

# Product Knowledge Document

## Blinker Lights

QUALITY



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# INTRODUCTION

The lighting system of a motor vehicle consists of lighting and signaling devices mounted or integrated to the front, rear, sides, and in some cases the top of a motor vehicle.

Blinker Lights are part of the automotive lighting system used for the signalling other drivers and pedestrians the direction of travel.



Turn signals—formally called "direction indicators" or "directional signals", and informally known as "directionals", "blinkers", "indicators" or "flashers"—are blinking lamps mounted near the left and right front and rear corners of a vehicle, and sometimes on the sides or on the side mirrors of a vehicle, activated by the driver on one side of the vehicle at a time to advertise intent to turn or change lanes towards that side

# HISTORY OF LIGHTING SYSTEM

- Night driving was uncommon at the earliest period of automobiles
- The earliest head lamps were introduced in the late 1880s, were fueled by acetylene gas.
- 1880 Carbide lamps
- 1898 1st electric head lamps on the Columbia Electric Car
- 1912 Electrical ignition and lighting system by Cadillac
- 1924 Bilux bulb (dipped and main light from one bulb)
- 1940 Sealed beam headlamp (US, GB, J)
- 1962 1st halogen head lamp (Europe)
- 1991 High intensity discharge system
- 2001 LED brake lights
- 2007 LEDs in front lighting

# HISTORY OF SIGNALING SYSTEM (DIRECTION INDICATORS)

- Directional changes were first signaled on a basis by rotating arrows, hand signals, and later by illustrated semaphores
- Until the early 1960s, most front turn signals worldwide emitted white light and most rear turn signals emitted red.
- The auto industry in the USA voluntarily adopted amber front-turn signals for most vehicles beginning in the 1963 model year
- Front turn signals were still legally permitted to emit white light until [FMVSS 108](#) took effect for the 1968 model year



# INDIAN STANDARDS FOR AUTOMOTIVE LIGHTINGS

The National Highway Safety Transportation Administration (NHTSA), an agency of the U.S. Department of Transportation (DOT), is responsible for regulating most automotive lighting. Headlamps and Taillamps must comply with the Federal Motor Vehicles Safety Standard ([FMVSS 108](#)). [Interpretations](#), as well as records of past interpretations, are available for public view at the NHTSA Legal Council.

IS: 1068-1993 for Copper, Nickel and Chromium Electrode deposited coating

# Light Sources

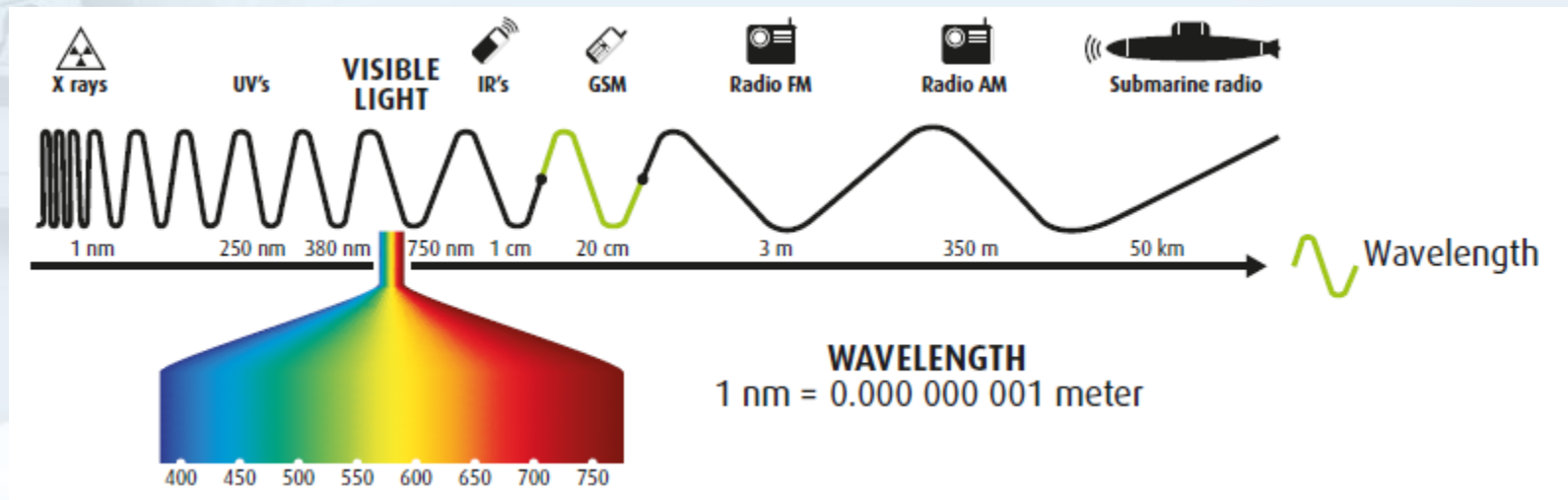
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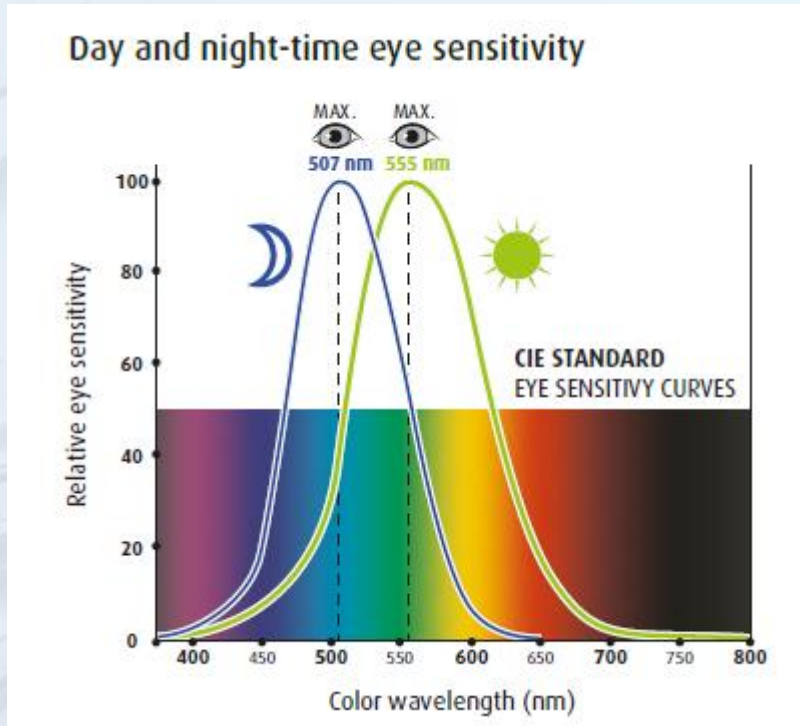


# What is Light?

- Light is one of the many electromagnetic radiations that surrounds us
- From X- Rays to submarine communication system all radiation sources are defined by wave length in meters
- Visible light is composed of a range of wavelengths from 380 nm (Blue Light) to 780 nm (red Light)



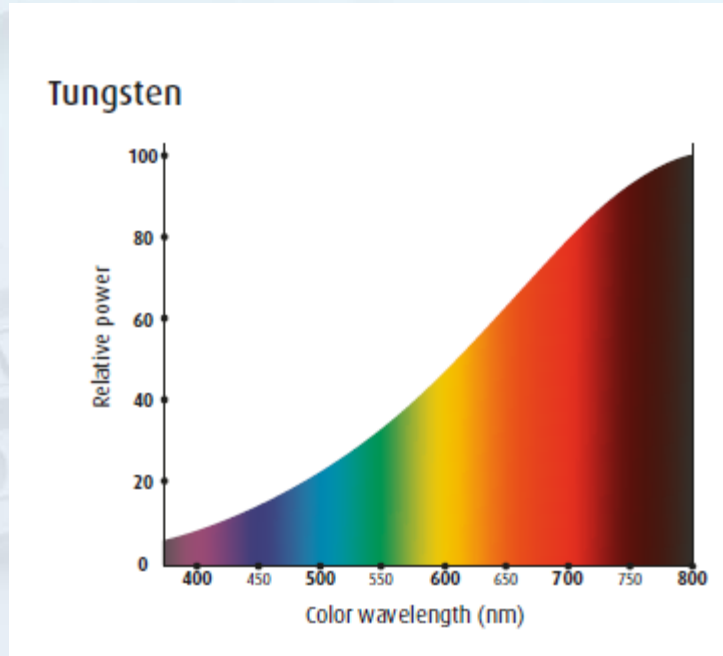
# Lighting System- Selection of Light



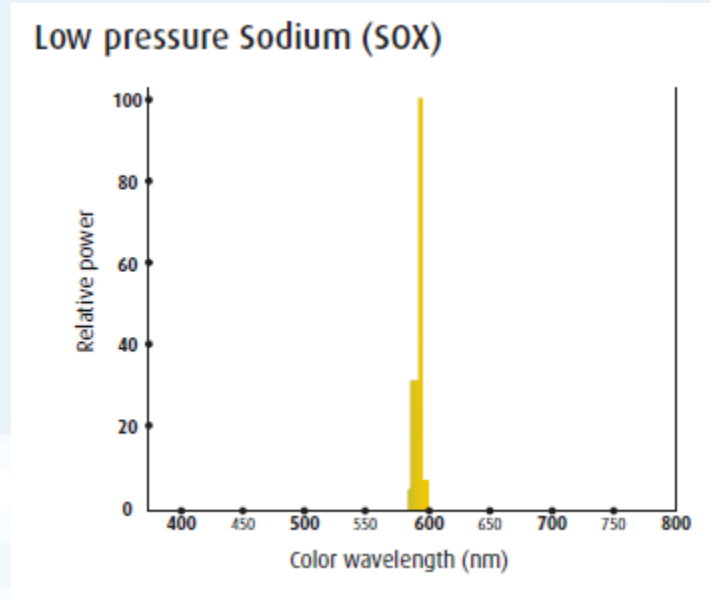
- Most natural light for human eye is day Light
- Daylight is composed of a range of different colours called as “Polychromatic Colour”
- This is demonstrated when light passes through a prism
- Each light source is characterised by a light spectrum showing wave length against power
- The light system of the automotive industry are designed according to the visual perception of the human eye
- Human eye is more sensitive to the blue light during night time and towards red light during day time
- Red and yellow lights being of higher wave length can be seen from larger distance

# Types of Light Source

- Tungsten



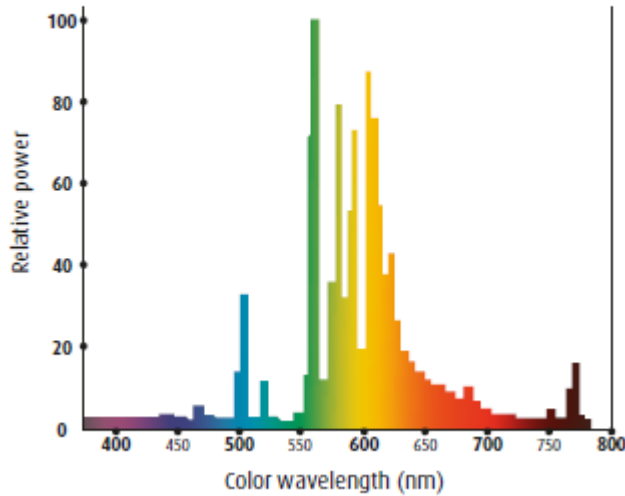
- Low Pressure Sodium



# Types of Light Source

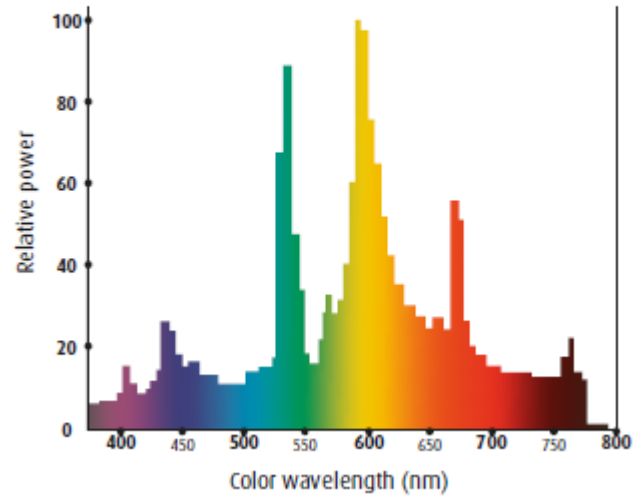
- High Pressure Sodium

High pressure sodium (SON)



- Metal Halide

Metal halide 3000 K (MBI)



## Illumination Level

- In photometry, this is used as a measure of the intensity
- Illuminance is a measure of how much luminous flux is spread over a given area.
- One lux is equal to one lumen per square metre

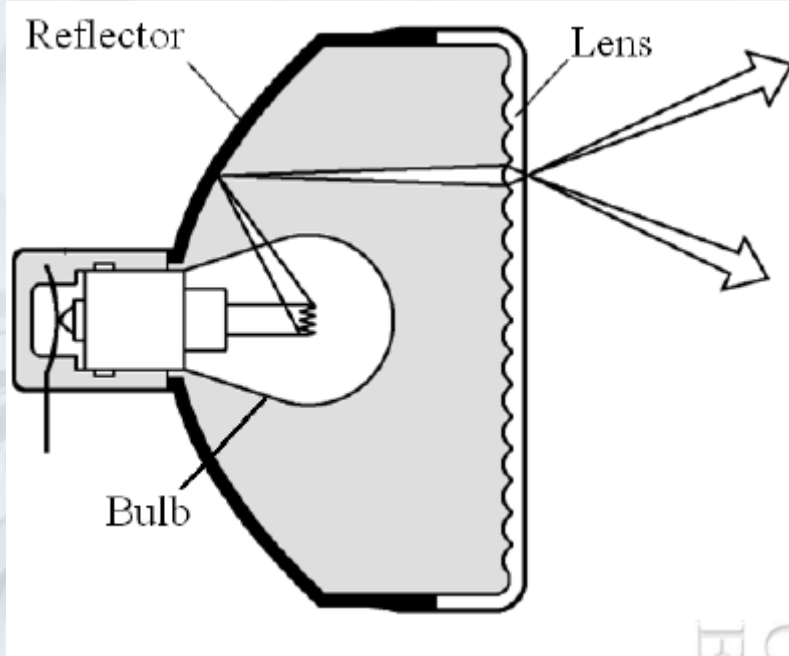
$$1 \text{ lx} = 1 \text{ lm/m}^2 = 1 \text{ cd}\cdot\text{sr/m}^2$$

# BLINKER LIGHTS – COMPONENTS

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# Elementary Components of Lighting System



**A. Bulb**-Light Source for the Indicators

**B. Reflector**-To Reflect maximum amount of light outwards

**C. Lens**- Outer Cover of the indicators

## Component 1: Reflectors

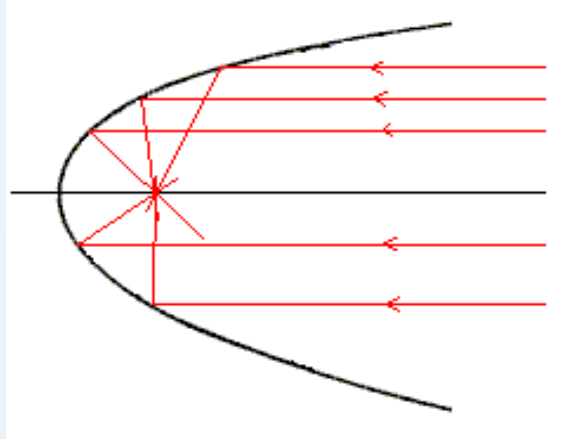
- Reflectors are used for reflecting maximum amount of light out side
- Plastic parts are coated with materials with high reflection properties.
- Plating techniques like Chromium plating is utilized for doing the coating
- Plastic can be readily molded into intricate shapes and the light weight and ease of fabrication in plastics may be combined with certain desirable characteristics of metal by pasting the tensile impact properties and abrasion resistance of plastics are improved by metal coating.

IS: 1068-1993 for Copper, Nickel and Chromium Electrode deposited coating





## Component 1: Reflectors (Cont..)

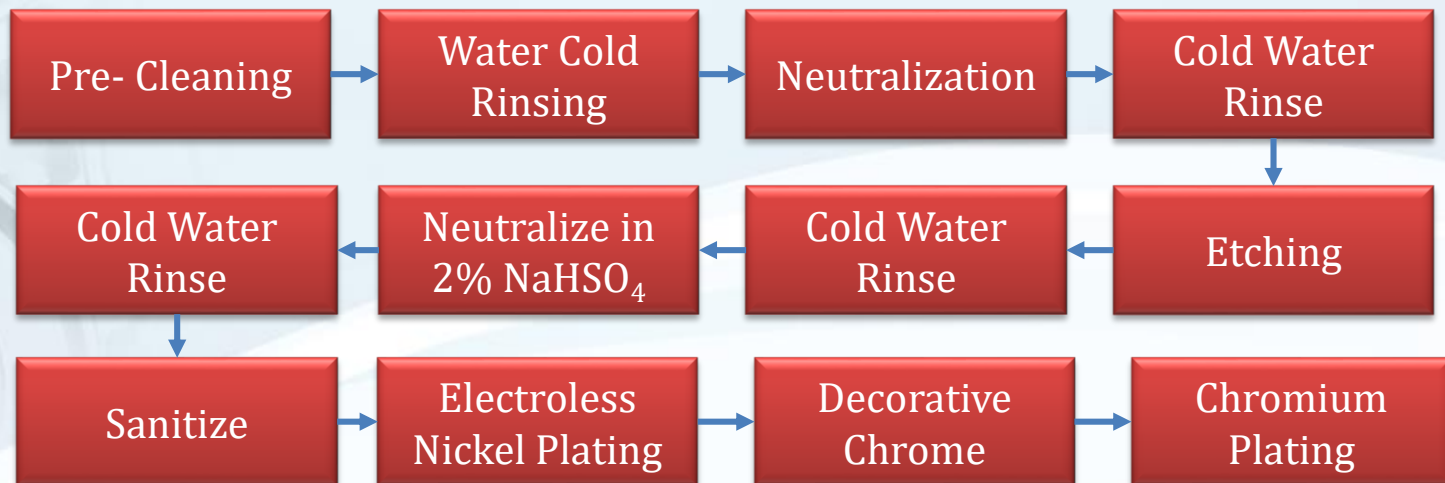


- **Light source placed in a PARABOLIC reflector to achieve a directed beam**
- **Chromium plating is done in the reflectors to reflect maximum amount of light**

# Component 1: Reflectors (Cont..)

## Chromium Plating For the Reflector

- Chromium is bluish-white and lustrous metal
- Chromium plating, therefore, is extensively used as a final finishing operation
- Chromium Plating Process on ABS Plastic Materials are carried out as follows

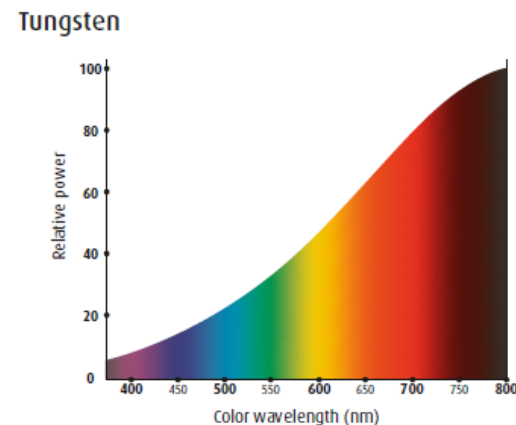


## Component 2: Bulb

- Mostly indicator Bulb utilizes light radiations emitted with higher wavelength (That is in the yellow band)
- Signal lamps with internal or external coloured lenses use colourless bulbs
- Bulbs of 4 to 10 W, producing 40 to 130 lm (3 to 10 mscp) are used for tail lamps, parking lamps, side marker lamps and side turn signal repeaters
- Types of Bulb commonly used in Indicator lights include
  - Incandescent Lamps
  - LED

### Incandescent Lamps:

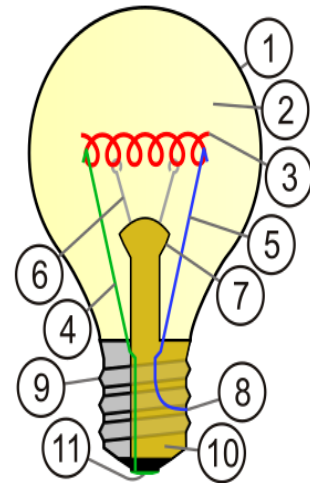
Spectral Distribution of a tungsten Bulb



## Component 2: Bulb (Cont..)

### Incandescent Lamps:

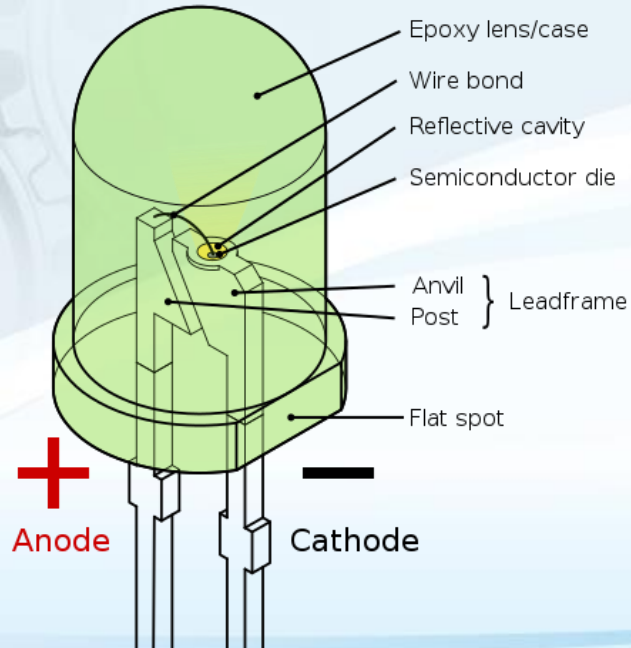
- Incandescent light bulb was long the light source used in all automotive lighting devices
- Components of Incandescent Bulb is as follows
  1. Outline of Glass bulb
  2. Low pressure inert gas (argon, nitrogen, krypton, xenon)
  3. Tungsten filament
  3. Contact wire (goes out of stem)
  4. Contact wire (goes into stem)
  5. Support wires (one end embedded in stem; conduct no current)
  6. Stem (glass mount)
  7. Contact wire (goes out of stem)
  8. Cap (sleeve)
  9. Insulation (vitrite)
  10. Electrical contact



## Component 2: Bulb (Cont..)

### LED (Light Emitting Diode)

- With the development of high-efficiency and high-power LEDs, it has become possible to use LEDs in lighting and illumination.
- Automotive applications for LEDs continue to grow
- LEDs are small, durable and need little power



## Component 2: Bulb (Cont..)

### LED Vs Incandescent Lamps

- **LEDs** are extremely energy efficient and consume up to 90% less power than **incandescent bulbs**. Since **LEDs** use only a fraction of the energy of an **incandescent light bulb** there is a dramatic decrease in power costs. Also, money and energy is saved in maintenance and replacement costs due to the long **LED** lifespan.

## Component 3 :Lens

- **Lens used indicator bulbs have multiple function**
  - **Protect the complete unit from atmospheric conditions**
  - **Distribution of light throughout the indicator**
- **PC (Polycarbonate) or PMMA (Poly Methyl Methacrylate) is used in the moulding of lenses**
- **If the Lamp is in front of the vehicle it is best to use PC for its crack resistance (No hard coat is necessary)**
- **FMVSS 108 requires the UV induced haze of signaling lamps must be less than 30%**
- **By using PC or PMMA no UV inhibitor is needed**

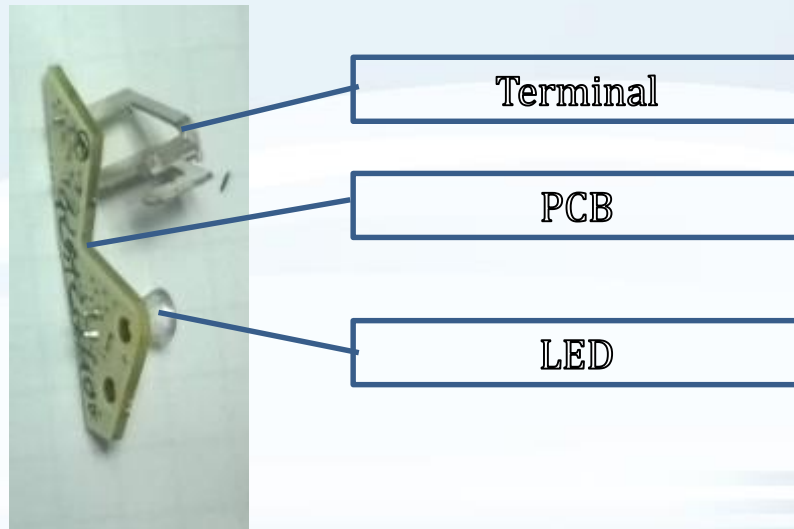
## Other Components Required

### Terminals:

- To fit in the mating part of the Wiring harness so that current can pass to the bulb

### PCB (Printed Circuit Board):

- When LED is used as the light source a PCB may be used to hold the LEDs and distribute the current



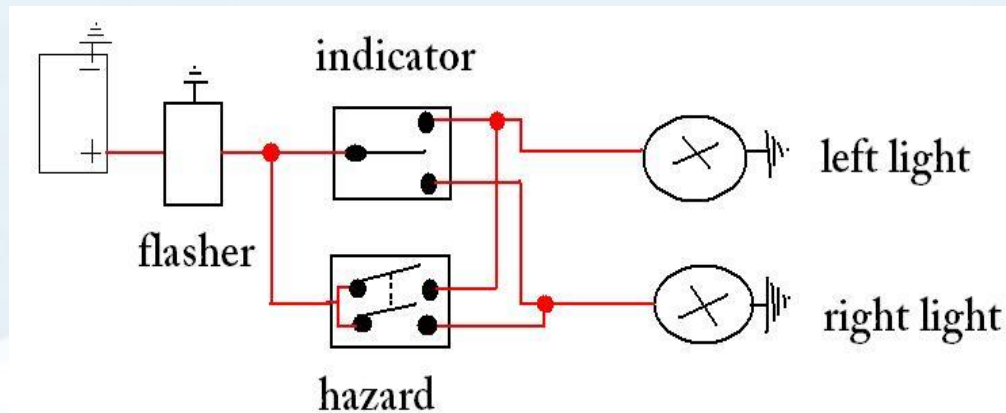


## Assembly of Indicators

- **Typical joining methods for plastic parts are screwing, snap- and press-fitting, gluing and welding.**
- **Welding is an effective method for permanently joining plastic components.**
- **There are various welding techniques such as spin-, ultrasonic-, friction, laser and hot plate welding.**

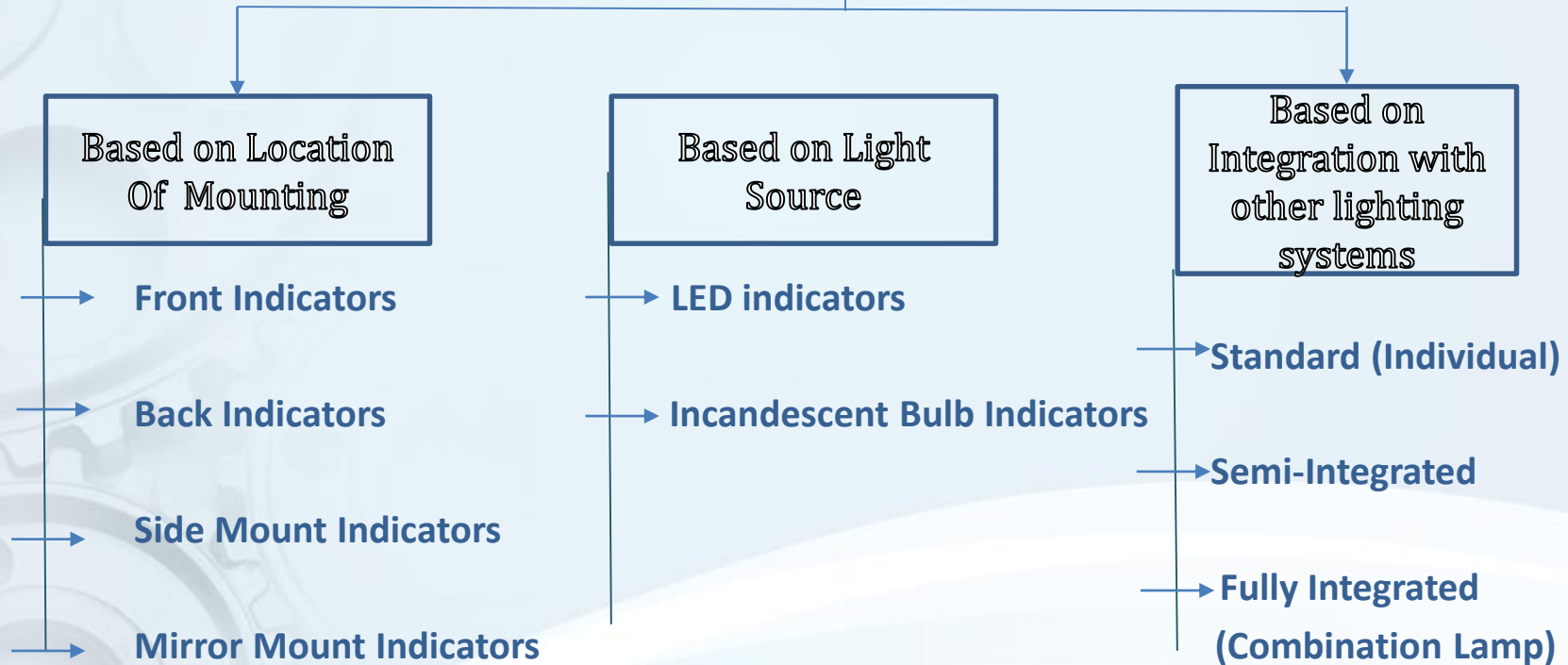
## The Blinking Properties of the indicator is achieved – ( Wiring Harness)

- This wiring arrangements can be used even if you have no turn signal switch, which would then be substituted using standard buttons or flip switches
- Flasher unit of about 12 V feeds both relays –done for the sake of efficiency and reduce cost
- When ever Hazard is activated light will flash at a faster rate is a disadvantage



# Blinker Lights Classification

## BLINKER LIGHTS CLASSIFICATION



# Based on Location of Mounting

Front Indicators



Back Indicators



Side Indicators



Mirror Mount Indicators



## Based on Light Source

Incandescent Bulb  
Indicators



LED Indicators



# Classification Based on Integration With Other Lighting System

Standard (Individual)



Indicator comes as a single unit

Semi-Integrated



All signalling units lens are manufactured separately and assembled in a single unit

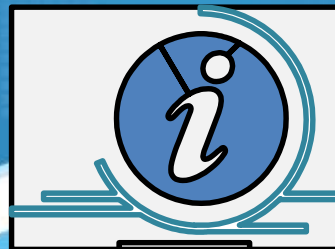
Fully Integrated



All signalling units lens are moulded in a single unit

# THANK YOU

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## Are there any Questions?

