

Lighting for Walk-In Coolers and Freezers



Overview

Lighting is an essential component of any business. It's not just a utilitarian choice anymore, but one that can make the difference between feeling comfortable, focused, motivated, happy, or even energized.

Electricity usage accounts for a large percentage of its business expenses, therefore, the choice of lighting for a walk-in cooler or freezer is a decision that shouldn't be taken lightly - pun intended. Arctic offers lighting solutions to find the appropriate balance between adequate illumination for its walk-in coolers and freezers, while minimizing heat load on the refrigerated space and electricity usage for the business.

Light Bulb Characteristics

When talking about bulbs, we encounter terms like Lumens, Color Temperature, Watts, etc. While they may seem overwhelming and confusing, they are relatively simple, and they all play a big role in the characteristics and the efficiency of the lighting choice. Some of the most common specifications of light bulbs and fixtures are:

Watts (W)

Power consumption. The higher the wattage, the more power it consumes and the higher the electricity bill.

Color Temperature (K)

The appearance of the light put out. Measured in Kelvin degrees. The higher the number the bluer the light and the lower the redder. At high values (5,000K - 6,500K) you'll find bluish colors which are known as the cool side of the spectrum and at lower values (2,500K - 3,000K) you'll see yellowish tones which are known as the warm side of the spectrum. In between you'll find the Bright White part of the spectrum (~3,500K - 5,000K). This "cold" and "warm" description has nothing to do with actual temperature in the space, it is just a term to describe the type and color of light.

For commercial applications like walk-ins, work areas and kitchens the crisp white light color offered by the middle part of the spectrum (3,500K - 5,000K) is an ideal choice.

Lumens

A measurement of how bright a light is. The higher the lumens, the brighter the light. In the past, Watts was the way to account for brightness in bulbs, but Lumens is now the standard unit for specifying the brightness of a bulb or integrated lamp fixture.

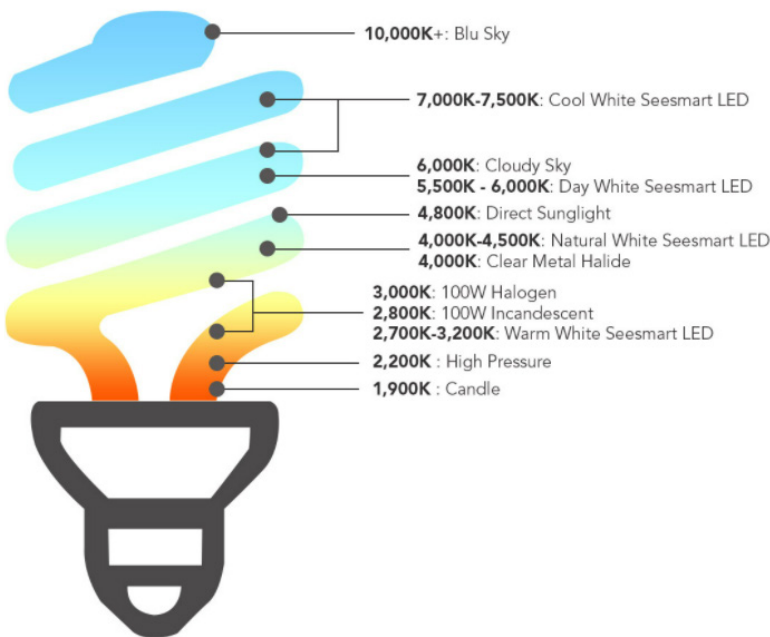
As a rule of thumb, commercial spaces and work areas like a walk-in cooler or freezer should be designed with 70-80 Lumens per square foot.

Color Rendering Index (CRI)

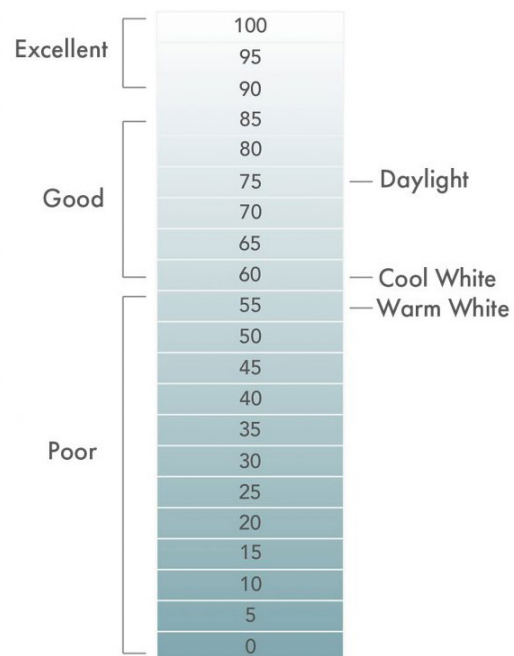
A measurement of how light will affect the appearance of color, as compared to a natural light source. The higher the CRI, the closer to "true" color you will have in that light.

Values over 65 are a good choice for commercial and work area applications like walk-ins, over 85 is ideal. Values less than 65 may result in colors looking yellow, washed out, and even changing the hue of objects. If your walk-in cooler has display windows for customer viewing of the walk-in contents, a CRI above 80 is recommended.

Color Temperature Scale



Color Rendering Index (CRI)



Common Types of Light Bulbs

Incandescent Bulbs

The original light bulb. The one that started it all and made light possible in our homes without the use of flames. These bulbs are simple technically speaking. The flow of electricity heats a metal filament (typically tungsten) until it glows. To prevent oxidation and prolong its life, the filament is housed in a glass bulb filled with an inert gas (commonly argon and nitrogen, but also sometimes krypton and xenon).

Incandescent light bulbs have several advantages for home use. They give off a warm light color, they are cheap, and they are dimmable. On the other hand, incandescent bulbs are hot, have a short lifespan and they are energy-inefficient, making them a bad choice for a walk-in cooler or freezer application.

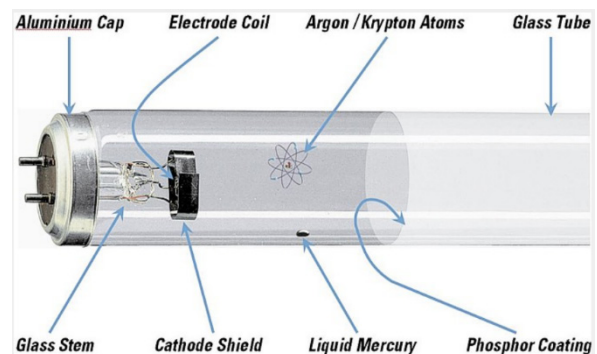
One 25W incandescent bulb will output about 85 BTUs/hr. inside a Walk-in cooler or freezer with an efficiency of only 10-17 Lumens per Watt.

Incandescent bulbs were quickly replaced by fluorescent bulbs in most commercial and work areas applications.



Fluorescent Bulb

Fluorescent light bulbs are common in commercial spaces. They don't have filaments like incandescent light bulbs. Instead, fluorescent bulbs consist of a glass tube that's coated on the inside with phosphor powder and filled with inert gas and small amounts of mercury. The flow of electricity through the tube ionizes the mercury, which emits ultraviolet (UV) light. The phosphor powder absorbs the UV light and in turn, emits visible white light.



The advantages of fluorescent lights include energy-efficiency and producing light on the white end of the color temperature spectrum—which is desirable in some environments. Fluorescent lamps are also long-

lasting, having a lifespan of about 7-10X that of incandescent bulbs. They are also available in many shapes including long tubes, U-shapes, and twisted lightbulbs.

Fluorescent light bulbs have some disadvantages. The light they emit can be harsh. They are typically not dimmable. They often take time to “warm up” after turning on, and they rely on the use of other components in the fixture ‘ballasts’ that are prone to wear or failure. Finally, they are not environmentally friendly as safe disposal is difficult because of their mercury content, which is harmful to humans and should not be released into the environment.

In walk-in coolers and freezers, fluorescent lights offer a huge step up from incandescent bulbs in energy efficiency, but they still produce nearly 9X the heat of an equivalent LED light.

LED Lights

In the last decade, LEDs became the new sheriff in town. LED stands for light-emitting diode. They are more complex in the way they work compared to incandescent or fluorescent lights, but a basic level, electricity flows through a semiconductor and produces light when it jumps across a nonconductive region.

LEDs have many advantages over their counterparts:

- They don’t require a filament to be heated, so they are very energy efficient.
- LEDs can produce the same lumens as an incandescent bulb at a fraction of the watts needed.
- LEDs (like incandescent) turn on instantly and don’t need time to warm up to reach full brightness.
- LEDs don’t contain mercury, so they are environmentally friendly and safe to use in walk-in coolers and freezers.
- Many LEDs are dimmable.
- They are long-lasting, with average lifespans of 25X the average life of an incandescent bulb and about 10X the life of fluorescents.



- They don't run the risk of failure in low temperatures and high humidity environments as other lighting types do.
- The LEDs in merchandising glass doors provide a brighter light than fluorescents to better illuminate products.
- Energy savings when retrofitting from fluorescent lights can be upwards to 85%.

LEDs are quickly replacing incandescent and fluorescent light applications as prices have drastically come down compared to when the technology was new, which was a drawback of LEDs at the time. Another caveat is the "shape" of LED light. Incandescent bulbs project light roughly spherically (in all directions), whereas LEDs emit light more directionally. This can be mitigated with lenses.



Take Away

LEDs have become the status quo of lighting for refrigeration applications due to the long list of benefits they offer and because they align with the energy efficiency goals of the walk-in cooler and freezer industry. Arctic offers LED lighting solutions for walk-ins from the traditional [walk-in door light fixture](#) that can use LED lightbulbs, to the upgraded [LED door light fixture](#), to the highly popular auxiliary [4 FT ceiling mount LED light fixture](#).

Visit Arctic's accessories site, mywalkinparts.com for all your lighting needs.

Fun Facts About Light

- Light travels in a vacuum at $\sim 3 \times 10^8$ m/sec. That is 186,282 miles per sec!!
- Light behaves both as a wave and particle.
- Light is the relatively narrow frequency band of electromagnetic waves.
- Light consists of packets of energy called photons.
- Light cannot escape the gravitational pull of a black hole.
- Light can be used to weigh stars.



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