
Certificate of Competency as Compass Adjuster

Notice to all candidates

This notice supersedes M.1199

Summary

This notice details the new requirements for experience prior to examination for a certificate of competency as a compass adjuster.

It should also be noted that exemption is now only available from Paper III of the written examination.

Introduction / Background

1. Certificates of competency for adjusters of magnetic compasses in merchant ships are issued by The Maritime and Coastguard Agency (MCA) on the conditions set out in this notice. Adjustment of the compasses of merchant ships in the United Kingdom should, whenever practicable, be entrusted to compass adjusters holding such certificates.
2. Certificates are awarded to candidates who satisfy the MCA of their competency in the practice and principles of compass adjustment. In order to do this, candidates must first meet the required conditions concerning their experience and then pass both a written examination and an oral examination which will include practical tests.

Experience

3. Candidates must either:
 - (i) have had a minimum of six months' workshop experience, in order to appreciate fully the workings of the magnetic compass, during which time they must have been involved in the

service of nine class A magnetic compasses and the practical work of adjusting compasses on board ships. This work must all be done under the supervision of an MCA certificated compass adjuster (i.e. the holder of a compass adjuster's certificate of competency issued by the MCA or by any of its predecessor bodies). Such candidates must be over 21 years old; *or*

- (ii) hold a UK-recognised certificate of competency as Master (Unlimited), or any equivalent certificate previously issued by the MCA or its predecessor bodies, and have taken a course of a minimum three months appropriate workshop experience with an MCA certificated compass adjuster. During this time the candidate must have been involved in the service of nine class A magnetic compasses.

4. Every candidate must show to the satisfaction of the MCA's Chief Examiner that they have adjusted the compasses of at least 12 sea-going ships (which must include nine foreign going merchant ships, three of which must have crossed the

magnetic equator) under the supervision of an MCA certificated compass adjuster. Candidates must produce a Chart and Nautical Instrument Trade Association (CNITA) deviation record sheet for all of those ships, showing in each case the position of the magnets and soft iron correctors. Each record sheet must be signed by the candidate and countersigned by an MCA certificated compass adjuster, with whom the candidate was working at the time, stating that the **complete** adjustment has been carried out in his presence, under his supervision and to his satisfaction. Finally each record sheet must also be verified by the CNITA Compass Adjusters Certification Panel. Blank deviation record sheets may be obtained on application to the Secretaries of the CNITA.

5. It is strongly recommended that trainee compass adjusters should, if practicable, visit the Qinetiq Compass Test Centre (formerly Admiralty Compass Observatory) or other MCA recognised testing authority to observe the procedure for testing a standard compass in accordance with the latest international standards.

Examination

6. Candidates who have complied with the conditions laid down in paragraphs 3 & 4 will be accepted for examination by the MCA. Applications should be made on forms which may be obtained from any MCA Marine Office or the Seafarer Training & Certification Branch: contact details at the end of this notice. Completed application forms, with the appropriate fee and the certificates, testimonials, letters or other documents showing that the candidate has the requisite qualifications according to paragraphs 3 & 4 should be sent to the Seafarer Training & Certification Branch. The supporting documents must be original. Any candidate failing to submit all the required documents will have the application returned without being processed. 28 days should be allowed for processing. Examinations are held as demand requires, but candidates should expect at least eight weeks to elapse between application and examination.

7. The syllabus for the examinations is set out in the Annex to this notice. Candidates must pass all three written papers (unless they are exempted) and the oral examination. Prior to taking the oral examination a candidate who fails in the written examination may be required, at the Chief Examiner's discretion, to submit evidence of having adjusted the compasses of a specified further number of ships before being accepted for re-examination of the written papers.
8. Candidates who hold a UK-recognised Master (Unlimited) certificate of competency or any equivalent certificate previously issued by the MCA or its predecessor bodies will be exempt from Paper III.
9. The examination will be held under the same general conditions as those which govern the conduct of the MCA's examinations for certificates of competency in the Merchant Navy. Information can be found in the Training and Certification Guidance series of Marine Guidance Notes.

Lists of MCA Certificated Compass Adjusters

10. The MCA maintains a list of the compass adjusters who have been granted certificates. The MCA reserves the right to withdraw the certificate of any compass adjuster for incompetence or misconduct and to remove their name from the list, either temporarily or permanently. However, this will not be done without first giving to the person concerned written notice of the incompetency or misconduct alleged against them and an opportunity to show why their name should not be removed from the list and why their certificate should not be withdrawn.

Further Information

11. Further information on the contents of this notice can be obtained from Seafarer Training & Certification Branch: contact details at the end of this notice.

Syllabus of Examination for Compass Adjusters.

Note: All candidates will be expected to be familiar with M. Notices, IMO and ISO publications related to the compass.

PART A - WRITTEN EXAMINATION

Paper I

1. Properties of magnets; meaning of terms “hard” and “soft” iron, magnetic induction and permeability. Effects of magnets on a compass needle under varying conditions. Knowledge of the fields of magnets. Disturbing and restoring couples, position of equilibrium. Molecular theory of magnetism. Magnetic effects of electrical currents.
2. Terrestrial magnetism, variation, dip, total force, horizontal force, vertical force, local attraction; their varying strengths in different parts of the world and their various effects on deviation.
3. Ships’ magnetism; effects of permanent and induced magnetism. Components P, Q and R; the rods a, b, c, d, e, f, g, h and k. Subpermanent magnetism and its effects at sea.
4. Compass design; general principles with special reference to:
 - (a) Size and relative position of compass needles.
 - (b) Location of soft iron correctors and permanent magnets, with reference to each other and to the compass needles, with due regard to standard binnacles of all types, including overhead compasses, and the probable effects if conventional limits are not complied with.
 - (c) Relative position of lubber mark, card, pivot and gimbals axes.
 - (d) Types of correctors used in ships. Their advantages and disadvantages.
5. The siting and lining up of compasses with due regard to the proximity of magnetic material, electrical devices and other disturbing influences. Magnetic screening. Meaning of λ (lambda), μ (mu) and ship’s multiplier. How to find and use these quantities.

Paper II

Compass compensations: Various methods of swinging ship to obtain a deviation table. Construction of a curve of deviations and its practical use in coefficient analysis. Constant, semi-circular, and quadrantal deviation. Analysis of a ship’s deviation book to determine causes of irregular deviations and suggest measures for their removal. Analysis of a table of deviations, obtaining and explaining the approximate coefficients A, B, C, D and E. General principles of compass correction and the methods of finding and compensating for A, B, C, D and E types of deviation. The relation severally of the components P, Q and R and the rods a, b, c, d, e, f, g, h and k to the various coefficients and to heeling error. A knowledge of sextantal and octantal deviations. Compensation by use of the Kelvin deflector. Principle of the deflector method and information which can be deduced from the readings. Limits of accuracy of results obtained. Rules to be followed with regard to the placing of correctors. Questions on “wiping” and degaussing so far as they affect magnetic compasses. A knowledge of the various types of transmitting magnetic compass bowls and repeaters.

Paper III

Ascertaining the true bearing of sun or star and thence the compass error and deviation. Recognition of the principal bright stars. Checking accuracy of instruments used in connection with compasses.

PART B - ORAL EXAMINATION

1. Candidates will be required to demonstrate on suitable apparatus the principle of compass adjustment. They will be required to adjust a dry card compass or a spirit compass using the vertical force instrument in the correction of heeling error. They will be required to have a thorough knowledge of the methods of detecting mechanical errors in dry card and liquid magnetic compasses at sea, alongside and in the workshop and of the positioning and condition of all types of correctors, faulty heeling error conditions; and how such faults should be dealt with. Candidates must be able to demonstrate how a mass of soft iron would be magnetised lying in the Earth's Magnetic Field in different parts of the world or under the influence of permanent magnets.
2. Candidates must know the different methods of taking a bearing and of using and testing a pelorus and an azimuth mirror. Candidates should be familiar with certification procedures.
3. Practical tests may be required or questions may be asked on the use of the Kelvin deflector.
4. Candidates must understand the assessment of safe distances of navigational and other equipment in the vicinity of the Compass.
5. Candidates must show that they appreciate the navigational responsibilities of the Master (and the Pilot if any) whilst the ship is being swung.
6. The Examiner may ask any other questions he deems necessary arising out of the written work submitted by the candidate.

Seafarer Training & Certification Branch
Maritime and Coastguard Agency
Spring Place
105 Commercial Road
SO15 1EG

Telephone: 023 8032 9231
Fax: 023 8032 9252
E-Mail: exams_section@mcga.gov.uk

General enquiries: 24 Hour Info Line
infoline@mcga.gov.uk
0870 600 6505

MCA Website Address: Internet:
<http://www.mcga.gov.uk>

File Ref: MC 057/001/0385

Published: 10/2004

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