

Regulation concerning amendments to the Regulations of 1 January 2005 No. 8 concerning the working environment, health and safety of workers on board ship

Legal basis: Laid down by the Norwegian Maritime Authority on 30 June 2014 under the Act of 16 February 2007 No. 9 relating to Ship Safety and Security (Ship Safety and Security Act) sections 6, 21 and 22, cf. Formal Delegation of 16 February 2007 No. 171 and Formal Delegation of 31 May 2007 No. 590.

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Regulations of 1 January 2005 No. 8 concerning the working environment, health and safety of workers on board ship are amended as follows:

Chapter 15 should read:

Chapter 15 Provisions concerning the protection against noise

Section 15-1 Definitions

1. *"A-weighted equivalent continuous sound level $L_{Aeq}(T)$ "*: A-weighted sound pressure level of a continuous steady sound that, within a measurement time interval, T, has the same mean square sound pressure as a sound under consideration which varies with time. It is expressed in decibels A (dB(A)) and is given by the following equation:

$$L_{Aeq,T} = 10 \log \frac{1}{T} \int_0^T \frac{p_a(t)^2}{p_0^2} \cdot dt$$

where: T = measurement time

$p_a(t)$ = A-weighted instantaneous sound pressure

p_0 = 20 μ Pa (the reference level).

2. *"A-weighted sound pressure level or noise level"*: The quantity measured by a sound level meter in which the frequency response curve is weighted according to the A-weighting curve (see IEC 61672-1).
3. *"Navigating bridge wings"*: The parts of the vessel's navigating bridge extending out towards the vessel's sides.
4. *"C-weighted equivalent continuous sound level $L_{Ceq}(T)$ "*: C-weighted sound pressure level of a continuous steady sound that, within a measurement time interval, T, has the same mean square sound pressure as a sound under consideration which varies with time. It is expressed in decibels C (dB(C)) and is given by the following equation:

$$L_{Ceq,T} = 10 \log \frac{1}{T} \int_0^T \frac{p_c(t)^2}{p_0^2} \cdot dt$$

where: T = measurement time

$p_c(t)$ = C-weighted instantaneous sound pressure

p_0 = 20 μ Pa (the reference level).

5. "C-weighted sound pressure level or noise level": The quantity measured by a sound level meter in which the frequency response is weighted according to the C-weighting curve (see IEC 61672-1 (2002-05)).
6. "C-weighted peak sound level, L_{Cpeak} ": C-weighted maximum instantaneous sound pressure level. It is expressed in decibels C (dB(C)) and is given by the following equation:

$$L_{Cpeak} = 10 \log \frac{p_{peak}^2}{p_0^2}$$

where: p_{peak} = C-weighted maximum instantaneous sound pressure
 p_0 = 20 μ Pa (the reference level).

7. "Daily noise exposure level ($L_{ex,8h}$) (dB(A) re. 20 μ Pa)": Time-weighted average of the noise exposure levels for a nominal eight-hour working day as defined by international standard ISO 1999:1990, point 3.6. It covers all noises present at work, including impulsive noise.
8. "Daily noise exposure level ($L_{ex,24h}$)" represents the equivalent noise exposure level for a period of 24 hours.

$$L_{ex,24h} = L_{Aeq,T} + 10 \log(T/T_0)$$

where: T is the effective duration on board
 T_0 is the reference duration 24 h.

The total equivalent continuous A-weighted sound pressure level ($L_{Aeq,T}$) shall be calculated by using the different noise levels (L_{Aeq,T_i}) and associated time periods with the following equation:

$$L_{Aeq,T} = 10 \log \left[\frac{1}{T} \sum_{i=1}^n (T_i \times 10^{0.1 L_{Aeq,T_i}}) \right]$$

where:

L_{Aeq,T_i} is the equivalent continuous A-weighted sound pressure level, in decibels, averaged over time interval T_i ,

$$T = \sum_{i=1}^n T_i$$

$L_{ex,24h} = L_{Aeq,24h}$ when the persons working on board are on board the vessel for a period of 24 hours.

9. "Dynamically supported craft": A craft which is operable on or above water and which has characteristics different from those of conventional displacement ships. Within the aforementioned generality, a craft which complies with either of the following characteristics:

- .1 the weight, or a significant part thereof, is balanced in one mode of operation by other than hydrostatic forces;
 - .2 the craft is able to operate at speeds such that the function $\frac{v}{\sqrt{gL}}$ is equal to or greater than 0.9, where "v" is the maximum speed, "L" is the water-line length and "g" is the acceleration due to gravity, all in consistent units.
10. "*Exposure limits*": Noise exposure values which require immediate actions if they are exceeded.
 11. "*High-speed craft*": Craft as defined in the International Convention for the Safety of Life at Sea, 1974, regulation X/1.
 12. "*Hearing loss*": Hearing loss is evaluated in relation to a reference auditory threshold defined conventionally in ISO Standard 389-1(1998). The hearing loss corresponds to the difference between the auditory threshold of the subject being examined and the reference auditory threshold.
 13. "*Hearing protector*": A device worn to reduce the level of noise reaching the ears. Passive noise-cancelling headsets block noise from reaching the ear. Active noise-cancelling headphones generate a signal that cancels out the ambient noise within the headphone.
 14. "*Impulsive noise*": High-intensity noise of short time duration.
 15. "*Integrating sound level meter*": A sound level meter designed or adapted to measure the level of the mean squared time averaged A-weighted and C-weighted sound pressure.
 16. "*Continuously manned spaces*": Spaces in which the continuous or prolonged presence of persons working on board is necessary for normal operational periods.
 17. "*Sound*": Energy that is transmitted by pressure waves in air or other materials and is the objective cause of the sensation of hearing.
 18. "*Sound pressure level L_p* ": Sound pressure level expressed in decibel (dB), or a sound or noise given by the following equation:

$$L_p = 10 \log \frac{p^2}{p_0^2}$$

where: p= sound pressure, in Pascal

$p_0 = 20 \mu\text{Pa}$ (the reference level).

19. "*Peak sound pressure (p_{peak})*": Maximum value of the 'C'-frequency weighted instantaneous sound pressure.
20. "*Machinery spaces*": Any space which contains steam or internal-combustion machinery, pumps, air compressors, boilers, oil fuel units, major electrical machinery, oil filling stations,

thrusters, refrigerating, stabilizing, steering gear, ventilation and air conditioning machinery, etc., and trunks to such spaces.

21. "*Dredger*": A vessel undertaking operations to excavate bottom sediment, where the vessel has permanently installed excavation equipment.
22. "*Pile driving vessel*": A vessel undertaking operations to install pilings in the seabed.
23. "*Accommodation spaces*": Cabins, offices (for carrying out ship's business), hospitals, messrooms, recreation rooms (such as lounges, smoke rooms, cinemas, gymnasiums, libraries and hobbies and games rooms) and open recreation areas to be used by persons working on board.
24. "*Noise*": For the purpose of this chapter all sound which can result in hearing impairment, or which can be harmful to health or be otherwise dangerous or disruptive.
25. "*Noise level*": See A-weighted sound pressure level in paragraph 2 of this section.
26. "*Noise induced hearing loss*": A hearing loss, originating in the nerve cells within the cochlea, attributable to the effects of sound.
27. "*Action values*": Noise exposure values which requires actions to be taken in order to reduce the health risk and unfortunate strain to a minimum.
28. "*Duty stations*": Those spaces in which the main navigating equipment, the ship's radio or the emergency source of power are located or where the fire recording or fire control equipment is centralised and also those spaces used for galleys, main pantries, stores (except isolated pantries and lockers), mail and specie rooms, workshops other than those forming part of the machinery spaces and similar such spaces.
29. "*Weekly noise exposure level ($L_{ex,8h}$)*": Time-weighted average of the daily noise exposure levels for a nominal week of five eight-hour working days as defined by international standard ISO 1999:1990, point 3.6 (note 2).
30. "*Weighted sound reduction index, R_w* ": A single number value expressed in decibels (dB) which describes the overall sound insulation performance (in laboratory) that walls, doors or floors provides (see ISO 717-1:1997 as amended by 1:2006).

Section 15-2 *Systematic prevention of noise*

- (1) The work shall be planned and carried out in such a manner as to protect the persons working on board against noise. Measures shall be taken at source as far as practicable with regard to technical improvements, or by limiting the duration and intensity of sound exposure in other ways.
- (2) Technical devices shall be arranged, used and maintained in such a way that unnecessary noise does not arise.
- (3) Risks arising from exposure to noise shall be reduced based on the general principles or prevention set out in chapter 2 of these Regulations, taking into account in particular:
 - a) other working methods that require less exposure to noise;
 - b) the choice of appropriate work equipment, taking account of the work to be done, emitting the least possible noise, including the possibility of making available to persons working on board work equipment with the aim or effect of limiting exposure to noise;

- c) the design and layout of workplaces and work stations;
- d) adequate information and training to instruct persons working on board to use work equipment correctly in order to reduce their exposure to noise to a minimum;
- e) noise reduction by technical means:
 - i) reducing airborne noise, e.g. by shields, enclosures, sound-absorbent coverings;
 - ii) reducing structure-borne noise, e.g. by damping or isolation;
- f) appropriate maintenance programmes for work equipment, the workplace and workplace systems;
- g) organisation of work to reduce noise:
 - i) limitation of the duration and intensity of the exposure;
 - ii) appropriate work schedules with adequate rest periods.

Section 15-3 *Risk assessment*

(1) Risk assessments of the noise levels to which the persons working on board are exposed, shall be carried out. The requirements of this chapter for noise limits, noise measurements, methods of measurement, measuring equipment and personnel to carry out the measurements, are a part of such risk assessment. The risk assessments shall be kept up to date on a regular basis, and new risk assessments shall always be carried out when significant changes affect the noise exposure or when the results of health surveillance show it to be necessary.

(2) The risk assessments shall give particular attention to the following:

- a) the level, type and duration of exposure, including any exposure to impulsive noise;
- b) the exposure limits and action values for noise exposure laid down in section 15-18;
- c) any effects concerning the health and safety of persons working on board belonging to particularly sensitive work groups;
- d) as far as technically achievable, any effects on the health and safety of persons working on board, resulting from interactions between noise and work-related ototoxic substances, and between noise and vibrations;
- e) any indirect effects on the health and safety of persons working on board, resulting from interactions between noise and warning signals or other sounds that need to be observed in order to reduce the risk of accidents;
- f) information on noise emission provided by manufacturers of work equipment used on board;
- g) the existence of alternative work equipment designed to reduce the noise emission;
- h) exposure to noise beyond normal working hours;
- i) appropriate information obtained following health surveillance, including published information, as far as possible;
- j) the availability of hearing protectors with adequate attenuation characteristics.

(3) The risk assessments shall be kept readily accessible to all persons working on board in order for the information to be applied at a later point in time.

(4) When preparing the individual risk assessments, the Act of 14 April 2000 No. 31 relating to the processing of personal data shall apply.

Section 15-4 *Measuring equipment*

(1) Measurement of sound pressure levels shall be carried out using precision integrating sound level meters that meet the requirements of this chapter. Such meters shall be manufactured to IEC 61672-1(2002-05) type/class 1 standard as applicable. Standards other than IEC 61672-1(2002-05) may be applied if the company provides documentary evidence for the Norwegian Maritime Authority showing that the standard is equivalent. Sound level meters type/class 1 manufactured according to IEC 651/IEC 804 may be used until 1 July 2016.

(2) Octave filter set, either used alone or in conjunction with a sound level meter, shall conform to IEC 61260 (1995). Standards other than IEC 61260 (1995) may be applied if the company provides documentary evidence for the Norwegian Maritime Authority showing that the standard is equivalent. "Octave filter set" means octave-band and fractional-octave-band filters.

- (3) Sound calibrators shall comply with the standard IEC 60942 (2003-01) and shall be approved by the manufacturer of the sound level meter used.
- (4) Calibrator and sound level meter shall be verified at least every two years by a Norwegian standard laboratory or a competent laboratory accredited according to ISO/IEC 17025:2005/Cor 1:2006.
- (5) A microphone wind screen shall be used when taking readings outside, e.g. on navigating bridge wings or on deck, and below deck where there is any substantial air movement.

Section 15-5 *Noise measurement*

- (1) For vessels covered by section 15-19 the measurement of noise levels in all spaces specified in section 15-19 second paragraph shall be carried out upon completion of the construction of the vessel, or as soon as practicable thereafter. The measurements shall take place under the operating conditions specified in section 15-7, and shall be recorded in a survey report, cf. section 15-28.
- (2) Measurements of the A-weighted equivalent continuous sound level, $L_{Aeq}(T)$ shall be made, and measurements of the C-weighted equivalent continuous sound level, $L_{Ceq}(T)$ and the C-weighted peak sound level L_{Cpeak} shall be made in spaces where $L_{Aeq}(T)$ exceeds 85 dB(A).

Section 15-6 *Personnel to carry out noise measurements*

- (1) Persons conducting noise measurements shall have:
 - a) knowledge in the field of noise, sound measurements and handling of used equipment;
 - b) training concerning the procedures specified in this chapter.
- (2) The measuring institutes or experts shall prove their competence with view to noise measurements.
- (3) Testing institutions which support a quality management system according to ISO 17020/25 are considered to fulfil the requirements of the first and second paragraphs.

Section 15-7 *Operating conditions at sea trials*

- (1) The course of the vessel shall be as straight as possible. The actual conditions during the measurements shall be recorded in the noise survey report, cf. section 15-28.
- (2) Noise measurements shall be taken at normal service speed and, unless otherwise provided in this section, no less than 80% of the maximum continuous rating (MCR). Controllable pitch and Voith-Schneider propellers, if any, shall be in the normal seagoing position. For special vessel types and for vessels with special propulsion and power configurations, such as diesel-electric systems, due consideration may be given to actual ship design or operating parameters when applying the requirements of this and the second paragraph.
- (3) All machinery, navigation instruments, radio and radar sets, etc., normally in use at normal seagoing condition and levels, including squelch shall operate throughout the measurement period. However, neither energised fog signals nor helicopter operations shall take place during the taking of these measurements.
- (4) Measurements in spaces containing emergency diesel engine driven generators, fire pumps or other emergency equipment that would normally be run only in emergency, or for test purposes, shall be taken with the equipment operating.
- (5) Mechanical ventilation, heating and air-conditioning equipment shall be in normal operation, taking into account that the capacity shall be in accordance with the design conditions.
- (6) For thrusters, measurements shall be made at 40% thruster power and the ship's speed shall be appropriate for thruster operation. Measurements shall be taken at positions around such machinery when in operation and in adjacent accommodation spaces and duty stations. If such equipment is intended for continuous operation, e.g. stabilizers, measurements shall be made. If such systems are intended for short temporary use only, for instance during port manoeuvres, measurements are only relevant for ensuring compliance with section 15-18 on noise exposure.
- (7) In case of vessels with Dynamic Positioning (DP), which is intended for use in normal working condition, additional noise measurements at DP mode shall be made at control stations, duty

stations and accommodation spaces to ensure that the maximum noise level limits in these spaces are not exceeded. Such measurements shall be carried out with at least 40% load on the DP thruster system.

Section 15-8 *Environmental conditions during noise measurements*

- (1) During the measurement only noise sources related to the vessel, such as machinery and propulsion, shall be taken into account. Noise from wind, waves, ice, alarms, public address systems (PA system) etc. are not included.
- (2) The following conditions shall be recorded in the noise survey report, cf. section 15-28:
 - a) water depth which is less than five times the draught, or when there are large reflecting surfaces in the vessel's vicinity;
 - b) the meteorological conditions such as wind and rain, as well as sea state, which influence the measurements;
 - c) wind force exceeding 4 and wave height of more than 1 m.
- (3) Care shall be taken to see that noise from extraneous sound sources, such as people, entertainment, construction and repair work, does not influence the noise level on board the vessel at the positions of measurement.

Section 15-9 *Measuring procedures*

- (1) During noise level measurement, only persons necessary for the operation of the ship and persons taking the measurements shall be present in the space concerned.
- (2) Sound pressure level readings shall be taken in decibels using an A-weighting (dB(A)) and C-weighting (dB(C)) filter and if necessary also in octave bands between 31.5 and 8,000 Hz.
- (3) The noise level measurements shall be taken with the integrating sound level meter using spatial averaging, cf. section 15-14 second paragraph, and over a time period until stable readings are found or at least 15 s in order to represent the average value from variations due to irregular operation or variations in the sound field. Readings shall be made only to the nearest decibel. If first decimal of the dB reading is 5 or higher, the reading shall be made to nearest higher integer.
- (4) For a vessel which is not yet put into operation, compliance with the requirements of section 15-19 can be verified on the basis of sea trial measurements of noise levels by calculation of the expected noise exposure of each category of crew members in accordance with the method prescribed in section 15-10.

Section 15-10 *Determination of noise exposure*

In addition to the continuous sound level measurements, the noise exposure level of persons working on board shall be determined based upon ISO 9612:2009.

Section 15-11 *Calibration and measurement uncertainties*

- (1) The sound level meter shall be calibrated with the calibrator referred to in section 15-4 third paragraph before and after measurements are taken.
- (2) The uncertainty of measurements on board vessels depends on several factors, for example, measurement techniques and environmental conditions. Measurements made in conformity with this chapter with few exceptions result in reproducibility standard deviation of the equivalent continuous A-weighted sound pressure level equal to or less than 1.5 dB.
- (3) Deviations of 1 to 3 dB(A) from the noise level limits are accepted for up to 15% of the number of cabins, including hospitals, and for up to 20% of the area of public spaces and offices on board.

Section 15-12 *Points of measurement*

- (1) Measurements shall be taken with the microphone at a height of between 1.2 m (seated person) and 1.6 m (standing person) from the deck. Measurements shall not be taken closer than 0.5 m from the boundaries of a space. The microphone positions shall be as specified in the third paragraph and

sections 15-13 to 15-15. Measurements shall be taken at positions where the personnel work, including at communication stations.

(2) The noise level shall be measured at all points where work is carried out. Additional measurements shall be performed in spaces containing duty stations if variations in noise level are thought to occur in the vicinity of the duty stations.

(3) When measuring noise levels, the microphone should, where possible, not be placed within a 30° angle away from the direction of the gas stream and not less than a distance of 1 m from the edge of the intake or exhaust opening of engines, ventilation, air conditioning and cooler systems, and as far as possible from reflecting surfaces.

Section 15-13 *Measurements in machinery spaces*

(1) Measurements shall be taken at the principal working and control stations of the persons working on board, in the machinery spaces and in the adjacent control rooms, if any, special attention being paid to telephone locations and to positions where voice communication and audible signals are important.

(2) Where it is not possible to take measurement further away than 1 m from operating machinery, or from decks, bulkheads or other large surfaces, or from air inlets, measurement shall be taken at a position midway between the machinery and adjacent reflecting surface.

(3) Measurements from machinery which constitutes a sound source should be taken at 1 m from the machinery.

Section 15-14 *Measurements in navigation spaces and accommodation spaces*

(1) Measurements shall be taken on both navigating bridge wings.

(2) One measurement shall be taken in the middle of the space. The microphone shall be moved slowly horizontally and/or vertically over a distance of 1 m +/- 0.5 m, taking into account the measurement criteria in section 15-12 first paragraph.

(3) The number of measurement cabins shall be not less than 40 per cent of the total number of cabins. Cabins which are obviously affected by noise, i.e. cabins adjacent to machinery or casings, must be considered in any case.

(4) For vessels with a large number of cabins for the persons working on board, such as passenger/cruise ships, it will be acceptable to reduce the number of measurement positions. The selection of cabins to be tested shall be representative for the group of cabins being tested by selecting those cabins in closer proximity to noise sources.

(5) On open deck, measurements shall be taken in any areas provided for the purpose of recreation.

Section 15-15 *Measurements in normally unoccupied spaces*

(1) In addition to the spaces referred to in sections 15-12 to 15-14, measurements shall be taken:

- a) in all locations with unusually high noise levels where persons working on board may be exposed, even for relatively short periods; and
- b) at intermittently used machinery locations.

(2) Noise levels need not be measured for normally unoccupied spaces, holds, deck areas and other spaces which are remote from sources of noise.

(3) In cargo holds, at least three microphone positions in parts of holds where personnel are likely to carry out work shall be used.

Section 15-16 *Limitation of noise exposure*

(1) Persons working on board shall not be exposed to noise exceeding the exposure limit values set out in section 15-18.

(2) If exposures above the exposure limit values are detected, the company shall:

- a) take immediate action to reduce the exposure to below the exposure limit values;
- b) identify the reasons why overexposure has occurred; and
- c) amend the protection and prevention measures in order to avoid any recurrence.

Section 15-17 *Measures in the event of exceeded action values*

- (1) If the upper exposure action values referred to in section 15-18 are exceeded, necessary technical and/or organisational measures shall be established and implemented, so that the noise exposure is eliminated at source or reduced to a minimum.
- (2) The measures shall be developed on the basis of the risk assessments carried out pursuant to section 15-3, taking into account in particular the measured referred to in section 15-2 third paragraph.

Section 15-18 *Exposure limit values and exposure action values*

- (1) The exposure limits in respect of the daily noise exposure levels and peak sound pressure are $L_{ex,8h} = 87$ dB(A) og $p_{peak} = 200$ Pa (140 dB(C) in relation to 20 μ Pa).
- (2) When applying the exposure limit values, the determination of the effective exposure shall take account of the attenuation provided by the individual hearing protectors worn by the persons working on board.
- (3) The action values in respect of the daily noise exposure levels and peak sound pressure are:
 - a) upper exposure action values: $L_{ex,8h} = 85$ dB(A) and $p_{peak} = 140$ Pa (137 dB(C) in relation to 20 μ Pa);
 - b) lower exposure action values: $L_{ex,8h} = 80$ dB(A) and $p_{peak} = 112$ Pa (135 dB(C) in relation to 20 μ Pa).
- (4) The exposure action values shall not take account of the effect of any hearing protectors.
- (5) When assessing the levels of noise to which the persons on board are exposed, the weekly noise exposure level may, for the purposes of applying the exposure limits and the exposure action values, be used in place of the daily noise exposure level, for activities where daily noise exposure varies markedly from one working day to the next, on the condition that:
 - a) the weekly noise exposure level as shown by adequate monitoring does not exceed the exposure limit value of 87 dB(A); and
 - b) appropriate measures are taken in order to reduce the risk associated with these activities to a minimum.

Section 15-19 *Noise level limits*

- (1) This section applies to vessels of 1,600 gross tonnage and upwards, the keel of which is laid or which are at a similar stage of construction on or after 1 January 2014.
- (2) The noise level limits (dB(A)) in the below table shall not exceed the values specified for the various spaces:

| Designation of rooms and spaces | Vessel size | |
|---|-----------------------|------------------|
| | 1,600 up to 10,000 GT | $\geq 10,000$ GT |
| 1 Work spaces | | |
| Machinery spaces | 110 | 110 |
| Machinery control rooms | 75 | 75 |
| Workshops other than those forming part of machinery spaces | 85 | 85 |
| Non-specified work spaces, incl. open deck workspaces that are not machinery spaces, and open deck workspaces where communication is relevant | 85 | 85 |
| 2 Navigation spaces | | |
| Navigating bridge and chartrooms | 65 | 65 |
| Look-out posts, incl. navigating bridge wings and | 70 | 70 |

| | | |
|--|----|----|
| windows | | |
| Radio rooms with radio equipment operating but not producing audio signals | 60 | 60 |
| Radar rooms | 65 | 65 |
| Accommodation spaces | | |
| Cabins and hospitals | 60 | 55 |
| Messrooms | 65 | 60 |
| Recreation rooms | 65 | 60 |
| Open, external recreation areas | 75 | 75 |
| Offices | 65 | 60 |
| 4 Service spaces | | |
| Galleys, without food processing equipment operating | 75 | 75 |
| Serveries and pantries | 75 | 75 |
| 5 Normally unoccupied spaces | | |
| Spaces referred to in section 15-15 | 90 | 90 |

(3) The noise level limits specified in the second paragraph shall be regarded as maximum levels and not as desirable levels. Where reasonably practicable, it is desirable for the noise level to be lower than the maximum levels specified.

(4) Before the vessel is put in service, the noise level limits shall be assessed by the equivalent continuous sound level measurement for the spaces specified in the second paragraph. In large rooms with many measurement positions the individual positions shall be compared to the noise level limits.

(5) The noise level limit for machinery spaces of 110 dB(A) pursuant to the second paragraph assumes that hearing protectors giving protection meeting the requirements for hearing protectors in section 15-22 are worn.

(6) For vessels not put in service, the noise level limits pursuant to the second paragraph are considered fulfilled if the sea trial measurements pursuant to section 15-9 fourth paragraph show that the persons working on board are not exposed to an $L_{ex}(24)$ exceeding 80 dB(A). That is to say, that within each day or 24-hour period the equivalent continuous noise exposure does not exceed 80 dB(A).

(7) For vessels designed for and employed on voyages of short duration, or on other services involving short periods of operation of the vessel, the noise level limits for accommodation spaces and service spaces pursuant to the second paragraph only applies with the vessel in the port condition. This is provided that the periods under such conditions are adequate for the rest and recreation for the persons working on board. "Voyages of short duration" means voyages where the vessel is not generally underway for periods long enough for the persons working on board to require sleep, or long off-duty periods, during the voyages. "Port condition" means the condition in which all machinery solely required for propulsion is stopped.

(8) The following vessels are exempt from the requirements of this section:

- a) high-speed craft;
- b) fishing vessels;
- c) dynamically supported craft;
- d) manned barges;
- e) mobile offshore units;
- f) ships belonging to the Norwegian Armed Forces and ships used in such service;
- g) pile driving vessels;
- h) dredgers; and

- i) ships not propelled by mechanical means.

Section 15-20 Noise level limits on high-speed craft

- (1) The noise level in public spaces and spaces for the persons working on board shall be kept as low as possible to enable the public address system to be heard (PA system), and shall in general not exceed 75 dB(A).
- (2) The maximum noise level in the wheelhouse shall in general not exceed 65 dB(A).

Section 15-21 Use of hearing protectors

- (1) If the risks arising from exposure to noise cannot be prevented by other means, appropriate and properly fitting individual hearing protectors shall be made available to the persons working on board, under the conditions set out below:
 - a) where noise exposure exceeds the lower exposure action values, the company shall make individual hearing protectors available to the persons working on board;
 - b) where noise exposure matches or exceeds the upper exposure action values, individual protectors shall be used.
- (2) Individual hearing protectors shall be in accordance with section 15-22, and shall be so selected as to eliminate the risk to hearing or to reduce the risk to a minimum.
- (3) The company shall see to that hearing protectors are worn, and is responsible for checking the effectiveness of the measures taken in compliance with the first and second paragraphs.

Section 15-22 Technical requirements for hearing protectors

- (1) Hearing protectors shall be of a type such that they can reduce sound pressure levels to 85 dB(A) or less.
- (2) Selection of suitable hearing protectors shall be in accordance with the HML method described in ISO 4869-2:1994.
- (3) Noise-cancelling technology may be used if the headset(s) have equivalent performance to hearing protectors in their unpowered condition.

Section 15-23 Warning notices

- (1) Where the noise level in machinery spaces (or other spaces) is greater than 85 dB(A), entrances to such spaces shall carry a warning notice comprising symbol and supplementary sign in the working language of the vessel, corresponding to the example of warning notice and signs of this section.
- (2) The areas in question shall also be delimited and access to them restricted where this is technically feasible and the risk of exposure so justifies.

| Signs at the entrance to noisy rooms (example in English) | |
|--|--|
| 80–85 dB(A) | HIGH NOISE LEVEL – USE HEARING PROTECTORS |
| 85-110 dB(A) | DANGEROUS NOISE – USE OF HEARING PROTECTORS MANDATORY |
| 110-115 dB(A) | CAUTION: DANGEROUS NOISE – USE OF HEARING PROTECTORS MANDATORY – SHORT STAY ONLY |
| >115 dB(A) | CAUTION: EXCESSIVELY HIGH NOISE LEVEL – USE OF HEARING PROTECTORS MANDATORY – NO STAY LONGER THAN 10 MINUTES |



Section 15-24 *Health surveillance and hearing examination*

(1) Any person working on board whose exposure to noise exceeds the upper exposure action values set out in section 15-18 third paragraph (a), has the right to have his or her hearing checked. The hearing examination shall be conducted by a doctor or by another suitable qualified person under the responsibility of a doctor.

(2) Any person working on board whose exposure to noise exceeds the lower exposure action values set out in section 15-18 third paragraph (b) shall be offered preventive hearing examination where the risk assessments and measurements to be carried out pursuant to section 15-3 indicate a risk to health.

Section 15-25 *Follow-up of health surveillance*

(1) Where, as a result of the health surveillance, a person working on board is found to have identifiable hearing damage, a doctor, or a specialist if the doctor considers it necessary, shall assess whether the damage is likely to be the result of exposure to noise at work.

(2) Where the hearing damage is the result of exposure to noise at work, the company shall:

- a) see to that the person suffering from the hearing damage is informed by the doctor or other suitably qualified person of the result which relates to him or her personally;
- b) review the risk assessment carried out pursuant to section 15-3;
- c) review the measures provided to eliminate or reduce risks pursuant to sections 15-2, 15-21 and 15-22;
- d) take into account the advice of the occupational healthcare professional or other suitably qualified person or the competent authority in implementing any measures required to eliminate or reduce risk in accordance with sections 15-2, 15-21 and 15-22, including the possibility of assigning the person suffering from the hearing damage to alternative work where there is no risk of further exposure; and
- e) arrange systematic health surveillance and provide for a review of the health status of any other persons working on board who has been similarly exposed.

Section 15-26 *Information and training*

(1) Where the noise level on board entails that some of the persons working on board are exposed to noise at work at or above the lower exposure action values, the company shall ensure that information and training is provided for the persons working on board, and, if applicable, their safety representatives, relating to risks resulting from exposure to noise.

(2) The information and training pursuant to the first paragraph shall in particular include:

- a) the nature of such risks;
- b) the measures taken pursuant to this chapter in order to eliminate or reduce to a minimum the risks from noise, including the circumstances in which the measures apply;
- c) the exposure limit values and the exposure action values laid down in section 15-18;
- d) the results of the assessments and measurements of the noise carried out in accordance with section 15-3 together with an explanation of their significance and potential risks;
- e) the correct use of hearing protectors;
- f) why and how to detect and report signs of hearing damage;
- g) the circumstances in which persons working on board are entitled to health surveillance and the purpose of health surveillance, cf. section 15-24; and
- h) safe working practices to minimise exposure to noise.

Section 15-27 *Acoustic insulation between accommodation spaces*

(1) Consideration shall be given to the acoustic insulation between accommodation spaces in order to make rest and recreation possible even if activities are going on in adjacent spaces, e.g. music, talking, cargo handling.

(2) The airborne sound insulation properties for bulkheads and decks within the accommodation shall comply at least with the following weighted sound reduction index (R_w) according to ISO Standard 717-1:1996 as amended (1:2006), part 1:

| | |
|--|------------|
| Cabin to cabin | $R_w = 35$ |
| Messrooms, recreation rooms, public spaces and entertainment areas to cabins and hospitals | $R_w = 45$ |
| Corridor to cabin | $R_w = 30$ |
| Cabin to cabin with communicating door | $R_w = 30$ |

(3) The airborne sound insulation properties shall be determined by laboratory tests in accordance with ISO 10140-2:2010.

(4) The following vessels are exempt from the requirements of this section:

- a) vessels the keel of which is laid or which are at a similar stage of construction before 1 July 2014;
- b) vessels of less than 1,600 gross tonnage;
- c) high-speed craft;
- d) fishing vessels;
- e) dynamically supported craft;
- f) manned barges;
- g) mobile offshore units;
- h) ships belonging to the Norwegian Armed Forces and ships used in such service;
- i) pile driving vessels;
- j) dredgers; and
- k) ships not propelled by mechanical means.

Section 15-28 *Survey report*

(1) A noise survey report shall always be carried on board and be accessible for the persons working on board.

(2) The report shall comprise information on the noise levels in the various spaces on board, and shall show the reading at each specified measuring point. The points shall be marked on a general arrangement plan, or on accommodation drawings attached to the report, or shall otherwise be identified.

Section 15-29 *Exemptions*

(1) The Norwegian Maritime Authority may upon application grant exemptions from one or more of the requirements of this chapter when it is acceptable in terms of health and protection, and it is documented that compliance with the requirement(s) will not be possible despite applicable and reasonable technical noise reductions measures. The Norwegian Maritime Authority may demand that the company submits a statement from a competent person or body in connection with the application, and may impose specific conditions for the exemption. Before such exemption is granted, the company shall document that:

- a) the need for speech communication and for hearing audible alarms has been ensured;
- b) the noise level does not hinder concentration when clear-headed decisions are to be made in control stations, navigation and radio spaces and manned machinery spaces;
- c) the persons working on board are protected from excessive noise levels which may give rise to noise-induced hearing loss;
- d) there is an acceptable degree of comfort in rest, recreation and other spaces;
- e) appropriate conditions for recuperation from the effects of exposure to high noise levels have been provided; and
- f) exposure limit values and exposure action values pursuant to section 15-18 are not exceeded.

(2) In exceptional cases, the Norwegian Maritime Authority may upon application grant exemptions from sections 15-16 and 15-21, where, because of the nature of the work, the full and proper use of hearing protectors would be likely to cause greater risk to health or safety than not using such protectors. Such exemptions may only be granted after consultation with the employers' and employees' organisations, and with Norwegian health authorities if applicable. The exemption shall include conditions ensuring that the health risks are reduced to a minimum, and that the persons affected by the exemption receive increased health surveillance. Such exemption shall furthermore be reviewed every four years, and shall be withdrawn if the justifying conditions for the exemption are no longer present.

II

This Regulation enters into force on 1 July 2014.