vic roads

Testing Times

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Clear Rear Lamps

Lighting on vehicles has become a very complex issue. Once upon a time the requirements for lights were relatively simple – sometimes just a basic position and colour with a globe wattage specified. However, with the adoption of the UN/ECE Regulations in the Australian Design Rules (ADRs) and the ever changing appearance of lights (often just for style or fashion) it is now much harder to tell what meets the rules and what doesn't. New technologies such as gas discharge and LED systems also complicate the matter.

A recent trend has been to fit lamps that appear clear or un-coloured all over when not lit. Turn signals were the first in this trend with amber lens being replaced with clear lens and coloured (amber) globes being used. The next step for turn signals was amber globes with a silvered outer finish so that even the amber colour of the globe itself did not show in the reflector until the globe was lit. Also about this time "jewelled" lamp assemblies (often with clear outer lenses) became popular so that instead of just a dull red appearance for the tail and stop lights, the whole assembly sparkled and glittered when not lit.

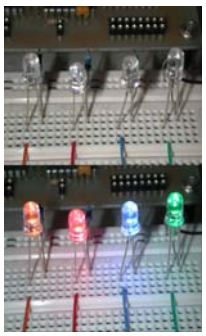
Now, not only do original equipment manufactuers (OEMs) have a wide variety of rear lamp assemblies available, but the aftermarket has got into the act too. There are now all sorts of OEM and aftermarket complying variations as can be seen.

But the one thing that is common to all the above assemblies is that those parts of the lamp assembly that are required to show red light have retained an inner red lens. This is because no OEM has yet managed to make a complying stop/taillight using a coloured filament globe similar to the amber turn signal lamp globe.

Enter the LED lamp systems. Not only do LEDs use much less power, they are resistant to vibration and are long lasting. For these reasons they quickly became very popular on heavy vehicles. They also have a much faster response time (claimed to be a safety advantage for stop lights) and are now being used to achieve stylish and cosmetic changes on light vehicles.

In this issue:

This is partially because high intensity LEDs which emit coloured light but are “water clear” when not lit have been developed as shown to the right. The correct colour can be generated and, unlike many rear lamp lenses, the colour does not deteriorate over time.



The illustration below shows two different versions of a BMW rear lamp assembly using LEDs for the stop light. Note that the tail light, which is not a LED system in both these versions, still retains a red lens cover.

The left hand version uses water clear high intensity red LEDs while the right hand version uses white LEDs and needs a red lens. These high intensity water clear LEDs have a narrow beam so a large number often along with individual reflectors (as can be seen above) are needed to meet the ADR light distribution requirements.

When water clear high intensity red LEDS are also used for the tail light, an even more striking appearance can be achieved with almost fully clear assemblies as shown below. The left hand assembly is for a Lexus and the right hand one for a BMW.

With LED based assemblies using clear lenses the only area that still requires a continuously visible colour is the red reflector as shown in the above three examples. Eventually someone may even figure out how to make a reflector that reflects red light but appears colourless in normal conditions.

Unfortunately some parts of the aftermarket industry are taking shortcuts to achieve this clear look by replacing the inner red lenses with a clear lens and inserting a red filament bulb.

The outer lens may even be the original clear OEM one complete with an “E” mark – a capital E inside a circle. As no OEM appears to have been able to produce a complying unit without a red inner lens, the “E” mark is almost certainly fraudulent.

The bottom line for testers looking at vehicles with aftermarket rear lamp assemblies is that:

- if it has to incorporate a reflector (some vehicles used red rear reflectors separate from the lamp assembly) it must appear red,
- if a filament globe is used for the stop and/or tail light they must have a red inner or outer lens – that is, clear lenses with red filament globes are not acceptable; and
- If LEDs are used:
  - the light distribution should be checked – stop lights must be visible from 45^{O} to both sides of the lamp and tail lights must be visible from 45^{O} towards the vehicle centreline and 80^{O} to the outside; and
  - the brightness of the stop and tail lights should be compared with typical OEM rear lamps including the difference in light output between the stop and tail lights.

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