

INTRODUCTION

Well designed and efficient lighting for farms is an important part of the farm business infrastructure. Farms have specific production requirements where lighting plays an important role. Being, as they are, in the countryside where incidental lighting is not available, farm lighting must be available in all key areas.

Farm operations can always be carried out more efficiently in good lighting conditions. Work will be easier, faster and safer if the lighting system used is of the correct design and well maintained. In recent years lighting technology has brought new lighting sources which are cheaper to run, longer lasting and give better lighting conditions.

This guide should help in making the important choice of the correct lamp type and fitting for the job.

LAMP TYPES

Tungsten Filament

- The universally available lamp.
- Internally coated lamps available to diffuse glare.
- Cheap to buy, but efficiency poor.
- High surface temperature.
- Can be dimmed.

Tungsten Halogen

- Light output maintained throughout life of lamp.
- Easy to control
- Small, lightweight fittings.
- High surface temperature.
- Easy installation.
- Poor efficiency.
- Commonly used with proximity sensors.
- A quality white light
- Cheap to buy, but efficiency poor.

Compact Fluorescent

- Low wattage replacement for tungsten filament lamp - note select a lamp which can be accommodated in the light fitting that is being used.
- Many new designs – shapes, sizes and outputs.
- Slow to warm up, especially in low temperatures.
- Cheap to run. A quarter to one fifth of the running cost of a tungsten filament lamp.
- Not suitable for dimming.

Fluorescent Tubes

- High efficiency and cheap to run.
- Range of tube colours - check type if colour rendering important.
- High frequency ballast (control gear) gives lower running costs, longer tube life and good starting in cold conditions.
- Can be dimmed with special control.
- A diffused light which reduces shadows – good for manual task lighting.



High Pressure Sodium

- Long life.
- Limited colour rendering for standard lamp.
- Cheap to run.
- Warm-up period required.
- Frequent switching not practical
- Not affected by cold operating conditions.

Low Pressure Sodium

- Long life.
- Highest efficiency.
- Cheap to run.
- Harsh monochromatic yellow light.
- Frequent switching not advised.

Metal Halide

- Long life.
- More expensive than High Pressure Sodium to buy and slightly less efficient.
- Excellent colour rendering with a white appearance.
- Warm-up period required.
- Frequent switching not advised.

OUTSIDE LIGHTING

General Lighting

Wall or pole mounted lights mainly designed for outside yard lighting but can be used inside high buildings such as cattle yards or grain stores. Being mounted at high level, care has to be taken to ensure their position does not cause dazzling.

Fittings are of robust plastic or metal construction, weatherproof and usually with the lamp itself totally enclosed. Floodlights should be mounted at a minimum height of 4 or 5 metres.

For large areas where the lamps are left on for long periods, high intensity discharge lamps such as High Pressure Sodium, Metal Halide and Mercury Vapour are suitable. These lamps have a long life and are cheap to run. However, when switched on they take a couple of minutes to warm up and if switched off they cannot be restarted until they cool down. They are not suitable for switching by proximity sensors.

As running costs for Tungsten Halogen lamps are relatively high, they are recommended for intermittent use only. With no 'warm-up' time they can be fitted with infrared proximity sensors to switch lamps on in response to a vehicle or body passing nearby.

A new generation of high output compact fluorescent lamps are now being introduced for external lighting. These lamps are low energy, produce an immediate white light and can be used with proximity sensors in the same way as tungsten halogen lamps.

Security Lighting

Low Pressure Sodium lights are suitable for all night security lighting. The light emitted is monochromatic yellow. A range of low wattage and hence cheap to run fittings is available. High Pressure Sodium can also be used if better colour rendering or appearance is required.



For large areas 'street light' type fittings or floodlights can be used. For more localised areas, bulk head type fittings would be adequate.

Sodium lamps are not suitable for frequent switching (e.g. by infrared sensor) as a 'warm-up' time is required and frequent switching reduces the lamp life. A photoelectric sensor is best suited to this type of fitting to activate it as darkness falls, or it can be switched by means of a time-switch.

Bulk head fittings with Compact Fluorescent Lamps can be used for small areas, pathways and building access points. Tungsten Halogen flood lamps and fittings can be used with passive infrared detectors (PIR's) but are not suitable for prolonged use due to their relatively high running cost.

INTERIOR LIGHTING

The type of fitting employed will depend on the use of the building and its size.

Wide Span Building

(3m mounting height and over)

For large span high buildings such as cattle yards, High Bay or Low Bay, High Intensity Discharge fittings with High Pressure Sodium, Metal Halide or Mercury Vapour lamps are most suitable.

High Bay fittings have a dome or bell shaped reflector and are particularly suited to buildings where the luminaries can be mounted at a height in excess of 6 metres.

Low Bay fittings have a flatter cone shaped reflector and are better suited to lower mounting heights (minimum 3m).

Consideration should be given to how these fittings can be suspended from the roof of the building as the starting gear can be quite heavy. Access for easy lamp replacement should be taken into account when designing a lighting layout.

Some High Bay and Low Bay fittings can be supplied with Tungsten Halogen lamps (in addition to the discharge lamp) to provide light during the 3 to 5 minutes 'warm-up'.

Wall mounted floodlight fittings are often used but care should be taken to avoid glare, particularly where vehicles are being manoeuvred within the building.

Fluorescent Tube lighting can be used where a more even lighting level with good colour rendering is required. This may be particularly important in pack houses where quality discrimination of produce is important.

Smaller Rooms

(under 3m in height)

Smaller, lower farm buildings can be adequately served by Bulk Head Tungsten Filament, Compact Fluorescent and Fluorescent Tube systems. Where lights are on for long periods it is worth investing in Fluorescent fittings as the running costs are lower.

STANDARDS OF CONSTRUCTION AND IP RATING

Farm building environments tend to be hostile places for electrical equipment e.g. milking parlours or livestock houses. Any electrical fitting should be of sufficiently strong construction and

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proof against the hazards of the situation in which it is placed. The installation should be such that it is out of reach of livestock and positioned to avoid accidental damage by farm machinery.

The degree of protection against the ingress of water and from solid objects (including dirt) can be determined from the Ingress Protection (IP) rating of the fitting. The first digit in the code indicates the solid object protection and the second, water protection. An example might be IP54. Each number is in the range 0 to 6.

SAFETY

Where any food or drink product is involved all fittings should be totally enclosed to avoid glass hazards. Portable lighting used in workshops should ideally be operated on an 110V supply for increased safety.

Fluorescent Tubes and High Intensity Discharge Lamps (High Pressure Sodium, Metal Halide and Mercury Vapour) together with Low Pressure Sodium all contain toxic substances. Sodium lamps are potentially explosive. In view of this these lamps must be disposed of in the correct manner. Enquiries should be made with your local authority or the lamp manufacturer as to a safe disposal method.

General

For colour sensitive tasks, high quality colour rendering lamps can be used to obtain light quality close to daylight.

Not all lamps are suitable for mounting at all angles. For example the life of tungsten halogen and some discharge lamps are reduced if they are not mounted in the correct orientation.

LIGHTING REQUIREMENTS FOR CROP ASSURANCE SCHEMES

Clause 6.2 of the Assured Combinable Crops Scheme Standards 2002 - 2003 states that: 'All light bulbs, tubes, lamps, windows or any other glass material must be protected or constructed to avoid broken glass contaminating the grain. This applies to temporary holdings, long-term stores and all grain movement areas.'

This has implications for those grain storage facilities covered by the scheme.

For many existing stores, two options are available to meet the requirement of the scheme. Either the existing glass fittings are replaced, or suitable non-glass protective covers are fitted. In deciding the right course of action it is wise to consider not only the costs of each option but to review the suitability of the existing lighting installation. On examination many existing systems are inadequate in terms of providing a safe and efficient lighting level. If money is to be spent in providing non-glass covers, it may be better in the long run to invest a little more and update the lighting system completely.

The lamps covered in the Interior Lighting section of this guide should be considered for grain stores. Where non-glass covers are to be fitted, a number of products are available to update existing fittings. These are:

Tungsten Lamps/Compact Fluorescent Lamps

Plastic sleeving or 'shrink fit' covers are available for most lamp sizes. A better option is to use a polycarbonate bulk head fitting.



Farm Lighting

Fluorescent Lamps

Again sleeving or 'shrink fit' covers can be used. Fully protective plastic fittings are the preferred option.

Tungsten Halogen Lamps

Special plastic coating which can be applied to the glass fronted fittings are now available. However the high temperature of these lamps can cause plastic based covers to discolour and fog.

THE CONTROL OF LIGHT IN THE COUNTRYSIDE

Many organisations, including the Institution of Lighting Engineers (ILE), the Council for the Protection of Rural England (CPRE) and the British Astronomical Association (BAA), have voiced their concerns over the increasing problem of spill light from farms and villages into formerly dark rural areas. The character of the countryside at night, with its interplay of moonlight, starry skies and shadows, is under threat from poorly aimed and over bright lights of all kinds.

Farm lighting can play its part in safeguarding the special character of the rural night, and the night sky. Lamps should be sensitively mounted in order to illuminate only the premises to be lit, with wattages kept to the minimum necessary for effective illumination.

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