



SHIP SAFETY BULLETIN

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Subject: THE IMPORTANCE OF PROPERLY FITTING AN EFFECTIVE RADAR REFLECTOR ON SMALL OR NON-METALLIC VESSELS

This Bulletin replaces Bulletin No. 14/1998.

Purpose

The purpose of this Bulletin is to remind owners and operators of small vessels or vessels constructed of primarily non-metallic materials of the importance of fitting an effective and practicable radar reflector.¹ This bulletin also stresses that, due to the wide range in effectiveness among available radar reflector types and sizes, owners and operators must take care in selecting the most appropriate radar reflector for the safety of their vessel.

Background

There have been collisions between small and large vessels where casualty investigations have indicated that ineffective radar reflectors may have played a role in these accidents.

Small vessels are generally difficult to detect both visually and by radar for a number of reasons. Visually, they present a relatively low profile and they may be difficult to see from the bridge of a large vessel if they are below the horizon. This problem is compounded in rough weather as they are often screened by spray or may not be seen at all when in the trough of a swell. When navigating at night their navigation lights are often difficult to see due to heel or because they may be obscured by shore lights in the

¹ Rule 40 *Collision Regulations, Canada Shipping Act 2001* requires a vessel that is less than 20 metres in length or is constructed primarily of non-metallic materials to be equipped with a radar reflector if practicable, unless (i) it operates in limited traffic conditions, daylight, and favourable environmental conditions and where compliance is not essential for the safety of the vessel, or (ii) the small size of the vessel or its operation away from radar navigation makes compliance impracticable. For specific requirements, the Collision Regulations should be consulted.

Keywords:

1. Radar reflector
2. Small vessels
3. Collision Regulations

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background. By radar, they present a relatively weak target because of their size and construction type.

In restricted visibility, where radar and sound signals are the only means of detection, the small vessel operator must use an effective, properly fitted radar reflector and the appropriate sound signal to indicate their presence to the larger vessels in the vicinity.

Radar Reflector Effectiveness

There are two main factors in determining the effectiveness of a reflector:

- 1) size is the most important factor in determining the effectiveness of a passive radar reflector (i.e., the larger the radar cross section the better); and
- 2) the method of mounting such as, height above water and orientation of the fitted reflector also matter greatly when determining effectiveness.

Radar comparative performance studies have revealed that radar reflectors on the market vary greatly in their effectiveness. Some radar reflectors have a reflectivity well below the standard.² Consequently, the owner or operator must make an informed decision on what is the most effective and practicable radar reflector model available for their vessel.

Recommendation

It is strongly recommended that owners and operators of small vessels inform themselves and take into account available information and studies on radar reflector performance and comparisons to determine the most effective and practicable radar reflector for the safety of their vessel (for 2 examples, refer to footnotes^{3,4}). Studies may also provide advice on the proper procedures for fitting radar reflectors.

Where larger vessels may be encountered, small vessels should fit a radar reflector and anything that improves a vessel's radar visibility is worthwhile. Early detection of your vessel by large vessels is one of the best ways to avoid collision. However, fitting a radar reflector does not reduce the need to maintain a proper lookout and use all available resources in order to avoid collision.

² Recommendation on performance standards for radar reflectors, Resolution MSC.164 (78)
<http://www.tc.gc.ca/marinesafety/oep/navigation/safety/msc-164-78.pdf>

³ Report by QinetiQ “*Performance Investigation of Marine Radar Reflectors on the Market*” March 2007, commissioned by the British Marine Accident Investigation Branch. http://www.maib.gov.uk/cms_resources/Radar_reflectors_report.pdf

⁴ 1995 Radar Reflector Test
http://www.ussailing.org/Safety/Studies/radar_reflector_test.asp