Radar Reflectors - Commercial

**EM230 Basemount**

EM230 Basemount Ideal for fisheries or fish farms. Factory fitted with optional DOT all round white navigation light, DOT tricolour, Hella LED light or a light or your choice. Shown here with a Sealite SL15

Chosen by the RNLI as best reflector for their fleet of 400 RIB's. After capsize tests and exhaustive sea trials, the Midi recorded 100% paints at 3.8 miles and 80% paints at 5 miles plus in sea state 'fair' although mounted only 2m above sea level. (RORC/ORC recommend 4m above sea level).

All versions available in white, orange, yellow, red, green or black.

**EM305BM2**

Designed where a high response is required but there is a limited amount of space in the buoys top mark.

EM305 BM2 fitted with two stack 313 mm maximum RCS of 63.1M2 and an average of 8.4M2 at +/- 3 degrees of heel

Dimensions length 475mm diameter 333mm
Fixing centers @ 200mm pcd
Fixing holes 4 x12mm female

**EM305PE**

The EM305PE is a popular high response radar reflector with a robust Polyethylene case and is suitable for large 15 - 20 metres size vessels.

Following a year of sea trials the US Navy SubPac Division Hawaiiose the original EM305 glass fibre cased unit for enhanced visibility upon surfacing for their fleet of Nuclear Submarines. Following their sea trials we introduced the new Polyethylene case with peak performance of 62.9m² with an average at +1-3° of 10m² which was 21.6% more effective than the glass fibre model. Also used on Trinity House Buoys, Ostend Harbour Entrance and recently the River Rhone.

Successfully tested by QinetiQ to ISO 8729-1999 and meets RORC, ORC, ISAF 2012/13 and WCC requirements of 10M2.

- NATO stock number 5840 99 812 8790
Following tests and interests from the French Navy, recent tests have been carried out by QinetiQ for response to the Nato frequencies 8 - 18 Ghz (I and J band) see below.

For linear diagram [click here] (New 305PE fitted with enhanced array tested to Nato frequencies I and J band)

For 5220 linear diagram [click here] (New 305PE fitted with enhanced array)

For 5221 linear diagram [click here] (New 305PE fitted with standard array)

For 56 linear diagram [click here] (Glass fibre model fitted with enhanced array identical to 5220)

For line drawing [click here]

Available in White, Yellow, Red, Green, and Black PE

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**EM305FPMS**

Custom made version of the popular EM305PE but with flat top and base used to upgrade existing buoys or top marks, marine or land hazard - mooring platforms - pedestal mounted version available etc

Used by Renewable Energies on their Water turbine off the Shetland Islands.

Standard base fixings of 4 x 12mm female fixings @ 200mm PCD - Optional top fixings to suit chosen navigation light.

**Dimensions:**
- Case Height 68.5 cm | Diameter 33.3 cm
- Approx. Weight 7 Kg
- Maximum RCS 62m2 | Average RCS+/- 3 deg 10M2

**Dimensions:**
- Case Height 68.5 cm | Diameter 33.3 cm
- Approx. Weight 7 Kg | Standard fixings top and bottom – 4 x 12mm female fixings at 200mm PCD
- Available in White, Yellow, Red, Green or Black in high quality UV resistant Virgin PE
EM305TH

Custom made for Trinity House. QinetiQ testing proved the Echomax 305 to give an incredible response of 12 separate 50 sq.m peaks @ +/- 3°@30° intervals with an astonishing peak of 63m². Trinity House are currently testing two EM305 TH reflectors on lateral buoys Black Deep-7 and Barrow-7 off Harwich.

Available in base or pedestal mount.

**Dimensions:**
- Length (case only): 680mm
- Length (with light without pedestal): 995mm
- Circular base: 400mm
- Square base: 433mm
- Overall Diameter: 325mm
- Fixing Holes: to be specified
- Weight: from 5kg depending upon array composition
- Polar diagram to be added shortly
- Superseded by EM305 FPMS

EM313 S2/S3

NEW REFLECTOR DESIGNED ESPECIALLY FOR BUOYS WITH MASSIVE RESPONSE AND CENTRAL LIFTING FACILITY –

New two stack Echomax array made from 1mm stainless with provision for 25mm central rod fixing enabling easy connection of lifting eye, St. Andrews Cross etc. or navigation light. With massive QinetiQ proven maximum response of 63.1M2 and average at plus or minus three degrees of 8.4M2. Where sufficient space is available the more powerful EM313-
S3 may be used

**Dimensions:**
- Width: 313mm (S3 - 313mm)
- Height: 438mm (S3 - 660mm)

**Base fixings:**
- 4 x 8mm at 80mm centres
- Weight: 4kg (S3 - 6kg)

For linear diagram [click here](#).

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### Echomax EM305BML & Echomax EM400BML

Customised versions of the 305 and 400 units with maximum responses of 63.1M2 and 229.3.M2 now being used by foreign navies for target use. Units illustrated utilise IMCO approved yacht navigation lights visible up to 2nm with 2 core electric cable for independent 12v supply. These lights can be substituted by any of the popular Sealite solar powered battery lanterns subject to customers specification ie Sealite SL15 1NM or SL 60 or 70 for 2NM.

The EM305BML and EM400BML are both supplied with base fixings @ 200pcd. The EM305BML and EM400BML units are base fixed by 4 x 12mm female base fixings at 200 mm pcd centres.

For EM305BML line drawing [click here](#).

For EM400BML line drawing [click here](#).

**Specification EM305BML EM400BML**
- Width: 338mm 410mm
- Height (ex light): 730mm 890mm
- Wt: 5.3kg 10.2kg
- Max RCS: 63.1M2 229.3M2
- SPL: 10.00M2 54.6M2
- Fixings: Top to suit to suit
- Female Base Fixings: 4x12mm @ 200mm pcd

**Stainless Steel Pedestals**
- Width: top 26cm base 30cm
- Height: 114cm
- Wt: 10kg
- Fixings top and bottom: 4x12mm @ 200mm pcd

All mounting brackets are optional extras.

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### EM325

New top mark for buoys or land hazards, massive 75m2 RCS response with robust 5mm thick UV resistant PE case will support the heaviest navigation lights. 4 x 12mm base fixings @ 200mm PCD for pedestal mounting. Optional top fixings to suit. Available in I.A.L.A Red, Green or Yellow.

Stock stainless pedestals available Replaces EM305BM2/3 & EM305FPMS - EM305TH.
EM325
- 2 Stack -
  Ht 513mm, Dia 365mm, Wt 5.4kg
- 3 Stack -
  Ht 706mm, Dia 365mm, Wt 7kg

EM400PE
Developed for Scandinavian made Ice buoy to give enhanced radar visibility. The picture shown has neutral PE case but these can be made in red, green or black etc.

Dimensions:
- Overall height: 885mm
- Width: 410mm
- Weight: with neutral PE case 6.5kg with coloured case 7.3kg

For linear diagram click here

EM400 as used by the Canadian Coast Guard

EM500
Latest edition to the Echomax range with massive response ideal for target use.
- Maximum radar cross section 361.1m²
- Average RCS over +/- 3 degrees of heel = 68.1m²
Andrew Ridley, Conservancy Operations Manager of Tees & Hartlepool Port Authority Limited first discovered Echomax at Seawork 2001. He was so impressed with their QinetiQ test results and a series of on-site tests that he insisted Echomax arrays were fitted into all the new Eason Marine buoys which he was in the process of ordering. Eason Marine, probably one of the largest suppliers of navigation buoys in the U.K, modified their top marks and cases to suit the EM230/305 arrays. Since they have been laid he has received unsolicited compliments regarding both the radar response and visibility of these units. It was confirmed that the radar response from the Eason Polyethylene 2.4m maintenance free buoy fitted with Echomax arrays was at least equal to if not better than 3m steel buoys fitted with 32” octahedral reflectors. (It is probably only the sheer mass of the metal buoys which has enabled the octahedral reflectors to be fitted for so long).

Mr. Ridley was also receiving complaints from the Harbour Master when another commercially available reflector fitted to a GRP pilot boat built in 2000 provided inconsistent response resulting in loss of the traces on the VTS radar.

New white and orange Echomax 230’s have now been fitted to all seven vessels in Tees & Hartlepool Port Authority’s pilot and workboat fleet to comply with SOLAS Chapter V regulation 19. (Andrew Ridley is too much a gentleman to state that the poorly performing radar reflectors he removed from his vessels were Firdell Blippers 210-5, 210-7 and Firdell Pilot 300’s).

Tees & Hartlepool Pilot Vessel Coatham, fitted with a custom made Echomax EM 305 reflector, built into the radar/mast structure on the wheelhouse roof.

As there was insufficient mast height to fit a standard EM305, a customised 305 was fitted into a GRP roof box/mast support. Although additional height above sea level would have been beneficial it was reported that the EM305 gives a much improved response signal. An EM305 fitted to a fixed wooden finger jetty has enhanced the radar signal through all tidal states and avoids the reflection being lost when a combination of high tide and sea clutter would otherwise have caused problems to approaching vessels.
Sea Trip on Trinity House vessel Vectis to view Barrow - Black Deep 7 fitted with Echomax EM 305 Top mark After just one and a half hours steaming from Harwich on the Trinity House Vessel Vectis, Black Deep 7, green channel buoy was picked up 6.84 miles ahead. The Skipper of Vectis remarked that Echomax radar response was brighter than 11m Sunk Tower beacon with top mark. Half a mile closer we picked up the response of corresponding Trinity House Red Inner Fishers buoy. The very calm sea conditions did not demonstrate the superior response given by Echomax at heel. All parties are aware that the Decca scanner is set very low on the Vectis mast and had this been higher all objects may well have been picked up earlier.

Echomax EM305 Top Mark as fitted to Barrow and Black Deep 7 Trinity House buoys

Cefas SmartBuoy with EM230 radar reflector mounted.

Deployed in Liverpool Bay the unit is used to monitor water quality. Data is telemetered back to Cefas every 2 hours and used in assessments and modelling projects. There are currently 6 active SmartBuoy sites and there are smaller guard buoys to mark bottom lander deployments. Cefas have stated they like to use Echomax radar reflectors on all their buoys, due to the improved performance over the conventional design, and get a radar return from about 3NM in good conditions. They hope this makes the buoys more visible to shipping and thus avoid being hit!

Echomax comment – The reflector mounting height is only 2m considerably reducing the distance response.

Following the development of the Tees & Hartlepool buoys, Eason Marine - XJF - Orchid now recommend Echomax as a standard fitting on all new Polyethylene buoys. Echomax custom made arrays - reflectors have been supplied world wide to Sealite Australia -USA , Corilla, Orchid, Norfloat, JFC,GoDeep, Pharos, Tideland UK and USA, Hippo, Manuplas, E.Y.E., and Mobilis and as far a field as Australia, USA, Canada, Nigeria, China, Malta, Singapore, Indonesia, UAE and Argentina. The Canadian Coast Guard chose our EM400 arrays for their new series of 300 navigation buoys and our EM230-313-400 are used by the US Navy on their Nuclear Submarines and as targets and by many other foreign navies.

“Eason Marine have been manufacturing navigation buoys for over 20 years. Over this period we have strived to achieve a high performance product. One of the most important parts of the navigation buoy is the radar reflector. When we fitted the Echomax Radar Reflector we were so impressed by their performance that we now use them as standard on all EM buoys. In fact many port authorities have commented on the large RCS given by the Echomax Radar Reflector.”
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