### Medical Examination of Seafarers

Seafarers are required to hold a valid medical certificate issued in accordance with the provisions of the Maritime Labor Convention (MLC),2006, and International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW Convention), 1978, amended in 2010 (section A-I/9 of the STCW ).

The aim of the medical examination is to ensure that the seafarer being examined is medically fit to perform his or her routine and emergency duties at sea and is not suffering from any medical condition likely to be aggravated by service at sea, to render him or her unfit for service or to endanger the health of other persons on board.

### **Evaluating Medical Examination Results**

There are defined criteria for some aspects of vision and hearing. These criteria are also mentioned under the titles of seeing and hearing. For other conditions, the criteria have been classified in three categories, depending on the likelihood of recurrence at different stages and the severity of each condition.

- Incompatible with reliable performance of routine and emergency duties safely or effectively
- Able to perform some but not all duties or to work in some but not all waters
- Able to perform all duties worldwide within designated department

### STCW Code table A-I/9 "Minimum Eyesight Standards"

STCW Code table A-I/9: Minimum in-service eyesight standards for seafarers

STCW Convention regulation	Category of seafarer	Distance vision aide One	d <sup>1</sup> Other	Near/intermediate Vision Both eyes together,	Colour vision <sup>3</sup>	Visual fields <sup>4</sup>	Night blindness <sup>4</sup>	Diplopia (double vision) <sup>4</sup>
I/11 II/1 II/2 II/3 II/4 II/5 VII/2	Masters, deck officers and ratings required to undertake look-out duties	Eye 0.5 <sup>2</sup>	<sub>Еуе</sub> 0.5	Vision required for ship's navigation (e.g. chart and nautical publication reference, use of bridge instrumentation and equipment, and identification of aids to navigation)	See Note 6	Normal visual fields	Vision required to perform all necessary functions in darkness without compromise	No significant condition evident
I/11 III/1 III/2 III/3 III/4 III/5 III/6 III/7 VII/2	All engineer officers, electro-technical officers, electro- technical ratings and ratings or others forming part of an engine-room watch	0.4 <sup>5</sup>	0.4 <sup>5</sup>	Vision required to read instruments in close proximity, to operate equipment, and to identify systems/components as necessary	See Note 7	Sufficient visual fields	Vision required to perform all necessary functions in darkness without compromise	No significant condition evident
I/11 IV/2	GMDSS radio operators	0.4	0.4	Vision required to read instruments in close proximity, to operate equipment, and to identify systems/components as necessary	See Note 7	Sufficient visual fields	Vision required to perform all necessary functions in darkness without compromise	No significant condition evident

Notes:

<sup>1</sup> Values given in Snellen decimal notation.

<sup>2</sup> A value of at least 0.7 in one eye is recommended to reduce the risk of undetected underlying eye disease.

<sup>3</sup> As defined in the International Recommendations for Colour Vision Requirements for Transport by the Commission Internationale de l'Eclairage (CIE-143-2001, including any subsequent versions).

<sup>4</sup> Subject to assessment by a clinical vision specialist where indicated by initial examination findings.

<sup>5</sup> Engine department personnel shall have a combined eyesight vision of at least 0.4.

<sup>6</sup> CIE colour vision standard 1 or 2.

<sup>7</sup> CIE colour vision standard 1, 2 or 3.

### • Distance Vision Examination

- Distance vision should be tested using Snellen test type.
- All seafarers should achieve the minimum eyesight standard of 0.1 unaided in each eye (STCW Code, section B-I/9, paragraph 10).
- This standard may also be relevant to other seafarers who wear glasses or contact lenses to ensure visual capability under emergency conditions when visual correction may be lost or damaged.
- Distance vision is as important as color vision for look-out duties.
- Deck personnel must have a combined vision of at least 0.5 but a value of at least 0.7 in one eye is recommended to reduce the risk of undetected underlying eye disease
- Engine department personnel shall have a combined eyesight vision of at least 0.4.

### Evaluation of Distance Vision with Snellen Chart

- The distance between the person and the chart should be 6 meters.
- The room must have enough light.
- There should be no light, shadow or shine on the Snellen Chart.
- Eye examinations in the dark may result in a better visual acuity measurement.
- It should not be used at different distances.
- The eyes must be checked separately.

### Near Vision Examination

- Near vision should be tested with reading test type.
- Near vision is required to be able to read the computer screen, monitors, maps, and instructions.

### **Visual Correction**

- Eyeglasses and contact lens correction are accepted for near and distance vision defects in all classes.
- Those who wear glasses will have a replacement of their glasses, and those who need to wear contact lenses will keep a sufficient number of replacement and one pair of glasses in an easily accessible place on board.
- If there is a requirement to wear glasses or contact lenses to meet the required standards, aided vision should be stated on the seafarer health certificate.

### **Colour Vision Examination**

- It is found appropriate that the color vision examination of seafarers is carried out according to the color vision standards of the International Commission on Illumination (CIE).
- Deck officers must have the ability to distinguish between green and red with port and starboard markings, as well as red, green and white lights, which are navigation signs, while having their shift and look-out duties.
- Engineer officers must be able to distinguish between warning lights (red) and normal status lights (white and green) and the colours of the electrical cables which they will connect.

#### • Color Vision Tests According to CIE

- Ishihara test
- Another Pseudo-isochromatic (PIC) test
- Holmes Wright Lantern test
- Spectral Anomaloscope test
- Farnsworth Dichotomous Test Panel (D15)

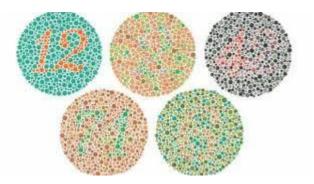
### **Color vision tests for Deck Class**

According to CIE color vision standards tests should be performed as below ;

- Ishihara test or,
- Another Pseudo-isochromatic (PIC) test or,
- Holmes Wright Typ B Lantern test or
- Spectral Anomaloscope test should be performed.
- Color vision tests for Machine Class
- Ishihara test or,
- Another Pseudo-isochromatic (PIC) test or,
- Farnsworth Dichotomous Test Panel (D15) or,
- Holmes Wright Typ B Lantern test or
- Spectral Anomaloscope test should be performed.

### **Pseudo-isochromatic color vision test (PIC) (Ishihara test)**

- Applies to all classes and all color vision standards.
- It is a primary test.
- Red-green vision defect is determined.
- The test is applied from a lenght of an arm (0,5 m) away for 4 sec.
- Proper lighting should be used.
- Daylight fluorescent light is the proper lighting.
- Plates must be protected against fading and contamination.
- There should be no photocopy.
- It should not be looked directly, it should be oblique.
- It should be displayed randomly.
- Colored lenses and glasses should not be used.



### **Pseudo-isochromatic color vision test (PIC) (Ishihara test)**

- In the application of Ishihara Test, people with normal color vision; There may be 1-2 errors; In this case, it can be seen that he/she corrected this mistake or made another 1-2 mistakes in reapplication.
- Therefore, it is considered to be successful to have 2 or less errors..
- If the person pass the Ishihara test; It is considered that the person is able to distinguish red-green colors and does not require additional testing.
- If this test fails, additional tests which meet color vision standards should be performed.

### **Other PIC tests**

Pseudo-isochromatic (PIC) Tests	Publisher
İshihara Test for color vision	Kanehara Shuppan Co. Ltd,
	Tokyo
American Optical Company's Pseudo-isochromatic	Beck Engraving Company,
Color Plates	Philedelphia
Boström Kugelberg Sheets for color vision.	KİFA,
Tabulae Pseudo-isochromatic Plates	Stockholm
Dvorine Pseudo-isochromatic Plates	The Psychological Corporation,
	USA
Standard Psuedo-isochromatic Plates (SPP)	İgaku-Shoin,
	Tokyo
Hahn New Pseudo-isochromatic Color Vision Test	Hahn Tıbbi Cihazlar Mfg Co,
	Seul, Korea

### **Holmes Wright Type B Lantern Test**

• Shows marine signals from afar.



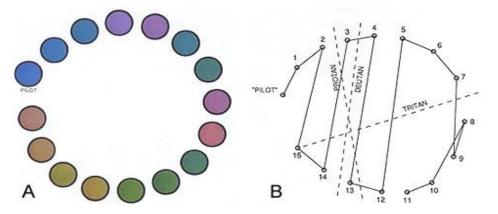
- 9 pairs of colors are shown in two rounds. The names of the defined colors are recorded. When a mistake is made, these rounds should be repeated 3-4 times.
- Test failure criteria; 2 or more mistakes in two rounds of 9 pairs count as failures.
- These types of tests are useful in determining the suitability for profession of those with "mild" color vision defects.
- Applies to all classes of seafarers. It simulates the signal lights of lanterns used in practice.
- It effectively detects all people with defective color vision defects.
- Bright lights should be avoided during the application of this test and the test should be done in a low light environment. Individuals should be adapted to lighting for 10 minutes before the test.
- The test should be explained to the person and the names of the colors should be told.
- The names of the colors to be displayed must be expressed.
- Colors are shown within 2 seconds.
- Without informing the person about her/his mistakes, they should be only recorded and the test should be repeated.

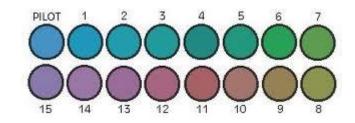
### **Farnsworth D15 Test**

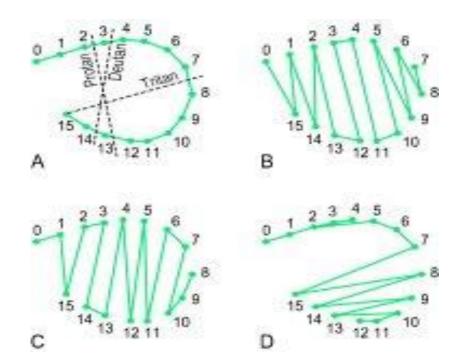


- The Farnsworth D 15 test consists of 16 sets of colored disc with a diameter of 12 mm.
- Colors; ranges from blue, blue-green, yellow-green, yellow, orange and red to red-purple.
- A person who fails this test will have difficulty distinguishing surface color codes.
- If there are two or more opposite intersections it is the cause of failure.
- Applies to machine class, radio and electrical class only. It does not apply to the deck class.
- The Farnworth D15 test allows to distinguish those with severe or moderate color vision defects from those with mild color vision defects or normal color vision.
- People who have severe color vision defects and, as a result, have great difficulty detecting signal colors will always fail the D15 test.

### Evaluation of Farnsworth D 15 test

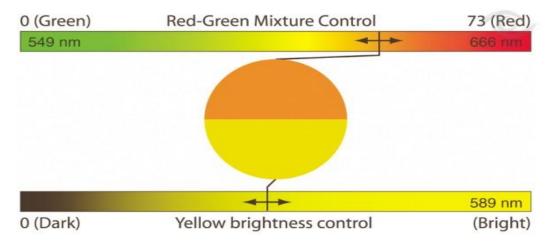






### **Spectral Anomaloscope**

- It is enabled that the colour of the red green mixture to be varied from pure red, to orange, yellow, yellow-green through to pure green by changing proportions of the red and green. The mixture is varied by the subject to find a colour that exactly matches the colour of the yellow half field. The brightness of the yellow field is then adjusted until the two half fields have exactly the same colour and brightness.
- It is found that the match to yellow holds only within a very narrow range of variation of the red + green mixture (std. dev. 1,5 scale units). This range of red-green mixture settings over which a colour match holds is known as the matching range. It is a measure of the ability to distinguish differences in colour.



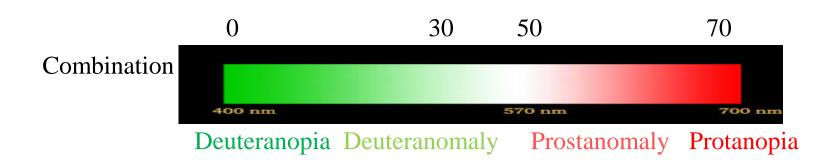


Source: Schiefer, Wilhelm, Hart (Eds.). Clinical Neuro-Ophthalmology - A Practical Guide. Springer, Berlin/Heidelberg/New York, 2007.

### **Spectral Anomaloscope Test**

Rayleigh: Green-red test

- Protonomals will choose a match that has an excess of red and will usually reject the normal colour match because it is too green.
- Deuteranomals will choose a match that has an excess of green and will usually reject the normal colour match because it is too red.
- In the fail criteria, the mean matched point (MMP) is more than + 2 standard deviations from the normal population color mean, or the match rate is more than 3 standard deviations of the normal mean.





# Wearing glasses/contact lenses during the color vision test

- Glasses and contact lenses are not allowed during the color vision test.
- The use of sunglasses and normal correction glasses with tinted lenses is not suitable, as they try to differentiate the colors from the brightness difference by changing the relative brightness of the colors.
- Testing with chromogen lenses will make the test invalid.

### Visual Field Examination

- The entire field that any one of the eyes can see while looking at a fixed point is called the "Visual Field".
- The devices that measure the visual field are called perimeter and the measurement process is called perimetry.
- An excitant light (a stimulant) is given at varying points and intensity.
- The person's response to these stimuli is evaluated.
- Even if the person's visual acuity is at full level, there may be a visual field defect.
- There is also a simple visual field test known as the confrontation test, which can be done without tools and is subjective. This test is performed by the doctor sitting in front of the patient, approaching from the periphery, right, left, down, and the patient's tracking the finger.
- It is assumed that the visual field of the person performing the test is normal. The results of these tests are not reliable in patients with compliance problems.
- There should be no central scotoma.
- Peripheral visual fields should be 140 degrees in total.

### Hearing Evaluation

- Seafarers are required to have sufficient hearing and speaking abilities to communicate effectively and perceive audio warnings.
- Hearing capacity for seafarers should be at least 30 dB on average (unsupported) in the good ear and 40 dB on average (unsupported) in the worse ear at frequencies of 500, 1,000, 2,000 and 3,000 Hz (respectively equivalent to approximately 3 meters and 2 meters of speech-hearing distance).
- Hearing examinations are recommended to be done with pure tone audiometry.
- Speech and whisper tests can be useful for quick practical evaluations.

### Hearing Evaluation

- Those performing on deck and bridge duties should be able to hear the whispering sound from 3 meters away during periodic inspections.
- Hearing aids are only accepted in seafarers when it is confirmed that they have the capacity to safely and effectively perform the routine and emergency duties expected from them. This should be at a hearing level that complies with the normally required minimum hearing standard.
- The seafarer should be warned by the attending physician that he or she should have a replacement of the hearing aid on board. Necessary arrangements should be made to ensure that these people can reliably wake up from sleeping during an emergency alarm.
- The need for a hearing aid should be stated on the seafarer's health certificate.

### Speaking

- Speaking should be reasonably clear enough to use walkie-talkies and communicate on the bridge, with no stuttering or hesitation.
- People with incomprehensible speech disorders (articulation disorder, dysarthria, stuttering, etc.) and voice disorders (dysphonia, hypernasality, hyponasality, etc.) cannot work in the radio class.

### **Evaluation of Physical Abilities**

- In Seafarers' Examinations, it is very important to evaluate their physical competence well and to make sure that they comply with the criteria.
- Especially heavy and tiring working conditions and sometimes harsh and unfavorable weather conditions on the vessel will require the seafarer to be able to move normally on board, agility, flexibility, and sufficient muscle strength.

### Table B-I/9: Assessment of minimum entry level and in-service physical abilities for seafarers

Shipboard task, function, event or condition 3	Related physical ability	A medical examiner should be satisfied that the candidate: 4
<ul><li>Routine movement around vessel:</li><li>on moving deck</li></ul>	• Maintain balance and move with agility	• Has no disturbance in sense of balance
<ul> <li>between levels</li> <li>between compartments</li> </ul>	<ul> <li>Climb up and down vertical ladders and stairways</li> <li>Step over coamings (e.g. Load Line Convention requires coamings to be 600 mm high)</li> <li>Open and close watertight doors.</li> </ul>	<ul> <li>Does not have any impairment or disease that prevents relevant movements and physical activities</li> <li>Is, without assistance, 5 able to:</li> <li>climb vertical ladders and stairways</li> <li>step over high sills</li> <li>manipulate door closing systems</li> </ul>

Shipboard task, function, event or condition 3	Related physical ability	A medical examiner should be satisfied that the candidate: 4
<ul> <li>Routine tasks on board:</li> <li>use of hand tools</li> <li>movement of ship's stores</li> <li>overhead work</li> <li>valve operation</li> <li>standing a four-hour watch</li> <li>working in confined spaces</li> <li>responding to alarms, warnings and instructions</li> <li>verbal communication</li> </ul>	<ul> <li>Strength, dexterity and stamina to manipulate mechanical devices</li> <li>Lift, pull and carry a load (e.g. 18 kg)</li> <li>Reach upwards, stand, walk and remain alert for an extended period</li> <li>Work in constricted spaces and move through</li> <li>restricted openings (e.g. SOLAS regulation 11-I/3- 6.5.1 requires</li> </ul>	<ul> <li>Does not have a defined impairment or diagnosed medical condition that reduces ability to perform routine duties essential to the safe operation of the vessel</li> <li>Has ability to:</li> <li>✓ work with arms raised</li> <li>✓ stand and walk for an extended period</li> <li>✓ enter confined space</li> </ul>
	<ul> <li>openings in cargo spaces and emergency escapes to have the minimum dimensions of 600 mm × 600 mm)</li> <li>Visually distinguish objects, shapes and signals</li> <li>Hear warnings and instructions</li> </ul>	competent authority or take account

• Give a clear spoken description

### Table B-I/9: Assessment of minimum entry level and in-service physical abilities for seafarers

Shipboard task, function, event or condition 3	Related physical ability	A medical examiner should be satisfied that the candidate: 4

Emergency duties 6 on board:

- escape
- firefighting
- evacuation



- Don a lifejacket or immersion suit •
- Escape from smoke-filled spaces
- Take part in fire-fighting duties, including use of breathing apparatus
- Take part in vessel evacuation procedures
- Does not have a defined impairment or diagnosed medical condition that reduces ability to perform emergency duties essential to the safe operation of the vessel
- Has ability to:;
- ✓ don lifejacket or immersion suit
- ✓ Crawl
- ✓ feel for differences in temperature
- ✓ handle fire-fighting equipment
- ✓ wear breathing apparatus (where required as part of duties)

### Situations That Physical Abilities Can Be Restricted;

- Some drugs, which have the potential to affect seafarers' duties on board, their ability to use equipment and materials, and their ability to move in emergencies, are important in this regard, as they weaken their physical capacity.
- Seafarers should not use any medication that has side effects that would impair the judgment, balance, and other requirements necessary to effectively and safely perform routine and emergency duties on board.

#### **CRITERIA FOR COMMON MEDICAL CONDITIONS**

• The evaluation criteria for common medical conditions are **divided into three categories**, **based on the likelihood and severity of recurrence**:

#### 1-Temporary or permanent health status of being unable to be a seafarer:

- Unsuitable medical conditions for seafarers to perform their routine and emergency duties safely:
- This means a medical condition that could endanger the safety of the **vessel or the people on board**, be unable to **perform routine and emergency duties on board**, or put their health at greater risk than on shore. In these medical situations, a medical report is issued for **the inability to be a seafarer**.
- Being **unable** to be seafarer health status may be **temporary** (**T**) (e.g. less than two years) or **permanent** (**P**) (e.g. more than two years).
- **Temporary unable to be seafarer situation** (T): It is considered temporary until it is **treated** or a period when there are **no additional attacks** and shows that there is **no possibility of recurrence**, and during this period there is unable to be seafarer health report is issued by specifying the duration. These people are re-examined after the specified period and re-evaluated.
- **Permanent unable to be seafarer situation** (P): **The permanent unable to be seafarer report** is issued to the seafarers whose health condition is considered **not to meet the required minimum capacities within two years**.

(T) surveillance needed (L) – expected to be permanent (P)	ICD-10 (diagnostic codes)	Condition (justification for criteria)		Able to perform some but not all duties or to work in some but not all waters (R) Increased frequency of surveillance needed (L)	Able to perform all duties worldwide within designated department
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#### 2- Limited and short-term report

#### Medical conditions that they can perform some routine and emergency duties or

#### they can work in some waters or

#### require more frequent check-ups.

In cases where they can perform **some but not all routine and emergency duties**, or can **work in some waters (R)**, **a restricted and prohibited "able to be a seafarer" health report** is issued.

A short-term "able to be seafarer" medical report is issued when increased surveillance is required, i.e. more frequent health checks are required (P).

#### **3- Unlimited report**

Able to perform **all duties worldwide** within designated department:

In these cases, an **unlimited** "able to be seafarer" **medical report and attendance certificate** is issued.

ICD-10 (diagnostic codes) Condition (justification for criteria)	Incompatible with reliable performance of routine and emergency duties safely or effectively – expected to be temporary (T) – expected to be permanent (P)	Able to perform some but not all duties or to work in some but not all waters (R) Increased frequency of surveillance needed (L)	Able to perform all duties worldwide within designated department
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## FITNESS CRITERIA FOR COMMON MEDICAL CONDITIONS:

- The recommendations in this appendix (Table 7) are intended to allow some flexibility of interpretation while being **compatible** with consistent decision-making that aims to maintain safety at sea.
- The medical conditions listed are common examples of those that may render **seafarers unfit**. The list can also be used to **determine appropriate limitations to fitness.**
- The ability to work at sea varies greatly depending on the natural course of each condition and the extent of treatment.
- The table is laid out as follows:
- Column 1: WHO Classification.
- Column 2: The common **name** of the condition or group of conditions, with a brief statement on its **relevance** to work at sea.
- Column 3: The guideline recommending when work at sea is unlikely to be indicated, either **temporarily** or **permanently**. This column should be consulted first when the table is being used to aid decisions about **fitness**.
- Column 4: The guideline recommending when work at sea may be appropriate but when restriction of duties or monitoring at intervals of less than two years is likely to be appropriate. This column should be consulted if the seafarer does not fit the criteria in column 3.
- Column 5: The guideline recommending when work at sea within a seafarer's designated department is likely to be appropriate. This column should be consulted if the seafarer does not fit the criteria in columns 3 or 4.

ICD-10 (diagnostic codes)	Condition (justification for criteria)	Incompatible with reliable performance of routine and emergency duties safely or effectively – expected to be temporary (T) – expected to be permanent	Able to perform some but not all duties or to work in some but not all waters (R) Increased frequency of surveillance needed (L)	Able to perform all duties worldwide within designated department
		(P)		

<b>ICD-10</b> Diagnost ic Codes	Condition (justification for criteria)	Incompatible with reliable performance of routine and emergency duties safely or effectively – expected to be temporary (T) – expected to be permanent (P)	in some but not all waters	duties worldwide
Classify by conditi on	Conditions not specifically listed	T – Until investigation and treated if indicated P – If permanently impairing	Use analogy with related conditions as a guide. Consider likelihood of sudden incapacity, recurrence or progression and limitations on performing normal and emergency duties. If in doubt, obtain advice or consider restriction and referral to referee	Use analogy with related conditions as a guide. Consider excess likelihood of sudden incapacity, of recurrence or progression and limitations on performing normal and emergency duties. If in doubt, obtain advice or consider restriction and referral to referee

### **Restrictions and prohibitions**

- Fit for near coastal waters and temperate work
- Not fit for lone working
- Not fit for solo watchkeeping
- Fit for non-watchkeeping duties in cabotaj
- Fit for work with a low liability for injury in coastal waters
- Fit for duties in harbour areas
- Fit for near coastal waters
- Fit for operating within one hour of port

#### Restrictions and prohibitions according to health status

- Gastrointestinal infection Fit for non-catering department
- **HIV** Fit for near coastal
- Malignant neoplasms Fit for near coastal
- Anaemia/Haemoglobinopathies Fit for near coastal
- **Splenectomy** Fit for coastal and temperate work
- **Diabetes Insulin using** Fit for near coastal duties without solo watchkeeping
- **Diabetes Non-insulin treated** Fit for near coastal waters and non-watchkeeping duties
- Obesity/abnormal body mass Fit for time limited and restricted to near coastal waters
- Alcohol abuse Not fit to work as master in charge of vessel or without close supervision and continuing medical monitoring
- **Drug dependence/persistent substance abuse** Not fit to work as master in charge of vessel or without close supervision and continuing medical monitoring
- **Psychosis** Fit for restricted near coastal waters and not to work as master in charge of vessel or without close supervision and continuing medical monitoring
- **Mood/affective disorders** Fit for restricted near coastal waters and not to work as master in charge of ship

#### Restrictions and prohibitions according to health status

- Epilepsy No provoking factors (multiple seizures) Fit for restricted non-watchkeeping duties in near coastal waters
- Narcolepsy (Sleeping Sickness) Fit for near coastal waters and no watchkeeping duties
- Syncope and other disturbances of consciousness Fit for near coastal with no lone watchkeeping
- Intracranial surgery/injury Fit for near coastal, no lone watchkeeping
- Congenital and valve disease of heart Fit for near coastal
- **Cardiac event** Fit for no lone working or watchkeeping/lookout; and operating within one hour of port
- Arterial-claudication Fit for restricted non-watchkeeping duties in coastal waters
- **Deep vein thrombosis/pulmonary embolus** Fit for work with a low liability for injury in national coastal waters
- **Pneumothorax** Fit for duties in harbour areas
- **Peptic ulcer** Fit for near coastal duties
- Hernias Inguinal and femoral Fit for near coastal duties
- Non-infectious enteritis, colitis, Crohn's disease, diverticulitis, etc. Fit for near coastal duties
- Prostatic enlargement/urinary obstruction Fit for near coastal duties
- **Pregnancy** Fit for near coastal duties