ภาคผนวก ก.

Medical Supplies

Types, Number, Location and Contents of Medical Supplies

(แนบท้ายประกาศกรมการบินพลเรือน เรื่อง การเดินอากาศด้วยเครื่องบินของผู้ดำเนินการเดินอากาศ พ.ศ. ๒๕๕๗ (ฉบับที่ ๒))

1. Types

1.1 The different types of medical supplies should be provided as follows: first-aid kit(s) for carriage on all aeroplanes, universal precaution kit(s) for carriage on all aeroplanes that require a cabin crew member, and a medical kit for carriage where the aeroplane is authorized to carry more than 100 passengers on a sector length of more than two hours. Where national regulations allow it, operators may elect to carry the recommended medication in the first-aid kit.

1.2 Based on the limited available evidence, only a very small number of passengers are likely to benefit from the carriage of automated external defibrillators (AED) on aeroplanes. However, many operators carry them because they offer the only effective treatment for cardiac fibrillation. The likelihood of use, and therefore of potential benefit to a passenger, is greatest in aircraft carrying a large number of passengers, over long duration sector lengths. The carriage of AEDs should be determined by operators on the basis of a risk assessment taking into account the particular needs of the operation.

2. Number of First-Aid and Universal Precaution Kits

2.1 First-aid kits

The number of first-aid kits should be appropriate to the number of passengers which the aeroplane is authorized to carry:

Passenger	First-aid kits
0 – 100	1
101 – 200	2
201 – 300	3
302 – 400	4
401 – 500	5
More than 500	6

2.2 Universal precaution kits

For routine operations, one or two universal precaution kits should be carried on aircraft that are required to operate with at least one cabin crew member. Additional kit(s)

should be made available at times of increased public health risk, such as during an outbreak of a serious communicable disease having pandemic potential. Such kits may be used to clean up any potentially infectious body contents such as blood, urine, vomit and faces and to protect the cabin crew members who are assisting potentially infectious cases of suspected communicable disease.

3. Location

3.1 First-aid and universal precaution kits should be distributed as evenly as practicable throughout the passenger cabins. They should be readily accessible to cabin crew members.

3.2 The medical kit, when carried, should be stored in an appropriate secure location.

4. Contents

4.1 The following provides guidance on typical contents of first-aid, universal precaution and medical kits.

4.1.1 First-aid kit:

— List of contents
— Antiseptic swabs (10/pack)
— Bandage: adhesive strips
— Bandage: gauze 7.5 cm × 4.5 m
— Bandage: triangular; safety pins
— Dressing: burn 10 cm × 10 cm
— Dressing: compress, sterile 7.5 cm × 12 cm
— Dressing: gauze, sterile 10.4 cm × 10.4 cm
— Tape: adhesive 2.5 cm (roll)
— Steri-strips (or equivalent adhesive strip)
— Hand cleanser or cleansing towelettes
— Pad with shield, or tape, for eye
— Scissors: 10 cm (if allowed by national regulations)
— Tape: Adhesive, surgical 1.2 cm × 4.6 m
— Tweezers: splinter
— Disposable gloves (multiple pairs)
— Thermometers (non-mercury)
— Mouth-to-mouth resuscitation mask with one-way valve

— First-aid manual, current edition

— Incident record form

The following suggested medications can be included in the first-aid kits where permitted by national regulations:

— Mild to moderate analgesic

— Antiemetic

— Nasal decongestant

— Antacid

— Antihistamine

4.1.2 Universal precaution kit:

— Dry powder that can convert small liquid spill into a sterile granulated gel

— Germicidal disinfectant for surface cleaning

— Skin wipes

— Face/eye mask (separate or combined)

— Gloves (disposable)

— Protective apron

— Large absorbent towel

— Pick-up scoop with scraper

— Bio-hazard disposal waste bag

— Instructions

4.1.3 Medical kit:

Equipment

— List of contents

— Stethoscope

— Sphygmomanometer (electronic preferred)

— Airways, oropharyngeal (three sizes)

— Syringes (appropriate range of sizes)

— Needles (appropriate range of sizes)

— Intravenous catheters (appropriate range of sizes)

— Antiseptic wipes

— Gloves (disposable)

— Needle disposal box

— Urinary catheter

— System for delivering intravenous fluids

— Venous tourniquet

— Sponge gauze

— Tape – adhesive

— Surgical mask

— Emergency tracheal catheter (or large gauge intravenous cannula)

— Umbilical cord clamp

— Thermometers (non-mercury)

— Basic life support cards

— Bag-valve mask

— Flashlight and batteries

Medication

— Epinephrine 1:1 000

— Antihistamine – injectable

— Dextrose 50% (or equivalent) – injectable: 50 ml

— Nitroglycerin tablets, or spray

— Major analgesic

— Sedative anticonvulsant – injectable

— Antiemetic – injectable

— Bronchial dilator – inhaler

— Atropine – injectable

— Adrenocortical steroid – injectable

— Diuretic – injectable

— Medication for postpartum bleeding

— Sodium chloride 0.9% (minimum 250 ml)

— Acetyl salicylic acid (aspirin) for oral use

— Oral beta blocker

If a cardiac monitor is available (with or without an AED) add to the above list:

— Epinephrine 1:10 000 (can be a dilution of epinephrine 1:1 000)

ภาคผนวก ข.

Flight Recorders

(แนบท้ายประกาศกรมการบินพลเรือน เรื่อง การเดินอากาศด้วยเครื่องบินของผู้ดำเนินการเดินอากาศ พ.ศ. ๒๕๕๗ (ฉบับที่ ๒))

1. Flight Data Recorder (FDR)

1.1 General requirements

1.1.1 The FDR is to record continuously during flight time.

1.1.2 The FDR container is to:

a) be painted a distinctive orange or yellow colour;

b) carry reflective material to facilitate its location; and

c) have securely attached an automatically activated underwater locating device.

1.1.3 The FDR is to be installed so that:

a) the probability of damage to the recording is minimized. To meet this requirement it should be located as far aft as practicable. In the case of pressurized aeroplanes it should be located in the vicinity of the rear pressure bulkhead;

b) it receives its electrical power from a bus that provides the maximum reliability for operation of the FDR without jeopardizing service to essential or emergency loads; and

c) there is an aural or visual means for pre-flight checking that the FDR is operating properly.

1.2 Parameters to be recorded

1.2.1 Type I FDR. This FDR will be capable of recording, as appropriate to the aeroplane, at least the 32 parameters in Table 1. However, other parameters may be substituted with due regard to the aeroplane type and the characteristics of the recording equipment.

1.2.2 Types II and IIA FDRs. These FDRs will be capable of recording, as appropriate to the aeroplane, at least the first 15 parameters in Table 1. However, other parameters may be substituted with due regard to the aeroplane type and the characteristics of the recording equipment.

1.2.3 Type IA FDR. These FDRs will be capable of recording, as appropriate to the aeroplane, the parameters listed in Table 2.

1.3 Additional information

1.3.1 A Type IIA FDR, in addition to a 30-minute recording duration, is to retain sufficient information from the preceding take-off for calibration purposes.

1.3.2 The measurement range, recording interval and accuracy of parameters on installed equipment is usually verified by methods approved by the appropriate certificating authority.

1.3.3 The manufacturer usually provides the national certificating authority with the following information in respect of the FDR:

a) manufacturer's operating instructions, equipment limitations and installation procedures;

b) parameter origin or source and equations which relate counts to units of measurement; and

c) manufacturer's test reports.

1.3.4 Documentation concerning parameter allocation, conversion equations, periodic calibration and other serviceability/maintenance information should be maintained by the operator. The documentation must be sufficient to ensure that accident investigation authorities have the necessary information to read out the data in engineering units.

2. Cockpit Voice Recorder (CVR)

2.1 General requirements

2.1.1 The CVR is to be designed so that it will record at least the following:

a) voice communication transmitted from or received in the aeroplane by radio;

b) aural environment on the flight deck;

c) voice communication of flight crew members on the flight deck using the aeroplane's interphone system;

d) voice or audio signals identifying navigation or approach aids introduced in the headset or speaker;

e) voice communication of flight crew members using the passenger address system, if installed; and

f) digital communications with ATS, unless recorded by the FDR.

2.1.2 The CVR container is to:

a) be painted a distinctive orange or yellow colour;

b) carry reflective material to facilitate its location; and

c) have securely attached an automatically activated underwater locating device.

2.1.3 To aid in voice and sound discrimination, microphones in the cockpit are to be located in the best position for recording voice communications originating at the pilot and co-pilot stations and voice communications of other crew members on the flight deck when directed to those stations.This can best be achieved by wiring suitable boom microphones to record continuously on separate channels.

2.1.4 The CVR is to be installed so that:

a) the probability of damage to the recording is minimized. To meet this requirement it should be located as far aft as practicable. In the case of pressurized aeroplanes it should be located in the vicinity of the rear pressure bulkhead;

b) it receives its electrical power from a bus that provides the maximum reliability for operation of the CVR without jeopardizing service to essential or emergency loads;

c) there is an aural or visual means for pre-flight checking of the CVR for proper operation; and

d) if the CVR has a bulk erasure device, the installation should be designed to prevent operation of the device during flight time or crash impact.

2.2 Performance requirements

2.2.1 The CVR will be capable of recording on at least four tracks simultaneously. To ensure accurate time correlation between tracks, the CVR is to record in an in-line format. If a bi-directional configuration is used, the in-line format and track allocation should be retained in both directions.

2.2.2 The preferred track allocation is as follows:

Track 1 — co-pilot headphones and live boom microphone

Track 2 — pilot headphones and live boom microphone

Track 3 — area microphone

Track 4 — time reference plus the third and fourth crew members' headphone and live microphone, if applicable.

Note 1.— Track 1 is located closest to the base of the recording head.

Note 2.— The preferred track allocation presumes use of current conventional magnetic tape transport mechanisms, and is specified because the outer edges of the tape

have a higher risk of damage than the middle. It is not intended to preclude use of alternative recording media where such constraints may not apply.

2.2.3 The CVR, when tested by methods approved by the appropriate certificating authority, will be demonstrated to be suitable for the environmental extremes over which it is designed to operate.

2.2.4 Means will be provided for an accurate time correlation between the FDR and CVR.

Note.— One method of achieving this is by superimposing the FDR time signal on the CVR.

2.3 Additional information the manufacturer usually provides the national certificating authority with the following information in respect of the CVR:

2.3.1 manufacturer's operating instructions, equipment limitations and installation procedures; and

2.3.2 manufacturer's test reports.

3. Inspections of FDR and CVR Systems

3.1 Prior to the first flight of the day, the built-in test features on the flight deck for the CVR, FDR and Flight Data Acquisition Unit (FDAU), when installed, should be monitored.

3.2 Annual inspections should be carried out as follows:

3.2.1 the read-out of the recorded data from the FDR and CVR should ensure that the recorder operates correctly for the nominal duration of the recording;

Table 1
Parameter for Flight Data recorders

Serial number	Parameter	Measurement range	Recording interval (seconds)	Accuracy (input to FDR read-o
1	Time (UTC when available, otherwise elapsed time)	24 hours	4	±0.125% per hour
2	Pressure-altitude	−300 m (−1 000 ft) to maximum certificated altitude of aircraft +1 500 m (+5 000 ft)	1	±30 m to ±200 m (±100 ft to ±700 ft)
3	Indicated airspeed	95 km/h (50 kt) to max V_{S_0} *(Note 1)* V_{S_0} to 1.2 V_D *(Note 2)*	1	±5% ±3%
4	Heading	360°	1	±2°
5	Normal acceleration	−3 g to +6 g	0.125	±1% of maximum range excluding datum error
6	Pitch attitude	±75°	1	±2°
7	Roll attitude	±180°	1	±2°
8	Radio transmission keying	On-off (one discrete)	1	
9	Power on each engine *(Note 3)*	Full range	1 (per engine)	±2%
10	Trailing edge flap or cockpit control selection	Full range or each discrete position	2	±5% or as pilot's indica
11	Leading edge flap or cockpit control selection	Full range or each discrete position	2	±5% or as pilot's indica
12	Thrust reverser position	Stowed, in transit, and reverse	1 (per engine)	
13	Ground spoiler/speed brake selection	Full range or each discrete position	1	±2% unless higher accu uniquely required
14	Outside air temperature	Sensor range	2	±2°C
15	Autopilot/auto throttle/AFCS mode and engagement status	A suitable combination of discretes	1	

Note.— The preceding 15 parameters satisfy the requirements for a Type II FDR

16	Longitudinal acceleration	±1 g	0.25	±1.5% max range exclu error of ±5%
17	Lateral acceleration	±1 g	0.25	±1.5% max range exclu error of ±5%
18	Pilot input and/or control surface position-primary controls (pitch, roll, yaw) *(Note 4)*	Full range	1	±2° unless higher accur uniquely required

Serial number	Parameter	Measurement range	Recording interval (seconds)	Accuracy limits (sensor input compared to FDR read-out)
19	Pitch trim position	Full range	1	±3% unless higher accuracy uniquely required
20	Radio altitude	–6 m to 750 m (–20 ft to 2 500 ft)	1	±0.6 m (±2 ft) or ±3%, whichever is greater below 150 m (500 ft) and ±5% above 150 m (500 ft)
21	Glide path deviation	Signal range	1	±3%
22	Localizer deviation	Signal range	1	±3%
23	Marker beacon passage	Discrete	1	
24	Master warning	Discrete	1	
25	NAV 1 and 2 frequency selection *(Note 5)*	Full range	4	As installed
26	DME 1 and 2 distance *(Notes 5 and 6)*	0 – 370 km	4	As installed
27	Landing gear squat switch status	Discrete	1	
28	GPWS (ground proximity warning system)	Discrete	1	
29	Angle of attack	Full range	0.5	As installed
30	Hydraulics, each system (low pressure)	Discrete	2	
31	Navigation data (latitude/longitude, ground speed and drift angle) *(Note 7)*	As installed	1	As installed
32	Landing gear or gear selector position	Discrete	4	As installed

Note.— The preceding 32 parameters satisfy the requirements for a Type I FDR.

Notes —

1. V_{S_0} stalling speed or minimum steady flight speed in the landing configuration.

2. V_D design diving speed.

3. Record sufficient inputs to determine power.

4. For aeroplanes with conventional control systems "or" applies. For aeroplanes with non-mechanical control systems "and" applies. In aeroplanes with split surfaces, a suitable combination of inputs is acceptable in lieu of recording each surface separately.

5. If signal available in digital form.

6. Recording of latitude and longitude from INS or other navigation system is a preferred alternative.

7. If signals readily available.

If further recording capacity is available, recording of the following additional information should be considered:

a) operational information from electronic display systems, such as electronic flight instrument systems (EFIS), electronic centralized aircraft monitor (ECAM) and engine indication and crew alerting system (EICAS). Use the following order of priority:

1) parameters selected by the flight crew relating to the desired flight path, e.g. barometric pressure setting, selected altitude, selected airspeed, decision height, and autoflight system engagement and mode indications if not recorded from another source;

2) display system selection/status, e.g. SECTOR, PLAN, ROSE, NAV, WXR, COMPOSITE, COPY, ETC ;

3) warnings and alerts;

4) the identity of displayed pages for emergency procedures and checklists;

b) retardation information including brake application for use in the investigation of landing overruns and rejected take-offs; and

c) additional engine parameters (EPR, N_1, EGT, fuel flow, etc.).

Table 2

1. The following parameters satisfy the requirements for flight path and speed:
   - Pressure altitude
   - Indicated airspeed or calibrated airspeed
   - Air-ground status and each landing gear air-ground sensor when practicable
   - Total or outside air temperature
   - Heading (primary flight crew reference)
   - Normal acceleration
   - Lateral acceleration
   - Longitudinal acceleration (body axis)
   - Time or relative time count
   - Navigation data*: drift angle, wind speed, wind direction, latitude/longitude
   - Groundspeed*
   - Radio altitude*

2. The following parameters satisfy the requirements for attitude:
   - Pitch attitude
   - Roll attitude
   - Yaw or sideslip angle*
   - Angle of attack*

3. The following parameters satisfy the requirements for engine power:
   - Engine thrust/power: propulsive thrust/power on each engine, cockpit thrust/power lever position
   - Thrust reverse status*
   - Engine thrust target*
   - Engine bleed valve position*
   - Additional engine parameters*: EPR, N1, indicatedvibration level, N2, EGT, TLA, fuel flow, fuel cut-off lever position, N3

4. The following parameters satisfy the requirements for configuration:
   - Pitch trim surface position
   - Flaps*: trailing edge flap position, cockpit control selection
   - Slats*: leading edge flap (slat) position, cockpit control selection
   - Landing gear*: landing gear, gear selector position
   - Yaw trim surface position*
   - Roll trim surface position*
   - Cockpit trim control input position pitch*
   - Cockpit trim control input position roll*
   - Cockpit trim control input position yaw*
   - Ground spoiler and speed brake*: Ground spoiler position, ground spoiler selection, speed brake position, speed brake selection
   - De-icing and/or anti-icing systems selection*
   - Hydraulic pressure (each system)*
   - Fuel quantity*
   - AC electrical bus status*
   - DC electrical bus status*
   - APU bleed valve position*
   - Computed centre of gravity*
   - Low pressure warning*: hydraulic pressure, pneumaticpressure
   - Computer failure*
   - Loss of cabin pressure*
   - TCAS/ACAS (traffic alert and collision avoidance system / airborne collision avoidance system)*
   - Ice detection*
   - Engine warning each engine vibration*
   - Engine warning each engine over temperature*

- Engine warning each engine oil pressure low*
- Engine warning each engine over speed*
- Wind shear warning*
- Operational stall protection, stick shaker and pusher activation*
- All cockpit flight control input forces*: control wheel, control column, rudder pedal cockpit input forces
- Vertical deviation*: ILS glide path, MLS elevation, GNSS approach path
- Horizontal deviation*: ILS localizer, MLS azimuth, GNSS approach path
- DME 1 and 2 distances*
- Primary navigation system reference*: GNSS, INS, VOR/DME, MLS, Loran C, ILS
- Brakes*: left and right brake pressure, left and right brake pedal position
- Date*
- Event marker*
- Head up display in use*
- Para visual display on*

Note 1.— Parameter requirements, including range, sampling, accuracy and resolution, are as contained in the Minimum Operational Performance Specification (MOPS) document for Flight Recorder Systems of the European Organization for Civil Aviation Equipment (EUROCAE) or equivalent documents.

Note 2.— The number of parameters to be recorded will depend on aeroplane complexity. Parameters without an (*) are to be recorded regardless of aeroplane complexity. Those parameters designated by an (*) are to be recorded if an information source for the parameter is used by aeroplane systems and/or flight crew to operate the aeroplane.

ภาคผนวก ค.

Lights to be displayed by Aeroplanes

(แนบท้ายประกาศกรมการบินพลเรือน เรื่อง การเดินอากาศด้วยเครื่องบินของผู้ดำเนินการเดินอากาศ พ.ศ. ๒๕๕๗ (ฉบับที่ ๒))

1. Terminology

When the following terms are used in this document, they have the following meanings:

Angles of coverage.

a) Angle of coverage A is formed by two intersecting vertical planes making angles of 70 degrees to the right and 70 degrees to the left respectively, looking aft along the longitudinal axis to a vertical plane passing through the longitudinal axis.

b) Angle of coverage F is formed by two intersecting vertical planes making angles of 110 degrees to the right and 110 degrees to the left respectively, looking forward along the longitudinal axis to a vertical plane passing through the longitudinal axis.

c) Angle of coverage L is formed by two intersecting vertical planes, one parallel to the longitudinal axis of the aeroplane, and the other 110 degrees to the left of the first, when looking forward along the longitudinal axis.

d) Angle of coverage R is formed by two intersecting vertical planes, one parallel to the longitudinal axis of the aeroplane, and the other 110 degrees to the right of the first, when looking forward along the longitudinal axis.

Horizontal plane. The plane containing the longitudinal axis and perpendicular to the plane of symmetry of the aeroplane.

Longitudinal axis of the aeroplane. A selected axis parallel to the direction of flight at a normal cruising speed, and passing through the centre of gravity of the aeroplane.

Making way. An aeroplane on the surface of the water is "making way" when it is under way and has a velocity relative to the water.

Under command. An aeroplane on the surface of the water is "under command" when it is able to execute manoeuvres as required by the International Regulations for Preventing Collisions at Sea for the purpose of avoiding other vessels.

Under way. An aeroplane on the surface of the water is "under way" when it is not aground or moored to the ground or to any fixed object on the land or in the water.

Vertical planes. Planes perpendicular to the horizontal plane.

2. Navigation lights to be displayed in the air

Note.— The lights specified herein are intended to meet the requirements of Annex 2 for navigation lights.

As illustrated in Figure 1, the following unobstructed navigation lights shall be displayed:

a) a red light projected above and below the horizontal plane through angle of coverage L:

b) a green light projected above and below the horizontal plane through angle of coverage R:

c) a white light projected above and below the horizontal plane rearward through angle of coverage A.

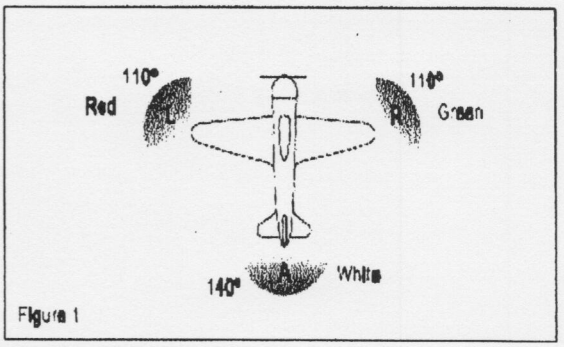


Figure 1

3. Lights to be displayed on the water

3.1 General

Note.— The lights specified herein are intended to meet the requirements of Annex 2 for lights to be displayed by aeroplanes on the water.

The International Regulations for Preventing Collisions at Sea require different lights to be displayed in each of the following circumstances:

a) when under way;

b) when towing another vessel or aeroplane.

c) when being towed;

d) when not under command and not making way;

e) when making way but not under command;

f) when at anchor;

g) when aground.

The lights required by aeroplanes in each case are described below.

3.2 When under way

As illustrated in Figure 2, the following appearing as steady unobstructed lights:

a) a red light projected above and below the horizontal through angle of coverage L;

b) a green light projected above and below the horizontal through angle of coverage R;

c) a white light projected above and below the horizontal through angle of coverage A; and

d) a white light projected through angle of coverage F.

The lights described in 3.2 a), b) and c) should be visible at a distance of at least 3.7 km (2 NM). The light described in 3.2 d) should be visible at a distance of 9.3 km (5 NM) when fitted to an aeroplane of 20 m or more in length or visible at a distance of 5.6 km (3 NM) when fitted to an aeroplane of less than 20 m in length.

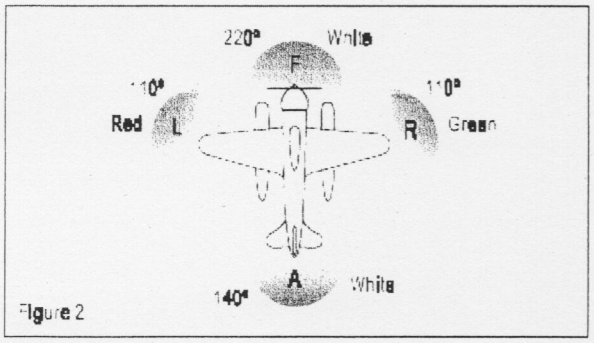


Figure 2

3.3 When towing another vessel or aeroplane

As illustrated in Figure 3, the following appearing as steady, unobstructed lights:

a) the lights described in 3.2;

b) a second light having the same characteristics as the light described in 3.2 d) and mounted in a vertical line at least 2 m above or below it; and

c) a yellow light having otherwise the same characteristics as the light described in 3.2 e) and mounted in a vertical line at least 2 m above it.

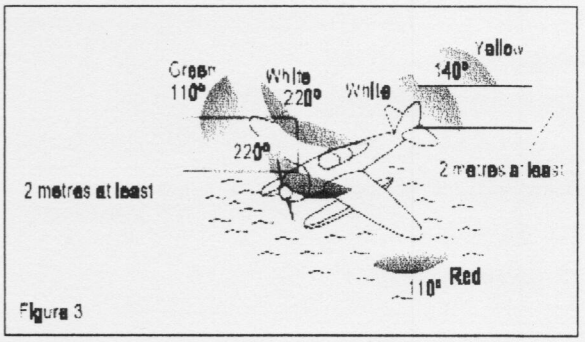


Figure 3

3.4 When being towed

The lights described in 3.2 a), b) and c) appearing as steady, unobstructed lights.

3.5 When not under command and not making way

As illustrated in Figure 4, two steady red lights placed where they can best be seen, one vertically over the other and not less than 1 m apart, and of such a character as to be visible all around the horizon at a distance of at least 3.7 km (2 NM).

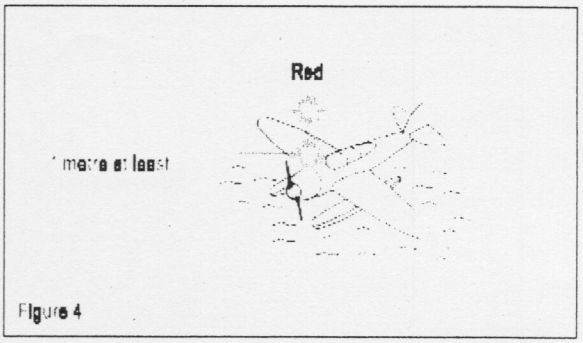


Figure 4

3.6 When making way but not under command

As illustrated in Figure 5, the lights described in 3.5 plus the lights described in 3.2 a), b) and c).

Note.— The display of lights prescribed in 3.5 and 3.6 is to be taken by other aircraft as signals that the aeroplane showing them is not under command and cannot therefore get out of the way. They are not signals of aeroplanes in distress and requiring assistance.

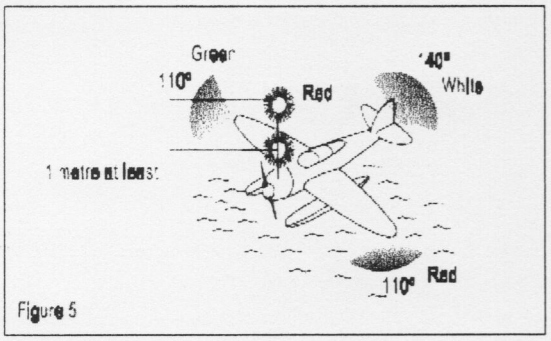


Figure 5

3.7 When at anchor

a) If less than 50 m in length, where it can best be seen, a steady white light (Figure 6), visible all around the horizon at a distance of at least 3.7 km (2 NM).

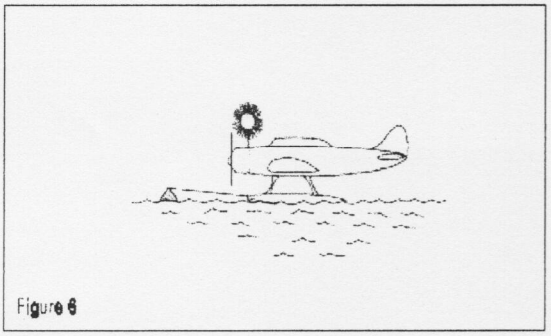


Figure 6

b) If 50 m or more in length, where they can best be seen, a steady white forward light and a steady white rear light (Figure 7) both visible all around the horizon at a distance of at least 5.6 km (3 NM).

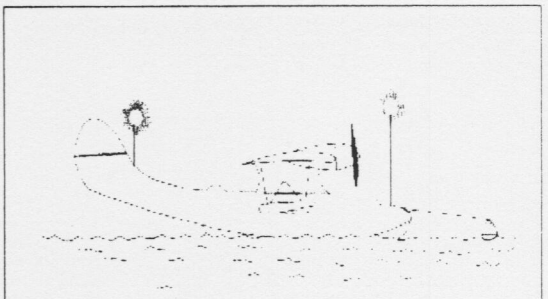
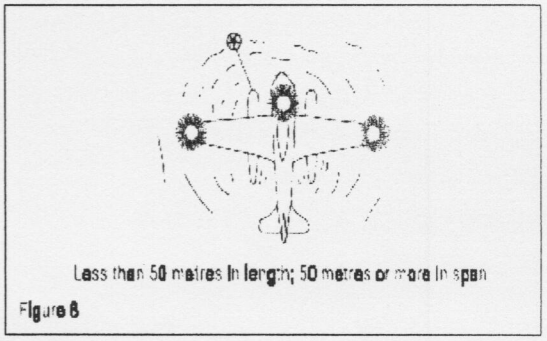
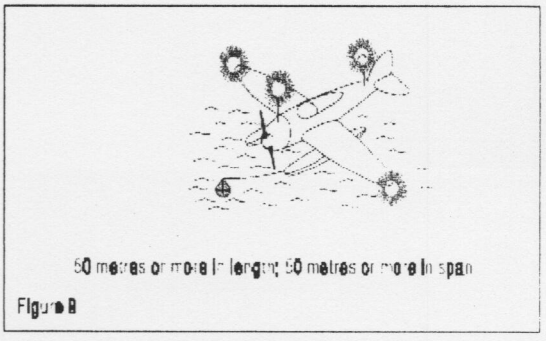


Figure 7

c) If 50 m or more in span a steady white light on each side (Figures 8 and 9) to indicate the maximum span and visible, so far as practicable, all around the horizon at a distance of at least 1.9 km (1 NM).


Less than 50 metres in length; 50 metres or more in span
Figure 8


50 metres or more in length; 50 metres or more in span
Figure 9

3.8 When aground

The lights prescribed in 3.7 and in addition two steady red lights in vertical line, at least 1 m apart so placed as to be visible all around the horizon