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## References

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Battery operated fluorescent lamp ballasts are used in both portable and emergency lighting applications. However, a lack of relevant published data on fluorescent lamps often results in the development of sub optimum circuitry. This paper describes the load presented by a 9 W compact fluorescent lamp with a built in starter (PL-S9W<sup>Philips™</sup>). The lamp ignition and arc discharge characteristics are established. The electrode thermal delay, onset of transverse discharge and temperature characteristics are also presented. The glow starters are characterised in terms of minimum power requirement and dynamic resistance. Six lamps from three different manufacturers were used in the tests in order to illustrate performance variations.

## SUMMARY



S V Marais

# Compact fluorescent lamps - an electronic ballast's perspective

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Fluorescent lamp performance specifications relevant to high frequency or dc operation are usually scarce or non-existent. This hampers the ballast designer and is the primary reason for the large performance variations in both commercial and industrial battery powered ballasts. It is preferable to use compact fluorescent lamps with built in starters (Philips<sup>™</sup> PL-S prefix) for emergency lighting applications, to simplify the changeover wiring and because they are generally cheaper than the electronic versions (PL-E prefix). The use of PL-S type lamps, however, complicates ignition due to the load presented by the starter components. This paper provides performance characteristics of PL-S 9 W lamps and their starter components.

A total of six 9 W compact fluorescent lamps from three different manufacturers were tested. The

manufacturers were Philips, Osram and "No Name Brand". The latter were chosen in order to investigate whether any other characteristics would be distinguishable from reputable products besides lumen maintenance and/or colour rendering. The lamps were first aged for 100 hours to obtain more representative results<sup>(1)</sup>. All tests

were conducted with the lamps in a horizontal position. The total light output was measured by situating the lamp in an integrating sphere with an aperture to accommodate a cosine corrected illuminance meter. The absolute measurements of illuminance given here are thus of little value, but the relative results are of interest. Lamp tests were conducted without the starter components connected.

## DC Arc Discharge Performance

The dc performance of the lamp is similar to the performance at high frequency as there is no periodic arc extinction<sup>(2,3,4)</sup>. The aim was to determine the lamp negative resistance and to reveal performance variations between lamps. The output from a variable mains supply was full wave rectified and

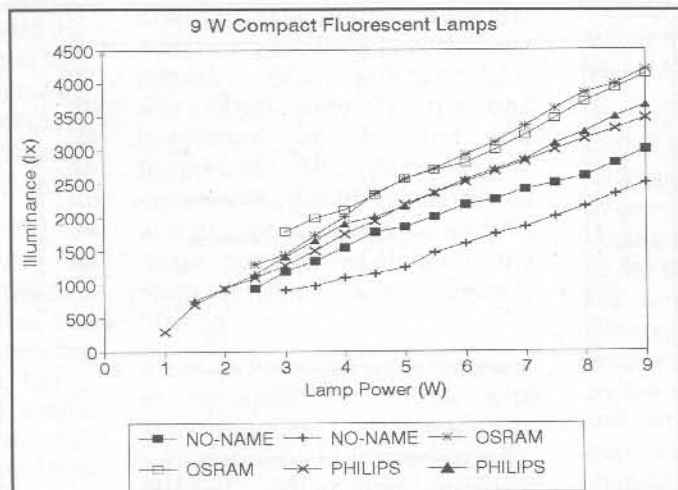


Fig 1: Comparison of luminous efficacy using dc lamp current.