

PRODUCT KNOWLEDGE TRAINING

Learn the common features and uses of each product.

PK DESCRIPTIONS

1. Incandescent Bulb



• Produces light by passing current through a thin coil of wire called a filament. As the wire heats, it

becomes white hot and emits visible light.

Vacuum filled. When the filament vaporizes, the bulb “burns out.”

- Use for general and task lighting around the house.
- Wattage indicates the amount of electric power used by a bulb to produce light. Generally, the greater the wattage, the greater the light output. Some bulbs produce more light per watt than others.
- Standard household bulbs have an average life of 750 to 1,000 hours.
- Long-life bulbs may last longer than ordinary bulbs, because they have heavier filaments that do not burn out as quickly. However, these bulbs do not produce as much light as standard bulbs.

2. Halogen Bulb

• Produce light by passing current through a coiled tungsten wire. The tungsten wire is enclosed in a small quartz or high-tempera-

ture glass tube, which is then filled with gases, including a halogen gas.

• The advantages of tungsten halogen bulbs compared with standard incandescent bulbs include less loss of light over lamp life; smaller physical size for better directional light control; whiter, brighter light; more light per watt; and longer life.

- Like incandescent bulbs, halogen lights have the advantage of instant-on light. They are easy to use with dimmers for energy savings.
- Typical halogen lamps last 2,000 to 4,000 hours. Wattage levels for home use run from 5 watts to 500 watts.
- More energy-efficient than standard incandescent bulbs. They generate up to 30 percent more light for the same electricity.
- Advise customers not to touch the glass on halogen bulbs.

3. Fluorescent Bulb

• Current flows through an atmosphere of inert gas and mercury vapour, producing ultraviolet energy that is invisible to the human eye. A phosphor coating on the inside of the tube transforms the ultraviolet energy into visible light.



• Fluorescent bulbs can vary from straight tubes 6" to 96"

long to U-shaped tubes and circular tubes. Wattages for home use range from 4 to 75 watts.

- Tubes also come in a variety of diameters. The most common tube is the 1-1/2" used in most bulbs from 15" to 96" long.
- Features include a long lamp life, relatively low brightness and low heat content and glare, compared with incandescent lamps.
- Available in many shades of white and colours. Soft white fluorescent bulbs are recommended for living areas, baths and kitchens since they offer good colour rendering. Warm white bulbs are good for living areas, although not in areas where colour discrimination is important. Cool white bulbs are used for work areas.
- Use a ballast. Dim only with special equipment that is relatively expensive. Standard household fluorescents are also sensitive to temperature, and therefore work best indoors.
- Ballasts have sound ratings—“A” is the quietest; “C” is the loudest. If a customer is complaining about the noise made by a fluorescent bulb, suggest replacing the ballast.
- Electrical connections to the bulbs are made

to the bases at each end. The most common is the two-pin base, designated miniature bi-pin for small diameter bulbs, medium bi-pin for average size bulbs and the mogul bi-pin for industrial bulbs. Single-pin bases are used for instant start bulbs, and recessed double contact bases are used on rapid-start bulbs longer than 48".

4. Compact Fluorescent Bulb

- Compact fluorescent bulbs offer different style and performance from standard fluorescent bulbs. Their colour nearly equals that of Soft White incandescents, and they offer superior energy efficiency and long life.
- Cannot be dimmed. Their life will be maximized if they are used in locations where a light stays on for hours at a time.
- Types include twist-shaped and stick-shaped, which can replace incandescent bulbs in most applications.
- When choosing a compact fluorescent bulb to replace an incandescent bulb, compare the lumen output of the two bulbs. For maximum energy efficiency, select a bulb with the highest lumens and lowest wattage combination. For example, replace a 100-watt incandes-



NOTE: ALWAYS CONSULT YOUR PROVINCIAL AND LOCAL CODES



cent household lamp that produces 1600 lumens with a 25-watt compact fluorescent lamp that also produces 1600 lumens.

5. High Intensity Discharge Bulb

• Produces light when current flows through a conducting gas. Uses ballasts to start the bulb and to control its operation. Unlike fluorescent,



most of the light comes from the arc itself rather than through the work

of the phosphor.

- Used primarily for area and security lighting. They feature a lifespan of 20,000 to 24,000 hours. They come in a variety of shapes and in medium and mogul bases.
- One type is the **mercury vapour lamp**. These are used for exterior area and security lighting, such as dusk-to-dawn residential lighting. Mercury vapour lamps provide twice the light output per watt as incandescent lamps. Along with the higher output, they also have a longer lamp life, in some cases up to 30 times as long. They are also more expensive than incandescent or fluorescent. Mercury vapour bulbs produce a bluish white colour.
- **Self-ballasted mercury lamps** can be used with a ballast in incandescent fixtures and are available for 120V systems in the lower

wattages (up to 250 watts) and for 240V systems in both lower and higher wattages.

These lamps deliver slightly more light output per watt as the incandescent lamps but have the long life of mercury lamps.

- **Metal halide lamps** feature medium efficiency, with 50 to 110 lumens per watt. They provide good colour characteristics (similar to cool white fluorescent lamps) along with higher light output.
- **High-pressure sodium lamps** provide even higher light output per watt than metal halide (50 to 150 lumens per watt), with a golden yellow light. Residential applications include security and landscape lighting.
- **Low-pressure sodium bulbs** feature the highest efficiency, with 100 to 180 lumens per watt. They produce an orange light.
- When replacing HID bulbs, you must replace it with exactly the same type of bulb.

OTHER TRAINING TIPS

Designed to give you confidence on the salesfloor!

This section is for retail skills training specific to this core product category.

Classes of Light Bulbs

Bulbs come in a variety of shapes, sizes and designs, each with a different purpose. Bulb

shapes have letter codes that correspond to a general guideline. For example, “C” refers to cone-shaped bulbs and “T” to tubular bulbs.

- **Type A.** General service bulb used for lower-wattage bulbs from about 15 watts to 200 watts. This type is normally used for home lighting.
- **Vibration Service.** Used on machinery or where continuous vibration could cause early failure of the filament. These bulbs have lower lighting efficiency.
- **Rough Service.** Can withstand shocks and bumps. The relatively long filament is securely mounted with many supports, but has a lower efficiency than general and vibration service bulbs. They are used in workshops and garages and with trouble lights.
- **Appliance Bulbs.** For ovens, refrigerators, freezers, microwave ovens and range hoods.
- **Special Coated Bulbs.** Covered with a Teflon™ or silicon protective material to prevent shattering and to resist breakage upon contact with water. They are recommended for use in trouble lights and outdoor fixtures.
- **Decorative Bulbs.** Have clear or coated flame-shaped glass, smooth B-type glass, C-line glass with bent tip bulbs and globe-shaped bulbs are useful in chandeliers and wall bracket fixtures where fashion is

important.

- **Reflector® Bulbs.** Usually made of “soft” glass for indoor service as a directional light source with a built-in reflector. These are available as spot or floodlights.
- **Projector (PAR) Bulbs.** Made of hard heat-resistant glass moulded into a reflector and lens that are sealed together. Most are weather-resistant.
- **Elliptical Reflector Bulbs.** Shaped differently than the parabolic reflector bulbs, bringing light to a focus a couple of inches in front of the bulb. Less light is wasted in deep-baffle fixtures, and glare is reduced in downlight fixtures.

Light Bulb Bases

- **Candelabra.** Screw base used for specialty chandeliers and decorative lighting. It is the smallest base for 120V lamps.
- **Intermediate.** Screw base with applications similar to the candelabra bulb.
- **Medium.** Screw base, standard on most general-service bulbs of 300 watts and under. It has a high degree of interchangeability in bulb applications.
- **Mogul bases.** Used for larger, heavy-duty bulbs rated at 300 watts and higher.
- **Skirted Screw Base.** Used on bulbs where the neck is too large to fit into the desired size base or where additional space between filament and bulb terminals is desired.

NOTE: ALWAYS CONSULT YOUR PROVINCIAL AND LOCAL CODES



• **Three-contact bases.** Used for three-way bulbs that contain two separate filaments in one bulb. They are similar to other screw bases, but use an extra ring contact to light wattage filaments separately or in combination for three light levels.

• **Bayonet bases.** Used on specialty lamps such as vacuum cleaners, sewing machines and low-voltage bulbs. It provides a more secure contact by using two small protruding pins on the sides of the base that fit into slots in the socket.

• **Medium Bi-Post Base.** Used for higher-current bulbs.

FAQs

Q: What is the difference between a floodlight and a spotlight?

A: The floodlight will have a broader light pattern, while a spotlight will focus on a more narrow area.

Q: What's making the tubes in my fluorescent light flicker?

A: Wiggle the tubes to make sure they are properly seated. Replace any tubes that are dark or have damaged pins. Replace the starter if there is one.

Q: Do 4-foot fluorescent fixtures come in dif-

ferent wattages?

A: Yes, the most common are 25-, 34- and 40-watt bulbs.

Q: What is the advantage of a halogen bulb?

A: It provides brighter, cleaner light. However, it consumes lots of electricity and gets very hot. You should ensure that it stays away from draperies, bedding, clothing and hanging plants.

Q: Do I need to buy a special bulb for my garage door opener?

A: It's best to use a rough service bulb.

Q: The tubes in my fluorescent light are gray-ing near the ends. Does this mean they are wearing out?

A: Working tubes usually have a gray tinge on the ends, but dark gray or black is a sign that the tube is failing.

Q: My fluorescent fixture does not seem to be putting out as much light as it used to. Could the tube be failing?

A: If the entire tube is dim, it may simply need washing. Try removing it and wiping it with a damp cloth.

Q: How much energy do compact fluorescent

light bulbs save?

A: Most estimates are 70 percent, which means that over the life of the bulb you can save as much as \$100.

Upselling

• The main objection to fluorescents in the past has been their unflattering colour. New, colour-connected tubes overcome this drawback with recent developments in phosphor technology. Premium types use rare-earth phosphors to offer superior colour that blends beautifully with incandescents.

• Encourage customers to consider compact fluorescent bulbs. They last longer and will save them money on their energy bill.

Add-On Sales

- Timers
- Lighting Fixtures
- Photoelectric Cell
- Dimmer Switch
- Fluorescent Starters
- Ballast

Usage Tips

• Incandescent bulbs turn black as they near the end of their lifetimes. Customers should consider replacing darkened bulbs, as they use the same amount of electricity to produce

less light.

• To save energy, customers can do the following to economize on the lighting portion of a electricity bill: use dimmers, Use photoelectric cells or timers to turn off outdoor lights automatically, use reflector bulbs for task and accent lighting, use energy saving fluorescents where practical.

Additional Resources

• CSA International (CSA) and Underwriters' Laboratory (UL) are recognized, approved independent product certification testing authorities. Manufacturers submit products to CSA and/or UL for evaluation as to meeting the requirements of a standard—typically a CSA or ANSI standard testing. "Listed" by CSA or UL and marked "CSA or UL" means that the merchandise meets minimum safety standards and is suitable and safe if used for the purpose for which it was intended by the manufacturer.

• CSA (Canadian Standards Association)—an independent, "hands off" division of CSA International—and ANSI (American National Standards Institute) are non-profit organizations that coordinate the voluntary development of Canadian and U.S. national consensus standards. Such consensus-based standards—developed by a "balanced" com-

NOTE: ALWAYS CONSULT YOUR PROVINCIAL AND LOCAL CODES



mittee of general interest, producers, regulators and users—are used voluntarily becoming mandatory only when adopted by government laws and regulations.

- CSC—Canadian Electrical Code is based on safe and functional wiring methods. The code is updated at least every five years and provides a framework for electrical codes in Canada. Provinces have adopted this code and some have also superimposed a number of more restrictive or additional requirements. Be sure that you consult with your provincial and/or local governments to determine the requirements in force in your area.

Merchandising

- Light bulbs are the most highly promoted items in the entire electrical department. Display them immediately off of the power aisle. They are also good impulse purchases.
- Arrange bulbs so well recognized name brands are next to other brands so customers can shop and compare.



NOTE: ALWAYS CONSULT YOUR PROVINCIAL AND LOCAL CODES

CANADIAN IMPERIAL AND METRIC MEASUREMENTS

Canadians generally use a mixture of measurement units.

Liquid volumes are typically based on the metric (SI) system. Temperatures and distances are commonly specified using metric terminology. Weights, depending on the type of product, use either the metric or Canadian Imperial system. Lengths and dimensions of construction products, particularly for residential use, are generally in Canadian Imperial measurements. And many of the products we use are manufactured in U.S. measurements.

Canadian building codes are written using metric units. But the construction trades, particularly those in residential construction, typically use the Canadian Imperial system.

This mixture of measurement systems frequently results in many product manufacturers providing information using both systems. Unfortunately, the approaches used in presenting the "converted" measurements are not consistent. Some information is based on "exact" conversion measurements, whereas other information is based on "rounded" measurements.

From your perspective and in communicating with your customer, it is important to

recognize that in some instances the exact conversion is necessary and in other

instances a more "rounded" conversion is appropriate.

CONVERSION FACTORS

1 inch (in.)	=	25.4 mm	32 fluid ounces - US (oz.)	=	1 US qt.
1 foot (ft.)	=	0.3048 m	40 fluid ounces - Canadian (oz.)	=	1 Canadian qt.
1 yard (yd.)	=	0.9144 m			
1 mile (mi.)	=	1.609 km	1 fluid ounce - US (oz.)	=	29.6 mL
			1 fluid ounce - Canadian (oz.)	=	22.8 mL
1 ounce - avoirdupois (oz.)	=	28.35 g	1 cup - US (cup)	=	236mL
1 pound - avoirdupois (lb.)	=	0.454 kg	1 cup - Canadian (cup)	=	227mL
			1 quart - US (qt)	=	0.946 L
1 pound per square inch (psi)	=	6.895 kN/m ²	1 quart - Canadian (qt)	=	1.136 L
1 pound per square foot (psf)	=	0.04788 kPa	1 gallon - US (gal.)	=	3.785 L
			1 gallon - Canadian (gal.)	=	4.546 L

$$\text{Celsius temperature} = (\text{Fahrenheit temperature} - 32) / 1.8$$

SOME TYPICAL MEASUREMENTS FOR HARDWARE AND FASTENER PRODUCTS

("rounded" conversions)

Length		Length		Length		Length		Weight	
in.	mm	in.	mm	in.	m	ft.	m	lbs	kg
1/32	0.8	1 3/8	35	48	1.2	7.5	2.3	1	0.45
1/8	3.2	1 1/2	38	60	1.5	10	3.0	10	4.5
1/4	6.4	2	51	72	1.8	12	3.7	50	22.7
3/8	9.5	4	102	84	2.1	18	5.5	100	45.4
1/2	12.7	12	305	90	2.3	25	7.6	750	340
5/8	15.9	18	457	120	3.0	50	15.2	1250	567
3/4	19.1	24	610	156	4.0	75	22.9	1900	862
7/8	22.2	30	762	216	5.5	100	30.5	2650	1202
1	25.4	36	914	312	7.9			5000	2268

NOTE: ALWAYS CONSULT YOUR PROVINCIAL AND LOCAL CODES