

## CIE – Div 2

Reportership Div 2 – R2.30

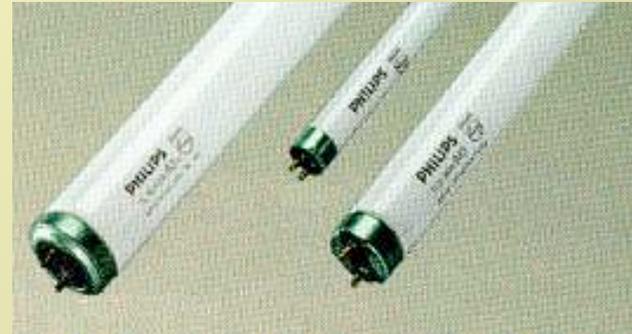
### *Specific photometric problems linked to TL5 fluorescent lamps*



**Guy Vandermeersch, ir  
Belgium**

### 3 diameters

- T12    38 mm Ø  
          20 à 65 W (140 W)
- T8      26 mm Ø  
          (15) 18 à 58 W
- T5      16 mm Ø (5/8 inch)  
          14 à 80 W



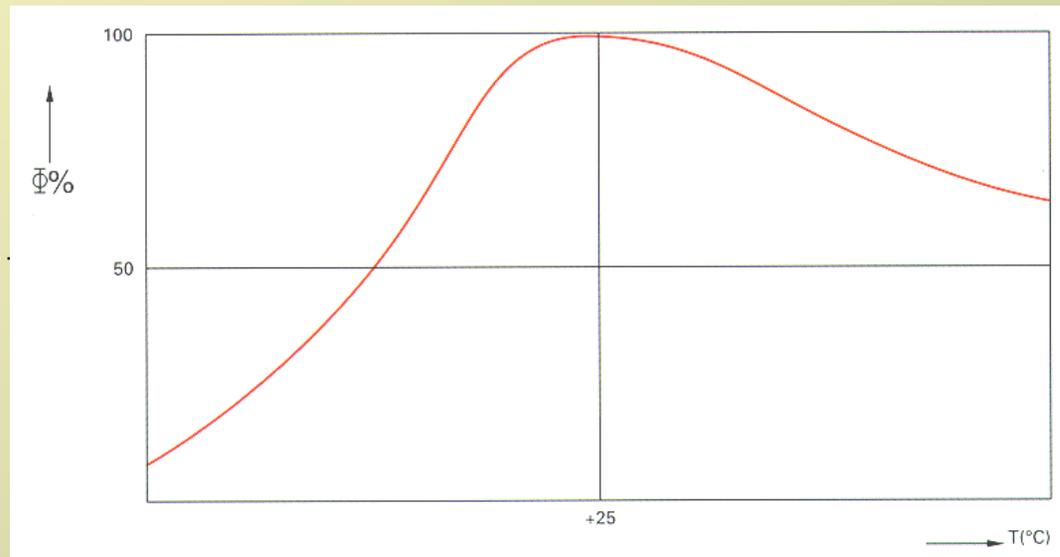
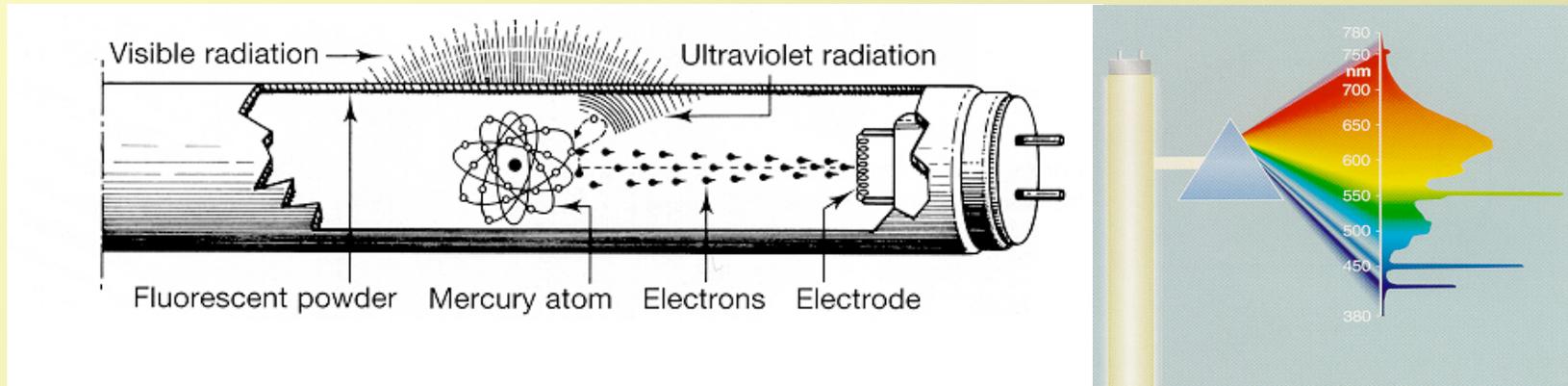
*TL5 Lamps are a new generation of fluorescent lamps which are designed to allow system miniaturisation and energy savings. They appeared on the market in 1995. They work only at High frequencies (electronic ballast).*

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# CIE – Div 2 : TL5 report

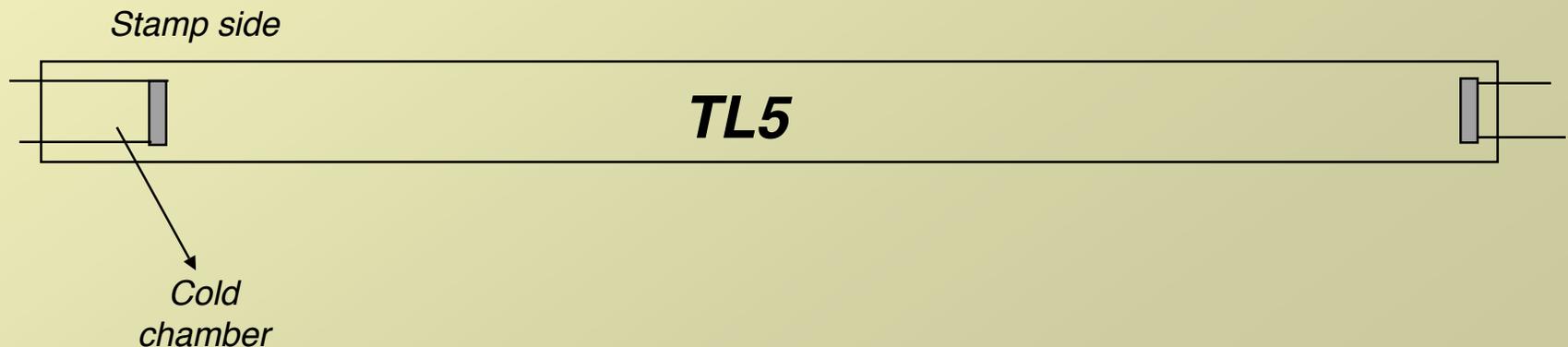
## R2-30 : Photometry of TL5

*Classical lamps T12 or T8 :*



### Working principle of TL5 :

- The lamp works on the low pressure mercury discharge principle and mercury is present in both liquid and vapour states.
- The luminous flux is determined by the mercury pressure which on its turn is dependent on the temperature of the coldest spot in the lamp.
- In case of TL5 lamps this cold spot is situated, by construction, behind the electrode at the stamp side, the so-called cold chamber



### Working principle of TL5 :

- *The lamp is designed to provide maximum lamp output at a temperature of 45°C in the cold chamber (= t of nearest lampcap)*
- *This is achieved at ambient temperature of 35° around the lamp in the luminaire or at 25°C ambient temperature of the room*
- *The excess of mercury is concentrated in the cold chamber*
- *If these optimal conditions vary and the equilibrium is affected the performances are degraded : the lamp behaviour is strongly temperature and by construction position dependent*

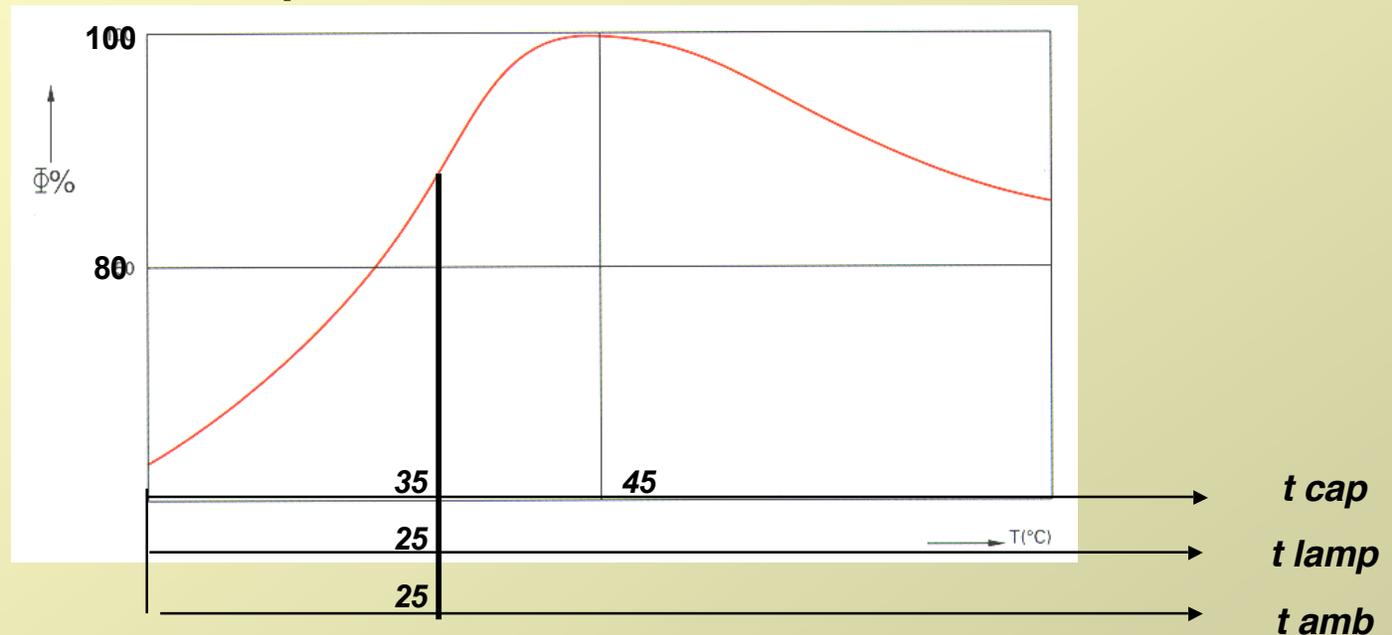


### Lamp measurement in luminaire at 25°C amb. outside luminaire



- The performance of the luminaire is optimal at 25° C amb
- The associate ballast must preheat the lamp at start but must me of the cut-off type (switch off of the preheating after a few sec), otherwise the additional power dissipation will shift the top

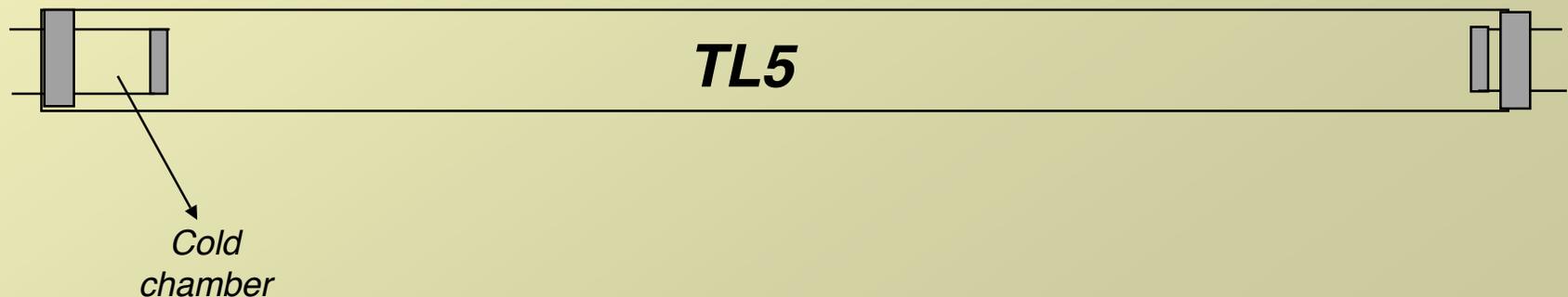
### Bare lamp measurement at 25°C



*Lamp flux is also dependent of prior history if cold spot was not at the cold chamber and liquid mercury not at this location*

*Manufacturers recommend for handling and measuring :*

- *Always handle the lamp as much as possible in vertical position with the stamp at the lowest position, to keep the liquid mercury in the cold spot*
- *Season the lamp for 100 h vertically, stamp down*
- *Season 4 hours again each time the lamp has been off for 12 h*
- *Transport the lamp in vertical position to the measuring system*
- *Gently put the lamp in the horizontal position but take care that the cold chamber stays at the lowest point*
- *Burn again the lamp for 1 hour before the measurements at 25°*



### Luminaire measurement at 25°C



- The photometry of the luminaire at the classical recommended temperature of 25°C is done with optimal lamp flux
- The LOR of the luminaire is increased by about 10% in comparison with same luminaire equipped with T8 lamps
- LOR may exceed 100 %

### *Photometry of a luminaire with two lamps*

*-Always have the two chambers at the same side to keep the temperature of the cold chambers at 45° C*



### **Conclusions :**

*TL 5 lamps are not easy lamps to measure.*

*Their high dependance to temperature and to position and prior history is not fully perceived by all photometric laboratories. Perhaps some laboratories are even not aware of the stamp signification.*

*Further study related to the reproducibility of flux behaviour verso temperature of production lamps in the zone 25-35°C seems also necessary.*

*IEC standards not yet implement the vertical seasoning with stamp down but the proposal is under consideration within IEC 34.*

***There is a need to update the chapter  
« Handling and measuring lamps » of CIE 121-1996  
« Photometry and goniophotometry of luminaires ».***

