



Low Flying Operations Sqn
(MOD CAS-AS LFOS)
Royal Air Force Wittering

Peterborough
PE8 6HB
Tel: 01780 783838 Ext 7184
Fax: 01780 783838 Ext 5001
Email: cas-aslfosoc@wittering.raf.mod.uk

DFTS: 95351 Ext 7184
DFTS Fax: 95351 Ext 5001
RAFMAIL: CAS-AS LFOS OC

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MOD Specification for IR and Low Intensity Red Vertical Obstruction Lighting

Introduction. The CAA does not require obstruction lighting to be fitted to vertical structures below 500ft agl/amsl within the open UK FIR. Accordingly, wind turbines, most of which are between 200ft and 450ft high, are not subject to a mandatory lighting requirement. However, the proliferation of turbines across the UK has caused The MOD concern with regard to military night flying training which is conducted at heights that directly conflict with wind turbines. Clearly there is a Flight Safety requirement for the lighting of such large vertical obstructions that present a hazard to military aircraft and helicopters conducting night training. Unfortunately, local opposition to the fitting of visible lighting (including low, and very low, intensity units) has been both vocal and successful. Cognisant that military night low flying is now conducted with the aid of aircrew NVGs, the MOD Low Flying Ops Sqn, together with Qinetiq and RAF CAM, have undertaken a series of trials to determine the suitability of NVG compatible IR obstruction lights which are invisible to the naked eye (Joe Public). The trials were successful and the specification recommended is detailed in the following paragraphs.

Specification IR. In the vast majority of locations, a basic IR light conforming to the following specification will be sufficient.

IR wavelength – 750 to 900nm.

But ideally concentrated within 800 to 850nm for optimum detection by all military NVG types.

IR intensity – 600mW/sr.

This will generate a 7-8 nautical mile NVG pick-up range - remaining above 5 as the light ages.

Horizontal Pattern – unrestricted 360 deg.

Vertical Pattern – full intensity between +30 deg and –15 deg. Overspill is acceptable

Flash Pattern – 60 flashes per min at 100-500 ms duration (ideally 250ms)

Synchronisation – all lights fitted to a wind turbine site to flash together (GPS sync)

Specification IR + Red. In a few specific locations, it may be necessary to supplement the basic IR lights with a few combined IR+Red lights; for example where Search and Rescue Helicopters conduct night training without NVGs.

IR Element

The IR element of the combined light to be the same as the basic IR light.

Red Element

Light Intensity – equal or better than 25cd.
Ideally 32-50cd to allow for deterioration with age.

Horizontal Pattern – unrestricted 360 deg.

Vertical Pattern – full intensity between +15 deg and level (0 deg).

Overspill – upwards overspill is acceptable; downwards overspill is to be minimised such that the red light cannot be observed below –10 deg.

Flash Pattern – 60 flashes per min at 100-500ms duration (ideally 250ms)

Synchronisation – all lights fitted to a wind turbine site to flash together (GPS sync)

Windfarm vs Lighting Layout. For sites of more than 2 turbines it may not be necessary to light all turbines. Indeed, on the larger sites it may only be necessary to light the perimeter turbines or, for tightly packed sites with smaller turbines, every other perimeter turbine. Where the combo IR+Red lights are required, these will be used only to define the 'ends' of turbine lines or the 4 cardinal turbines on the largest sites.

Testing. Since the characteristics of modern diode lighting vary considerably between manufacturers, the MOD will only accept/approve lights that have been independently tested against military NVGs. Accordingly, the specialist NVG team at Qinetiq Boscombe Down have been requested to test all new IR lights offered for use on wind turbines. Qinetiq will charge the light manufacturer for this service.

Conclusion. The lighting specifications detailed above will go a long way to addressing the MOD's Flight Safety concerns regarding large unlit structures within the Low Flying System. It is recognised that the specification is a compromise between the current statutory requirement (no lighting) and the standard aviation obstruction lighting (2,000cd red) for structures above 500ft. Hopefully, this specification will address the difficult situations where either, a windfarm planning application is rejected due to local lighting opposition, or, the windfarm is consented without a lighting requirement.

Original signed

*M D Hale
Sqn Ldr
OC LFOS
01780 783838 ext 7184*