Beacons, Flash Alarm or Strobe Technical Information for Instrument and Fire & Gas Engineers

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A visual signal (also known as beacon, flash-alarm or strobe) is a luminous source within a coloured transparent enclosure and is used in many applications not least as reinforcement to an audible signal in the event of danger, warning or machine / system process.

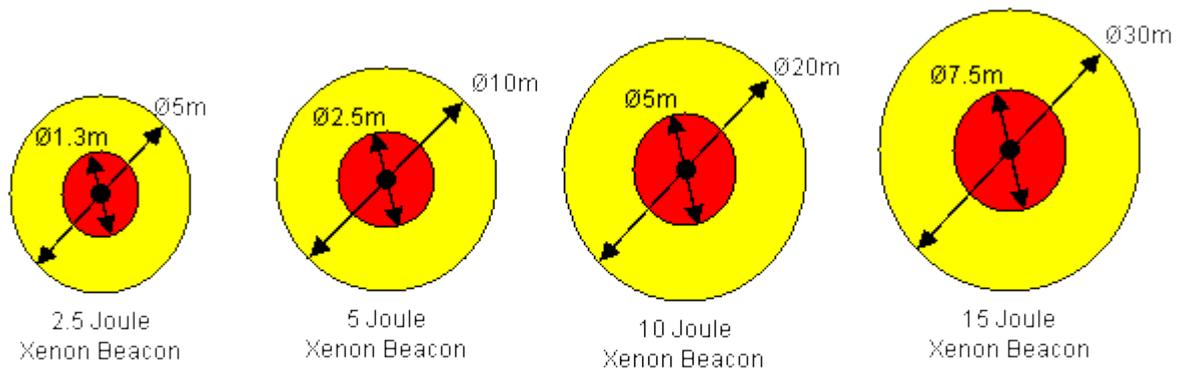**There is a choice of luminous sources**

Filament bulb – usually operated in conjunction with an additional circuit, both a steady output and more effective blinking output may be achieved. The filament light bulb gives adequate performance, at a relatively low cost, which may be enhanced with a freznel lens. It does however have quite a short life, and is further shortened when exposed to quite low levels of vibration.

Xenon (strobe) tube – operating at high voltage generated by an inverter circuit, the xenon tube is ignited creating an instantaneous brilliant flash of light, which may further be enhanced when viewed through a freznel lens. The energy of the flash is a function of the tube size, the voltage across it and the capacitor discharging into it. The tube life is typically 5 to 8 million flashes with after which erosion of light output is experienced until the tube eventually fails.

L.E.D (light Emitting Diode) - a semiconductor device, which unlike the filament bulb and the xenon tube emits only one frequency of light (i.e. one colour) dependent on its construction. L.E.D technology is developing and does not as yet offer as bright a solution as the xenon tube, it does however offer an extremely low current and very long life time, giving an effective solution where an indication or status is required.

Beacon effectiveness & range

This is dependent on the brightness of the light source and the lens colour of the visual signal. A general indication of the effective 360O coverage for xenon beacons within an industrial environment may be shown in the diagrams below

2.5 Joule Xenon Beacon — Ø1.3m / Ø5m
5 Joule Xenon Beacon — Ø2.5m / Ø10m
10 Joule Xenon Beacon — Ø5m / Ø20m
15 Joule Xenon Beacon — Ø7.5m / Ø30m

In addition the effect of the lens colour on the intensity of the light source within an industrial environment may be expressed as follows;

Light Source	Lens Colour					
	Clear	**Yellow**	**Amber**	**Red**	**Blue**	**Green**
Xenon	100%	93%	70%	23%	24%	25%
Filament	100%	95%	70%	17%	17%	12%

As a rule of thumb, the intensity of a beacon is reduced by ¼ if the viewing distance is doubled.

Please note all the above information is for guidance only and does NOT guarantee performance or coverage.

Siting of a visual signalling device

All round light dispersion should be the first consideration when installing a beacon, ensuring free air movement around the beacon enclosure and therefore preventing the build up of heat from the light source emitted during the normal operation of the beacon. Vibration should be avoided particularly with filament bulb beacons. Light travels in straight lines, the beacon will be far more effective if positioned in the line of sight rather than relying on reflections. Where applicable audible signals should always be the primary warning with the beacon used as a secondary indication or status.

IEC 73

Colours of luminous indicators & push buttons, sets out the required colours as shown below in order to conform to the machine directive.

RED – Danger Act Now.
Danger of live or unguarded moving machinery or essential equipment in protected area.

AMBER – Warning, Proceed with Care
Temperature or pressure different from normal level

GREEN – Safety Precaution: Go Ahead
Checks complete, machine about to start

BLUE – Site Specified
Pre-set ready or remote control

CLEAR – No specific Meaning
Could confirm an earlier message