

## Choosing the Correct Heating Element

When choosing the correct replacement element, three factors must be considered:

1. Element Flange Style (Screw-In, Flat, etc...) 2. Voltage/wattage 3. Watt-density

### 1. Element Flange Style

Water heater elements are offered in several styles. Since the development of the modern water heater, manufacturers have used various methods of installing elements in their water heaters. There are still many of these older units in operation today that have the older style elements. The most common are the Universal Flange, Flat Flange and the Round Head style. The Universal and the Flat Flange elements are bolted to the tank with four 3/8" bolts. The Round Head element is secured to the tank with a separate 4-bolt flange.

**Note: The Universal Adapter Kit (Camco #07223) will adapt a screw-in style element to a bolt-in style element that can replace the above elements.**

Today, all manufacturers of residential water heaters use only Screw-in style elements. This style provides for easy installation and serviceability because it screws into a spud welded directly on the tank of the water heater. The thread is a 1" (diameter) x 11-1/2 NPSM thread and is standard for all residential water heaters that use screw-in elements.



**EXCEPTION: For a period of time, State Industries manufactured a Duron brand heater that used a 1-3/8" thread. These elements are not interchangeable with the standard 1" threaded element.**

### 2. Voltages and Wattages

The majority of residential style water heaters use 240v power. The 120v elements are primarily used for smaller water heaters, point-of-use heaters and in locations where a 240v circuit is not available.

The wattage rating, which determines the heat output, of the 240v elements can be anywhere from 1000 watts to 6000 watts. The wattage rating of 120v elements is 1000 watts to 2500 watts.

Each model water heater is designed for a specific voltage/wattage rated element. **The replacement element must be the same voltage and wattage as the element being replaced. Never exceed the nameplate rating on the water heater.**

### 3. Watt-Density

Another significant difference that should be noted when choosing a replacement element is the watt-density construction. Whether the element is 120v or 240v, screw-in or bolt-in, there are three watt-density ratings available. The watt-density of an element is basically the amount of heat concentrated on any point on the surface of the element.

The lower the watt-density, the greater the amount of element surface. The heat per square inch of the surface is reduced, but the total surface is increased so that the total heat of the element is the same for a particular wattage. Generally, a lower watt-density in an element would mean a longer expected life. The lower watt-density elements normally last longer in water with high lime content. It helps lower lime deposit build-up. The **fold-back feature** of most low watt-density and Lime Life elements is to keep the length short enough to fit all tanks.

#### **STANDARD: Regular High Watt-Density Element**

Most common; same as original equipment provided with most water heaters. It is the least expensive. Can be used in all replacement situations if the same wattage and voltage are used.

#### **BETTER: Low Watt Density Element**

Most are fold-back elements. Better suited for areas with problem water (hard water, lime, etc). The lower watt-density provides no loss of efficiency, yet reduces lime deposit build-up. Can be used to replace any high watt-density element if same wattage and voltage are used. Normally it is more expensive than high watt-density.

#### **PREMIUM: Lime Life Element**

Carries a limited 5 year warranty. Ultra low watt-density and special metal surface (premium grade nickel and stainless steel) reduce chances of lime build-up. Also resists dry-firing. Ideal for problem water areas and locations with intermittent water supply. Higher initial cost, but may last the life of the water heater.

## Element Flange Styles

### Screw-In Flange

Fits most GE, Rheem, Rudd, Richmond, Montgomery Ward, Sears/ Kenmore, State, Norge, Westinghouse, Reliance, Noland, A.O. Smith, Bradford White, GS Wood, Maytag, Whirlpool and Duro-Matic water heaters, some Mor-Flo, American and Craftmaster prior to 1991 and all water heaters manufactured after 1994.



### Universal Flange

Fits older Bradford-White, U.S. Water Heater, most D&R, Day and Night, Briggs, Jackson, Tennessee Tank and early models of State and A.O. Smith.



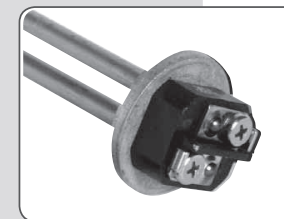
### Flat Flange

Fits most older Mor-Flo, American, Craftmaster, some older State, Reliance, Rheem, Rudd, Richmond, Montgomery Ward, Norge, Intertherm and Westinghouse models. Fits some Briggs, Bradford-White, U.S. Water Heater, Republic, Day and Night, Jackson, Tennessee Tank and Duro-Matic.



### Round Head Style

Fits July 1975 or older models of State, Reliance, Sears, J.C. Penney, Crane and some A.O. Smith. Camco no longer stocks this style. To replace this style, use a Screw-In Flange element with a Universal Adapter Kit (#07223).



## Element Removal

A long socket wrench is needed to remove and install the **Screw-in** style elements. The **Camco element wrench (#09943, 09951, 09883)** is designed specifically for the standard and the Duron screw-in elements.



## Element Conversion Kit

Use a standard screw-in element to replace a flat, universal or round flange element using the Element Conversion Kit.

This adapter kit is intended for use with a screw-in type element to replace water heater elements that look like figures 1, 2 or 3.

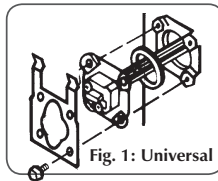


Fig. 1: Universal

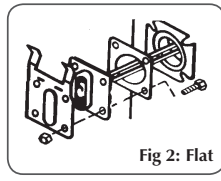


Fig 2: Flat

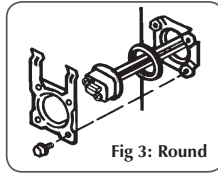
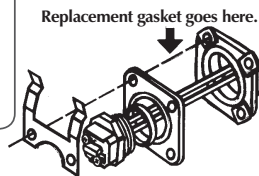


Fig 3: Round



### Directions:

1. Remove screws and discard old element and thermostat bracket.
2. Install screw-in element and gasket supplied with element into square adapter flange. Tighten firmly.
3. Install gasket (supplied with this kit) in element seat, being careful to ensure a good seat. See diagrams above to determine which gasket to use.
4. Install element with new thermostat bracket using old screws or new ones provided. Be careful that screws are not too long and bottom out against the tank.

## Dry-Fired Elements

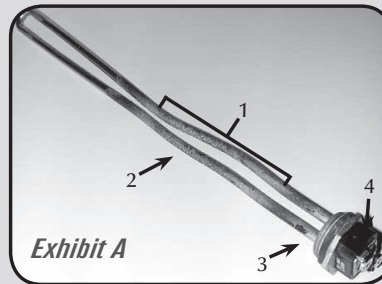
**Dry-fired means the element operated without being immersed in water.**

High watt-density and low watt-density elements are manufactured with a resistance coil wire imbedded in a magnesium oxide material covered by copper tubing. Water heater elements are designed to operate only in water. Dry-firing (applying power to an element with inadequate or no water in the tank) raises the internal and tubing temperatures on the copper element to cause melt-down of the sheath and failure of the internal heating resistance wire. The expected life of a dry-fired copper element is 30-45 seconds. In a dry tank the element temperature may reach 1900 to 2000° F.

**Lime Life elements are manufactured of premium grade nickel and stainless steel and will resist dry-firing.**

## Evidence of Dry-Firing

1. The element shaft is annealed so soft you can bend it with your fingers.
2. Shows evidence of melting.
3. Plastic terminal block melted, even slightly, indicates that you have positive proof that element was dry-fired.



An immersion element that has been dry-fired has been misused and therefore is not covered by any manufacturer's warranty.

**NOTE: A melted sheath can also be caused by an electrical storm, which is obviously not a defect in material or workmanship and is therefore not covered by warranty.**

We bring this to your attention with the hope that it will be of some value to you, as it might avoid the cost and effort of returning the elements.