

RADAR REFLECTORS

Regulation 19.2.1.7 – Radar Reflectors All ships shall have, if less than 150grt and if practicable, a radar reflector. *RYA Note: The Department of Transport and the Local Regions has given a definition of “if practicable” as, “if it is possible to use a radar reflector on your boat then you must use one”. MCA guidance says that if your boat is bigger than 15m hull length, you should have a radar reflector that complies with the IMO performance standard (ie the reflector should have a radar cross section (RCS) of 10 square metres). Check with the supplier or manufacturer before you buy. If your boat is less than 15m in length, you should fit the largest radar reflector (in terms of RCS) that you can. Whatever size your boat is, you should fit the reflector according to the manufacturer's instructions and as high as possible to maximise its effective range.*

The above is part of the SOLAS, enforceable by law in the UK. Additionally, failure to comply could make your insurance invalid, that sounds pretty harsh, but it's no different from COLREGS. Skippers should remember also their duty of care to their crew.

The above regulation and the MCA interpretation makes it clear that vessels over 15m must have a reflector of a minimum of 10m² RCS. Below this length it should be as large as you can fit.

It's relatively simple (but expensive) to have a radar reflector tested in a lab to determine its RCS. It's notoriously difficult to reproduce these test results at sea in real life conditions. Over the last 10 years 3 British yachting magazines have conducted extensive tests on radar reflectors, culminating in the June 2005 edition of Yachting Monthly. They all do, however, come up with the same conclusion about the transparent tubular reflectors. These all make clear that, whatever their manufacturers claim they are little, if any, better than no reflector at all. Surprisingly, the very popular Firdell Blipper does not come up to expectations. Original claims for their RCS seems to have been dropped by some manufacturers. Advertisers' claims are given below.

	Peak RCS
Firdell Blipper:	No RCS claimed
Visiball:	No RCS claimed
Cyclops:	No RCS claimed
Echomax:	24m ² No heel, 6.5 ² - 15 ⁰ heel
Octahedral (18 inch)	7m ² No heel
Octahedral (14 inch)	3m ² No heel
Mobri 100mm tubular	4m ² No heel
Mobri 50mm tubular	2m ² No heel

All the above are peak values. Average values are much lower and many reflectors have large nulls (areas where there are virtually no radar returns at all). Some cease to work effectively as soon as there is any heel, especially the transparent tubular ones, where even 3 degrees of heel makes them virtually invisible.

However, what is obvious is that the transparent Mobri reflectors (and the Plastimo and other look a-likes) and the smaller octahedral are nowhere as big in terms of RCS as some others. They therefore do not fulfil the 'as large as possible' requirement.

The above figures are for visibility to 'X' band radars. The other type of radar used by large ships is 'S' band and RCS to these is reduce to about one fifth of the above figures.

It should be noted that the rules state: "that all ships shall have...." The state of visibility is not mentioned. Yachts become lost in sea clutter and often do not become visible to big ship's radar until about 2 ½ miles range, even in conditions of unlimited visibility.

Although much more costly and taking a small current to power it, an active radar reflector (Radar Target Enhancer – RTE) guarantees a much bigger effective RCS than a passive one. The Sea-Me RTE has a maximum RCS of 63m² at no heel reducing to just less than 10m² at 15⁰ heel. The return is devoid of nulls. Currently the Sea-Me works only on 'X' band but the return from most passive reflectors on 'S' is so weak as to be almost useless in this mode. At the moment, the Sea-Me cannot be used as the sole radar reflector, because it is 'X' band only.

CONCLUSION

I believe that:

1. Race organisers should ensure compliance with ISAF Special regulations.
2. Clubs should encourage all yachtsmen to comply with the MCA recommendations with respect to radar reflectors.
3. Yachtsmen should consider the marked superiority of a Radar Target Enhancer (RTE) when purchasing a radar reflector. To compensate for the fact that the only current RTE (Sea-Me) is 'X' band only, an octahedral reflector could be used when necessary.

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