

# CHAPTER 10: BASELOAD MEASURES

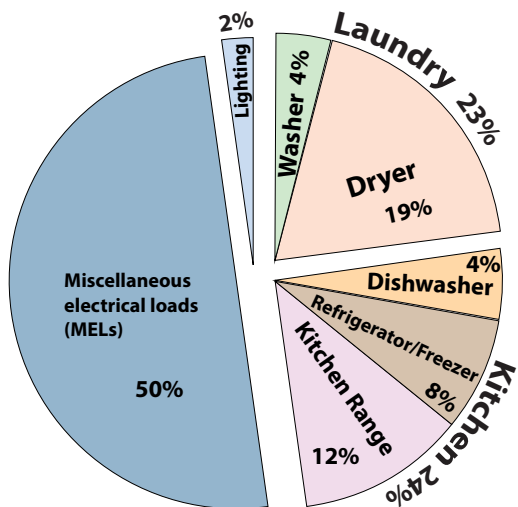
## SWS Detail: 7 Baseload

Baseload energy consumption accounts for a large part of home energy use. This chapter discusses energy savings for refrigeration, entertainment, lighting, laundry, and water heating.

**Table 10-1: Levels of Household Electric Baseload Consumption**

Indicator	Low	Medium	High
kWh per Year	<4500	4500–8500	>8500
kWh per Month	<375	375–700	>700
kWh per Day	<12	12–23	>23
kWh per Person (Annual)	<1900	1900–3500	>3500

Doesn't include heating, cooling, or water heating. Assumes 2.4 persons per household and average annual consumption of 6500 kWh per household.



**Baseload Energy Consumption:** These baseload usage percents are, of course, different for every dwelling unit. However this chart gives ideas of a typical distribution. Miscellaneous electrical loads or MELs can be up to half of total baseload consumption.

**Table 10-2: Electrical Consumption of Typical Appliances**

<b>Appliance</b>	<b>Annual usage (kWh)</b>	<b>Annual cost</b>
Ten-year-old refrigerator or freezer	1250	\$188
New ENERGY STAR refrigerator or freezer	500	\$75
Television	100–1000	\$15–\$150
Clothes dryer	1200	\$180
Well pump	500	\$75
Furnace fan	500	\$75
Computer	50–400	\$8–\$60
Hot tub, spa	2300	\$345
Water bed	1000	\$150
Data from Lawrence Berkeley Laboratory and others. Based on 15¢ per kilowatt-hour for electricity.		

## 10.1 REFRIGERATOR REPLACEMENT AND MAINTENANCE

Refrigerators built after 1993 use less electricity than refrigerators built before that year. Another efficiency increase occurred in 1999 in the refrigerator industry.

### 10.1.1 Refrigerator Replacement

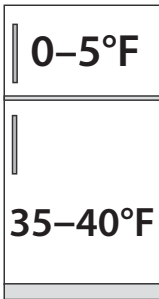
#### *SWS Detail: 7.0101.1 Refrigerator and Freezer Replacement*

Comply with the following requirements when replacing refrigerators.

- ✓ The new refrigerator must fit the existing space.

- ✓ The new refrigerator must be 40% more efficient than the minimum federal standards or be labeled ENERGY STAR.
- ✓ The new refrigerator must have a minimum one-year warranty.
- ✓ Take refrigerators that are replaced to a facility that is licensed to reclaim their refrigerant and recycle the refrigerator's parts.
- ✓ No refrigerator, taken out of service, may be returned to service by sale, barter, or for free.
- ✓ Instruct the client about location and operation of energy controls such as the thermostats for the refrigerator and freezer.

Some clients use two or more refrigerators in their homes, and this practice results in high electricity usage. Suggest to these clients to consolidate food storage into a large single refrigerator.



**Refrigerator clean and tune:** Clean coils and check temperatures. Adjust temperatures that are out of range.

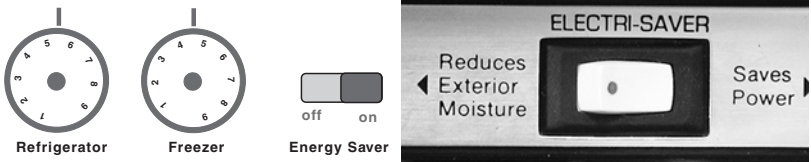


## 10.1.2 Refrigerator Cleaning and Tuning

*SWS Detail: 7.0101.2 Refrigerator/Freezer Clean and Tune*

Cleaning and tuning an existing refrigerator can increase its efficiency. Follow these procedures.

- ✓ Clean dirt off clogged coils.
- ✓ Move objects that block airflow around the refrigerator, and ask the client to store the objects elsewhere.
- ✓ Measure refrigerator temperature and verify that it is between 35° and 40° F. Otherwise re-set the thermostat to this temperature range.
- ✓ Measure the freezer temperature, and verify that it is more than or equal to 0° F. If it is colder than 0°, re-set the freezer's thermostat to 0° F.
- ✓ Check the condensation-control switch. If the condensation control is on, the refrigerator door or door frame is being heated. Try turning the switch to “energy saver” which turns the heating elements off. If frost forms on the door, turn the control back on.
- ✓ Explain the function of the condensation control to clients. If the energy-saver setting isn't adequate for very humid weather, the occupants could toggle setting.



**Refrigerator energy controls:** Refrigerator and freezer temperatures aren't typically labeled in degrees, so there might be some trial and error in getting the setting within range. The condensation control is either on and heating the door perimeter or off and not heating the door perimeter.

### 10.1.3 Refrigerator Metering Protocol

Older refrigerators use from 1000 to 2000 kWh per year. Newer ENERGY STAR refrigerators use less than 400 kWh per year. You need a minimum of two hours to accurately measure refrigerator energy consumption using a recording watt-hour meter.

There are two (2) common options for evaluating refrigerator energy consumption for replacement.

1. The first option is to follow the metering procedure presented here.
2. If metering isn't practical, use the database housed in the Weatherization Assistant (WA) Software.

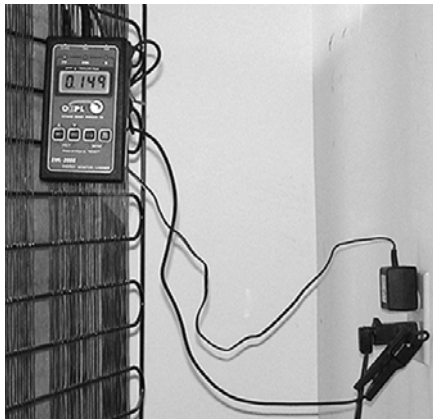
## Metering Accuracy Issues

A number of unusual circumstances could reduce the accuracy of the metering, including the following.

- A quantity of warm food recently placed in the refrigerator.
- Abnormally high or low ambient temperature. For example: refrigerators in garages during the summer or winter; or refrigerators in vacant homes where heating or cooling systems aren't operating.

### **Recording watt-hour meter:**

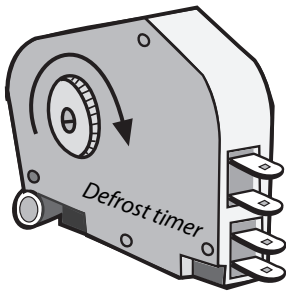
Measures energy consumption over time. The better units can also calculate monthly consumption, or record maximum current draw to help identify the defrost cycle.



## Refrigerator Metering Procedure

If the refrigerator is an automatic-defrost model, you could measure an inaccurate reading if the unit goes into the electric defrost mode during the test period. The following test protocol includes provisions to prevent the defrost mode from activating.

1. Determine if the refrigerator is equipped with automatic defrost. This is usually stated on the manufacturer's data plate or on the outside of the unit. If the refrigerator is equipped with a manual defrost, proceed to step 3.
2. If the unit is equipped with automatic defrost, follow this sub-procedure.
  - a. Locate the defrost timer. This small electrical-control box is located in the refrigerator or behind the front kick-plate. The defrost timer may also be located on the rear of the unit.



**Defrost Timer:** The defrost timer initiates the defrost cycle to melt ice at regular intervals.

- b. Open the defrost timer and locate the advance pinion. This shaft usually has a screwdriver slot to allow you to manually advance the timer.
    - c. Turn the timer clockwise (you can break the timer if you turn it counter-clockwise) until you hear a loud click. This turns the defrost heaters on. Turn it further until it clicks loudly again, turning the defrost heaters off.
    - d. You can now perform your measurement since the timer won't call for defrost heat again for several hours.
3. Connect the refrigerator to a recording watt-hour meter. Run the test for at least two hours. You don't need to stop at two hours, and a longer measurement is better. During the test, avoid opening the refrigerator, or do so briefly.

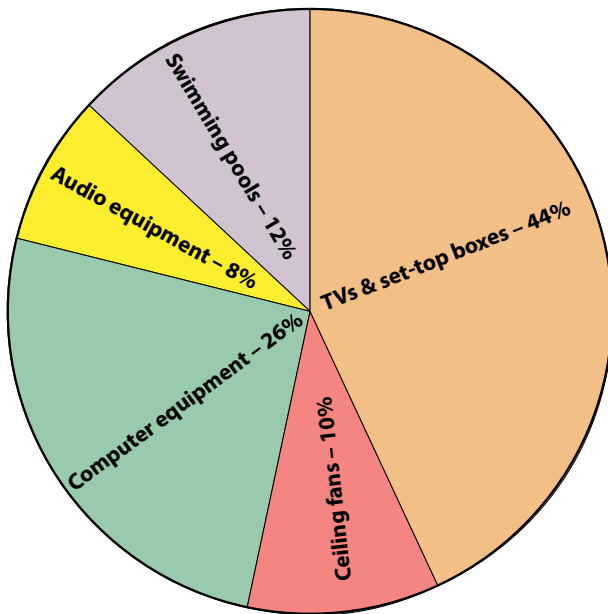
- At the end of the test, read the kilowatt/hours of consumption measured by the meter. Divide this number by the number of hours in the test. This gives you the number of kilowatt-hours consumed each hour. Multiply this number times the total number of hours in a year (8760 hours per year). The product of this calculation is the annual kilowatt-hours of electrical usage.
- Remove the meter and plug the refrigerator back into its outlet.**

$$\begin{array}{c}
 \text{length of test} \\
 \text{in hours} \quad \swarrow \\
 \mathbf{0.32 \div 2 = 0.16} \times \mathbf{8760 = 1402} \\
 \nearrow \qquad \qquad \qquad \uparrow \qquad \qquad \qquad \nwarrow \\
 \text{kilowatt-hours} \quad \text{hourly} \quad \text{predicted annual} \\
 \text{consumed} \quad \text{consumption} \quad \text{consumption in} \\
 \qquad \qquad \qquad \text{in kilowatt-hours} \quad \text{kilowatt-hours}
 \end{array}$$

**Refrigerator consumption example:** In this example, a 2-hour measurement was performed. During this time, the appliance consumed 0.32 kilowatt-hours of electricity, or 0.16 kilowatt-hours per hour. The annual total of 1402 kilowatt-hours, calculated above, is well beyond the 450 kilowatt-hours per year consumed by today's most efficient refrigerators.

**Table 10-3: Kilowatt-Hours per Hour & Kilowatt-Hours per Year**

kWh/hour	kWh/year	kWh/hour	kWh/year
0.23	2000	0.16	1400
0.22	1900	0.15	1300
0.21	1800	0.14	1200
0.19	1700	0.13	1100
0.18	1600	0.11	1000
0.17	1500	0.10	900



**Miscellaneous Electrical Loads (MELs):** MELs consume from 1000 to 3000 kWh per household, a huge increase over households 20 or even 10 years ago. The explanation is more TVs with set-top boxes, computers, and electronic entertainment.


## 10.2 ELECTRONIC ENTERTAINMENT AND COMPUTERS

### SWS Detail: 7.0102 Electronics; 7.0102.1 Consumer Electronics Replacement

Change settings for the plan: Power saver

Choose the sleep and display settings that you want your computer to use.

 Turn off the display:

 Put the computer to sleep:

[Change advanced power settings](#)

[Restore default settings for this plan](#)

#### Computer power settings:

Go to your computer's control panels and set the *power-saver control* to rest the display and sleep the computer after some chosen time of inactivity.



The purpose of this section is to help clients conserve electricity and identify major electricity users among their computer and entertainment systems. These measures must not be charged to DOE or LIHEAP funds.

- ✓ Advise clients to buy equipment labeled ENERGY STAR.
- ✓ Advise clients to buy electronic equipment that doesn't need to be left on when not being used.
- ✓ Recommend power strips that can be turned off when electronic equipment isn't being used.
- ✓ Standby losses for electronic equipment should be one watt or less.
- ✓ Typical Set-top boxes consume between 30 and 50 W even when they're switched off. Most energy efficient models still consume more than 10 W when they're off.
- ✓ Read the operating manual and enable all energy-saving features of an appliance. Explain the energy-saving features to the client.
- ✓ Verify that clients have operating instructions for their electronic equipment or that they know how to access instructions using the Internet.
- ✓ Recycle or dispose of equipment using principles of the Environmental Protection Agency (EPA) Responsible Recycling (R2) Initiative.



**Smart plug strips:** A variety of plug strips with built-in controls are now available. The plug strips interrupts power to appliances by remote control, on a time schedule, or by sensing occupancy.

## 10.3 LIGHTING-EFFICIENCY IMPROVEMENTS

*SWS Detail: 7.0103 Lighting; 7.0103.2 Lighting Reduction; 7.0103.1 Lighting Replacement*

Lighting-efficiency improvements include bulb (lamp) replacement, daylighting, fixture replacement, and energy-efficient lighting controls.

### 10.3.1 LEDs versus CFLs

*SWS Detail: 7.0103.2 Lighting Reduction; 7.0103.1 Lighting Replacement*

CFLs were the dominant energy-saving alternative to incandescent for at least 20 years. Now, LEDs have largely captured the lighting-retrofit market because of their superior energy efficiency, long life, and low cost.

CFLs are still a viable choice, especially when you have a large stock of them. However the future now belongs to LEDs. The more LEDs that WAP installs, the more energy savings WAP achieves from lighting retrofits.

### 10.3.2 Light Color

Some clients are sensitive to light color. Manufacturers design and label commercial lamps with a color temperature (°K), depending on their “coolness” or “warmness.” People perceive colors at the blue-green end of the color spectrum as cool and those at the color spectrum’s red end as warm. Morning sunlight from the north is a cool blue-green and from southwest evening sunlight is a warm red-yellow.

Office workers perform better under cool light sources for visual tasks, since cool light produces better illumination and contrast at the printed page, workbench, or other task. People often prefer warm light sources for living spaces, because warm

light seems to many to illuminate people's skin and clothing in a flattering way.

Light color is a complex topic of color measurement by degrees Kelvin (°K) through a range of 3000°K (very warm) to 5000°K (very cool). The full discussion of this range of options is more relevant for commercial and industrial buildings than residential buildings. That discussion goes beyond the scope of this field guide.

### 10.3.3 Daylighting

*SWS Detail: 7.0103.7 Daylighting*

Use daylighting as appropriate to save electricity.

- ✓ Replace, adjust, or repair window coverings to maximize useful daylight where appropriate.
- ✓ Design and use active and passive day lighting where appropriate.

### 10.3.4 Home Lighting Retrofit Equipment

*SWS Detail: 7.0103.2 Lighting Reduction; 7.0103.1 Lighting Replacement; 7.0103.3 Ballast Replacement; 7.0104 Lighting Controls*

Consider the following specifications when retrofitting lighting equipment.

- ✓ Ask the client about their lighting usage, and explain the electrical savings potential for switching to light-emitting diodes (LEDs).
- ✓ Demonstrate a LED bulb to the client if they're hesitant about replacing their incandescent light bulbs.
- ✓ Select the type of LED and its wattage, according to its use and the client's accustomed light level.

- ✓ Consider the color temperature of the LED — warm versus cool.
- ✓ Turn on each LED after installation to ensure that it operates. Make sure that the client is satisfied with the light level.



Cree.com



*LED recessed-light replacement*



*LED bulb*

**LED lamps and fixtures:** LEDs now dominate the lighting-retrofit market because of their superior energy efficiency and long life.

- ✓ Replace a halogen-torchiere lamp holder with an LED conversion kit for the torchiere.
- ✓ Replace incandescent bulbs in candelabra fixtures with LEDs designed for this purpose.
- ✓ Install bulbs, fixtures, and controls designed for their intended application (for example: enclosed, dimmable, indoor, outdoor).
- ✓ Select bulbs, fixtures, and controls to provide the brightness and light quality required in that application (for example: task lighting, walkway lighting, night lights).
- ✓ All bulbs, fixtures, and controls must be ENERGY STAR® rated where applicable.

- ✓ Bulb wattage must not exceed rated wattage of the light fixture.
- ✓ Select bulb replacements based on expected life span, light quality, and lifetime energy use.
- ✓ Install occupancy sensing controls where appropriate.
- ✓ All bulbs, fixtures, and controls must be UL-approved and installed according to local code(s) and *NFPA 70 National Electric Code*
- ✓ Inform clients about proper recycling of fluorescent bulbs by stores, municipal waste departments, or other recycling organizations.
- ✓ Replace fluorescent light ballasts containing polychlorinated biphenyls (PCBs) according to the EPA's *Healthy Indoor Environment Protocols for Home Energy Upgrades*.

### 10.3.5 Reducing Fixture Wattage

*SWS Detail: 7.0103.1 Lighting Replacement; 7.0103.2 Lighting Reduction; 7.0103.3 Ballast Replacement; 7.0103.4 Exit Sign Replacement; 7.0103.5 Emergency Lighting Replacement; 7.0103.6 Security Lighting*

Many rooms and common areas of multifamily buildings are unnecessarily over-lit. Areas that, by reasonable standards, require between 2 and 15 footcandles sometimes measure 20 to 60 footcandles.

Measure light levels before and after lighting retrofits. Occupants very seldom notice light-level reductions unless they know it happened.

#### General Fixture Retrofit

- Clean lenses and fixtures as part of the retrofit.

- Consider replacing incandescent and CFL bulbs with LEDs of a reduced lumen output.
- Retrofit point-source fixtures in over-lit areas with the same bulb type of a lower wattage and reduced lumen output.
- Replace existing fixtures in intermittently occupied areas with fixtures equipped with integral occupancy sensors if available.



**Footcandle meter:** Measure light levels in rooms and outdoor areas before and after lighting retrofits.

## Multifamily Fluorescent Fixtures

Multifamily stairs, parking garages, hallways, and lobbies are some of the most over-lit areas. Fluorescent fixtures light many of these areas. Consider these retrofits depending on the building's budget and the cost of electricity.

- Clean lenses and fixtures as part of the retrofit.
- Replace T-12 lamps with T-8 lamps.
- Remove up to two tubes from 4-lamp fixtures or 1 lamp from a 2-lamp fixtures.
- Modernize existing magnetic-ballast fixtures to the Super T-8 standard.
- Replace fluorescent fixtures with LED fixtures with reduced lumen output.

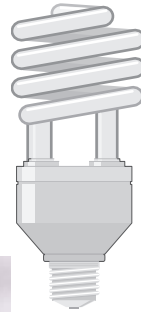
**Table 10-4: Recommended Horizontal Light Levels (FC)**

<b>Building Area</b>	<b>Recommended Footcandles (FC)</b>
<b>Corridors and stairways</b>	5-10
<b>Kitchens and work areas</b>	25-50
<b>Dining rooms and bedrooms</b>	10-20
<b>Common bathrooms</b>	5-10
<b>Parking garages</b>	1-2
<b>Lobbies</b>	5-10
<b>Outdoor walkways</b>	1-2
<b>Outdoor building entrance</b>	2-5

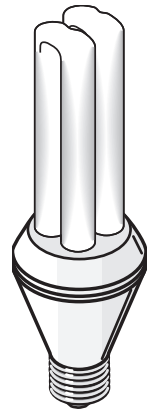


*LED candle*

*LED torchiere*



*Spiral CFL*



*Quad CFL*

**CFL and LED lamps:** These advanced lamps use about one-third of the electricity of the incandescent lamps they usually replace, and they last about ten times as long.

## 10.4 CLOTHES WASHER SELECTION/REPLACEMENT

### *SWS Detail: 7.0105 Laundry*

Observe the following standards to minimize the energy consumption of clothes washers. This measure must not be charged to DOE or LIHEAP funds.

### 10.4.1 Clothes Washer Selection

#### *SWS Detail: 7.0105.1 Washing Machine*

Comply with these requirements when selecting a new clothes washer.

- ✓ Select clothes washers that meet or exceed ENERGY STAR® and WaterSense® specifications.
- ✓ Maintain adequate clearance around appliance when fit into the available space, so the washer doesn't block access to cabinets and light switches.
- ✓ Appliance must be covered by a minimum one-year warranty.
- ✓ Standby losses for clothes washers must be one watt or less.

### 10.4.2 Clothes Washer Installation

#### *SWS Detail: 7.0105.1 Washing Machine*

Comply with these requirements when installing a new clothes washer. This measure must not be charged to DOE or LIHEAP funds.

- ✓ Install clothes washers in accordance with manufacturer specifications, (including leveling, plumbing connections, electrical connections) and meet all applicable codes.



- ✓ Install shut-off valves on hot and cold supply water if not already present.
- ✓ If located in conditioned or finished area, install an overflow pan and drain the pan to a safe location
- ✓ Air seal any penetrations to the exterior of the home created by the washer's installation.
- ✓ Demonstrate energy-related appliance controls to the occupant.
- ✓ Provide specific information about proper maintenance of the washer to the occupant.
- ✓ Provide warranty information, operation manuals, and installer name to the owner.

## 10.5 CLOTHES DRYER SELECTION/REPLACEMENT

### *SWS Detail: 7.0105 Laundry*

The following standards minimize the energy consumption of clothes dryers. This measure must not be charged to DOE or LIHEAP funds.

### 10.5.1 Clothes-Dryer Selection

#### *SWS Detail: 7.0105.2 Clothes Dryer*

Comply with these requirements when selecting a new clothes dryer. This measure must not be charged to DOE or LIHEAP funds.

- ✓ Maintain adequate clearance around appliances to avoid blocking cabinets and light switches.
- ✓ Verify that appliances have a minimum one-year warranty.
- ✓ Select equipment with features that reduce peak electric demand and energy use.

- ✓ Standby losses for clothes dryers must be one watt or less.

## 10.5.2 Clothes-Dryer Installation

*SWS Detail: 6.0202.1 Clothes Dryer; 7.0105.2 Clothes Dryer*

Install the appliance in accordance with manufacturer specifications and all applicable codes.

Consider these requirements when replacing clothes dryers. This measure must not be charged to DOE or LIHEAP funds.

- ✓ Demonstrated energy-related dryer controls to the occupant.
- ✓ Provide specific information of the proper maintenance of the equipment to the occupant.
- ✓ Provide warranty information, operation manuals, and installer contact information to the occupant.
- ✓ Recycle or remove and dispose of replaced appliances in accordance with local regulations, including older equipment switches containing mercury.

If existing venting doesn't meet manufacturer specifications, code, or the following criteria, install new venting using these specifications. This measure must not be charged to DOE or LIHEAP funds.

- ✓ Vent all dryers, other than condensing dryers to the outdoors.
- ✓ Vent appliance to the outdoors using metal-to-metal or UL listed foil-faced dryer vent.
- ✓ Use only metal clamps on semi-rigid metal and UL listed foil-type vent pipes.
- ✓ Install a pest screen at the termination.
- ✓ Insulate at least 3 feet of the vent closest to the home's exterior to a minimum of R-6.

- ✓ If a combustion appliance is used, perform combustion-safety testing as described in *“If you find a conflict among the listed codes, local codes, manuals, and manufacturer’s specifications, comply with the most specific and stringent requirement among them.”* on page 277.
- ✓ Seal penetrations to the outdoors created by the appliance installation to an airtight condition.

### 10.5.3 Clothes-Dryer Service and Venting

SWS Detail: 6.0202.1 Clothes Dryer; 7.0105.2 Clothes Dryer

Clogged clothes-dryer vents are a leading cause of house fires. The drying time of a load of laundry depends first on the dryer installation. The original installation can also cause excessive drying time when flexible vents are excessively long, kinked, or restricted in some other way. The amount of lint in the dryer, vent piping, and vent termination also affects dryer safety and efficiency. Lint builds up over time and slows drying time and increases the fire hazard.

Vinyl flexible dryer vent isn’t an approved dryer vent material. To reduce energy cost and improve safety, replace vinyl flex duct with metal flexible dryer vent.



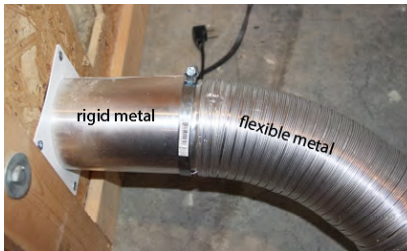
**Lint collection:** After years of operation, lint coats flexible pipe and eventually blocks the airway.

## Service Procedures

As part of the client education process, recommend servicing clothes dryers to prevent fires, reduce drying time, save energy and reduce lint build-up. Unless the clients are capable, a service professional may be required to adequately clean lint from a dryer and vent.

Observe the following suggestions when servicing clothes dryers to prevent fires, reduce drying time, improve energy efficiency, and reduce lint build-up.

- ✓ Unplug the clothes dryer before making any improvements.
- ✓ Remove the vent pipe and vent termination and clean all lint out of them.
- ✓ Clean lint out of the electric heating elements and the airway around them.



**Vent and termination:** Use rigid metal vent pipe if at all possible. Or use flexible metal vent and not foil vent when flexibility is required.



Termination fitting with backdraft damper

## Dryer Exhaust Venting Requirements

Follow these venting requirements for clothes dryers when servicing dryers.

- ✓ Clean lint from the dryer and vent system when making modifications or improvements to the dryer vent system.
- ✓ Pipe dryer vents with 4-inch-diameter rigid aluminum or galvanized pipe whenever and wherever possible.

- ✓ Don't use screws or rivets to join rigid pipe sections because they collect lint. Join and seal the sections with pipe clamps or UL 181B tape.
- ✓ Exhaust venting duct must be supported at a maximum of 4-foot intervals.
- ✓ Use short, stretched pieces of flexible metal dryer vent, labeled UL 2158A, to connect the dryer to the rigid vent through difficult framing or to allow dryer to be moved in and out. Make connections using rigid fittings installed male-to-female in the direction of exhaust flow to prevent lint build-up.
- ✓ Fasten UL listed foil-type vent or semi-rigid sheet metal to rigid metal with clamps.
- ✓ Fasten other specialized duct fittings according to manufacturer's specifications.
- ✓ Seal duct connection with foil tape labeled UL 181B or 181B-M.
- ✓ Install a booster fan for dryer ducts exceeding 35 feet in duct equivalent length. When calculating duct length, add 5 feet for each 90° bend and 2.5 feet for each 45° bend.
- ✓ Provide make-up air if you measure excessive depressurization or if the dryer moves 200 CFM or more of airflow.



**Dryer vent types:** Clothes dryer energy-efficiency depends on the type of vent material and the equivalent length of the vent.

## 10.6 WATER-HEATING ENERGY SAVINGS

For safety information on combustion water heaters, see “Spillage and CO Testing” on page 285.

The most important tasks in evaluating hot water energy savings are determining the water heater’s insulation level, measuring the shower’s flow rate, and measuring the water temperature.

**Table 10-5: Water Heating Consumption According to Family Size**

<b>Number of Residents</b>	<b>Annual kWh</b>	<b>Annual Therms</b>	<b>Gallons Per Day</b>
<b>1</b>	2700	180	25
<b>2</b>	3500	230	40
<b>3</b>	4900	320	50
<b>4</b>	5400	350	65
<b>5</b>	6300	410	75
<b>6</b>	7000	750	85

Author’s interpretation of data from single-family homes with existing water heaters from Energy Information Administration, Lawrence Berkeley Laboratory, *Home Energy Magazine*, and others.

## 10.6.1 Water-Saving Shower Heads and Faucet Aerators

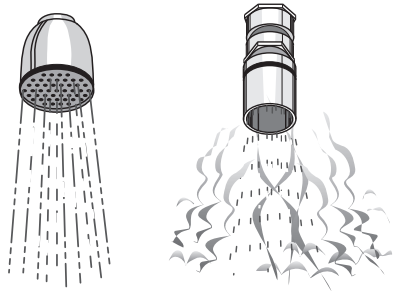
### *SWS Detail: 7.0201.1 Low-Flow Devices*

Most families use more hot water in the shower than for any other use. A low-flow shower head reduces this consumption.

- ✓ Water-saving shower heads must be rated for a flow of 2.5 gallons per minute or less.
- ✓ Water-saving aerators must be rated for a flow of 2.2 gallons per minute or less.

- ✓ Use caution in removing the existing shower head or aerator from old, fragile plumbing fixtures.
- ✓ The shower or faucet flow rate must be satisfactory to the occupants and be documented.
- ✓ Select features that meet any special needs of the occupant: swivel head, hand-held shower, for example.
- ✓ Evaluate water quality for debris that may clog the shower head or aerator.
- ✓ Use a non-hardening thread sealant when installing the device.
- ✓ Check the fixtures after installation for adequate tightness to prevent leakage at the connection.
- ✓ Recycle replaced shower heads and aerators.

**Water-saving shower heads:** Two styles of water-saving shower heads give consumers a choice between steamy showers and less steamy ones.



## Measuring Shower or Faucet Flow Rate

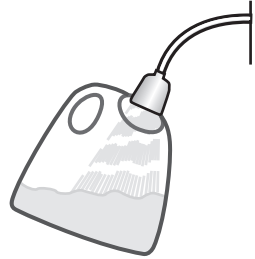
You can determine flow rate by measuring the time needed to fill a one-gallon plastic container. If the one-gallon container fills in less than 20 seconds, your flow rate is more than 3 gallons per minute.

1. Start the shower and set it to the maximum showering rate.
2. Start a stopwatch at the same time you move the container underneath the shower, capturing its entire flow.

- Record the number of seconds and divide 60 by that number to find gallons per minute.

**Measuring shower flow rate:** If you divide 60 by the number of seconds needed to fill a gallon container, you can calculate flow in gallons per minute.

$$60 \text{ sec} \div \frac{1 \text{ gal}}{15 \text{ sec}} = 4 \frac{\text{gal}}{\text{min}}$$



## 10.6.2 Water Heater Blankets

### *SWS Detail: 7.0301.2 Tank Insulation*

Install an R-11 insulation blanket on all water heaters **unless the manufacturer's label prohibits it**. Follow these guidelines to avoid fire hazards and to simplify future service.

#### Gas Water Heaters

When you install insulation on gas water heaters, use these specifications.

- ✓ Keep insulation at least 2 inches away from the gas valve and the burner access panel. Don't install insulation below the burner access panel.
- ✓ Don't cover the pressure relief valve or discharge line with insulation.
- ✓ Don't insulate the tops of gas-fired water heaters because the insulation can obstruct the draft diverter.
- ✓ Don't insulate Flammable Vapor Ignition Resistant (FVIR) water heaters. The blanket may shift and unintentionally cover the combustion air openings.