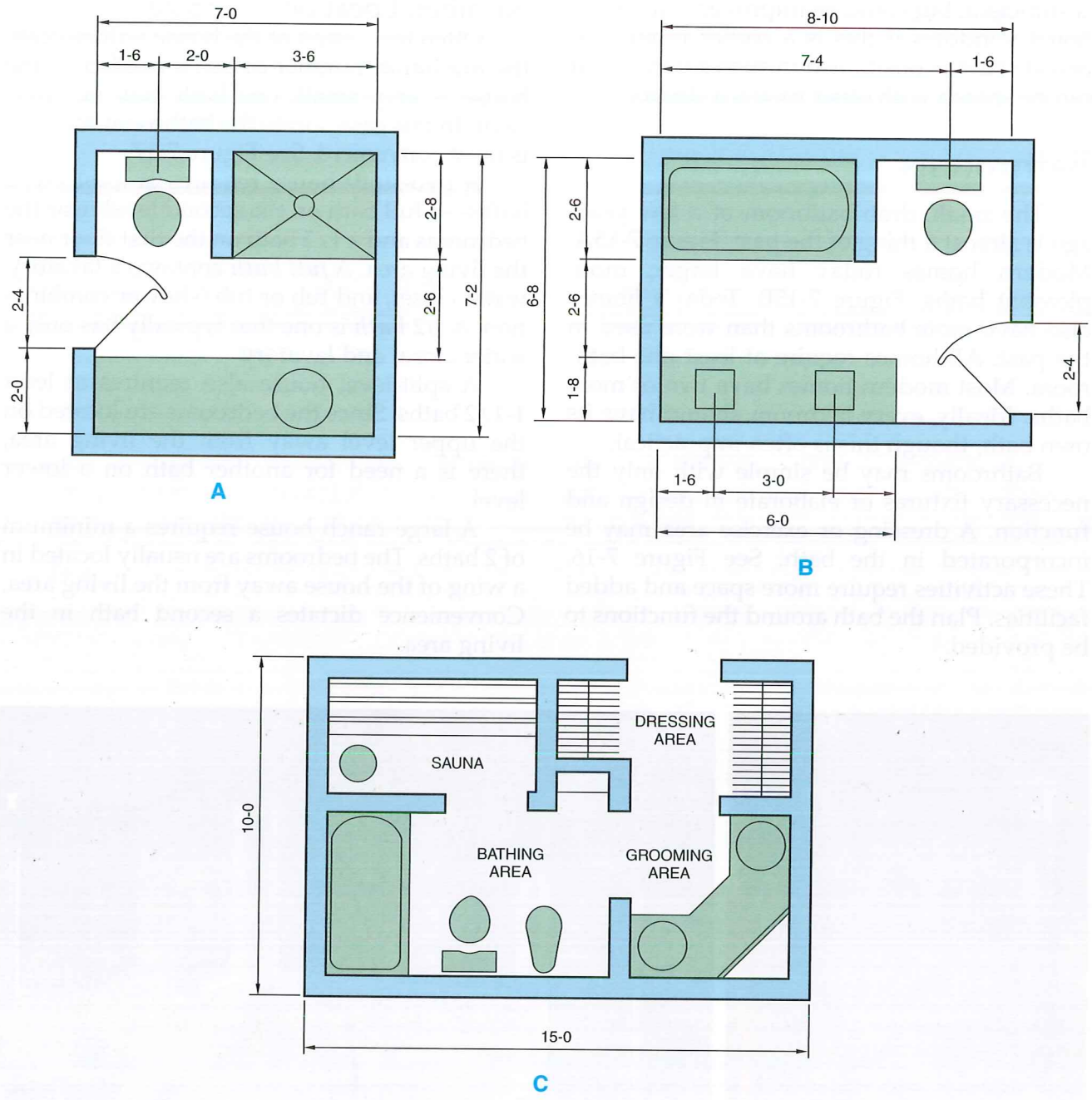

Figure 7-16. A—A small bathroom with a shower. B—A small full bathroom containing only the necessary fixtures. C—An elaborate bath design that includes the bathing area, a dressing area, a grooming area, and a sauna.

A ***3/4 bath*** is functional for basement or attic conversions. It contains only a lavatory, water closet, and shower.

For years, designers have emphasized the importance of locating bathrooms close together and near the kitchen to reduce cost. Granted, the cost will be less if baths share a common plumbing wall or are placed above or below one another. However, this is a rather minor consideration compared to convenience and function. It is desirable to design a functional bath and to place the bath in the most convenient location. Bathrooms should be located near the bedrooms and living area of the house.

A minimum size bath is 5′ × 8′, Figure 7-18. A large bath may be 10′ × 10′, 10′ × 12′, or larger. A family bathroom will require more

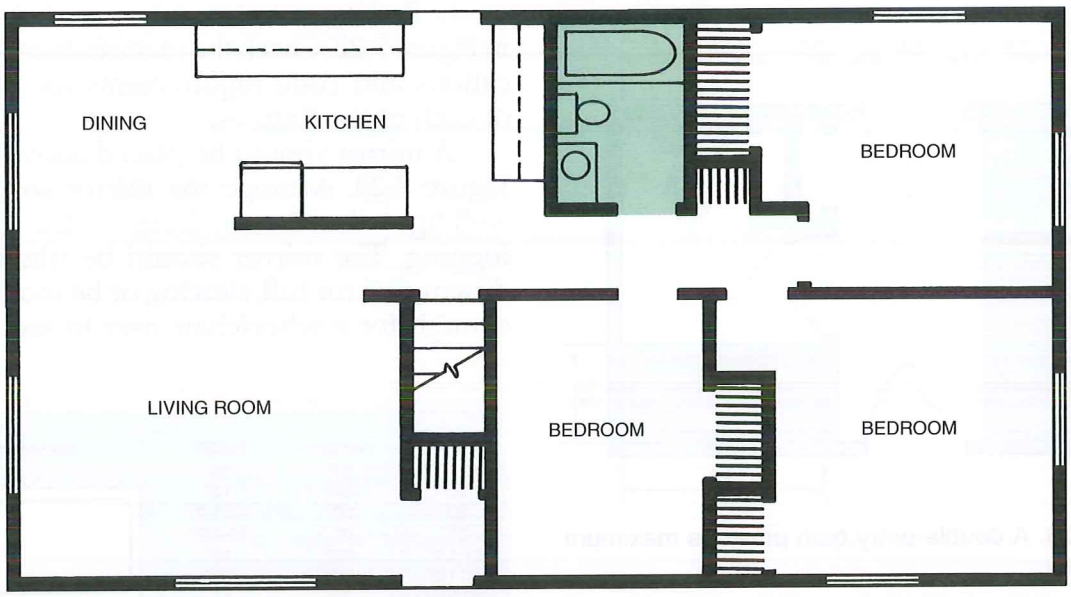

Figure 7-17. A well-planned, centrally located bath in a small house.

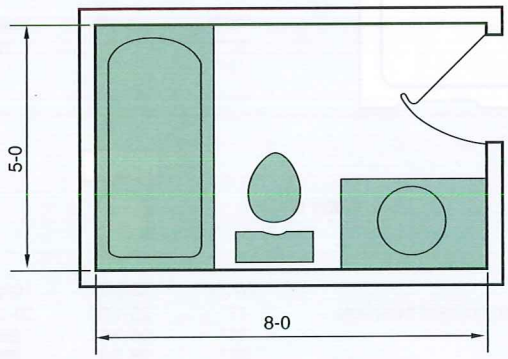

Figure 7-18. A planned layout for a minimum-size bathroom.

countertop and storage space than a guest bath. Most people prefer ample space for dressing, linen storage, and personal items. Larger bathrooms also allow for luxury or over-size tubs, Figure 7-19.

A large bathroom is most convenient for a wheelchair user. To be handicapped accessible, the bathroom must have a minimum of 5′ × 5′ clear space to allow turning of the wheelchair.

Accessibility

Accessibility to the bathroom is important, Figure 7-20. If there is only one bath for all the bedrooms, locate the door in a hall common to all the bedrooms. One should not be required to go through another room to reach the bath.

Figure 7-19. A large bathroom provides ample room for dressing, bathing, and grooming. It can also provide space for an oversize tub. (Summitville Tile)

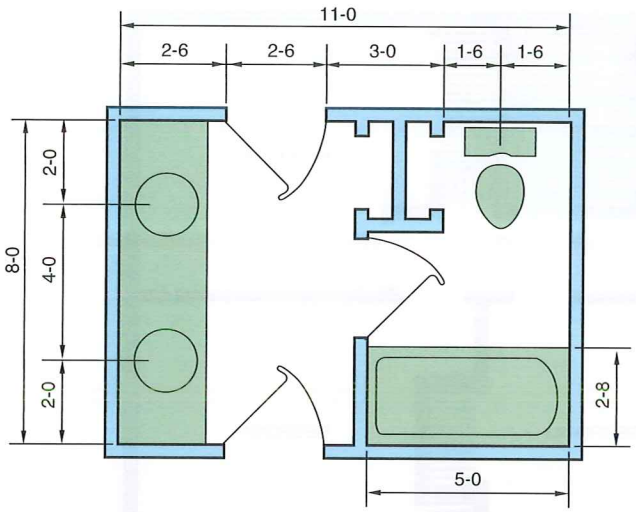

Figure 7-20. A double-entry bath provides maximum accessibility.

Bathroom doors are ordinarily not as wide as bedroom doors. A door width of 2′-6″ or even 2′-4″ is usually sufficient. If provisions are being made for wheelchair use, then the door should be a minimum of 2′-8″ wide. Doors should swing into the bathroom and not interfere with any fixtures. In some instances, a pocket door is used to subdivide the bath into two or more areas, as in a two-compartment bath, Figure 7-21.

Primary Fixtures

The three primary fixtures found in most bathrooms are the lavatory, water closet (toilet), and tub or shower. The arrangement of the fixtures determines whether or not the bath is truly functional. For example, avoid locating the lavatory or water closet under a window. Provide ample space for each fixture in the room. Bathroom fixtures vary in size as shown in Figure 7-22. Check the manufacturer's specifications and code requirements for placement of each of the fixtures.

A mirror should be placed above the sink, Figure 7-23. Arrange the mirror so it will be well lighted and away from the tub to prevent fogging. The mirror should be tilted slightly downward for full viewing or be mounted low enough for a wheelchair user to see. Another

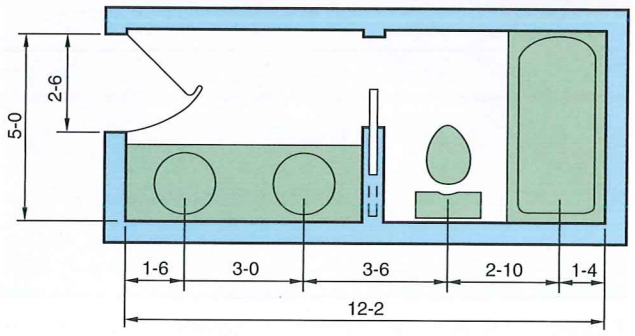

Figure 7-21. This two-compartment bath uses a pocket door as a divider.

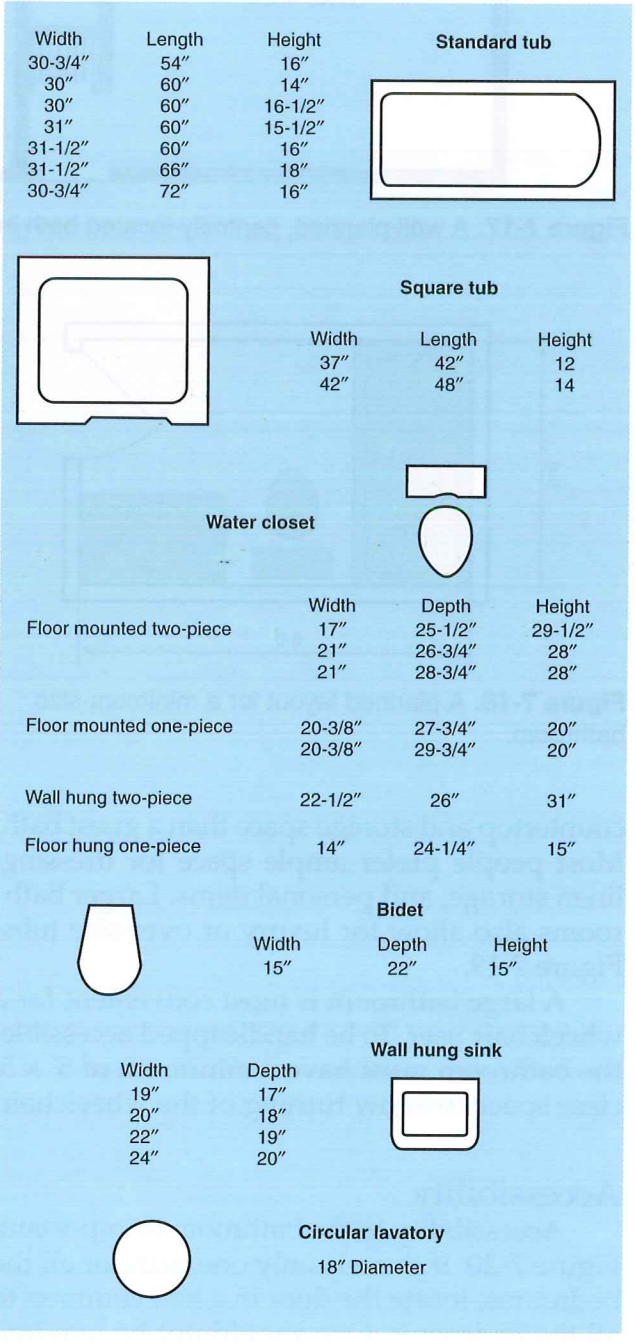

Figure 7-22. Common sizes of bathroom fixtures.

Figure 7-23. A lavatory should have a mirror above it. Avoid placing a lavatory or water closet under a window. (Photo courtesy of Kohler Co.)

option would be to install a full-length mirror on a bathroom wall or door. Medicine cabinets should be mounted so that the top shelf is not over 50-1/2" from the floor; lower if mounted over a counter or sink.

Sink cabinets or vanities are popular and provide much-needed countertop and storage space. Lavatories can be circular or rectangular shape as well as other shapes. A typical base unit is shown in Figure 7-24. Twin lavatories are desirable when more than one person must share the bathroom. Wall-mounted and pedestal models are once again becoming popular, Figure 7-25. They usually provide sufficient knee space for wheelchair users. A variety of vanity base units is shown in Figure 7-26.

Figure 7-24. This lavatory-vanity combination illustrates how beauty and function enhance a bathroom.

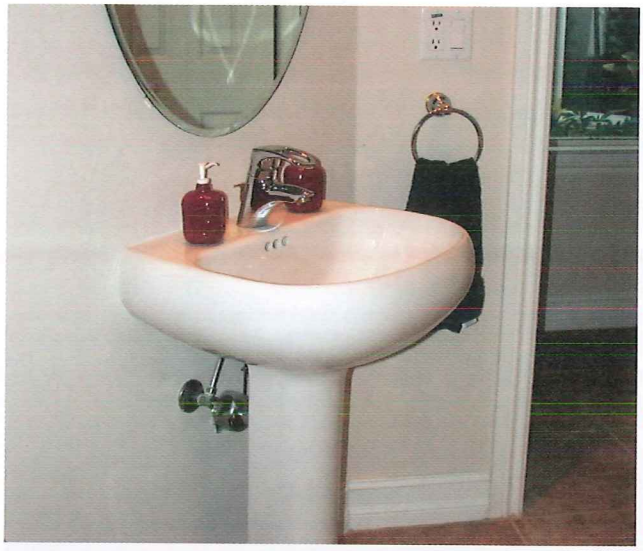

Figure 7-25. This attractively designed bath is functional and easy to clean.

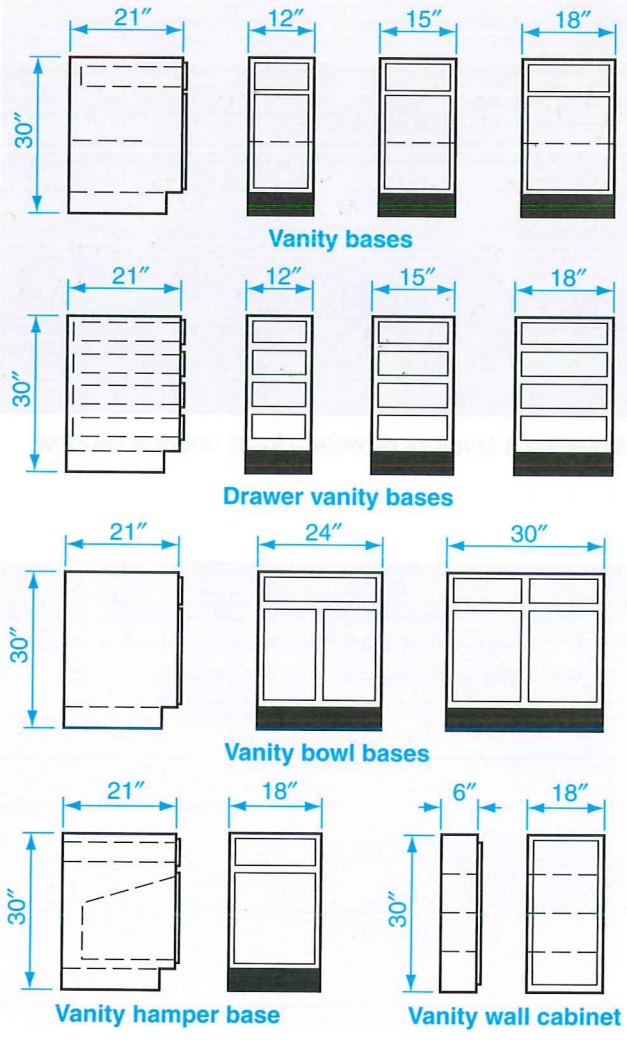

Figure 7-26. There are several standard vanity sizes and designs.

Allow 26″ to 30″ from the underside of the sink to the floor for wheelchair armrests. A space of 30″ to 34″ from the rim of the sink to the floor may be more preferable. If countertop sinks are used, insulate any exposed pipes to prevent burns. For easy reach, faucet handles should be a maximum of 18″ from the front of the sink. Lever-type handles provide greater usability.

Water closets are produced in a number of styles. The older style has a separate tank and stool. Many newer models are one-piece units, either floor- or wall-mounted, Figure 7-27. Wall-mounted water closets make cleaning easier. Most water closets require a space at least 30″ wide for installation, Figure 7-28. Allow 36″ for a handicapped person. Water closets should be placed so that they are not visible from another room when the bathroom door is open.

Figure 7-27. A contemporary one-piece water closet.

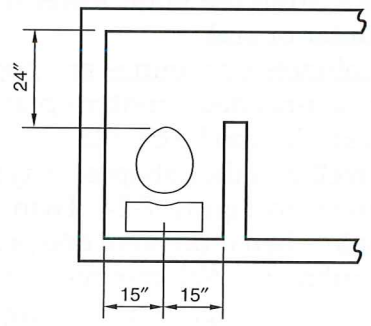

Figure 7-28. This is the minimum clearance for water closet installation. More space is required to be wheelchair accessible.

Wall-mounted water closets are more accessible for persons in wheelchairs. A water closet seat that is 20″ high is about the same height as most wheelchair seats and will provide for easy transfer. Elevated water closet seats are also available to provide access.

Regular bathtubs range in size from 54″ to 72″ long and 28″ to 32″ wide. The most common size is 30″ × 60″. Often, a shower is installed above the tub. This provides the convenience of both and does not require two separate facilities.

Bathtub rims should not be lower than 18″ from the floor to provide access from the wheelchair to the tub. Tubs may also have such safety features as nonskid bottoms and grab rails. In addition, various types of seats, stools, transfer seats, or lifts for use in bathtubs or showers are available. Bathtubs are available with built-in bath seat/platform on the opposite end of the tub from the drain.

Shower stalls are also popular. Many homes have a tub and separate shower stall. Prefabricated showers are available in metal, fiberglass, and plastic. More luxurious showers are usually made of ceramic tile, terrazzo, marble, or similar materials, Figure 7-29.

Figure 7-29. This shower makes use of durable ceramic tile. (Photo courtesy of Kohler Co.)

Hand-held shower heads may be more convenient and shower controls should be within reach of the user. Tub and shower floors should be flat and slip resistant. Common shower sizes range from 30″ × 30″ to 36″ × 48″.

Shower stalls are available for wheelchair users, Figure 7-30. Other stalls are available with a wall-mounted seat that will fold against the wall when not in use for persons who can transfer from a wheelchair to a seat. Placing a shower head over the center of the shower is more accessible for wheelchair users.

Additional Fixtures

Many modern homes include a bidet in bathrooms. Often, a bidet is only installed in the master bath. However, some home designs include a bidet in the main bath as well. A bidet is shown on the left in Figure 7-31.

Whirlpools, Jacuzzis™, and saunas can be installed in or near the bathroom. A whirlpool can be used as a bathtub, bubbling bath, or home spa, Figure 7-31. Powerful, pulsating jets of water are fully adjustable to provide a relaxing massage where it is needed the most. Some Jacuzzis™ may be used as a whirlpool or a bathtub as well. Saunas can be built as a part of the bath during construction or purchased in kits and added later. Some luxurious designs include a combination of a sauna, whirlpool, and steam bath.

Figure 7-30. This one-piece, prefabricated shower is installed as a complete unit during construction. It is accessible for wheelchair users. (Aqua Glass)

Figure 7-31. The touch of a button will transform this whirlpool bath into a soothing water retreat. (Photo of courtesy of Kohler Co.)

Ventilation and Electricity

A bathroom *must* have ventilation. This may be provided by windows or an exhaust fan. If windows are used, care must be taken to locate them properly. Windows should be placed such that a draft is not produced over the tub and maximum privacy is secured.

If an exhaust fan is used, it should be located near the tub and water closet area. *Electrical switches should be placed so that they cannot be reached from the tub!* Plus, ***ground fault circuit interrupter (GFCI)*** receptacles should be used in the bathroom. These are fast-acting devices that detect short circuits and immediately shut off power to the receptacle.

Safety

Safety should be a prime consideration when planning the bath. Flooring materials that become slick when wet should not be used. Devices should be installed in tub and shower faucets to control water temperature thermostatically to eliminate scalding from hot water. Also, devices can be installed to control the water pressure so that when the cold water pressure is reduced, the hot water flow is automatically reduced. Nonshatter or safety glass should be used in shower and tub enclosures.

Special provisions should be made for any handicapped persons who might use the bathroom. This may include installing a specially designed shower or tub, Figure 7-32. Grab bars

Figure 7-32. The floor area of the shower unit permits a 5′ turning radius for wheelchairs. Several grab bars are within easy reach. (Universal-Rundle Corporation)

should be provided, especially in the areas where the water closet, tub, and shower are located, Figure 7-33. Horizontal bars are designed for pushing up while vertical bars are designed for pulling up. Grab bars must be well anchored. They should be 1-1/4" in diameter with a profile that can be easily grasped with no sharp edges. Grab bars should be no further than 1-1/2" away from the wall.

Decor

The decor of a well-planned bath will provide for easy cleaning, resistance to moisture, and a pleasing atmosphere. Select fixtures that are appropriate for the desired color scheme of the room. Plants and art pieces may be added to enhance the beauty of the room. The bathroom need not be a dull room that is void of design and beauty, Figure 7-34.

Figure 7-35 shows a small bath that provides maximum convenience and practicality at a nominal cost. Economy is partially obtained by the supply and drains being placed on a single wall. Also, there is no wasted space in this functional bath. "Zones" may be created through the use of open-shelf cabinetry.

Figure 7-33. An example of a shower/tub combination that is accessible for the physically disabled. Notice the four grab bars and the sliding seat. (Photo courtesy of Kohler Co.)

A large bath is shown in Figure 7-36. This 12′ × 15′ bath groups all the plumbing fixtures into an island unit at the center of the room. The square tub and twin vanities create a unique design. The entrance and closets may be rearranged to suit the particular needs of a given plan. A vent fan, heater, lighting, and shower curtain track are mounted in a ceiling unit.

Figure 7-37 shows a luxury bath. The 240 square feet area provides separate, private dressing and grooming areas for the husband and wife. "Her area" may be decorated in a completely feminine decor while "his area" may be distinctly masculine. The sanitary area, tub, and shower may be completely closed when desired. The shower and tub area are tiled and slightly sunken.

Figure 7-34. This contemporary bath combines beautiful materials and architectural detail to produce a focal point. (Pittsburgh Corning Corporation)

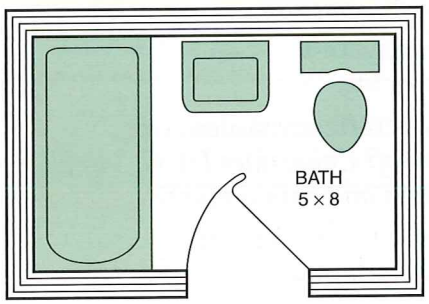

Figure 7-35. An economical bath with the supply and drains on a single wall.

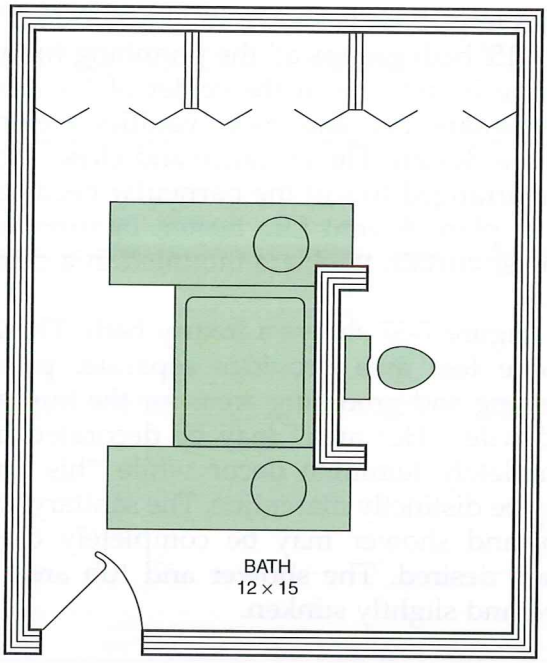

Figure 7-36. A large island bath with plumbing fixtures in a center cluster.

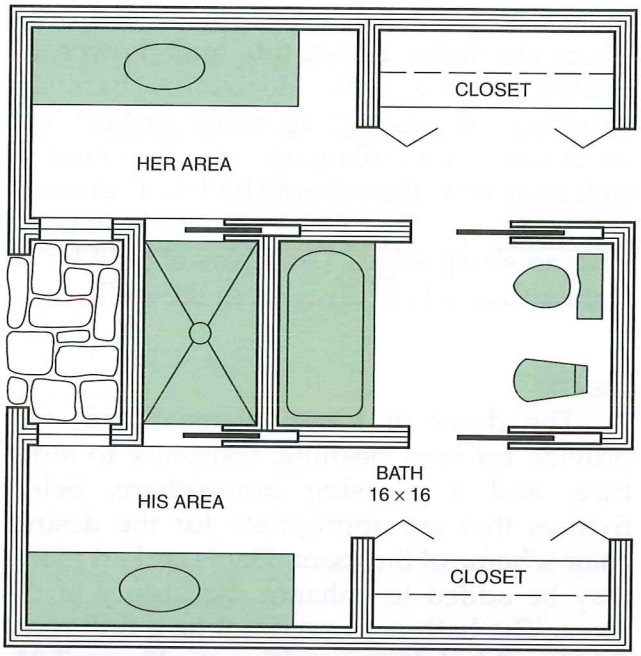

Figure 7-37. This "his" and "her" bath represents a luxury dressing and grooming area.

Internet Resources

www.gaf.com
GAF Materials Corporation, manufacturer of roofing materials

www.hotwater.com
A. O. Smith Water Products Company

www.jacuzzi.com
Jacuzzi, Inc.

www.kohler.com
Kohler Company

www.moen.com
Moen, Inc.

www.norcraftcompanies.com
Norcraft Companies L.L.C., supplier of kitchen and bath cabinets

www.owenscorning.com
Owens Corning

www.pricepfister.com
Price Pfister

www.velux.com
Velux, supplier of roof windows and skylights

www.wwpa.org
Western Wood Products Association

Review Questions – Chapter 7

Write your answers on a separate sheet of paper. Do not write in this book.

1. In bathroom design, which two electrical safety concerns must always be addressed?
2. List the three basic areas into which a residential structure may be divided.
3. In some design situations, a _____ is used to subdivide the bath into two compartments.
4. Which three materials are often used for bathroom showers in luxury homes?

5. Which three materials are commonly used for prefabricated bathroom showers in average homes?
6. Less space is wasted when the bedroom door is located near a _____ of the room.
7. FHA specifications recommend a minimum of _____ linear feet of closet rod space for a woman and _____ for a man.
8. FHA recommends that the minimum bedroom size be no smaller than:
   a) 100 square feet.
   b) 150 square feet.
   c) 200 square feet.
   d) 250 square feet.
9. A minimum size bathroom is _____.
10. Bathtubs range in size from 28″ × 54″ to 32″ × 72″. The most common size is _____.
11. List four types of doors generally used for closets.
12. A 3/4 bath contains only a _____, _____, and _____.
13. Allow _____ from the underside of the sink to the floor for wheelchair armrests.
14. Name two advantages of a wall-mounted water closet.
15. _____ must be well anchored, should be 1-1/4″ in diameter, have a profile that can be easily grasped with no sharp edges, and should be no further than 1-1/2″ away from the wall.

Suggested Activities

1. Select a floor plan of a house from a newspaper, magazine, or other literature. Using CADD, draw furniture symbols based on standard sizes. Refer to Figure 7-9. If CADD is not available, create paper cutouts. Then, plan furniture arrangements for each of the bedrooms. Prepare a short write-up of each room describing the furniture and arrangement. Include sizes of all pieces of furniture.
2. Design a small bathroom (5′ × 10′). Show the location and size of each fixture in a plan view.
3. Prepare a plan view for a clothes closet that is 3′ deep and 8′ in length. Show the maximum door access, clothes rod, and shelf storage area. Refer to the illustrations in this chapter for examples.
4. Design an average-size bedroom, as defined by the FHA. Make a plan view drawing of the room either manually or with CADD. Include the bed, dresser, chest of drawers, and other furniture to meet the needs of your own activities. You may want to include a study or reading area.
5. Look through a number of home design and planning magazines for closet arrangements. Prepare a display of clippings that illustrates maximum use of closet space for clothes, shoes, and other apparel.
6. Locate agencies and organizations that specify requirements for bath facilities to be handicapped-accessible. Enlist the help of your local librarian or the Internet to find at least two different sources. Then, obtain a list of these requirements from each source. Finally, design a bathroom for a disabled person that meets all of the requirements.
7. Using CADD, draw bedroom and bathroom symbols and add them to your symbols library for future use. Refer to Figure 7-9 and Figure 7-22.

Material Safety

As a drafter, you may not think about material safety. However, there are many types of materials that you come in contact with, and some may be considered hazardous. The Occupational Safety and Health Administration (OSHA) requires:

- A list be kept of all hazardous materials used on the premises.
- A file be maintained containing material safety data sheets (MSDS) on each hazardous material.
- Employees be trained in the proper use of hazardous materials.

Some materials that you may come in contact with include ammonia, cleaning fluids, inks, and toner. In addition to proper handling of these materials, they must be properly disposed of when you are done using them. For example, spent toner cartridges should not be placed in the garbage. They should be returned to a recycling facility for recharging and eventual reuse. When in doubt, check the facility's master list of hazardous materials. If the material is listed as hazardous, check the material's MSDS for hazards. Finally, check with the manufacturer or Environmental Protection Agency (EPA) for disposal procedures. A sample MSDS is shown below.

Material Safety Data Sheet

Preparation/Revision Date:

ACME Chemical Company

24 hour Emergency Phone: Chemtrec: 1-800-424-9300
Outside United States: 1-202-483-7616

Trade Name/Syn: **DICHLOROMETHANE * METHYLENE DICHLORIDE**
Chem Name/Syn: **METHYLENE CHLORIDE**
CAS Number: **75-09-2**
Formula: **Ch_2Cl_2**

NFPA Rating:
Health 4
Flammability 1
Reactivity 1

Statement of Hazard:
Possible cancer hazard. May cause cancer based on animal data. Harmful if swallowed or inhaled. Vapor irritating. May cause eye injury and/or skin irritation. May cause damage to liver, kidneys, blood, and central nervous system.

Effects of Overexposure-Toxicity-Route of Entry:
Toxic by ingestion and inhalation. Irritating on contact with skin, eyes, or mucous membranes. May cause eye injury. Inhalation of high vapor concentrations causes dizziness, nausea, headache, narcosis, irregular heartbeats, coma, and death. If vomiting occurs, methylene chloride can be aspirated into the lungs, which can cause chemical pneumonia and systemic effects. Medical conditions aggravated by exposure: heart, kidney, and liver conditions. Routes of entry: inhalation, ingestion.

Hazardous Decomposition Products:
HCL, phosgene, chlorine.

Will Hazardous Polymerization Occur?
Will not occur under normal conditions.

Is the Product Stable?
Product is normally stable.

Conditions to Avoid:
Contact with open flame, welding arcs, and hot surfaces.

Spill Procedures, Disposal Requirements/Methods:
Evacuate the area of all unnecessary personnel. Wear suitable protective equipment. Eliminate any ignition sources until the area is determined to be free from explosion or fire hazard. Contain the release with a suitable absorbent. Place in a suitable container for disposal. Dispose of in accordance with all applicable federal, state, and local regulations.

Ventilation:
Local exhaust: Recommended
Mechanical (Gen): Recommended
Special: NA
Other: None

Respiratory Protection:
NIOSH/MSHA air supplied respirator.

Protective Gloves:
Viton, PVA, or equivalent to prevent skin contact.

Other Protective Equipment:
Safety glasses with side shields must be worn at all times; eyewash; fume hood.