BLUE ANGEL
The German Ecolabel

Environmentally Friendly Ship Operation

DE-UZ 110

Basic Award Criteria
Edition March 2015
Version 1
The Environmental Label is supported by the following four institutions:

The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety is the owner of the label. It regularly provides information on the decisions taken by the Environmental Label Jury.

The German Environmental Agency with its specialist department for "Ecodesign, Eco-Labelling and Environmentally friendly Procurement" acts as office of the Environmental Label Jury and develops the technical criteria of the Basic Criteria for Award of the Blue Angel.

The Environmental Label Jury is the independent, decision-making body for the Blue Angel and includes representatives from environmental and consumer associations, trade unions, industry, the trade, crafts, local authorities, academia, the media, churches, young people and the German federal states.

The RAL gGmbH is the awarding body for the Environmental Label. It organises the process for developing the relevant award criteria in independent expert hearings – which involve all relevant interest groups.

If you require further information please contact:
RAL gGmbH
RAL UMWELT
Fränkische Straße 7
53229 Bonn
Tel: +49 (0) 228 / 6 88 95 - 0
E-Mail: umweltzeichen@ral.de
www.blauer-engel.de
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1 Introduction

1.1 Preface

In cooperation with the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, the German Environmental Agency and considering the results of the expert hearings conducted by RAL gGmbH, the Environmental Label Jury has set up these Basic Criteria for the Award of the Environmental Label. RAL gGmbH has been tasked with awarding the Environmental Label.

Upon application to RAL gGmbH and on the basis of a Contract on the Use of the Environmental Label to be concluded with RAL gGmbH, the permission to use the Environmental Label may be granted to all products, provided that they comply with the requirements as specified hereinafter.

The product must comply with all the legal requirements in the country in which it is to be marketed. The applicant shall declare that the product meets this requirement.

1.2 Goals of the Blue Angel Eco-Label

The purpose of awarding the Blue Angel eco-label to environmentally friendly ship operation is to reduce emissions and releases of harmful substances from sea-going vessels into the marine environment. In order to achieve this goal particularly high demands are placed not only on shipping company and onboard management but also and above all on measures to reduce emissions. The combination of these factors takes into account the complexity of the subject matter of environmentally friendly ship operation.

Therefore, following benefits for the environment and health are stated in the explanatory box:

Compliance with relevant international and national regulations (e.g. SOLAS, MARPOL) is a fundamental prerequisite for application for the Blue Angel eco-label; The environmental criteria for award of the Blue Angel set out in paras. 3 and 4 go beyond legal standards.

A future revision of these Basic Criteria is expected to take in account not only the state of the art in technology and the current environmental legislation but also and in particular the fact that ships already carrying the Blue Angel for environmentally friendly ship operation can meet the newly revised requirements of DE-UZ 110 with reasonable effort and that the Blue Angel eco-label can be re-awarded following application.

1.3 Methodology

A ship under application for the Blue Angel eco-label shall meet all criteria classified as mandatory (M) for this particular type of ship and, in addition, achieve a certain number of points (see table below) as a result of the implementation of optional requirements.
It is impossible to develop environmental criteria for all types and sizes of ships, maritime routes etc. which constitute equally ambitious environmental requirements and can be implemented onboard all ships. That is why an optional points scheme has been developed for the eco-label. This gives the applicant the flexibility to choose from the catalogue of requirements those measures which are considered reasonable for the ship and the field of use. The combination of mandatory and optional requirements still guarantees an ambitious eco-label. Moreover, special requirements for certain types of ships, e.g. tankers or passenger ships, have been additionally included in these Basic Criteria. Depending on the level of environmental effect one to ten points are assigned to the requirements marked “optional” (O).

Depending on the type of ship, a different total number of points can be earned for the optional requirements. Consequently, also the number of points required for award of the Blue Angel eco-label differs. Only those points are added whose measures do not exclude each other (technically) or which are defined as alternative requirements in Chapters 3 and 4. The minimum number of points listed in the table below must be achieved for each category of ship. The minimum number of points equals 35 percent of the total number of points achievable for optional measures.

<table>
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<tr>
<th>Type of Ship</th>
<th>Possible total number of points</th>
<th>Minimum number of points required</th>
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<tr>
<td>Cargo vessels</td>
<td>113</td>
<td>40</td>
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<td>Passenger ships (Pax)</td>
<td>124</td>
<td>43</td>
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<td>Tankers</td>
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The mandatory and/or optional measures required are based on the existing IMO regulations applying to a ship under way (cf. para. 1.2) but go beyond this standard. If an optional measure is internationally accepted as mandatory for all ships it shall automatically no longer be possible to gain optional points for such measure. If so, the minimum number of points required for award of the Blue Angel eco-label will be adjusted accordingly to make sure it continues to be 35 percent of the possible total number of points.

The mixture of mandatory and optional requirements (35 percent of the respective possible total number of points) results in an altogether high environmental standard for ship operation.

During the term of the eco-label an annual review shall be conducted to make sure that the ship operation continues to meet the requirements for the Blue Angel eco-label. Such review shall be conducted within the scope of the annual inspection/appraisal by the organisations listed under para. 5.1. and shall be attested by them.

The criteria to be checked annually are listed in the checklist (cf. Appendix B). RAL shall be informed about the periods scheduled for the annual inspections/appraisals upon filing the application. The checklist fully completed by an expert shall be sent to RAL without further request 8 weeks after inspection/appraisal at the latest.
The data/information on the compliance with the requirements (e.g. annual consumption data, fuel quality data) collected in the checklist shall also be made available to RAL and UBA at their request.

These present Basic Criteria are an update of the January 2010 version which again is based on the original 2002 version of DE-UZ 110. Revisions of the Basic Criteria are based on changes in the legal situation as well as on adjustments to the state of the art.

Applications can also be filed for ships already carrying the “Blue Angel for Eco-friendly Ship Design” (DE-UZ 141).

2 Scope

These Basic Award Criteria apply to merchant ship operation within the meaning of the current version of the SOLAS Convention applicable to the ship as well as to supply vessels, research and official vessels listed on a register of shipping (IMO ship identification number).

Excluded from award of the Blue Angel eco-label are fishing vessels, naval boats, high speed craft within the meaning of the HSC Code, nuclear powered ships as well as sport boats and inland water vessels.

Due to the wide spectrum of requirements and the fact that the onboard situation usually differs – even aboard sister ships – the award of the Blue Angel eco-label always refers only to the ship identified by the IMO number of the shipping company specified in the contract. The requirements for passenger ships (Pax) also apply to “comparable ships” where the number of non-crew members during regular operation exceeds the number of crew members (e.g. research ships).

3 Requirements for all Ships within the Scope

3.1 Policy and Management of the Shipping Company

3.1.1 Environmental Management

The International Safety Management Code (ISM) is legally binding for all ships of 500 or more gross tonnage.

The purpose of environmental management systems is to make sure that organizational measures ensure a continuous optimization of the environmental performance of an enterprise. A key prerequisite for achieving this goal is the commitment to continuous improvement and to avoid environmental damage.

Mandatory Requirement (M)

a) Implementation of the ISM Code on all ships irrespective of their size and purpose.

b) Implementation of an environmental management system (EMS) according to the principles of ISO 14001 (EMS model including guidelines, environmental objectives, planning, implementation, monitoring and corrective action as well as management feedback).
Compliance Verification

a) Implementation of the ISM Code shall be verified by the „Document of Compliance“ (DoC) and the „Ship Safety Management Certificate“ (SMC).

b) An environmental management system based on the principles of ISO 14001 shall be verified by presentation of relevant environmental management guidelines, documents and time schedules for achieving the targets and review cycles or by presentation of an ISO 14001 certification of the shipping company – also taking into account the ship operation. However, a certification under ISO 14001 is not mandatory. Compliance with the criteria shall be verified upon application as well as once per year according to the checklist.

Optional Requirements (O)
Certification of the ship in accordance with EMAS or ISO 14001 [5 points].

Compliance Verification

The applicant shall present the valid certification of the management system according to EMAS or ISO 14001. Compliance shall be verified upon filing the application as well as once per year according to the checklist.

3.1.2 Personnel Management

Legal standards vary depending on the flag of the particular vessel. The provisions of the Maritime Labour Convention are mandatory for all ships flying the flag of a member state of the International Labour Organization (ILO).

Additional requirements for the Blue Angel eco-label are aimed to make ship operation safer by means of improved environmental training, less language barriers etc. Thus, marine accidents involving potential environmental impacts can be avoided.

Mandatory Requirement (M)

a) The crew falls under the collective agreement provisions of the „International Transport Workers’ Federation (ITF) Standard Agreements“ or national collective agreements that set, at least, equivalent standards.

b) The certificates of competency (education and training) of the members of the crew must be issued by a country appearing on the IMO „White-List“ in terms of the „Standards on Training, Certification and Watchkeeping“ (STCW -95 Convention).

c) Continuity of Personnel: 80 percent of the ship officers shall be employed with the shipping company for more than 2 years. Service on different ships of the same company shall be admissible.

d) Environmental training: Implementation of and adherence to an environmental training program harmonized with the ship, its purpose and the maritime area at least once per year as well as if new crew members are on board and if the standards for the maritime area/routes change. The training should follow the training specifications set out in Appendix D and be documented in the Safety Management System (SMS) of the shipping company.

e) Language skills: Language tests for all crew members – including new crew – during the term of the Blue Angel eco-label – in accordance with the Resolution A 918/229 „Standard of Marine Communication Phrases“ (SMCP).
Compliance Verification

Compliance with the criteria shall be verified upon filing the application as well as once a year according to the checklist.

a) and b) „Blue Card“ for the ship or a comparable certificate. The provisions of the public service collective agreement shall be considered as an equivalent standard.

c) The implementation of this requirement can be documented by a corresponding entry (objective) into the management system (e.g. Safety Management System (SMS), EMS, Quality Management System (QMS) of the shipping company.

d) Environmental awareness training: entry of the training documentation into the management system.

e) Passing of the language test, entry of the training documentation into the management system.

Optional Requirements (O)

None

3.1.3 Personnel Development

The training standards for seafarers serving on board vessels operating on international routes are set out internationally in IMO’s STCW-95-Code.

Mandatory Requirement (M)

a) Systematic identification of the demand for initial and advanced onboard training of the crew and the commitment to implement the resulting initial and advanced training measures.

b) All nautical and engineering officers shall at least once every two years attend a course on current legal developments of relevance to the ship, the results of the last management assessment as well as on the company’s safety and environmental policy.

c) All nautical officers and shipmasters shall attend an approved course in Bridge Resource Management at least once every five years or when newly appointed.

d) All shipmasters shall - prior to their first appointment as master - attend a bridge simulation course to prepare for the duties of a master, especially for manoeuvring the ship in port as well as in emergency situations.

Compliance Verifications

Compliance with all above measures shall be verified by documentation of appropriate procedure instructions in the management system of the shipping company (upon application; annual review according to the checklist).

Alternative compliance verification for para. d): if no bridge simulator courses are offered for a specific type of ship alternative compliance verifications shall be presented to establish that shipmasters and nautical officers have been sufficiently prepared for various emergency situations.

Optional Requirements (O)

All masters and senior engineers shall attend at least once every five years an approved training course in energy-efficient ship operation providing the necessary knowledge to operate
the shipboard equipment and to use the information available. The measures of energy-efficient operation shall be implemented during shipboard operations [5 points].

**Compliance Verification**

Documentation of appropriate procedure instructions in the management system of the shipping company with regard to training and shipboard operations.

### 3.2 Ship Design and Ship Equipment

#### 3.2.1 Hull Stress Monitoring

Monitoring the stress strain on the ship’s structure by means of a hull stress monitoring system (HSMS) allows an early detection of critical conditions during loading and unloading as well as in high swell and it enables the crew to initiate timely countermeasures, as for example, reduce the speed and change the course of the ship. Because of the great number of accidents IMO recommends the use of these systems especially for bulk carriers. Meanwhile, these systems are also increasingly used on tankers and big container vessels. There are no legal provisions governing the use of hull stress monitoring systems.

**Mandatory Requirement (M)**

None

**Optional Requirements (O)**

For cargo vessels: Installation and operation of a hull stress monitoring system that continuously monitors the stress on the ship’s structure and - linked to an alarm system - transmits the data to the bridge [2 points].

**Compliance Verification**

Installation certificate. Entry of a procedure instruction into the management system.

#### 3.2.2 Emergency Towing System

The SOLAS Convention, Chapter II-1, Part A-1, requires all tankers of 20,000 dwt or more to be equipped with an emergency towing system. Since January 1, 2010 all ships subject to the SOLAS Convention are required to implement so-called emergency towing procedures, as specified in SOLAS.

**Mandatory Requirement (M)**

- Emergency towing concept / procedure for all ships.
- Tankers: All tankers of 5,000 dwt or more shall be equipped with an emergency towing system.
- This requirement shall apply analogously to other ships with a bunker capacity greater than 2,500 m³.

If passenger ships meet the „Safe Return to Port“ requirements this shall be considered as equivalent.
Compliance Verification

Entry of the emergency towing procedure in the ISM Manual of the ship.
Certificate confirming that the ship is equipped with an emergency towing system if the latter is mandatory or evidence of the fact that the ship meets the „Safe Return to Port“ requirements.

Optional Requirements (O)

- Tankers of less than 5,000 dwt: shall be equipped with an emergency towing system [2 points].
- Other ships: The requirement for an emergency towing system shall be met by ships with a bunker capacity of over 2,500 m³ [2 points].

Compliance Verification

Certificate confirming that the ship is equipped with an emergency towing system.

3.3 Ship Operation Management and Technology

3.3.1 Sulphur Dioxide Emissions

Most ships use heavy oil as fuel. These residual oils from refinery processes have much higher concentrations of sulphur and other contaminants, e.g. heavy metals, than fuels used on land. Sulphur oxide emissions (SOx) of ship exhaust gases have a massive adverse impact on the air quality of port cities and coastal areas in particular. The emissions are harmful to health and contribute to the acidification and eutrophication of ecosystems (land and sea).

MARPOL Annex VI limits the sulphur content in marine fuels to a maximum of 3.50 percent worldwide and from 2020¹ these sulphur limits will be further reduced to a maximum of 0.50 percent. In the special areas as defined in Annex VI (SECA: Sulfur Emission Control Area) a lower maximum limit of 1.00 % must be met - and from 2015 this limit will be further lowered to 0.10 percent².

From January 1, 2010, the EU Sulphur Directive (2005/33/EU) requires ships during lay days in a European port to use a fuel with a sulphur content not exceeding 0.10 percent.

Mandatory Requirement (M)

a) The sulphur content of the fuel shall not exceed 1.5 percent on an annual average. The limits applicable in SECAs as well as other national regulations shall remain unaffected.

b) An exhaust gas cleaning system (scrubber) may be used as an alternative, provided that it is a closed-loop exhaust cleaning system or a dry exhaust gas cleaning system approved under the current IMO Guidelines for shipboard exhaust gas cleaning systems (e.g. MEPC 184(59) of 17 July 2009 – “2009 Guidelines for exhaust gas cleaning systems”). Notwithstanding MEPC 184(59), a continuous exhaust gas monitoring system shall be installed for verification of the sulphur emissions. The sulphur emissions shall be

¹ On the international level compliance with the limit level requirement may be postponed by review to the year 2025. The EU did not adopt this option when revising the Sulphur Directive, - the 0.5 % sulphur limit will be mandatory in all EU waters from 2020.

² In 2012, when amending Directive 1999/32/EC, the EU adopted the limits.
documented in relation to the fuel used. The limits applying to the use of fuel with a maximum sulphur content of 1.5 percent on the annual average and in the SECAs as well as other national regulations, if applicable, shall be met. Closed-loop systems are systems which do not allow liquid or solid wastes (e.g. washing water) to reach the sea (zero discharge mode). All liquid and solid residual wastes from all types of scrubber must be disposed of ashore.

c) During port operation the 0.1 percent sulphur limit applies worldwide.

Compliance Verification

a) Compliance with the requirements regarding the sulphur content of the fuel on an annual average (either consecutively or within a calendar year) shall be verified by presentation of the ship’s Bunker Fuel Delivery Notes, (BDN) specifying the sulphur content of the fuel. According to MARPOL Annex VI the Bunker Fuel Delivery Notes shall be kept onboard the ship for a period three years. Compliance shall be verified annually (checklist).

b) Compliance verification regarding the use of exhaust aftertreatment systems: annual documentation of the measured values in the exhaust gas stream as well as verification that all liquid or solid residual materials have been delivered to port reception facilities (checklist).

c) Compliance shall be verified by entry of a procedure instruction into the management system specifying the use of the appropriate fuel quality. Annual verification that the limit has been met (checklist).

The use of LNG or other alternative fuels meeting the above-mentioned limits shall be permitted.

Optional Requirements (O)

- The maximum sulphur content of the fuel used shall be 1.00 % when operating outside SECAs. [4 points].
- Alternative: the maximum sulphur content of the fuel used shall be 0.50 % when operating outside SECAs. [6 points].
- Alternative: the maximum sulphur content of the fuel used shall be 0.10 % when operating outside SECAs. [8 points].
- Alternative: The ship shall run on LNG or a fuel with a sulphur content ≤ 0.001 % (10 ppm) [10 points].

Compliance Verification

Compliance verification identical with that for the mandatory requirement (including annual review according to the checklist).

3.3.2 Nitrogen Oxide Emissions

Nitrogen oxides (NOx) form during combustion in the engine. They contribute to eutrophication of ecosystems. An increased nutrient input into the oceans results in oxygen depletion and increased algal blooms, above all in smaller coastal or inland seas, like the Baltic Sea. Due to the fact that maritime routes often run close to densely populated coasts the emissions also have a negative impact on human health. They may cause, among others, respiratory diseases, cardiovascular diseases as well as the formation of health-endangering ozone. MARPOL Annex VI and the NOx Technical Code set maximum permissible emissions by means of a limiting curve as a function of the engine’s rotational speed. The limits will be tightened
for new ships in accordance with a time schedule divided into three tiers: Tier I (since 2005), Tier II (since 2011) and Tier III (from 2016 for existing NECAs). Tier III means a reduction of the NOx emissions by about 80 percent compared to the Tier I values.

**Mandatory Requirement (M)**
None

**Optional Requirements (O)**
- The nitrogen emissions of all ship equipment in operation shall meet MARPOL Annex VI Tier III [10 points].
- Alternative: At least one auxiliary diesel strong enough to supply the ship with electric power while in port shall meet the MARPOL Annex VI, Tier III standard. The engine shall be used during port operation if no onshore power supply is used [4 points].

**Compliance Verification**
Compliance shall be verified by a documentation of the emission reduction technology used. Annual verification that the engine(s) (with exhaust gas aftertreatment system, if applicable) meets Tier III during operation (checklist).

### 3.3.3 Particulate Matter Emissions

Particulate matter emissions (PM) are classified as hazardous to health or carcinogenic. The smaller the particulates the easier they reach the blood via the lung. In addition, hazardous substances, such as heavy metals or carcinogenic polycyclic aromatic hydrocarbons (PAHs), may be adsorbed on the surface of particulates. The WHO has classified black carbon as a part of the overall particulate emissions as carcinogenic.

So far, measures or equipment for reducing black carbon and particulates have only been tested or used on a small scale on large marine engines. As a matter of principle, in-engine measures, the use of low-soot fuel, a homogenization of the fuel, the use of an onshore power connection while in port as well as the use of a particulate filter can help reduce emissions.

There are no direct limits for particulates in the exhaust gas emissions of sea-going vessels. MARPOL Annex VI, Regulation 14 links particulate emissions to the sulphur content in the fuel.

Black carbon emissions are currently being discussed in more recent papers of IMO’s Marine Environment Protection Committee (MEPC).

**Mandatory Requirement (M)**
None

**Optional Requirement (O)**
The following techniques are, among others, considered as methods for reducing particulates. They will be approved if a qualitative reduction of particulate emissions can be established.
- Installation and operation of fuel-water emulsion technology [3 points];
- Alternative: installation and operation of additional systems for improving air supply, e.g. pre-blower or accessory blower; [3 points],
• Alternative: at least one auxiliary diesel strong enough to supply the ship with electric power while in port shall be operated in a way to reduce particulates [4 points].
• Alternative: particulate filters, gas-powered engine or other methods with similar high efficiency for the entire ship [8 points].

**Compliance Verification**

Certificate of the system, including proof of the qualitative reduction of particulate emissions. Verification of the installation and operation of the system (checklist).

### 3.3.4 External Energy Supply while in Port

Emissions of air pollutants pose serious health problems - especially in densely populated areas and ports. As landside emissions have continuously been reduced in Europe in recent decades and maritime traffic tends to rise the share of maritime traffic in the overall emissions goes up.

Most ships continue to run their auxiliary engines and boilers while at berth in order to generate the energy required for on-board operation (electricity and heat). The energy demand of passenger ships in particular, including cruise liners, is very high.

In addition to the use of cleaner fuels in port, as already specified in the EU Sulphur Directive (2005/33/EU), the power needed can also be generated externally (e.g. via onshore power supply or external power generation by an LNG power barge).

**Mandatory Requirement (M)**

None

**Optional Requirements (O)**

a) Passenger ships shall offer the on-board possibility for connection to an onshore power supply and they shall use this possibility if the port provides the necessary facilities [6 points].

b) Other ships: Onshore power shall be used while at berth for more than 1 hour, provided that appropriate onshore facilities exist [4 points].

**Compliance Verification**

a) + b) Compliance shall be verified by a document establishing the existence of an onshore power system and an entry into the management system stating that the unit shall be used if the necessary onshore facilities are available. Annual documentation of the use of the system (checklist).

The supply with onshore power via so-called “power barges” that generate power through gas engines shall be considered as equivalent to a) or b), respectively.

### 3.3.5 Carbon Dioxide Emissions

Carbon dioxide (CO₂) is the primary greenhouse gas known. It is true that the detrimental effect per unit is relatively low but the total amount of global emissions is huge. That is why effort is being made worldwide by means of the Kyoto Protocol and binding follow-up agreements to reduce the emissions of greenhouse gases. Maritime traffic too must significantly reduce its emissions in the future.
In 2011, IMO adopted the Ship Energy Efficiency Management Plan (SEEMP) which has been mandatory aboard all ships since 2013 (Resolution MEPC.203(62)). The Guidelines for Preparation of the SEEMP (Resolution MEPC.213(63)) name the Energy Efficiency Operational Indicator (EEOI) as the tool of preference.

Both regulations do not include requirements for reducing fuel consumption and, hence, the emission of CO₂ during operation. Various studies have shown that an optimized mode of operation, choice of route etc. can save significant amounts of fuel.

In 2013, the EU presented a draft Regulation on Monitoring, Reporting and Verification (MRV)³ which is currently being negotiated. It is expected that the emissions per ship will be reduced by the mere fact that the CO₂ emissions of ships are monitored, reported and verified. Moreover, the regulation is expected to facilitate further steps toward emission reduction (e.g. introduction of market-economy measures) and accelerate processes on IMO level.

**Mandatory Requirement (M)**

a) Maximum measuring tolerance of 2 % in fuel consumption measurements.
b) The aim is to continuously improve the ship’s energy consumption over the term of the Blue Angel eco-label. These improvements shall be documented (cf. compliance verification).
c) If the EU MRV Regulation is adopted it shall become mandatory for all vessels over 400 dwt from the year following the adoption – irrespective of the date of introduction specified therein.

**Compliance Verification**

a) Technical evidence of the measuring accuracy of the systems.
b) The energy consumption shall be documented to verify the ship’s energy consumption or its reduction. Within the scope of the expert report an action plan on how to achieve these continuous savings shall be elaborated and submitted upon filing the application. Should the annual review of the documented data show that the goal has not been achieved the annual inspection shall be used to check the causes and, where appropriate, adjust the measures (checklist).

*If during the term of the Blue Angel there is a change in purpose, routes etc. the target improvement can be adjusted in consultation with the expert.*

*During the annual review (checklist) the expert shall document the annual consumption data and the accomplishment of the reduction goals.*

c) The implementation of the EU requirements shall be documented by a corresponding entry into the management plan of the ship. If the MRV Regulation does not become mandatory before applying for the Blue Angel eco-label RAL gGmbH and UBA shall be informed during the next annual review (checklist) that the EU requirements have been implemented in due time.

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Optional Requirements (O)

a) Optional points can be earned if prior to filing the application measures to improve energy efficiency have been implemented that result in a reduction in carbon dioxide emissions by more than 5 percent. Measures implemented on existing ships can be taken into account with retroactive effect until 2002. On new ships, efficiency measures will be taken into account, provided that they are not included in the calculation of the vessel’s Energy Efficiency Design Index (EEDI) (e.g. pump control, ballast and trim optimization programmes, energy-saving lighting).

- For energy savings between 5 and < 10 percent: 5 points.
- For energy savings of ≥ 10 percent: 10 points.

b) An energy-efficient operation mode helps save fuel and thus CO₂ emissions. This approach could be technologically supported by installation and operation of a ship performance analysis system (Performance and Condition Monitoring) as well as appropriate training of those in command of the ship [5 points].

Compliance Verification

a) The EEDI of a comparable ship or the determination of the hitherto CO₂ emissions prior to starting the measures may be used to calculate the savings achieved.

b) Document verifying the installation of the system as well as entry of a procedure instruction into the management system that specifies the use of the system.

3.3.6 Refrigerants

The shipboard air conditioning equipment as well as the refrigeration units for the cooling of provision rooms, refrigerators, ice-making machines etc. usually contain climate-relevant and/or ozone-depleting refrigerants. The use of refrigerants with zero ozone-depletion potential (ODP) and low global warming potential (GWP) finds growing acceptance in the marine industry. This is a substantial contribution to climate protection.

MARPOL Annex VI, Regulation 12 prohibits the installation of systems containing CFCs and halons because of the high ODP of these substances. Substances of the group of HCFCs⁴, such as chlorodifluoromethane (R22) would - under MARPOL - still be permitted in new ships until January 1, 2020. However, the European Union and other countries prohibit the installation of systems containing substances with ODP, including HCFCs, as a matter of principle. Partially fluorinated hydrocarbons (HFCs) which are often used as substitutes for ozone-layer-depleting substances usually have a high global warming potential (GWP) (see Appendix C).

According to Article 8(3) of Regulation (EU) No 517/2014⁵, effective 1st of January 2015, the operator of mobile equipment containing fluorinated greenhouse gases must ensure that they are recovered by appropriately qualified natural persons to make sure they can be recycled, reclaimed or destroyed. Also, the equipment containing fluorinated greenhouse gases must be labelled in accordance with Article 12 of Regulation (EU) Nr. 517/2014.

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⁴ partially halogenated hydrochlorofluorocarbons
Moreover, Section 3 of the German Chemikalien-Klimaschutz Verordnung (Chemicals Climate Protection Ordinance) of 2 July 2008 (Federal Law Gazette I, page 1139) requires the operators to perform a leak detection test on their mobile equipment for cooling goods during transport at least once every twelve months by means of suitable tools and to make sure all leakage detected is stopped immediately.

**Mandatory Requirement (M)**

- **Existing Equipment**
  a) A refrigerant logbook including at least the following information shall be maintained: Quantity and type of the refrigerants contained in the equipment, recovery and refill quantities as well as information on maintenance, repair and accidents. Such logbook shall be kept for a minimum of 5 years.
  b) Systems with refrigerant charges of more than 300 kg shall be equipped with an automatic detector/alarm system that is sensible enough to detect excessive concentrations of the refrigerant(s) used (refrigerant detector / gas alarm system).
  c) A procedure instruction on how to recover the refrigerant from the system shall be presented for existing systems with refrigerant charges of more than 300 kg.

- **For new installations**
  d) No refrigerants with ozone depleting potential (ODP = 0) or refrigerants with a global warming potential (GWP) > 1,800 may be used in newly installed, replaced or substantially modified refrigerating and air conditioning equipment (see Appendix III for the GWP values).
  e) In the event of substantial changes/replacements of refrigerating/air conditioning equipment the units using halogenated refrigerants shall be replaced to the extent possible within the state of the art by units using halogen-free refrigerants. In addition, the optional criteria for energy consumption as specified in UZ 114 can be used.
  f) A newly installed refrigeration/air conditioning system shall be so prepared by design as to allow the recovery of the refrigerant from the system (recovery unit e.g. recovery pump, refrigerant container or suitable space for the installation of mobile equipment). The refrigerant recovery units shall be able to receive the refrigerant volume of the largest refrigeration system. The compressor shall be able to pump the refrigerant from the system. Work on existing plants shall be so planned and performed as to prevent - to the greatest possible extent - uncontrolled leakage of refrigerants.
  g) Upon modification or replacement of the systems at the latest, the refrigeration and air-conditioning equipment, including all refrigerant pipes, shall be made accessible for leakage tests, maintenance and repair.
  h) Upon shut-down of refrigeration and air-conditioning equipment that is not permanently connected to the ship (ice-making machine, refrigerators) this equipment shall be replaced by systems using halogen-free refrigerants.
  i) New systems containing refrigerant charges of more than 300 kg shall be equipped with an automatic detector/alarm system that is sensible enough to detect excessive concentrations of the refrigerant(s) used (refrigerant detector / gas alarm system).
**Compliance Verification**

a) Refrigerant logbook including the specifications/data sheet of the refrigerant and verification that the system has been charged with the refrigerant (e.g. service report). Description of the gas alarm system.

Document verifying the proper qualification of the natural persons authorized to act on the cooling circuit to recover refrigerants.

b) + c) + i) If the system contains more than 300 kg: Certificate of the installation of the automatic detection system and verification that a procedure instruction has been prepared.

d) + e) + f) Every installation of refrigeration/air conditioning equipment shall be documented (checklist). Verification that new systems meet the above-mentioned requirements, e.g. by plans of the system indicating the location of suction point, pump equipment, containers and access points to the system. In addition to e) If the system is modified and if it is impossible to do without halogenated refrigerants evidence of this necessity shall be furnished.

h) Registration of non-permanently installed equipment, specification of type and quantity of refrigerant. Verification of the disposal of defective equipment as well as verification of the fact that new units use natural refrigerants shall be furnished during the term of these Basic Criteria (checklist).

**Optional Requirements (O)**

a) Refrigeration equipment that is permanently installed or required for ship operation shall be operated by the use of natural refrigerants, such as for example ammonia and/or \( \text{CO}_2 \) [4 points].

b) No HFCs shall be used in any of the ship’s refrigeration and air conditioning systems [2 points].

**Compliance Verification**

a) Verification of the operation of the refrigeration equipment by the use of natural refrigerants, such as for example ammonia and/or \( \text{CO}_2 \).

b) Verification that no HFCs are used in any of the ship’s refrigeration and air conditioning systems.

**Annotation**

The refrigerants of conventional refrigerated containers used for cargo transport or which are on board only temporarily for special purpose (e.g. aboard research vessels) shall not be taken into account since the shipping company has no influence on these containers. This applies analogously to commercial cooling units approved for onboard use, such as for example, refrigerators, minibars etc..

The GWP data refer to \( \text{CO}_2 \) as a reference substance and a time horizon of 100 years. The GWP data of the IPCC Fourth Assessment Report (AR4, 2007) shall be used as a basis (cf. Appendix III).
3.3.7 Garbage Management/Disposal

The best solution to the waste problem is to avoid the generation of waste. This can best be achieved by an appropriate purchase policy of the shipping company and an onboard philosophy that is aware of the problem.

The disposal of garbage into the sea is principally prohibited. MARPOL Annex V includes exceptions (e.g. for food waste) for certain sea areas or certain distances from the coast. Also, MARPOL requires ships to keep a garbage record book.

The EU Port Reception Facility Directive 2000/59/EC has been in force in the EU member states since 2002. It requires ships to make sure their garbage is disposed of onshore.

In remote areas where no functioning garbage disposal system exists – for example, the destinations of cruise ships - the delivery to onshore facilities may also cause environmental problems. Therefore and due to the shortage of storage capacity and hygiene problems that may arise on board, garbage incineration of defined substances onboard passenger ships may be reasonable - also within the scope of the Blue Angel eco-label.

Mandatory Requirement (M)

a) Implementation of a purchasing strategy aimed at the avoidance of wastes.

b) Storage of all waste on board and delivery to onshore facilities. In accordance with MARPOL Annex V food waste shall be exempt from this requirement. To ensure the lowest possible impact on the waters a procedure instruction shall be set up to ensure the proper separation of food waste from other wastes (especially plastic waste).

c) Incineration of garbage if garbage cannot be temporarily stored on board until reaching the next ecologically reasonable destination for onshore garbage disposal.

Compliance Verification

Entry of a procedure instruction into the management system that specifies a proper waste management (purchasing instruction, storage, separation of wastes etc.).

With regard to b): Records of proper waste disposal and/or the garbage record book shall be used to verify the shipboard storage of garbage and the delivery of garbage to port facilities. Where food waste is disposed of overboard this shall also be documented (checklist).

With regard to c): Presentation of a statement to verify why it has been impossible to deliver all garbage (point c) to onshore facilities which also includes the expected approaches to port. Where applicable, this verification shall be revised every year, for example in the case of new routes (checklist). The amount of garbage incinerated shall be documented (checklist).

Optional Requirements (O)

Only 100 percent recycled paper shall be used on board in both passenger and ship operation areas (hygiene paper, writing paper, printed material, pulp/cleaning paper / in the engine room) [Pax: 2 points / cargo vessels: 1 point].

Compliance Verification

Entry of a procedure instruction into the management system of the ship (purchasing strategy); annual verification (checklist) e.g. by means of order lists.
3.3.8 Incineration of Garbage

On the international level, garbage incineration shall meet the requirements for operating modes and exhaust gas values as defined by MARPOL, Annex VI, Regulation 16. Moreover, relevant national/regional legislations which often do not allow any garbage incineration within sovereign territories must also be complied with.

Mandatory Requirement (M)

a) All ash must principally be disposed of onshore.

b) In order to avoid additional emissions of heavy metals and chlorine during garbage incineration a procedure instruction for the incinerator shall prohibit the incineration of coloured printed high gloss paper and PVC-containing materials.

Compliance Verification

a) Entry of a procedure instruction into the management system of the ship for an onshore disposal of the incinerator ash; annual verification of the disposal (checklist).

b) Verification that the above-mentioned procedure instruction has been set up for onboard operations and affixed visibly and close to the incinerator.

Optional Requirements (O)

Garbage generated on board shall be incinerated – if admissible (see Chapter on Garbage Disposal) – in compliance with the limits specified in the 17th BImSchV (Federal Immission Control Ordinance) for the substances NO₅, CO, SO₅ and particulates [3 points].

Compliance Verification

If the ship is equipped with an incinerator: Verification that the system meets the above-mentioned limits (incinerator certificate).

3.3.9 Black Water

Efficient onboard sewage treatment reduces the nutrients and oxygen-consuming substances of the wastewater and, thus, eases the strain on the environment if it is discharged into the sea, especially in heavily trafficked waters. A critical view is taken of the still widely used chlorination for wastewater disinfection because this may result in the formation of hazardous organochlorine compounds which add to the strain on the environment. An alternative would be, for example, membrane filtration systems as well as ultraviolet radiation following the biological processing of the wastewater.

The regulations of MARPOL Annex IV to MARPOL generally prohibit the discharge of untreated wastewater into the sea by ships over 400 gt or carrying more than 15 persons. The following exemptions shall be admissible depending on the distance from the nearest land:

- Outside 3 nm: discharge from certified sewage treatment plants (treated mechanically and disinfected),
- Outside 12 nm: without treatment at a minimum speed of 4 knots and a moderate discharge rate.
The permitted concentration of residual chlorine for sewage disinfection has been limited to 0.5 mg/l\(^6\) since 2010.

In 2013, the Baltic Sea was the first area to be designated as special area under MARPOL Annex IV with stricter limits for the discharge of treated wastewater from passenger ships. However, the regulation shall not become effective until the states bordering the Baltic Sea have reported to the IMO that sufficient reception facilities are available in their ports.\(^7\).

**Mandatory Requirement (M)**

a) In existing systems the residual chlorine concentration shall not exceed 0.5 mg/l, provided that a change to a chlorine-free or halogen-free disinfectant is impossible.

b) If during the term of these Basic Criteria a new sewage treatment plant is installed this new plant shall be operated without chlorine and halogen compounds.

- **The following additionally applies to passenger ships (Pax):**
  a) Compliance with the limits under MARPOL IV (Resolution MEPC.159 (55)): biological oxygen demand (BOD) < 25 mg/l, filterable solids\(^8\) < 35 mg/l, coliform bacteria < 100/100 ml in discharge water.
  
  b) Collection of the pre-purification products in holding tanks for incineration or disposal ashore, provided that this can be realised considering the number of persons on board the ship.
  
  c) Collection of biosludge in holding tanks for incineration or disposal ashore.

**Certificate Verification**

*Certificate of the plant(s) installed and corresponding procedure instructions in the management system. Annual verification (checklist) that requirements are implemented/met during operation.*

**Optional Requirements (O)**

a) Plants shall be operated without using any chlorine and halogen [Pax: 6 points / cargo vessels: 3 points].

b) Alternative: Collection of sewage in holding tanks and disposal ashore [Pax: 6 points / cargo vessels: 3 points].

c) Alternative: A limit for coli bacteria of less than 30 per 100 ml shall be met for sewage discharge (e.g. by the use of on-board membrane filter technologies). [Pax 5 points / cargo vessels: 2 points].

**Certificate Verification**

*Compliance shall be verified by documenting a corresponding procedure instruction in the management system. Annual verification (checklist) that requirements are implemented/met during operation.*

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\(^6\) According to Resolution MEPC.159(55)

\(^7\) According to Resolution MEPC.200(62)

\(^8\) AFS = filterable solids
3.3.10 Grey Water

Grey water is produced in the cabin/living areas of crew and passengers in showers and basins. Other sources of grey water are, among others, shipboard laundries and kitchens as well as other water used for cleaning purposes, unless mixed with black water (if so, it shall be regarded as black water). Grey water produced in the kitchen containing high levels of fat and grey water from the laundry which is heavily loaded with detergents may cause problems when treated in a biological purification process. It should be treated in accordance with the requirements for black water, especially because of the high nutrient concentration.

There are currently no legal regulations for shipboard treatment of grey water.

**Mandatory Requirement (M)**
None

**Optional Requirements (O)**

Treatment of grey water in accordance with the binding regulations for black water:

a) Same treatment as that for black water, i.e. co-discharge of all grey water into the purification process for black water [Pax: 5 points / cargo vessels: 2 points].

b) Alternative: Collection of all grey water and disposal ashore [Pax: 5 points / cargo ships: 2 points].

c) Applies to Pax only: Processing of the partial streams of grey water into technical water for further shipboard use [4 points].

**Compliance Verification**

Compliance shall be verified by documenting a corresponding procedure instruction in the management system. Annual verification (checklist) that requirements are implemented/met during operation.

3.3.11 Bilge Water

According to MARPOL, Annex I, the residual oil content of the bilge water shall not exceed 15 ppm upon discharge into the sea.

**Mandatory Requirement (M)**

Discharge into the sea in accordance with MARPOL, Annex I, yet with a residual oil content of the bilge water after oil-water separation of < 5 ppm triggering a corresponding alarm if the limit is exceeded.

**Compliance Verification**

Type approval test of the shipboard bilge water separator as well as entry of a corresponding procedure instruction into the management system.
Optional Requirements (O)
a) All bilge water shall be disposed of ashore. [5 points].
b) Conceptual implementation of the Integrated Bilge Water Treatment System (IBTS) for treating bilge water in the engine room following MEPC Circ. 760 [4 points].

Compliance Verification
Entry of a corresponding procedure instruction into the management system as well as verification of the technical option (storage capability) in the ship’s tank plan. Annual verification (checklist) that requirements are implemented/met during operation.

3.3.12 Antifouling Coating on the Ship Hull and on Seawater Cooling Systems
IMO has prohibited the use of TBT-containing (TBT - tributyltin) antifouling paints from 2003 by the International Convention on the Control of Harmful Antifouling Systems on Ships. This convention did not, however, come into force until September 2008. Negative impact on marine ecosystems can be further avoided by the use of biocide-free antifouling systems. They directly help to ease the strain on estuaries and heavily trafficked port areas. Also sea chests and seawater piping systems can house foreign organisms and, thus, contribute to the introduction of these species into other ecosystems. Moreover, the overgrowing of the systems/pipes pose technical problems. This is prevented by the use of biocides or other measures such as, for example, the use of chlorine. For example, the heating of sea chests and piping systems or the use of less hazardous substances are known to be more eco-friendly.

Mandatory Requirement (M)
None

Optional Requirements (O)
a) Use of biocide-free antifouling paints and systems or biocide-free coatings, respectively [5 points]
b) Neither chlorine or bromine compounds nor TBT shall be used in sea chests and seawater piping systems. The use of catalytic systems or external power systems shall be admissible, provided that it can be proved that these systems have no adverse impact on the environment. For example, the heating of sea chests and piping systems or the use of less hazardous substances are known to be more eco-friendly [3 points].

Compliance Verification
Manufacturer’s specification, verification of application.

3.3.13 Ballast Water Treatment
The introduction of foreign marine organisms by way of ballast water poses a threat to ecosystems and in some regions has already caused lasting changes in the aquatic biocoeconoses as well as economic damage. The IMO Ballast Water Management Convention (International Convention for the Control and Management of Ships’ Ballast Water and Sediments) was

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9 Guidelines for systems for handling oily wastes in machinery spaces of ships incorporating guidance notes for an integrated bilge water treatment system (IBTS), MEPC.1/Circ.511 and amendment MEPC.1/Circ.760, dated 25.08.2011
adopted in February 2004 but has not yet entered into force. The convention will enter into force 12 months after it is ratified by 30 nations, representing at least 35% of the world’s merchant shipping tonnage.

According to the Ballast Water Exchange Standard (D-1) ships shall conduct ballast water exchange at least 200 nautical miles from the nearest land and in water at least 200 metres in depth to achieve a volumetric exchange rate of at least 95 percent. The international Ballast Water Convention considers the exchange of ballast water as an interim solution that is to be followed by the more stringent Ballast Water Performance Standard (D-2).

Some countries have their own national regulations – these countries are among others the United States of America, Great Britain, Israel, India, Canada and New Zealand. These regulations stipulate certain ballast water treatment methods for certain ships independent of the international Ballast Water Convention. Some of these regulations have already been in force for some years.

**Mandatory Requirement (M)**

Development of a ballast water management plan and maintenance of a ballast water record book in accordance with the Annex to the Ballast Water Convention, Regulations B-1 and B-2.

**Compliance Verification**

*Documentation in the management system; maintenance of a ballast water record book as well as annual checks (checklist).*

**Optional Requirements (O)**

a) Operation of an existing or newly installed approved ballast water treatment system. [4 points].

b) Alternative: Operation of an existing or newly installed ballast water treatment system using no active substances within the meaning of Guideline G9 (IMO MEPC Resolution 169(57) [6 points];

c) Alternative: Closed-loop ballast water system or use of only fresh water as ballast; or no ballast water at all is needed for ship operation [8 points].

**Compliance Verification**

a) + b) Installation and approval certificate according to the “Guidelines for Approval of Ballast Water Management Systems (G8)” and “Procedure for Approval of Ballast Water Management Systems that make use of Active Substances (G9)” under MEPC Resolution 174(58) and 169(57).

b) Design documents of the ship, entry into the management manual.

c) + b) + c) Annual verification that systems are used (checklist).

**3.3.14 Extinguishing Agents**

The shipboard use of extinguishing agents is to ensure the safety of crew and ship which is always highest priority. Extinguishing agents can have an ozone-depleting potential (ODP) or a high global warming potential (GWP). Today, environmental alternatives exist for both groups. They are also used in the maritime industry.

MARPOL Annex VI, Regulation 12, prohibits the installation of systems using substances with ozone-depleting potential (e.g. CFCs and halons) – This ban has been in force in Germany
since 1995 and in the EU since the year 2000. From 2020, HCFCs shall also be banned under MARPOL.

Moreover, Regulation (EU) No 517/2014 prohibits the placing on the market of fire protection systems using perfluorinated hydrocarbons in fire extinguishing agents. In addition, the placing on the market of extinguishing systems using HFC R23 shall be prohibited from the 1st of January 2016. HFCs with low global warming potential as well as halogen-free extinguishing agents and systems are possible alternatives.

Fire-fighting foams containing more than 0.001 weight percent of perfluorooctane sulfonic acid and its derivatives (PFOS) have been prohibited in the EU since June 2011 (Regulation (EU) No. 757/2010 / Commission Regulation (EU) No. 757/2010 amending Regulation (EC) No. 850/2004 – POP Regulation). The use of halon for fire fighting is internationally prohibited on new ships - yet there are transitional regulations for existing systems or shipboard extinguishing agents. They will be effective until 2020. Halon fire extinguishers - still permitted on ships by way of exception - have to be removed in the EU by December 31, 2016 under Regulation (EU) No. 744/2010.

**Mandatory Requirement (M)**

a) Halon shall not be used.

b) If a new fire-fighting system or new hand-held fire extinguishers are installed during the term of the Blue Angel eco-label they shall meet “zero ODP” requirements and a GWP of less than 3,500.

**Optional Requirements (O)**

Use of a high-pressure water spraying system, if permitted under fire protection and ship safety provisions on the entire ship [3 points] in some parts of the ship [2 points].

**Compliance Verification**

- Entry into the Safety Equipment Certificate of the ship.
- Entry of the requirements for a new fire-fighting system / hand-held fire extinguishers in the management manual. Verification via the annual checklist that the newly purchased equipment meets the requirements.

### 3.3.15 Use of Lubricating and Hydraulic Oils

Every mechanical system requires lubrication with the emission of lubricants being unavoidable. Lubricants used in closed systems can be released into the environment by evaporation, leakages as well as minor or major interruptions in operation. Conventional lubricating and hydraulic oils are usually produced on the basis of mineral oils. They can put enormous strain on the environment because of the fact that they are toxic and non-biodegradable.

There are no binding national or international regulations.

**Mandatory Requirement (M)**

Use of biodegradable lubricating and hydraulic oils in accordance with the criteria for award of the Blue Angel eco-label for biodegradable lubricants and hydraulic fluids - DE-UZ 178
(formerly DE-UZ 64 or DE-UZ 79) in all existing shipboard systems as well as in transverse thruster systems and stern tubes approved for this use by the manufacturer taking into account the conditions of use.

**Compliance Verification**

Documentation of the inquiries whether or not the systems have been approved by the manufacturer for the use of biodegradable lubricating and hydraulic oils.

Verification of the use of appropriate oils and hydraulic fluids as well as a corresponding note on this use in the management manual (checklist).

**Optional Requirements (O)**

a) Installation and operation of new systems on deck for use with biodegradable lubricating and hydraulic oils. [2 points per system with a lubricating oil demand of more than 100 litres / 1 point for systems requiring more than 20 litres and less than 100 litres]. A maximum of 4 points can be earned.

b) Installation and operation of systems under deck for use with biodegradable lubricating and hydraulic oils. [1 point per system with a lubricating oil demand of more than 100 litres] A maximum of 2 points can be earned.

**Compliance Verification**

Document in support of the installation of the system and entry of the use into a procedure instruction in the management manual.

**3.3.16 Cleaning Agents**

Cleaning agents are used in all sections of the ship. Continuous change of staff and, usually, also a continuous change of cleaning agents may lead to wrong dosing and often to overdosing. The overdosed wash water can disturb the delicate biological balance in the wastewater treatment plant and, at worst, kill the microorganisms so that the system fails and wastewater is released into the environment untreated and highly contaminated.

The same applies to the use of cleaning agents on deck. This wash water is released into the environment untreated.

There are no binding national or international regulations.

**Mandatory Requirement (M)**

a) Installation of a system for well-dosed use of cleaning concentrates for use outside the engine room (e.g. kitchen, laundry) and affixing of a procedure description (dosage instructions) for the products.

b) The cleaning staff shall receive annual training in the proper and safe use of the cleaning agents. New personnel shall receive training soon after being employed.

**Compliance Verification**

a) Verification of the installation of the system and entry of the use into a procedure instruction in the management manual. The permanent use of the dosing systems shall be verified (checklist).

b) Regular training courses shall be documented. The documentation shall describe the instruction including a list of the training content. It shall be reviewed every year (checklist).
Optional Requirement (O)
a) Use of readily biodegradable\(^{10}\) products in all areas where technically possible (e.g. living spaces) in accordance with the criteria of sample calls for tenders for sustainable procurement of cleaning services on the basis of the EU eco-label for all-purpose cleaners (see also: http://www.umweltbundesamt.de/reinigungsdienstleistungen-mittel)

b) [2 points].

c) Installation of a system for well-dosed use of cleaning concentrates for use inside the engine room and affixing of a procedure instruction (dosage instructions) for the products [1 point].

Compliance Verification

Evidence of the installation of the system.
Entry of an appropriate procedure instruction into the ship’s management system as well as verification (e.g. by photo) that the procedure description is affixed in an appropriate location aboard the ship.
The permanent use of the dosing systems shall be verified (checklist).

3.3.17 Sound Emissions (Occupational Safety + Underwater Sound)

Today, effective legal provisions regarding sound/noise emissions from ships only refer to aspects of occupational safety. These are, among others the IMO Code for Noise Levels Aboard Ships as well as the IMO Code on High Speed Craft (HSC-Code).
The issue of airborne sound during ship operation is primarily a matter of the ventilation systems. Maintenance and, where possible, cleaning of the ventilators and ventilation ducts can help confine increases in noise. Moreover, the replacement of elastic bearing elements after a certain time of use of the sources of noise (sets of generators, small main engines, hydraulic systems, etc.) can prevent an increase in the level of structure-borne noise of the ship. If possible, ventilation systems can be slowed down to lower power levels while in port and in pilotage areas.

Reflected underwater sounds caused by maritime traffic disturb marine species in their use of sound waves to communicate, avoid enemies and orientate themselves. It may harm their hearing. Low-frequency sound signals can propagate in deep water (e.g. in oceans) over more than 1,000 km. At short distances, high sound levels occur at all frequencies.

Measures to reduce the underwater sound during ship operation depend on the type and speed of ship, routes, sea areas etc. so that no measures can be specified within the scope of these Basic Criteria.

Mandatory Requirement (M)

None

\(^{10}\) according to OECD 301 and Regulation (EC) No 648/2004.
Optional Requirement (O)

a) Periodic maintenance and repair work to meet the sound level within the meaning of vocational protection (e.g. elastic bearings, ventilation) [2 points].

b) When modifying underwater hull and propulsion system (optimization of the ship’s lines, e.g. bulbous bow and installation of more efficient propellers and rudders) the generation of underwater sound shall be included in the considerations [2 points].

Compliance Verification

a) Certificate and corresponding documentation in the management system.
b) Verification that sound reducing measures have been implemented (management manual / procedure instruction).

3.3.18 Environmentally Sound Recycling

The construction and equipment of a ship uses materials that can be hazardous to health and/or harmful to the environment especially during repair and shipbreaking. These materials include, for example, tank coatings, insulation and chlorine-containing materials. The documentation of the on-board materials facilitates repair and shipbreaking. Measures of vocational protection can be derived and environmentally harmful materials can be more easily treated and disposed of in an environmentally sound way and material cycles can be closed without enriching contaminants.

The Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships; HKC – Hong Kong Convention) took place in May 2009 with 63 states attending. It applies to new and existing vessels of 500 GT and more. The convention shall take effect 2 years after the date on which a minimum of 15 states representing more than 40 percent of world merchant shipping by gross tonnage have ratified it. Until now, Norway, Congo and France have ratified it.

The convention focuses on the development of an inventory of hazardous materials aboard ships, (IHM); Res. MEPC 197(62)) as well as on the authorization of recycling facilities – Res. MEPC 210(63))

On the European level, REGULATION (EU) No 1257/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20 November 2013 on ship recycling and amending Regulation (EC) No 1013/2006 and Directive 2009/16/EC entered into force on 30 December 2013. Requirements of this EU regulation are to maintain an inventory of hazardous materials (IHM) in accordance with the requirements and the guidelines of the Hong Kong Convention as well as the recording of at least one additional hazardous substance for existing ships (PFOS) and two additional ones for new ships (PFOS and HBCDD). All ships of more than 500 GT flying the flag of an EU member state or calling at a port of an EU member state shall have a certified inventory of hazardous materials (IHM) by 31 December 2020.

Mandatory Requirement (M)

a) Immediate compliance with the IHM regulations of the IMO Convention on Ship Recycling, as amended (Guidelines for the Development of the Inventory for Hazardous Materials, MEPC.197(62), 2011) plus the two EU substances.

b) Compliance with the entire industry directive “Guidelines on Transitional Measures for Shipowners“

c) Compliance with the requirements for maintaining IHMs (Sheet 13).
Compliance Verification

Presentation of the IHM Certificate and verification that the industry directive "Guidelines on Transitional Measures for Shipowners" is complied with.

Corresponding documentation in the management system. Annual verification that the IHM is updated (checklist).

Optional Requirement (O)
None

4 Additional Requirement for Tankers: Emissions from Cargo

According to Annex VI of the MARPOL Convention the control of volatile organic compounds (VOC) emissions is part of the responsibility of the member states. Ships calling at ports where national regulations exist shall be equipped with a gas recovery system approved under the provisions of the MARPOL Convention. Moreover, all tankers transporting crude oil shall implement a VOC management plan (MEPC 58/23/Add.1: 21 f.).

Mandatory Requirement (M)
Installation and operation (if possible in port) of a vapour recovery system or alternative systems.

Compliance Verification

Verification of the installation of appropriate equipment and entry of a procedure instruction for the operation of the system into the management system.

5 Inspection / Test Bodies

5.1 Expert Reports / Experts

The requirements under paras. 3.1 to 4 shall be considered met if compliance is verified in a summarized expert report.
This expert report can be prepared by:
an IACS-approved classification society or
a ship management company in a member country under 1.

5.2 Transferability

Due to the wide spectrum of requirements for environmentally friendly ship operation and the usually different situation aboard – even aboard sister ships - the Blue Angel eco-label is always awarded to one specifically named ship of shipping company.

5.3 Checklist – Annual Review

To make sure that ship operation continues to meet the requirements for the eco-label a review shall be conducted once a year during the term of the Blue Angel.
Such review shall be conducted within the scope of the annual inspection/appraisal by the organisations listed under para. 5.1. and will be certified by them.
The criteria to be checked each year are listed in the checklist (cf. Appendix B). RAL shall be informed about the periods scheduled for the annual inspections/appraisals upon filing the
application. The checklist fully completed by an expert shall be sent to RAL without further request 8 weeks after inspection/appraisal at the latest. The data/information on the compliance with the requirements (e.g. annual consumption data, fuel quality data) requested in the checklist shall also be made available to RAL and UBA at their request.

6 Applicants and Parties Involved

Shipping companies or ship-operating companies of final products according to Paragraph 2 shall be eligible for application.

Parties involved in the award process are:

- RAL gGmbH to award the Blue Angel Environmental Label,
- the federal state being home to the applicant’s production site,
- Umweltbundesamt (German Environmental Agency) which after the signing of the contract receives all data and documents submitted in applications for the Blue Angel in order to be able to further develop the Basic Award Criteria.

7 Use of the Environmental Label

The use of the Environmental Label by the applicant is governed by a contract on the use of the Environmental Label concluded with RAL gGmbH.

Within the scope of such contract, the applicant undertakes to comply with the requirements under Paragraph 3 and, where applicable, paragraph 4 while using the Environmental Label.

Contracts on the Use of the Environmental Label are concluded to fix the terms for the certification of products under Paragraph 2. Such contracts shall run until December 31, 2020. They shall be extended by periods of one year each, unless terminated in writing by March 31, 2020 or March 31 of the respective year of extension.

After the expiry of the contract, the Environmental Label may neither be used for labelling nor for advertising purposes. This regulation shall not affect products being still in the market.

The applicant (manufacturer) shall be entitled to apply to RAL gGmbH for an extension of the right to use the ecolabel on the product entitled to the label if it is to be marketed under another brand/trade name and/or other marketing organisations.

The Contract on the Use of the Environmental Label shall specify:

- Applicant (Shipping company or ship-operating company)
  - Name of the shipping company and of the ship (including IMO ship identification number),
  - Owner of the ship,
  - Type of ship,
  - Flag,
  - Classification society and class notation.
Appendix A  Evaluation Points Scheme

Available on a separate document
Appendix B  Checklist for Annual Verification of Compliance with the Requirement

Available on a separate document
### Appendix C  Global Warming Potential GWP100 of Refrigerants for Use in Shipboard Refrigeration Equipment

<table>
<thead>
<tr>
<th>Name</th>
<th>Individual Substances of Mixtures of Refrigerants</th>
<th>GWP100</th>
</tr>
</thead>
<tbody>
<tr>
<td>R507</td>
<td>R125, R143a</td>
<td>3 985</td>
</tr>
<tr>
<td>R404A</td>
<td>R125, R134a, R143a</td>
<td>3 922*</td>
</tr>
<tr>
<td>R407A</td>
<td>R32, R125, R134a</td>
<td>2 107*</td>
</tr>
<tr>
<td>R410A</td>
<td>R32, R125</td>
<td>2 088*</td>
</tr>
<tr>
<td>R407C</td>
<td>R32, R125, R134a</td>
<td>1 774*</td>
</tr>
<tr>
<td>R134a</td>
<td>-</td>
<td>1 430*</td>
</tr>
<tr>
<td>R744 (carbon dioxide, CO₂)</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Hydrocarbons (such as propane R290, propene R1270, butane R600, isobutane R600a)</td>
<td>-</td>
<td>3**</td>
</tr>
<tr>
<td>R717 (ammonia)</td>
<td>-</td>
<td>0**</td>
</tr>
</tbody>
</table>

For additional refrigerants, please use the GWP on the basis of Annexes I, II and IV to Regulation (EU) 517/2014.
Appendix D  Content of Shipboard Environmental Training

The content of environmental training for crew members on board of ships applying for award of the Blue Angel Eco-label for Environmentally Friendly Ship Operation shall meet the following requirements in terms of content and systematics (test, verification etc.) The training shall be conducted in accordance with the crew’s responsibilities aboard the ship.

1] Description of emissions from ship operation and their impact on the environment:
- Solid emissions (e.g. waste)
- Liquid emissions (e.g. black and grey water, ballast water)
- Gaseous emissions (e.g. sulphur dioxide, CFC).

Details of relevant guidelines and information on compliance with limits or emission reduction requirements:
- International legislation:
  - MARPOL 73 / 78, Annex I – VI
  - SOLAS (ISM-Code, among others)
  - ISO 14001
  - IMGD Code, BC Code
- National legislation of the country of registration:
  - Implementation of the above regulations into national law
  - Port Ordinance (e.g. regulations on the discharge of waste)
- Regional operating standards of the ship

General principles for improving environmental protection, e.g. measures aimed at “avoidance – reduction – recycling”.

Policy of the shipping company on environmental protection and environmental standards in the safety management system (SMS) and in the environmental management system (EMS) of the ship.

Implementation of the SMS standards on board the ship.

Practical training of the personnel concerned in their respective fields of work.

All new members of the crew shall receive environmental training within two weeks after commencing employment. Training material shall be made available to the member of the crew for preparation purposes (e.g. the Basic Criteria for Award of the Blue Angel Eco-label for Environmentally Ship Operation, among others). The crew shall receive refresh training if the standards for the maritime areas/routes change. Conduct of the training shall be documented in the logbook of the ship.
### List of Abbreviations and Comments

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC Code</td>
<td>Code of Safe Practice for Solid Bulk Cargoes</td>
</tr>
<tr>
<td>BGBl</td>
<td>Bundesgesetzblatt – Federal Law Gazette</td>
</tr>
<tr>
<td>BImSchV</td>
<td>Bundesimmissionsschutz Verordnung (Federal Immission Control Ordinance)</td>
</tr>
<tr>
<td>BOD</td>
<td>Biological Oxygen Demand: The quantity of oxygen consumed by aerobic microbes (bacteria) in the water in the decomposition process of organic material is called BOD and expressed in mg/l or parts per million (mm³/l or mg/kg).</td>
</tr>
<tr>
<td>BDN</td>
<td>Bunker Fuel Delivery Note</td>
</tr>
<tr>
<td>GT</td>
<td>Gross Tonnage (German: BRZ Bruttoraumzahl) (unit for measuring the size of a ship)</td>
</tr>
<tr>
<td>CO</td>
<td>Carbon monoxide</td>
</tr>
<tr>
<td>CO₂</td>
<td>Carbon dioxide</td>
</tr>
<tr>
<td>dwt</td>
<td>Dead weight tonnage (cargo-carrying capacity)</td>
</tr>
<tr>
<td>ECA</td>
<td>Emission Control Area under the criteria of MARPOL Annex VI.</td>
</tr>
<tr>
<td>EEDI</td>
<td>Energy Efficiency Design Index</td>
</tr>
<tr>
<td>EEOI</td>
<td>Energy Efficiency Operational Index</td>
</tr>
<tr>
<td>EMS</td>
<td>Environmental Management System</td>
</tr>
<tr>
<td>CFCs</td>
<td>Fluorinated and chlorinated hydrocarbons: Substances, for example, in cooling and refrigerating systems which, if released into the atmosphere, can contribute to global warming and ozone depletion.</td>
</tr>
<tr>
<td>GWP</td>
<td>Global Warming Potential</td>
</tr>
<tr>
<td>HBCDD</td>
<td>Hexabromocyclododecane (for example in flame retardants)</td>
</tr>
<tr>
<td>HCFCs</td>
<td>Halogenated, fluorinated and chlorinated hydrocarbons</td>
</tr>
<tr>
<td>HFCs</td>
<td>Partially fluorinated hydrocarbons</td>
</tr>
<tr>
<td>HKC</td>
<td>Hong Kong Convention (The Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships)</td>
</tr>
<tr>
<td>HSC</td>
<td>High Speed Craft</td>
</tr>
<tr>
<td>HSMS</td>
<td>Hull Stress Monitoring System</td>
</tr>
<tr>
<td>IACS</td>
<td>International Association of Classification Societies: Association of the world’s leading classification societies committed to enforce high standards in the classification of ships</td>
</tr>
<tr>
<td>IBTS</td>
<td>Integrated Bilge Water Treatment Systems</td>
</tr>
<tr>
<td>IHM</td>
<td>Inventory of Hazardous Materials</td>
</tr>
<tr>
<td>ILO</td>
<td>International Labour Organisation</td>
</tr>
<tr>
<td>IMO</td>
<td>International Maritime Organization</td>
</tr>
<tr>
<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change (United Nations)</td>
</tr>
<tr>
<td>ISO</td>
<td>International Standards Organization</td>
</tr>
<tr>
<td>Acronym</td>
<td>Full Form</td>
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<tr>
<td>---------</td>
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</tr>
<tr>
<td>ITF</td>
<td>International Transport Workers’ Federation</td>
</tr>
<tr>
<td>MEPC</td>
<td>Marine Environmental Protection Committee of the IMO</td>
</tr>
<tr>
<td>MRV Regulation</td>
<td>Monitoring, Reporting and Verification (draft EU Regulation)</td>
</tr>
<tr>
<td>NOX</td>
<td>Nitrogen oxides</td>
</tr>
<tr>
<td>NECA</td>
<td>NOₓ Emission Control Area under MARPOL Annex VI</td>
</tr>
<tr>
<td>ODP</td>
<td>Ozone Depletion Potential in the atmosphere: Depletion of the ozone layer results in increased UV radiation reaching the Earth’s surface (abnormalities in living organisms, risk of cancer)</td>
</tr>
<tr>
<td>OECD</td>
<td>Organization for Economic Cooperation and Development</td>
</tr>
<tr>
<td>PAHs</td>
<td>Polycyclic aromatic hydrocarbons</td>
</tr>
<tr>
<td>Pax</td>
<td>Passenger ships (Definition within the meaning of the Basic Criteria: Number of non-crew members exceeds that of crew members)</td>
</tr>
<tr>
<td>PFOS</td>
<td>Perfluorooctanesulfonic acid</td>
</tr>
<tr>
<td>ppm</td>
<td>Parts per million</td>
</tr>
<tr>
<td>PVC</td>
<td>Polyvinyl chloride</td>
</tr>
<tr>
<td>QMS</td>
<td>Quality Management System</td>
</tr>
<tr>
<td>RAL</td>
<td>Deutsches Institut für Gütesicherung und Kennzeichnung e.V. (German Institute for Quality Assurance and Certification)</td>
</tr>
<tr>
<td>SECA</td>
<td>Sulphur Emission Control Area under MARPOL Annex VI</td>
</tr>
<tr>
<td>SEEMP</td>
<td>Ship Energy Efficiency Management Plan</td>
</tr>
<tr>
<td>nm</td>
<td>Nautical mile</td>
</tr>
<tr>
<td>SMCP</td>
<td>Standard of Marine Communication Phrases</td>
</tr>
<tr>
<td>SMS</td>
<td>Safety Management System</td>
</tr>
<tr>
<td>SOLAS</td>
<td>International Convention for the Safety of Life at Sea of 1974; Guidelines for the maritime transport sector setting the standards for shipbuilding, ship operation etc.</td>
</tr>
<tr>
<td>SOX</td>
<td>Sulphur oxides</td>
</tr>
<tr>
<td>STCW</td>
<td>International Convention on Standards of Training, Certification and Watchkeeping for Seafarers</td>
</tr>
<tr>
<td>TBT</td>
<td>Tributyltin; toxic substance in the paint coat on the ship’s hull to prevent the growth of plants and animals on ship hulls.</td>
</tr>
<tr>
<td>UBA</td>
<td>Umweltbundesamt - Federal Environmental Agency</td>
</tr>
<tr>
<td>VOC</td>
<td>Volatile Organic Compounds</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
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