



WHITE PAPER

Fluorescent Lamps and Striation

Stan Zajac

Advance
10275 W. Higgins Road
Rosemont, IL 60018

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Did You Know?

Fluorescent lamps can provide an energy efficient light source in many applications, however, under certain conditions, there can be an undesirable visual aspect, commonly known as striations. Striations are a series of bright and dim areas in a fluorescent lamp, sometimes moving down the length of the lamp and sometimes taking the appearance of a standing wave. Striations are determined by lamp physics.

Striations are common in lamps made with a heavy fill gases such as Krypton. This phenomenon is exacerbated when these lamps are operated at low temperatures. This can be due to a low overall ambient temperature or more localized air blowing across the lamp. Although it is much more common in energy saver lamps, it can also occur in full wattage lamps. While this condition is not desired, it is an aesthetic condition, and is not an indication that the ballast or lamp is not operating electrically correct. Striations should have no-long term effect on lamp performance or life.

Fluorescent lamp striations have been experienced ever since fluorescent lamps have been in existence. For better understanding of this condition and possible corrections, it is best to divide the applications into those with full wattage lamps and those with energy saving lamps. It is also important to understand that lamps are rated for use in certain temperature ranges. In general, full wattage lamps can be operated at much lower temperatures than energy saving lamps. Typically, energy saving lamps have a minimum temperature of 60°F, or in some cases even higher temperatures may be recommended. We recommend verification with the particular lamp manufacturer to insure proper application temperatures for the given fluorescent lamp type chosen.

Full Wattage Lamps - example F32T8 (32 watt)

With full wattage (non-energy saving) type of fluorescent lamps, striations, although less likely, can occur. When full wattage lamps exhibit striations, it usually is result of one or both of the following conditions.

1. Low lamp currents - If the lamps currents get too low (i.e. deep dim operations), striations can occur. In dimming ballasts, this is typically overcome by additional circuitry.
2. The light output of a fluorescent lamp is directly related to its bulb wall temperature and operating environment, particularly its ambient temperature.
 - a) Airflow across the lamp(s) - Many times airflow across a lamp will produce lamp striations. This is commonly experienced where the lamp(s) is in close proximity to an air vent. Typically, shielding or deflecting the flow of air to the lamp will rectify this condition.
 - b) Ambient Temperature - Fluorescent lamp output is directly proportional to its bulb wall temperature. Every lamp has its optimum temperature for maximum light output. If extreme cold ambient temperatures exist, the light levels will be visually less and lamp striations may occur. It may be possible to reduce or eliminate this condition by using lamp tube guards or utilizing a luminaire that retains more heat in the lamp compartment. Please contact the lamp manufacturer for information regarding the use of tube guards with their lamps.



Energy Saving Lamps - example F32T8 (30), (28), or (25) watt

With the recent introduction of many new energy saving fluorescent lamps in the market, especially Krypton containing energy saving versions of the F32T8, there is a possibility of more lamp striation occurrences. Energy Saving lamps are more temperature sensitive. Again, it is recommended to verify if the application of energy saving lamps is proper for the application with desired lamp manufacturer. Energy saving lamps, typically are not rated for use below 60°F, nor with dimming ballasts.

If striations are experienced with energy saving lamps, it is first recommended to verify if they are due to cool air blowing across the lamps or too low ambient temperatures as is covered in full wattage lamps above.

If ambient temperature conditions are in the proper range and the conditions mentioned above are not the cause, then the lamp striations could be attributed to lamp characteristics. When these energy saving T8 lamps are utilized with electronic ballasts, especially those with reduced light output this condition could occur. It is not an indication that the ballast is at fault, that the lamps will fail prematurely, or that the overall performance will suffer. It is a "cosmetic" effect, which may or may not be objectionable.

As ballast technology continues to expand, there are now available electronic ballasts that can reduce or eliminate lamp striations with energy saving F32T8 lamps. These ballasts with anti-striation technology such as Advance's IOP Optanium series of ballasts, can remedy lamp striations with energy saving T8 lamps. Lamp striations may occur with electronic ballasts without anti-striation technology with energy saving F32T8 lamps such as 30W, 28W, or 25W.

It is important to understand that ballasts with anti-striation circuitry cannot always remedy lamp striations in applications where airflow or colder temperatures are the cause. It is also important to remember that striations, although sometimes a visual nuisance, will have no lasting effect on lamp performance and life and typically will not influence light levels on the work plane of normal fluorescent lamp applications and are only typically perceivable when looking directly at the lamp.

