



MECAL TECHNICAL NOTE

MTN 19-1

Issued by the *MECAL* Technical Committee

CHOICE OF RADAR REFLECTORS

Reference: All vessels

1. Code 19.3 requires a coded vessel to be provided with “a radar reflector approved to current IMO performance standards, or other means, to enable detection by ships navigating by radar”. Superseding an earlier standard DoT/1977, the current performance standard is ISO8729(1). This standard is currently under review by IMO and is likely to be replaced shortly by ISO8729(2).
2. The recent MAIB report on the OUZO fatal incident (http://www.maib.gov.uk/cms_resources/Ouzo_.pdf) and the subsequent QinetiQ report on the performance of commonly available small craft radar reflectors (http://www.maib.gov.uk/cms_resources/Radar_reflectors_report.pdf) have focused attention on the subject of radar reflectors fitted in small craft.
3. The evidence suggests that few of the radar reflectors currently available for small craft meet the performance standards of ISO8729 in all respects, especially at any angle of heel. However some radar reflectors are definitely superior in performance to others, whilst several have a very poor performance. It is known that urgent action is in hand to design and market more effective radar reflectors but until these become available MECAL examiners are to be guided by this MTN.
4. MECAL Ltd does not endorse any particular model but the following radar reflectors may be accepted on coded vessels as most nearly meeting the requirements of the code:
 - a. Sea-Me Radar Target Enhancer (RTE)
 - b. Phalconet RTE
 - c. Echomax 230
 - d. TriLens Large
 - e. TriLens Standard
 - f. Firdell Blipper 210-7
 - g. Firdell Blipper 300/5
 - h. Gillie Firth Mk3-12inch
 - i. Cyclops 3
 - j. Lensref DL-12A

- k. Octahedral types, at least 18in (450mm) across the diagonal and mounted in the “catch water” position, such as the Simpson Lawrence models 094501 and 3527804.
5. The following radar reflectors are considered to have too poor a performance and definitely are not acceptable:
- a. The clear plastic tubular series of reflectors (50mm and 100mm in diameter).
 - b. Octahedral types less than 18in (450mm) across the diagonal..
 - c. Any octahedral type not mounted in the “catch water” position.
 - d. Battered or damaged reflectors, as performance is critical on maintaining accurate reflecting corners.

Notes:

- i. In general, RTEs provide a considerably enhanced performance at X-band frequencies compared to passive reflectors but are more expensive and rely on a power supply (typically 160mA at 12V). They do not work at S-band frequencies.
- ii. Existing coded vessels with radar reflectors that now are not acceptable should upgrade to an acceptable radar reflector within 12 months.
- iii. Steel vessels (all sizes) also are required to have a radar reflector, to cover the bows-on aspect which can have very limited radar cross section.
- iv. Radar reflectors should be permanently mounted as high as practicable, and not merely carried ready to be rigged if visibility deteriorates.
- v. The radar reflectors listed above are optimized for use with X-band radar of the type required to be fitted in all ships above 300GRT. Some larger ships also use S-band radar, preferring the superior performance to X-band in sea clutter and heavy rain. All existing reflectors are considerably less effective at S-band frequencies than X-band, and the RTEs do not work at all at S-band. Only an X-band radar will trigger a SART.
- vi. If a vessel carries an external SOLAS B emergency pack in a grab bag for a liferaft, then the radar reflector must be one approved for use in a liferaft such as the inflatable Edwards Safety Equipment Ltd model ESE-R2 or the Chemring Ltd model FCR580/450. Aluminium “flat pack” octahedral types are not acceptable in life rafts because of their sharp edges.
- vii. Fitting two radar reflectors in an effort to increase effectiveness is not advised, as there is some evidence that they can cancel out one another.