

# Flickering issue with 185 HV



Investigation Report  
R&D Illuxtron International  
August 2016

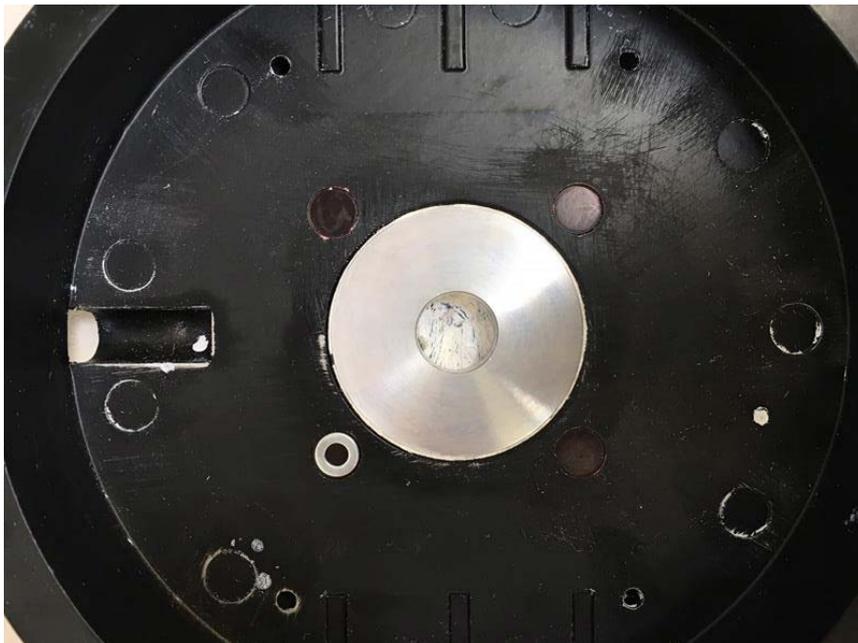
Lately, we have had a remarkably high incidence of reports on failure problems with 185HV-IC products in comparison to our generally low return rate of 0,2%. The message was always that the fixtures worked fine for a while and then started flickering intermittently.

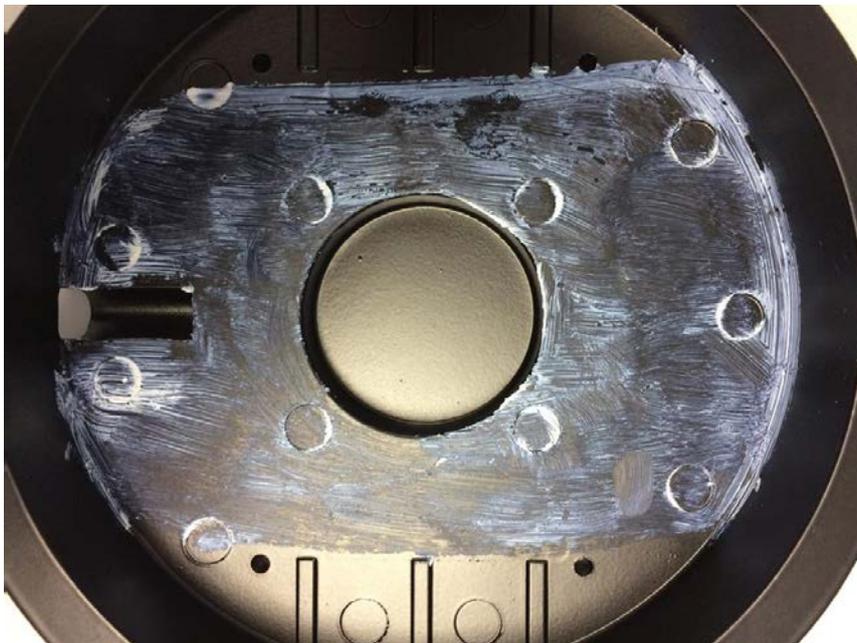
Below please find a number of facts, based on the reported defects we have investigated:

1. So far, the defect products have all come from orders dating back to 2013 and 2014
2. Date Code PCBs on these products are between 3413 and 4913, which means they all still have the previous design and a PCB board thickness of 0.6mm only.
3. Problems occurred in all variations: 1250/2000lm and 2700/3000/4000K.
4. Flickering began after an initial starting period of 1-1.5 hours. In some cases flickering occurred only for very short periods of time, but in all cases periodically.

There are now a number of PCBs and heat sinks which have been examined further. The following conclusions resulted:

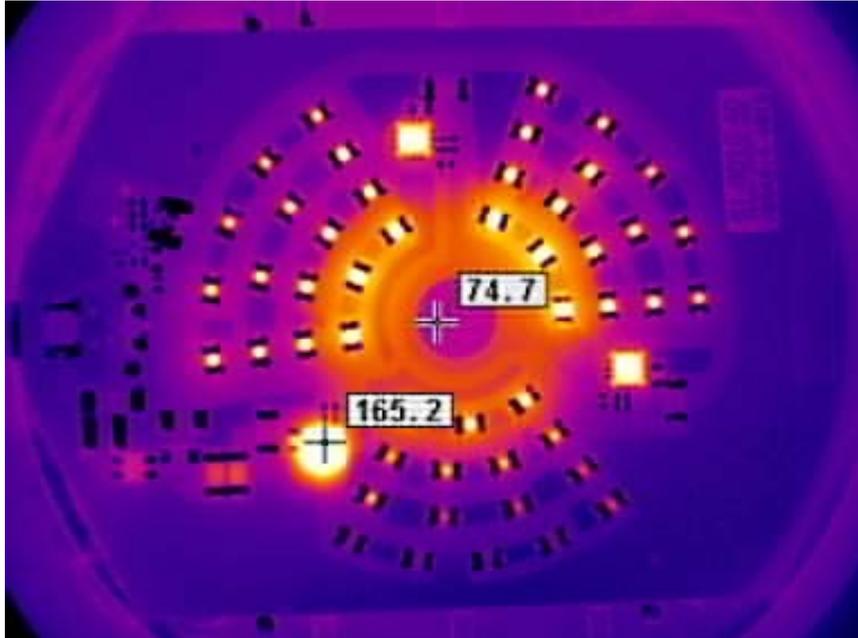
1. Temperature has been found to be a problem with the IC in the majority of cases.
2. It appears that one of the three IC's is located exactly above injection point of a heat sink, which has not always been sufficiently filled with heat past, resulting in less than optimal contact with the heat sink.





As a result, heat is increased enormously at that spot and comes up to the maximum temperature of 150 ° C that is allowed in the IC, causing it to go into overheat protection, resulting in light flashes.

In below picture you can see that at this point, the temperature has already risen to 165.2 ° C (measured with a Ta of 45°C). This also explains the image, which almost always shows only 1/3 of the LED's as flashing.

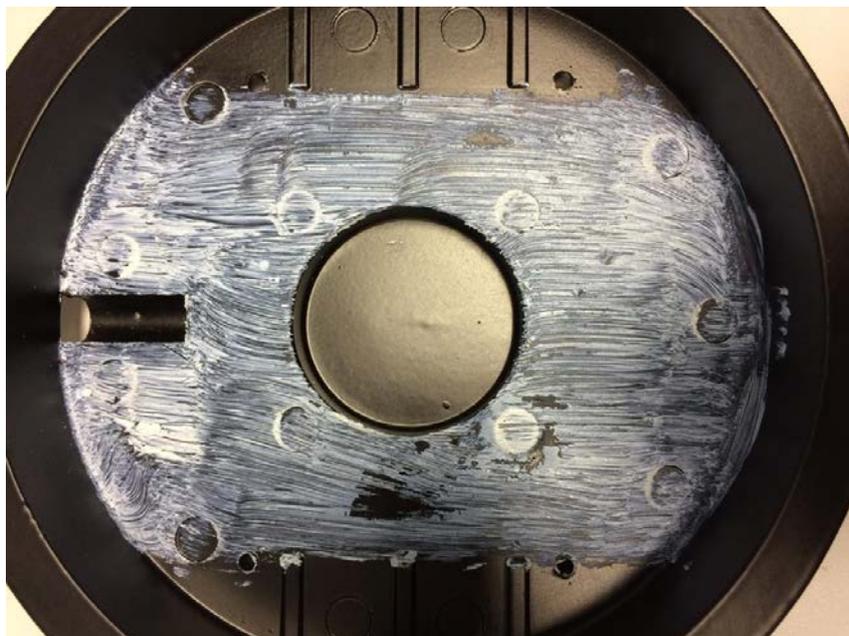


Moreover, an even higher ambient temperature in the summer may cause temperature to reach the critical threshold in the ICU. Aside from the fact that the IC will not function properly with too high a temperature, this is a negative influence on the lifespan and light colour of LEDs themselves.

3. We have evidence that heat paste used in this luminaire is subject to aging. As the paste dries out to a certain degree, adhesion will be reduced resulting in a decrease in thermal properties. This also explains why this problem occurs after a few years. In general our luminaires have been designed to stay well below critical temperatures.

4. Also, the IC is subject to a faster aging process when subjected to higher temperatures. Although it will function well for quite some time, eventually it will succumb at temperatures reaching 150°C.

5. Heat Paste has not consistently been used properly, in terms of location as well as in quantity.





**Known problems with our 185HV products:**

1. Higher incidence of broken PCBs
2. Higher incidence of defects caused by powersurges
3. Stroboscopic effect

**Improvements, which have significantly improved this product, were introduced early 2015 and include:**

1. The design of the PCB has been adjusted, so that the IC sits in a different spot, away from the injection point above a heat sink.
2. We now use a different heat paste, which has a different consistency as well as much higher adhesive strength, resulting in a more even spreading of the paste between PCB and heatsink when the fixture is screwed together.  
The amount of reduction of both elastic and thermal properties of the new paste is not yet known.

A dosing apparatus would be the ultimate solution, so that paste is always applied in the same amount and with optimal distribution resulting in superior consistency.

3. Thickness of the PCB has been changed to 1.0mm and breakage has not been reported since.
4. A plurality of resistors have been replaced by heavier version, whereby the fittings are more resistant to peak voltage (1200V of > 1400-1500V).
5. Also, the current IC is resistant to a higher peak voltage. A new IC Magna scores would score even better on this point. The possibilities to use these are being investigated currently.
6. The use of newer, better LEDs - 2000lm 38W to 20W 1250LM 25W to 13W has a strong positive effect on heat generation within the fixtures
7. Approximately 1-2% of people are sensitive to the stroboscopic effect which is associated with some types of lighting. For this problem, we developed a special AC-DC cable which can be retrofitted.

The first version AC-DC cable was not suitable for the 185HV 1250 / 2000lm version. A new AC-DC cable has been developed, which is suitable for the 1250LM and the 75HV 900lm. It even has an extra surge filter. Yet another advantage is that this cable is suitable for a group of luminaires (max. 140W) and thus does not need to be applied per fixture.

8. In addition to the AC-DC cable we also offer the Littelfuse surge filter. This product has been tested and will filter out surges between 1100 and 6000V. It is intended for projects where large surges in the power supply may be present coming from other equipment. In projects where these have been installed, no more incidents of defects have reported.

