



# LEDs and Dimmer Compatibility

Most dimmers currently installed in the US are designed to operate Incandescent and Halogen lamps. These types of dimmers utilize the fundamental characteristic of AC Power. AC stands for Alternating Current, which means that energy crisscrosses through each system as it operates. For typical line voltage (50-60 Hz) this will happen 50-60 times a second and produces no noticeable effect.

A dimmer decreases light output by shunting the power going to the light for a very brief period each cycle. The longer the break in the wave, the lower the visible light output. This saves energy, extends lamp life, and of course produces that dimming effect. As there are several unique categories of lamps, there must also be several different categories of dimmers. These must be updated along with their corresponding categories of lamps to achieve their best performance. These dimmers have been specifically designed to match with each group's internal components.

Halco LEDs are designed to operate with various dimmer technologies. However, it's important to remember that performance may vary based on your individual application. The information contained in this document is intended as a guide, based on limited testing in a controlled laboratory setting. The only way to verify that LED dimming performance meets your lighting needs is by testing in the application itself.

## Lighting Technology Details

Universal	Designed to be compatible with CFLs, LEDs, Incandescent and Halogen; these are newer and are gaining popularity due to their versatility
Incandescent/Halogen	Most residential dimmers will probably be of this style. It is important to note that while dimmable ProLED lamps are designed work with these dimmers, field testing is highly recommended as performance may vary greatly between applications. The Inrush Current equivalent of the LED must be taken into account when calculating the appropriate load placed on the dimmer as well.
CFL/LED	Both technologies require a different integrated component that carefully regulates the amount of amount of current supplied to the lamp. For CFLs, this component is called a Ballast and LEDs use a driver. In order for these to work, they initially must pull a much higher amount of power, called the Inrush Current, than its operating wattage. We use both of these values to calculate the number of lamps usable on a given dimmer.
Electronic Low Voltage (ELV)	Designed for ELV track lighting and under cabinet lighting, these do require a neutral wire for proper installation.
Magnetic Low Voltage (MLV)	Used primarily with recessed lighting, landscape and anything that uses a MLV Transformer. They tend to be larger and heavier due to the magnets they use.

## FAQs

### Is my dimmer compatible with these bulbs?

Without application specific testing, this is a difficult question to answer with certainty. While we at Halco strive to produce lamps that will be compatible with as many different dimmers as possible, we cannot assert that they will perform to the necessary standards in every dimming situation.

The lamps that we have tested may not work in your individual application or to the degree you are expecting. This is mainly due to the dimming installed base being designed for Incandescent bulbs and is unavoidable regardless of lamp or dimmer manufacturer. We recommend testing the dimmer out with a small sample size of bulbs before purchasing larger quantities to ensure the best results.

### Why do LEDs and CFLs not work perfectly with Incandescent Dimmers?

LEDs and CFLs require a driver and ballast respectively. These are necessary components that carefully regulate the amount of energy going into the lamp. Since Incandescent dimmers are not designed to properly interact with those components they can produce inconsistent results and can possibly damage the dimmer.

### How do I determine which style dimmer I have?

The dimmer packaging will state what type of bulbs it is designed to be used with (LED/ CFL, ELV, etc). It will also state the maximum amount of total watts it is able to dim. This is called it's Load. The type of bulb its designed for is called its load type.

### How many bulbs can I use with each dimmer?

We recommend checking with the dimmer manufacturer for the amount of bulbs each dimmer is rated for. This is normally found by dividing the bulb's wattage by the corresponding load. Keep in mind each installation is different with its own unique hurdles; length of wire between fixtures, overall length of the circuit, number of bulbs, and type of bulbs can all have an impact on performance.

**Manufacturers Note:** All configurations of lamps and dimmers cannot be tested and there are several factors in installation that can affect performance. As such the number of lamps in this guide is the calculated max load of lamps per dimmer only. While dimmable ProLEDs are designed to function with various dimmer technologies, performance will vary depending on number and assortment of lamps being used. Issues such as dead drop, lamp flickering, pop on, dead travel and reduction of dimming range are all common performance issues with LED dimming. The easiest way to reduce this risk is to install dimmers that are specifically designed for LEDs and to perform testing in the field.

