



**TRC - 31**  
ISSUE 1

**TELECOMMUNICATIONS  
REGULATION CIRCULAR**

**GUIDE FOR CANDIDATES  
TAKING EXAMINATIONS FOR**

**RADIOCOMMUNICATION OPERATOR'S  
GENERAL CERTIFICATE  
(MARITIME)**

**RADIO OPERATOR'S SECOND  
CLASS CERTIFICATE**

TELECOMMUNICATIONS REGULATION CIRCULARS ARE ISSUED FROM TIME TO TIME TO PROVIDE INFORMATION TO THOSE ENGAGED IN TELECOMMUNICATIONS IN CANADA. THE CONTENT OF THESE CIRCULARS IS SUBJECT TO CHANGE AT ANY TIME IN KEEPING WITH NEW DEVELOPMENTS.

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**CIRCULAIRE DE LA  
RÉGLEMENTATION DES  
TÉLÉCOMMUNICATIONS**

**GUIDE À L'INTENTION DES  
CANDIDATS EN VUE D'OBTENIR UN**

**CERTIFICAT GÉNÉRAL D'OPÉRATEUR  
DES RADIOCOMMUNICATIONS  
(SERVICE MARITIME)**

**CERTIFICAT D'OPÉRATEUR  
RADIO DE DEUXIÈME CLASSE**

LES CIRCULAIRES DE LA DIRECTION DE LA RÉGLEMENTATION DES TÉLÉCOMMUNICATIONS SONT PUBLIÉES EN VUE DE SERVIR DE GUIDE À CEUX QUI S'OCCUPENT DES TÉLÉCOMMUNICATIONS AU CANADA. LES RENSEIGNEMENTS CONTENUS DANS CES CIRCULAIRES PEUVENT ÊTRE MODIFIÉS EN TOUT TEMPS.

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**SERVICE DE LA RÉGLEMENTATION  
DES TÉLÉCOMMUNICATIONS**

CANADIAN PROFESSIONAL RADIOCOMMUNICATION OPERATORS'  
CERTIFICATES

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CANADIAN PROFESSIONAL RADIOCOMMUNICATION OPERATORS'  
CERTIFICATES

- General 1. This circular sets out the conditions to be satisfied in order to obtain a
- a) Radiocommunication Operator's General Certificate (Maritime) (RGMC); and
  - b) Radio Operator's Second Class Certificate (2nd)

GENERAL EXAMINATION REQUIREMENTS

Application 1.1 Applicants wishing to be examined for a certificate should apply to the nearest Department of Communications District Office.

Nationality 1.2 An applicant for a Radiocommunication Operator's General Certificate (Maritime) or Radio Operator's Second Class Certificate examination must be either a Canadian citizen or a landed immigrant.

Documentation 1.3 Candidates may be asked to bring to the examination the following documentation:

- Photograph - one passport size
- Nationality Status - Birth Certificate, Certificate of Canadian Citizenship, Canadian Immigration Identification card, or Declaration of Nationality Status (available at departmental offices)

Pass Marks 2. Pass Marks for the examination are:

<u>Examination</u>	<u>Pass Marks</u>
International Morse Code transmitting and receiving	100%
Technical	70%
Practical	70%
Regulations and Procedures	70%
Computation of Tolls	70%



RADIOCOMMUNICATION OPERATOR'S GENERAL CERTIFICATE (MARITIME)

Radio  
Communication  
Operator's  
General  
Certificate

5. The Radiocommunication Operator's General Certificate (Maritime) (RGMC) introduced in 1978 is expected to gradually replace existing first and second class certificates. A certificate will remain valid for five years from date of issue and may be renewed for an additional five years. Renewal is dependent upon the holder's experience and may involve formal and informal examinations.

Endorsements

5.1 The holder of a RGMC is qualified to act as a radiotelegraph or radiotelephone operator;

- a) on any class of radio station; or
- b) in charge of a Canadian ship station of the third category;
- c) in charge of a ship station of the second category when so endorsed by a Department of Communications' Radio Inspector;\*
- d) in charge of a ship station of the first category when so endorsed by a Department of Communication's Radio Inspector.\*

\* The requirement for endorsement of (c) and (d) is six and twelve months service, respectively, as a shipboard radio operator in the International Maritime Mobile Service.

5.2 Provision is being made for technical endorsements to these certificates in recognition of the holder's skill and knowledge through departmental examination in such areas as radar maintenance, closed circuit TV, data transmission systems, etc.

5.3 To be employed as a radio-communication operator at any coast or ship station, the Department of Transport requires a person to be a minimum of eighteen years of age.

Examination

6. The examination consists of six sections.

Morse Code  
Transmitting

6.1 Section (1) - International Morse Code - Transmitting (2 tests): A candidate is required to send correctly, in the International Morse Code, plain language at a speed of not less than twenty words a minute for five consecutive minutes on an ordinary radiotelegraph or semi-automatic key (Bug); five letters count as one word.

Part (a)

Part (b)

A candidate is required to send correctly, in the International Morse Code, five character code groups at a speed of not less than sixteen groups a minute, for five consecutive minutes. A code group may consist of mixed letters, accented letters, or signs of punctuation, or a series of five figures or mixed figures and signs of punctuation. Accented letters, figures and signs of punctuation are counted as two characters each.

The accuracy of signalling, correct formation of characters, correctness of spacing and style of sending are taken into account.

Morse Code  
Receiving  
Part (a)

6.2 Section (2) - International Morse Code Receiving (2 tests): The candidate is required to receive International Morse Code by ear and write legibly, or type, plain language at a speed of not less than twenty words a minute, for five consecutive minutes; five letters count as one word.

Part (b)

The candidate is required to receive International Morse Code by ear in the manner outlined in 6.2 five character code groups at a speed of not less than sixteen groups a minute for five consecutive minutes. Groups consist of mixed letters, accented letters, or signs of punctuation or mixed figures and signs of punctuation. Accented letters, figures and signs of punctuation are counted as two characters each.

Technical

6.3 Section (3) - Technical. Two written papers on the principles of electricity and the theory of radio and electronics at the technician level. The first paper covers such topics as magnetism and electromagnetism; DC circuit analysis; characteristics, care and maintenance of primary and secondary cells; capacitors; inductors; resistors; transformers; test equipment; motors and generators; AC theory; AC circuit analysis; resonant circuits; tubes and power supplies. The second paper covers such topics as transistors; amplifier circuits; oscillator circuits; pulse circuits; modulation and detection; SSB; transmission lines; antennas; wave propagation; solid state devices and integrated circuits.

On the second paper questions may also relate to the theory, adjustment, operation and maintenance of marine radiocommunication transmitters and receivers; auto-alarms; selective calling devices; lifeboat radio apparatus; direction finders and other radio-navigational apparatus; cathode-ray displays; servo-mechanisms; readout devices and test equipment.

Practical

6.4 Section (4) - Practical: The practical examination is divided into three parts, (1) operation of equipment, (2) fault tracing, and (3) use of test instruments.

In the operation of equipment portion, the candidate is asked to adjust and operate (a) a main and/or reserve transmitter, (b) a main and/or emergency receiver, (c) an automatic alarm receiver, (d) a direction finder, (e) lifeboat radiocommunication equipment, and (f) an automatic alarm signal keying device.

In the fault tracing portion, the candidate is asked to explain the operation of various circuits of the above equipment, to explain the effect if certain components failed, and to outline a fault tracing procedure to locate causes of equipment failures.

In the test instrument portion, the candidate is asked to use various test instruments, i.e. VOM, signal generator, oscilloscope, etc, and to solder and de-solder components in circuits.

Regulations

6.5 Section (5) - Regulations and Procedures: The examination consists of a written and operational test.

6.5.1 Operating Procedure. The procedure paper is an essay type examination on the international regulations applying to the exchange of radiocommunications, Ship Station Technical Regulations and Ship Station Radio Regulations made under the Canada Shipping Act, the general geography of the world, especially principal shipping and telecommunication routes; and the Safety of Life at Sea Convention relating to radio presently in force.

Telephony

6.5.2 Section (6) - Telephony: The candidate is required to demonstrate ability to send and receive messages correctly by telephone.

Computation  
of tolls  
(Maritime  
Service)

6.6 Computation of tolls. The candidate is required to count the words and compute the charges of a radiotelegram and to "transmit" the message to the examiner.



RADIO OPERATOR'S SECOND CLASS CERTIFICATE

Second Class  
Radio  
Operator's  
Certificate

7. With the introduction of the Radiocommunication Operator's General Certificate, the Radio Operator's Second Class Certificate will be gradually phased out.

New First Class certificates have not been issued since April 1, 1976.

Eligibility

To be eligible for examination a person must be a Canadian citizen or Landed Immigrant with not less than 75 percent of normal hearing in each ear as determined by a departmental standard audiometer.

To be employed as a radio-communication operator on any coast or ship station, the Department of Transport requires a person to be a minimum of eighteen years of age.

Validation/  
Renewal

Certificates will remain valid for five years from date of issue, at which time they may be renewed for an additional five years. Renewal criteria are dependent upon the holder's experience and may involve a formal and/or informal examination.

Second  
Class

The holder of a second class certificate may act as a radiotelegraph or radiotelephone operator:

- a) on any class of radio station
- b) in charge of a Canadian ship station of the third category; or
- c) in charge of a ship station of the second category provided the certificate is countersigned by a Canadian Government Radio Inspector certifying the holder has six months experience as a shipboard radio-telegraph operator in the International Maritime Mobile Service.

- Examination 8. The examination consists of six sections.
- Morse Code  
Transmitting  
Part (a) 8.1 Section (1) - International Morse Code - Transmitting - (2 tests): A candidate is required to send correctly, in the International Morse Code, plain language at a speed of not less than twenty words a minute for five consecutive minutes on an ordinary radiotelegraph or semi-automatic key (Bug); five letters count as one word.
- Part (b) A candidate is required to send correctly, in the International Morse Code, five character code groups at a speed of not less than sixteen groups a minute, for five consecutive minutes. A code group may consist of mixed letters, accented letters, or signs of punctuation or a series of five figures or mixed figures and signs of punctuation. Figures, signs of punctuation and accented letters are counted as two characters each.
- The accuracy of signalling, the correct formation of the characters, the correctness of spacing, the style of sending are taken into account.
- Morse Code  
Receiving  
Part (a) 8.2 Section (2) - International Morse Code - Receiving - (2 tests): The candidate is required to receive International Morse Code by ear and write legibly, or type, plain language at a speed of not less than twenty words a minute for five consecutive minutes; five letters count as one word.
- Part (b) The candidate is required to receive International Morse Code by ear, in the manner outlined in 8.2, five character code groups at a speed of not less than sixteen groups a minute, for five consecutive minutes. Groups consist of mixed letters, accented letters, or signs of punctuation, or a series of five figures or mixed figures and signs of punctuation. The figures, signs of punctuation and accented letters are counted as two characters each.

Technical  
Part (a)

8.3 Section (3) - Technical. (Two written papers):

Equipment. Questions on elementary theory, adjustment, principle of operation and maintenance of modern radiotelegraph and radiotelephone receiving and transmitting apparatus used in the maritime mobile service, automatic-alarm and keying devices, fixed and portable life-boat equipment; the principles of operation of other radio apparatus generally used for radionavigation; theory, adjustment, operation and maintenance of the auxiliary apparatus such as motor-generators, storage batteries, test equipment, etc.

Part (b)

Theory. Questions on the elementary principles and/or theory of structure of matter including atoms, electrons, protons, neutrons, etc.; direct current circuitry; conductors and insulators; Ohm's Law and calculations; energy and power; magnetism and inductance; alternating current circuitry; resonance and filters; electrical machines; capacitance and associated calculations; oscillators; transformers; vacuum tubes; transistors; radio transmission and reception; radio receivers, double conversion superheterodynes and power supplies; radio transmitters (CW, DSB, SSB, AM, FM); audio and RF amplifiers; microphones; storage batteries and chargers; antennas; propagation of radio waves; test instruments including oscilloscopes; suppression of radio interference, etc.

Practical

8.4 Section (4) - Oral and Practical. An oral and practical examination is given on marine radio equipment. A candidate is required to connect different parts of the apparatus; to explain the most common faults which may occur during normal operation and methods of repair; to trace and remedy several such faults on the apparatus on which the candidate is being examined; to adjust the apparatus after it has been placed out of commission; and to use direction-finding apparatus to obtain bearings.

Procedures  
and  
Regulations

8.5 Section (5) - The procedures and regulations examination consists of two papers and one practical test.

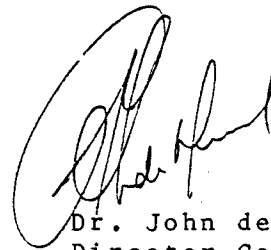
- Part (a) Operating Procedures. The procedure paper is an essay type examination on the international regulations applying to the exchange of radio-communications, Ship Station Technical Regulations and Ship Station Radio Regulations made under the Canada Radio Act, the general geography of the world, especially principal shipping and telecommunication routes; and the Safety of Life at Sea Convention relating to radio presently in force.
- Part (b) Computation of Tolls. Questions on "word count" and "computation of tolls" of radio traffic. The candidate is required to count the words and compute the charges of a radio-telegram and then simulate actual calling and transmission procedures. The International Lists of Coast Stations and other tariff books will be supplied.
- Telephony 8.6 Section (6) - Telephony: The candidate will be required to demonstrate ability to send and receive messages correctly by telephone.
- Training 9. The following technical colleges offer full-time courses in radiocommunication operator training
- 1) Institut Maritime du Quebec,  
53, rue St.Germain Ouest  
Rimouski, Quebec  
G5L 4B4
  - 2) Red River Community College,  
2055 Notre Dame,  
Winnipeg Manitoba  
R3H 0J9

- Study Guide 10. This section is a guide of possible reference sources for the subjects covered by the examinations.
- Technical 10.1 The theory for the technical examinations will be covered in radio and electronic text books which have been prepared for the technician level for a community college course.
- Practical 10.2 Manuals for the operation and maintenance of appropriate equipment are available from several manufacturers.
- Procedure and Computation of Tolls 10.3 The radiotelegraph and radiotelephone operating procedure and information on word counting and the computation of message tolls are covered in the following:
- a) Handbook for Radio Operators available from  
Pendragon House Canada,  
2133 Royal Windsor Drive,  
Unit 1,  
Mississauga, Ontario  
L5J 1K5
  - b) Manual for use by the Maritime Mobile and Maritime Mobile Satellite Services available from  
General Secretariat,  
International Telecommunication Union,  
Geneva, Switzerland.
- Radiotelephone Operating Procedures for the Maritime, Aeronautical and Land services are covered in the ITU manual, item b above, as well as in:
- "Radiotelephone Operator's Handbook" available from  
Canadian Government,  
Publishing Centre,  
270 Albert Street,  
Ottawa, Ontario  
K1A 0S9

Regulations

10.4 Regulations governing the use of radio in Canada are contained in such documents as:

- a) Radio Act
- b) Radio Operators' Certificate Regulations
- c) General Radio Regulations, Parts I and II
- d) Marine Services Radio Regulations
- e) Canada Shipping Act
- f) Ship Station Technical Radio Regulations (administered in Canada by the Canadian Coast Guard, Department of Transport)



Dr. John deMercado,  
Director General,  
Telecommunication  
Regulatory Service.