

## **8B-4 REQUIREMENTS CONCERNING EQUIPMENT FOR THE TREATMENT OF DOMESTIC WASTE WATER**

The Administration may allow the use of the equipment for the treatment of domestic waste water. In this case such equipment and its components shall meet the conditions required by the Administration. *This ~~Chapter~~ section applies to all on-board sewage treatment plants which are installed on passenger vessels.*

### *Article 14a.01*

8B-4.1 Definitions. *For the purposes of this ~~Chapter~~ section:*

1. *'on-board sewage treatment plant' means a ~~sewage treatment~~ plant of compact design for treating the quantities of domestic waste water accruing on board;*
2. *'type approval' means the decision whereby the competent authority confirms that an on-board sewage treatment plant satisfies the technical requirements of this ~~Chapter~~ section;*
3. *'special test' means the procedure carried in accordance with Article 14a.11 whereby the competent authority ensures that the on-board sewage treatment plant operated in a craft satisfies the requirements of this Chapter;*
4. *'manufacturer' means the person or body who is responsible to the competent authority for all aspects of the type approval procedure and for ensuring conformity of production. This person or body does not have to be involved in all stages of the construction of the on-board sewage treatment plant. If the on-board sewage treatment plant is converted by modifications or retrofitting after its original manufacture for use on a craft for the purposes of this Chapter, the person or body having carried out the modifications or retrofitting is considered as the manufacturer;*
5. *'information document' means the document set out in **Appendix VI, Part II** that lists the information to be supplied by an applicant;*
6. *'information folder' means the complete set of data, drawings, photographs or other documents supplied by the applicant to the technical service or the competent authority as prescribed in the information document;*
7. *'information package' means the information folder plus any test reports or other documents that the technical service or the competent authority have added to the information folder in the course of their duties;*
8. *'type approval certificate' means the document drawn up in accordance with **Appendix VI, Part III** with which the competent authority certifies the type approval;*
9. *'on-board sewage treatment plant parameters record' means the document drawn up in accordance with **Appendix VI, Part VIII** which records all parameters, including components of and adjustments to the on-board sewage treatment plant having an effect on the level of sewage treatment, including modifications thereto;*
10. *'manufacturer's guide to checking the components and parameters relevant to sewage treatment' means the document compiled in accordance with ~~Article 14a.11(4)~~ **paragraph 8B-4.11.4** for the purpose of implementing the special test;*

11. 'domestic waste water' means waste water from galleys, dining rooms, washrooms and laundries and faecal water;
12. 'sewage sludge' means residues accruing from operation of a sewage treatment plant on board a craft.

~~Article 14a.02~~

**8B-4.2 General provisions**

**8B-4.2.1** This Chapter applies to all on-board sewage treatment plants which are installed on passenger vessels.

**8B-4.2.2** (a i) On-board sewage treatment plants shall comply with the limit values set out in Table 1 during the type test.

Table 1: Limit values to be observed in operation in the outflow of the on-board sewage treatment plant (test plant) during the type test

<i>Parameter</i>	<i>concentration</i>	<i>Sample</i>
<i>Biochemical oxygen demand (BOD<sub>5</sub>) ISO 5815-1 and 5815-2 (2003)<sup>1</sup></i>	20 mg/l	24h composite sample, homogenised
	25 mg/l	Random sample, homogenised
<i>Chemical oxygen demand (COD)<sup>2</sup> ISO 6060 (1989)<sup>1</sup></i>	100 mg/l	24h composite sample, homogenised
	125 mg/l	Random sample, homogenised
<i>Total organic carbon (TOC) EN 1484 (1997)<sup>1</sup></i>	35 mg/l	24h composite sample, homogenised
	45 mg/l	Random sample, homogenised

1) Member States may implement equivalent procedures

2) Instead of the chemical oxygen demand (COD) the total organic carbon (TOC) may also be referred to for the check.

~~(b)~~**i**) During operation the control values set out in Table 2 shall be observed.

Table 2: Control values to be observed in the outflow of the on-board sewage treatment plant during operation on board passenger vessels

<i>Parameter</i>	<i>concentration</i>	<i>Sample</i>
Biochemical oxygen demand (BOD <sub>5</sub> ) ISO 5815-1 and 5815-2 (2003) <sup>1</sup>	25 mg/l	Random sample, homogenised
Chemical oxygen demand (COD) <sup>2</sup> ISO 6060 (1989) <sup>1</sup>	125 mg/l	Random sample, homogenised
	150 mg/l	Random sample
Total organic carbon (TOC) EN 1484 (1997) <sup>1</sup>	45 mg/l	Random sample, homogenised

1) Member States may implement equivalent procedures

2) Instead of the chemical oxygen demand (COD) the total organic carbon (TOC) may also be referred to for the check.

~~(e)~~ **iii**) The respective values in Tables 1 and 2 must not be exceeded in the random sample.

**8B-4.2.3** Procedures using products containing chlorine are not admissible.

It is equally inadmissible to dilute domestic waste water so as to reduce the specific load and thereby also enable disposal.

**8B-4.2.4** Adequate arrangements shall be made for storage, preservation (if necessary), and discharge of the sewage sludge. This shall also include a management plan for the sewage sludge.

**8B-4.2.5** Compliance with the limit values set out in Table 1 in ~~paragraph 2~~ **section 8B-4.2.2** shall be confirmed by a type test and determined by a type approval. The type approval shall be certified in a type approval certificate. The owner or their authorised representative shall include a copy of the type approval certificate with the application for inspection in accordance with **Article 2.02**. A copy of the type approval certificate and the on-board sewage treatment plant parameters record shall be carried on board.

**8B-4.2.6** After the on-board sewage treatment plant has been installed on board a performance test shall be carried out by the manufacturer before scheduled service begins. The on-board sewage treatment plant shall be entered in item 52 of the ~~vessel~~ **ship's** certificate with the following plant particulars:

- ~~(a)~~ **(i)** name;
- ~~(b)~~ **(ii)** type-approval number;
- ~~(c)~~ **(iii)** serial number;
- ~~(d)~~ **(iv)** year of construction.

**8B-4.2.7.** Any significant modification to an on-board sewage treatment plant that has an effect on the sewage treatment shall always be followed by a special test in accordance with ~~Article 14a.11(3)~~ **paragraph 8B-4.11.3.**

**8B-4.2.8.** The competent authority may make use of a technical service in order to fulfil the tasks as described in this Chapter.

**8B-4.2.9.** The on-board sewage treatment plant shall be regularly maintained in accordance with the manufacturer's instructions in order to ensure that it is in perfect working order. A maintenance log corroborating such maintenance shall be carried on board.

*Article 14a.03*

**8B-4.3 Application for type approval**

**8B-4.3.1** An application for type approval for an on-board sewage treatment plant type shall be submitted by the manufacturer to the competent authority. An information folder in accordance with ~~Article 14a.01(6)~~ **paragraph 8B-4.1.6** and the draft of an on-board sewage treatment plant parameters record in accordance with Article 14a.01(9), as well as the draft of a manufacturer's guide to checking the components and parameters relevant to sewage treatment for that on-board sewage treatment plant type in accordance with ~~Article 14a.01(10)~~ **paragraph 8B-4.10.1** shall be enclosed with the application. For the type test the manufacturer shall demonstrate a prototype of the on-board sewage treatment plant.

**8B-4.3.2** If, in a particular application for type approval for an on-board sewage treatment plant type, the competent authority finds that the application submitted with regard to the presented plant prototype is not representative of the characteristics of this type of on-board sewage treatment plant as described in **Appendix VI, Part II, Addendum I** another, if necessary additional, prototype, to be designated by the competent authority, shall be supplied for approval in accordance with paragraph 1.

**8B-4.3.3** No application for type approval for an on-board sewage treatment plant type may be submitted to more than one competent authority. A separate application shall be submitted for each on-board sewage treatment plant type to be approved.

*Article 14a.04*

**8B-4.4 Type approval procedure**

**8B-4.4.1** The competent authority to which the application is submitted shall issue the type approval for the on-board sewage treatment plant type which corresponds to the descriptions in the information folder and satisfies the requirements of this ~~Chapter section~~. The fulfilling of these requirements will be examined in accordance with **Appendix VII.**

**8B-4.4.2** For each on-board sewage treatment plant type that it type-approves, the competent authority shall complete all relevant parts of the type approval certificate, the model for which is to be found in **Appendix VI, Part III**, and shall compile or verify the contents of the index to the information package. Type approval certificates shall be numbered in accordance with the method described in **Appendix VI, Part IV.** The

*completed type approval certificate and its appendices shall be delivered to the applicant.*

**8B-4.4.3***If the on-board sewage treatment plant to be approved can only fulfil its function or only has specific properties in conjunction with other components of the craft in which it is to be installed and if for this reason compliance with one or more requirements can only be checked if the on-board sewage treatment plant to be approved is operated together with other real or simulated components of the craft, the scope of the type approval for this on-board sewage treatment plant shall be limited accordingly. In such cases, all restrictions on use and all installation requirements shall be detailed in the type approval certificate for that plant type.*

**8B-4.4.4***Each competent authority shall send the following documents:*

- (e) (i) the list of on-board sewage treatment plant types including the details as set out in **Appendix VI, Part V**, for which it has issued, denied or withdrawn approval in the period in question to the other competent authorities each time this list is amended;*
- (f) (ii) if requested to do so by another competent authority,*
  - (i) - a copy of the type approval certificate for the on-board sewage treatment plant type, with or without information package, for each type of on-board sewage treatment plant for which it has issued, denied or withdrawn an approval, and, if applicable,*
  - (ii) - the list of the on-board sewage treatment plants which have been manufactured in accordance with the type approvals issued, as laid down in ~~Article 14a.06(3)~~ **paragraph 8B-4.6.3**, which contains the details in accordance with **Appendix VI, Part VI**.*

**8B-4.4.5***Each competent authority shall once a year, or additionally when requested to do so, send the Commission a copy of the data sheet as shown in **Appendix VI, Part VII** on the on-board sewage treatment plant types for which an approval has been issued since the last notification.*

*Article 14a.05*

**8B-4.5**        *Amendment of type approvals*

**8B-4.5.1***The competent authority which issued the type approval shall make the necessary arrangements to ensure that it is informed of any change in the particulars appearing in the information package.*

**8B-4.5.2***The application for amendment or extension of a type approval shall be made exclusively to the competent authority which issued the original type approval.*

**8B-4.5.3***Should characteristics of the on-board sewage treatment plant as described in the information package have been modified, the competent authority shall:*

- (a i) issue revised pages of the information package as necessary, marking each revised page to show clearly the nature of the change and the date of re-issue. Whenever revised pages are issued, the index to the information package which is attached to the type approval certificate shall also be updated accordingly;*
- (b ii) issue a revised type approval certificate (with an extension number) if any information on it (excluding its annexes) has changed or if the minimum requirements of this **Chapter Section** have changed since the original approval*

*date. The revised approval certificate shall clearly show the reason for its modification and the date of the re-issue.*

*Should the competent authority which issued the type approval find that new trials or tests are justified owing to a modification made to the information package, it shall notify the manufacturer of this fact and issue the documents specified above only after new trials or tests have been successfully completed.*

*Article 14a.06*

#### **8B-4.6 Conformity**

**8B-4.6.1***The manufacturer shall affix to each on-board sewage treatment plant manufactured in conformity with the type approval the markings as defined in **Appendix VI, Part I**, including the type approval number.*

**8B-4.6.2***Should the type approval contain limitations of usage in accordance with ~~Article 14a.04(3)~~ **paragraph 8B-4.4.3** the manufacturer shall enclose detailed information on these limitations and all installation requirements with each unit manufactured.*

**8B-4.6.3***If requested by the competent authority which issued the type approval, the manufacturer shall provide a list of the serial numbers of all on-board sewage treatment plants which have been manufactured in accordance with the requirements set out in this ~~Chapter~~ **Section** since the last report, or since the point at which these provisions first came into force, within 45 days after the end of each calendar year, and immediately after each additional date specified by the competent authority. The list shall set out the correlations between the serial numbers, the corresponding on-board sewage treatment plant types and the type approval numbers. Furthermore, the list shall also include particular information for those cases where the manufacturer discontinues production of a type-approved on-board sewage treatment plant type. Should the competent authority not demand the regular provision of such a list from the manufacturer, the manufacturer shall retain the data recorded for a period of at least 40 years.*

*Article 14a.07*

#### **8B-4.7 Acceptance of equivalent approvals**

*Member States can recognize type approvals for on-board sewage treatment systems based on different standards for the use on their national waterways. These type approvals should be notified to the Commission*

*Article 14a.08*

#### **8B-4.8 Checking of serial numbers**

**8B-4.8.1***The competent authority issuing a type approval shall ensure – if necessary working in conjunction with the other competent authorities – that the serial numbers of the on-board sewage treatment plants manufactured in conformity with the requirements of this ~~Chapter~~ **Section** are registered and checked.*

**8B-4.8.2***An additional check of the serial numbers may take place in conjunction with the check on conformity of production as laid down in ~~Article 14a.09~~ **paragraph 8B-4.9***

**8B-4.8.3***In relation to the checking of the serial numbers, the manufacturer or their authorised representatives located in the Member States shall, if requested, promptly supply the competent authority with all necessary information relating to their direct purchasers as well as the serial numbers of those on-board sewage treatment plants*

*which have been reported as manufactured in accordance with ~~Article 14a.06(3)~~ paragraph 8B-4.6.3.*

**8B-4.8.4** *Should a manufacturer be unable to comply with the requirements set out in Article 14a.06 when requested to do so by the competent authority, the approval for the on-board sewage treatment plant type concerned may be withdrawn. In such a case the notification procedure specified in ~~Article 14a.10(4)~~ paragraph 8B-4.10.4 shall be used.*

~~Article 14a.09~~

#### **8B-4.9 Conformity of production**

**8B-4.9.1** *The competent authority issuing a type approval shall ascertain in advance – if necessary working in conjunction with the other competent authorities – that suitable arrangements have been made to ensure effective checking of conformity of production in respect of the requirements **of Appendix VI, Part I.***

**8B-4.9.2** *The competent authority which has issued a type approval shall ascertain – if necessary working in conjunction with the other competent authorities – that the arrangements specified in paragraph ~~±~~ **8B-4.9.1** in respect of the provisions of **Appendix VI, Part I** continue to be sufficient and that every on-board sewage treatment plant provided with a type approval number in accordance with the requirements of this Chapter continues to correspond to the description in the type approval certificate and its annexes for the type-approved on-board sewage treatment plant type.*

**8B-4.9.3.** *The competent authority may recognise comparable tests by other competent authorities as equivalent to the provisions of paragraphs ~~±~~ **8B-4.9.1** and ~~±~~ **8B-4.9.2.***

~~Article 14a.10~~

#### **8B-4.10 Non-conformity with the type-approved on-board sewage treatment plant type**

**8B-4.10.1** *Non-conformity with the type-approved on-board sewage treatment plant type shall be deemed to exist when there are deviations from the characteristics in the type approval certificate or, as the case may be, from the information package which have not been approved in accordance with ~~Article 14a.05(3)~~ paragraph 8B-4.5.3 by the competent authority which issued the type approval.*

**8B-4.10.2** *Should the competent authority which has issued a type approval find that on-board sewage treatment plants do not conform with the on-board sewage treatment plant type for which it issued the approval, it shall take the necessary measures to ensure that on-board sewage treatment plants in production again conform with the type-approved on-board sewage treatment plant type. The competent authority which found the non-conformity shall notify the other competent authorities and the Commission of the measures taken, which may extend to withdrawal of the type approval.*

**8B-4.10.3** *If a competent authority is able to demonstrate that on-board sewage treatment plants provided with a type approval number do not conform with the type-approved on-board sewage treatment plant type, it may require the competent authority which issued the type approval to have the on-board sewage treatment plant type that is in production checked for conformity with the type-approved on-board sewage treatment plant type. Such action shall be taken within six months of the date of the request.*

**8B-4.10.4** *The competent authorities shall notify each other and the Commission within one month of any withdrawal of a type approval and of the reasons for such withdrawal.*

~~Article 14a.11~~

**8B-4.11** *Random sample measurement / Special test*

**8B-4.11.1** *No later than three months after the commissioning of the passenger vessel or, in the case of retrofitting of the on-board sewage treatment plant, after it has been installed and the appropriate performance test has been carried out, the competent authority shall take a random sample during operation of the passenger vessel in order to check the values set out in ~~Article 14a.02(2)~~ **paragraph 8B-4.2.2**, Table 2.*

*At irregular intervals the competent authority shall carry out functionality checks on the on-board sewage treatment plant by means of random sample measurements to check the values set out in ~~Article 14a.02(2)~~ **paragraph 8B-4.2.2**, Table 2.*

*Should the competent authority find that the values of the random sample measurements do not conform with the values set out in ~~Article 14a.02(2)~~ **paragraph 8B-4.2.2**, Table 2, it may demand:*

- (a) that the defects in the on-board sewage treatment plant be remedied so as to ensure that it runs properly;*
- (b) that the on-board sewage treatment plant be made to conform with the type approval again; or*
- (c) that a special test be carried out in accordance with paragraph ~~3~~ **8B-4.11.3**.*

*Once the non-conformities have been remedied and the on-board sewage treatment plant has been made to conform with the type approval again, the competent authority may carry out new random sample measurements.*

*If the defects are not remedied or the conformity of the on-board sewage treatment plant with the specifications of the type approval is not restored, the competent authority shall seal the on-board sewage treatment plant and inform the inspection body to make an entry to that effect in item 52 of the ~~vessel~~ **ship's** certificate.*

**8B-4.11.2** *The random samples shall be measured in accordance with the specifications of ~~Article 14a.02(2)~~ **paragraph 8B-4.2.2**, Table 2.*

**8B-4.11.3** *Should the competent authority find any discrepancies in the on-board sewage treatment plant indicating a deviation from the type approval, the competent authority shall carry out a special test to determine the present state of the on-board sewage treatment plant in relation to the components specified in the on-board sewage treatment plant parameters record, the calibration and the setting of the parameters of the on-board sewage treatment plant.*

*Should the competent authority come to the conclusion that the on-board sewage treatment plant is not in conformity with the type-approved on-board sewage treatment plant type, it may take the following actions:*

- (a) demand that:*
  - (i) the conformity of the on-board sewage treatment plant be restored or*
  - (ii) the type approval in accordance with ~~Article 14a.05~~ **paragraph 8B-4.5** be amended accordingly, or*



(b) *order measurement in accordance with the test specification as set out in Appendix VII.*

*If conformity is not restored or the type approval is not amended accordingly, or if it becomes apparent from the measurements made in accordance with point (b) that the limit values laid down in ~~Article 14a.02(2)~~ paragraph 8B-4.2.2, Table 1 are not complied with, the competent authority shall seal the on-board sewage treatment plant and inform the inspection body to make an entry to that effect in item 52 of the vessel certificate.*

**8B-4.11.4** *The tests in accordance with paragraph ~~3~~ 8B-4.11.3 shall be carried out on the basis of the manufacturer's guide to checking the components and parameters of the on-board sewage treatment plant relevant to sewage treatment. This guide, which shall be compiled by the manufacturer and approved by a competent authority, shall specify the treatment-relevant components as well as settings, dimensioning criteria and parameters to be applied in order to ensure that the values set out in ~~Article 14a.02(2)~~ paragraph 8B-4.2.2, Tables 1 and 2 are continuously maintained. It shall include at least the following information:*

~~(a)~~ **i** *a specification of the on-board sewage treatment plant type with a process description and an indication of whether waste-water storage tanks are to be installed upstream of the on-board sewage treatment plant;*

~~(b)~~ **ii** *a list of the components specific to sewage treatment;*

~~(c)~~ **iii** *the design and dimensioning criteria, dimensioning specifications and regulations applied;*

~~(d)~~ **iv** *a schematic representation of the on-board sewage treatment plant with identifying features of the approved treatment-relevant components (e.g. part numbers on the components).*

**8B-4.11.5** *An on-board sewage treatment plant that has been shut down may be brought back into service only after a special test in accordance with paragraph ~~3~~ 8B-4.11.3, first subparagraph.*

#### *Article 14a.12*

### **8B-4.12** *Competent authorities and technical services*

*Member States shall notify the Commission of the names and addresses of the competent authorities and technical services responsible for carrying out the functions outlined in this Chapter. The technical services shall satisfy the European standard on general requirements for the competence of testing and calibration laboratories (EN ISO/IEC 17025 : 2005 - 8), taking the following conditions into account:*

~~(a)~~ **i** *manufacturers of on-board sewage treatment plants cannot be recognised as technical services;*

~~(b)~~ **ii** *for the purposes of this Chapter a technical service may, with the agreement of the competent authority, make use of facilities external to its own laboratory.*

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**1. Marking of on-board sewage treatment plants**

- 1.1 The type-tested on-board sewage treatment plant must bear the following information (marking):
  - 1.1.1 manufacturer's trademark or trade name;
  - 1.1.2 on-board sewage treatment plant type and serial number of the plant;
  - 1.1.3 number of the type approval in accordance with Part IV of this Appendix;

- 1.1.4 year of construction of the on-board sewage treatment plant.
- 1.2 The marking in accordance with point 1.1 must be durable, clearly legible and indelible throughout the working life of the on-board sewage treatment plant. If adhesive labels or plates are used, they must be affixed so as to stay on throughout the working life of the on-board sewage treatment plant and in such a way that they cannot be removed without being destroyed or rendered indecipherable.
- 1.3 The marking must be affixed to a part of the on-board sewage treatment plant necessary for normal operation of the on-board sewage treatment plant and not normally requiring replacement during the working life of the on-board sewage treatment plant.
  - 1.3.1 The marking must be affixed in such a way that it is clearly visible after the on-board sewage treatment plant has been fitted with all the auxiliary equipment necessary for its operation.
  - 1.3.2 If necessary, the on-board sewage treatment plant must bear an additional removable plate made of a durable material which must contain all the information in referred to in point 1.1 and which shall be affixed in such a way that that information is clearly legible and easily accessible after the on-board sewage treatment plant has been installed in a craft.
- 1.4 All parts of the on-board sewage treatment plant which may have an effect on the treatment of sewage must be clearly marked and identified.
- 1.5 The exact location of the marking referred to in point 1.1 shall be indicated in Section I of the type approval certificate.

## 2. Testing

The procedure for testing an on-board sewage treatment plant is laid down in Appendix VII.

## 3. Evaluation of conformity of production

3.1 With regard to the verification of the existence of satisfactory arrangements and procedures for ensuring effective control of production conformity before granting type approval, the competent authority must accept the manufacturer's registration to harmonised standard EN ISO 9001 : 2008 (whose scope covers the production of the on-board sewage treatment plants concerned) or an equivalent accreditation standard as satisfying the requirements. The manufacturer must provide details of the registration and undertake to inform the competent authority of any revisions to its validity or scope. Appropriate production inspections shall be carried out in order to ensure that the requirements of Article 14a.02(2) to (5) are consistently being fulfilled.

3.2 The holder of the type approval must:

3.2.1 ensure that procedures are in place for the effective control of the quality of the product;

3.2.2 have access to the testing equipment necessary for checking conformity with each type-approved type;

3.2.3 ensure that the results of the tests are recorded and that these records and the relevant documentation remain available for a period to be agreed with the competent authority;

3.2.4 analyse closely the results of each type of test, in order to verify and ensure the consistency of the on-board sewage treatment plant's characteristics, making allowance for normal variations in series production;

3.2.5 ensure that any samples from on-board sewage treatment plants or test pieces revealing apparent non-conformity in the type of test in question give rise to further sampling and testing, all necessary measures being taken to restore conformity of production.

3.3 The competent authority which has granted type approval may at any time verify the conformity control methods applied at each production works.

3.3.1 The test and production documentation shall be made available to the tester at each test.

3.3.2 If the quality of the tests appears unsatisfactory, the following procedure shall be applied:

3.3.2.1 one on-board sewage treatment plant shall be taken from the series and tested by means of random sample measurements in the normal load condition of the Appendix VII after one day operation. The treated sewage must according to the test methods in Appendix VII not exceed the values set out in Article 14a.02(2), Table 2;

3.3.2.2 should any on-board sewage treatment plant taken from the series fail to satisfy the requirements laid down in point 3.3.2.1 the manufacturer may ask for random sample measurements to be carried out on a number of on-board sewage treatment plants of the same specification taken from the series. This new sample must include the on-board sewage treatment plant originally taken. The manufacturer shall determine the scope  $n$  of the series in consultation with the competent authority. The on-board sewage treatment plants shall undergo testing by means of random sample measurement with the exception of the plant originally taken. The arithmetical mean ( $\bar{x}$ ) of the results obtained with the random sample of the on-board sewage treatment plant must then be determined. The series production shall be regarded as conforming with requirements if the following condition is fulfilled:

$$\bar{x} + k \cdot S_t \leq L$$

where:

k is a statistical factor which is dependent on n and is given in the following table:

n	2	3	4	5	6	7	8	9	10
k	0,973	0,613	0,489	0,421	0,376	0,342	0,317	0,296	0,279
n	11	12	13	14	15	16	17	18	19
k	0,265	0,253	0,242	0,233	0,224	0,216	0,210	0,203	0,198

$$\text{if } n \geq 20, k = \frac{0,860}{\sqrt{n}}$$

$S_t = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n-1}}$ , where  $x_i$  is any individual result obtained from the random sample n;

L is the admissible limit value set out in Article 14a.02(2) Table 2 for each pollutant studied;

- 3.3.3 if the values as set out in Article 14a.02(2), Table 2 are not complied with, a new test shall be carried out according to point 3.3.2.1 and, in case that tests has no positive results, in accordance with point 3.3.2.2 a full test is carried out, following the test procedure provided in Appendix VII. The limit values as set out in Article 14a.02(2), Table 1 may not be exceeded for either the composite sample or the random sample.
- 3.3.4 The competent authority must carry out the tests on on-board sewage treatment plants which are partially or fully functional according to the information supplied by the manufacturer.
- 3.3.5 The normal frequency of tests of conformity of production which the competent authority is entitled to conduct shall be one per year. In case of non-compliance with the requirements of point 3.3.2 the competent authority shall ensure that all necessary steps are taken to restore production conformity without delay.

**Part II**  
**(Model)**

**Information Document No.**

**relating to type approval of on-board sewage treatment plants  
intended for installation in inland waterway vessels**

On-board sewage treatment plant type: .....

0. General

0.1 Make (manufacturer's company name): .....

0.2 Manufacturer's designation for the on-board sewage treatment plant type: .....  
.....

0.3 Manufacturer's type code corresponding to the information given on the on-board sewage  
treatment plant: .....  
.....

0.4 Manufacturer's name and address: .....  
Name and address of manufacturer's authorised representative, if any: .....  
.....

0.5 Position, coding and method of attachment of the on-board sewage treatment plant's serial  
number: .....  
.....

0.6 Position and method of attachment of the type approval number: .....  
.....

0.7 Address(es) of production works: .....  
.....

Annexes

1. Main characteristics of the on-board sewage treatment plant type
2. Design and dimensioning criteria, dimensioning specifications and regulations applied
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4. Schematic diagram of the test plant with parts list
5. Electrical wiring diagrams (P/I diagram)
6. Statement that all specifications regarding the mechanical, electrical and technical safety of  
sewage treatment plants and specifications concerning ship safety have been observed
7. Characteristics of any parts of the vessel that are connected with the on-board sewage  
treatment plant
8. Manufacturer's guide to checking the components and parameters of the on-board sewage  
treatment plant relevant to sewage treatment in accordance with Article 14a.01(10)
9. Photographs of the on-board sewage treatment plant

- 10. Operating concepts<sup>1</sup>
- 10.1. Instructions for manual operation of the on-board sewage treatment plant
- 10.2. Notes on excess sludge management (discharge intervals)
- 10.3. Notes on maintenance and repair
- 10.4. Notes on action necessary in the case of stand-by operation of the on-board sewage treatment plant
- 10.5. Notes on action necessary in the case of emergency operation of the on-board sewage treatment plant
- 10.6. Notes on run-down, standstill and restart operation of the on-board sewage treatment plant
- 10.7. Notes on requirements for pre-treatment of galley waste water
- 11. Other appendices (list here)

**Date, signature of on-board sewage treatment plant manufacturer**

.....

---

<sup>1</sup> Operating phases

The following operating phases shall be defined for testing:

- (a) Stand-by operation is when the on-board sewage treatment plant is running but has not been fed with sewage for more than a day. An on-board sewage treatment plant may be in stand-by operation when, for example, the passenger vessel is not in service for an extended period and sits idle at its mooring.
- (b) Emergency operation is when individual subassemblies of an on-board sewage treatment plant have malfunctioned, so that the sewage cannot be treated as intended.
- (c) Run-down, standstill and restart operation is when an on-board sewage treatment plant is taken out of service for an extended period (winter mooring) and the power supply is switched off, or when the on-board sewage treatment plant is started up again at the beginning of the season.

**Addendum**

**Main characteristics of the on-board sewage treatment plant type**

(Model)

- 1. Description of the on-board sewage treatment plant**
  - 1.1 Manufacturer: .....
  - 1.2 Serial number of the plant: .....
  - 1.3 Mode of treatment: biological or mechanical/chemical <sup>2</sup>
  - 1.4 Upstream waste water storage tank? Yes, ... m<sup>3</sup> / No<sup>4</sup>
- 2. Design and dimensioning criteria (including any special installation instructions or restrictions on use)**
  - 2.1 .....
  - 2.2 .....
- 3. Dimensioning of the on-board sewage treatment plant**
  - 3.1 Maximum daily volumetric flow rate of sewage Qd (m<sup>3</sup>/d): .....
  - 3.2 Daily BOD5 pollution load (kg/d): .....

---

<sup>2</sup> specify as appropriate.



**Part III**  
**Type approval certificate**  
(Model)

Seal of the competent authority

Type approval No.: ..... Extension No.: .....

Notification of issuance/extension/refusal/withdrawal<sup>3</sup> of type approval for an on-board sewage treatment plant type in accordance with Directive 2006/87/EC

Reason for extension, if applicable: .....

**Section I**

0. General

0.1 Make (manufacturer's company name): .....

0.2 Manufacturer's designation for the on-board sewage treatment plant type:  
.....  
.....

0.3 Manufacturer's type code corresponding to the information affixed to the on-board treatment plant: .....

Position: .....

Method of attachment: .....

0.4 Manufacturer's name and address: .....

Name and address of manufacturer's authorised representative, if any:  
.....  
.....

0.5 Position, coding and method of attachment of the serial number of the on-board sewage treatment plant: .....

.....  
.....

0.6 Position and method of attachment of the type approval number: .....

.....

0.7 Address(es) of production works: .....

.....

**Section II**

---

<sup>3</sup> specify as appropriate

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1. Any restrictions on use: .....
- 1.1 Particularities to be observed when installing the on-board sewage treatment plant in a craft:  
.....
  - 1.1.1 .....
  - 1.1.2 .....
2. Technical service responsible for carrying out the tests<sup>4</sup> .....
3. Date of test report: .....
4. Number of test report: .....
5. The undersigned hereby certifies the accuracy of the manufacturer information in the annexed information document for the above mentioned on-board sewage treatment plant in accordance with Appendix VII of Directive 2006/87/EC and the validity of the annexed test results in relation to the on-board sewage treatment plant type. The sample(s) has (have) been selected by the manufacturer with the agreement of the competent authority and submitted by the manufacturer as the design type of the on-board sewage treatment plant:  
The type approval is issued/extended/refused/withdrawn<sup>5</sup>:  
Place:.....  
Date: .....

- Appendices:
- Information folder
  - Test results (see Annex 1)

---

<sup>4</sup> In case tests are made by the competent authority mark "not relevant"  
<sup>5</sup> specify as appropriate

**Annex 1**  
**Test results for type approval**  
**(Model)**

- 0. General
  - 0.1 Make (manufacturer’s company name): .....
  - 0.2 Manufacturer’s designation for the on-board sewage treatment plant type: .....
- 1. Information on the implementation of the test(s)<sup>6</sup>.
  - 1.1 Inflow values
    - 1.1.1 Daily volumetric flow rate of sewage Qd (m<sup>3</sup>/d): .....
    - 1.1.2 Daily BOD5 pollution load (kg/d): .....
  - 1.2 Purification efficiency
    - 1.2.1 Evaluation of outflow values

Evaluation of outflow values **BOD<sub>5</sub>** (mg/l)

Location:	Sample type	Number of tests that meet the limit-values	Min	Max		Mean
				Value	Phase	
Inflow	24h composite samples	-- <sup>7</sup>				
Outflow	24h composite samples					
Inflow	Random samples	--				
Outflow	Random samples					

Evaluation of outflow values **COD** (mg/l)

Location:	Sample type	Number of tests that meet the limit-values	Min	Max		Mean
				Value	Phase	
Inflow	24h composite samples	--				
Outflow	24h composite samples					
Inflow	Random samples	--				
Outflow	Random samples					

<sup>6</sup> In case of more test cycles indicate for each cycle  
<sup>7</sup> No limit values exist for the inflow

Evaluation of outflow values **TOC** (mg/l)

Location:	Sample type	Number of tests that meet the limit-values	Min	Max		Mean
				Value	Phase	
Inflow	24h composite samples	--				
Outflow	24h composite samples					
Inflow	Random samples	--				
Outflow	Random samples					

Evaluation of outflow values **SRF** (mg/l)

Location:	Sample type	Number of tests that meet the limit-values	Min	Max		Mean
				Value	Phase	
Inflow	24h composite samples	--				
Outflow	24h composite samples					
Inflow	Random samples	--				
Outflow	Random samples					

1.2.2 Purification efficiency (elimination efficiency) (%)

Parameter	Sample type	Min	Max	Mean
BOD <sub>5</sub>	24h composite samples			
BOD <sub>5</sub>	Random samples			
COD	24h composite samples			
COD	Random samples			
TOC	24h composite samples			
TOC	Random samples			
SRF	24h composite samples			

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SRF	Random samples			
-----	----------------	--	--	--

1.3 Further parameters measured

1.3.1 Additional inflow and outflow parameters:

Parameter	Inflow	Outflow
pH		
Conductivity		
Temperature of liquid phases		

1.3.2 The following operating parameters are – when available - to be recorded during sampling:

Concentration of dissolved oxygen in the bioreactor

Dry matter content in the bioreactor

Temperature in the bioreactor

Ambient temperature

1.3.3 Further operating parameters according to the manufacturer's operating instructions

.....  
 .....  
 .....  
 .....

1.4 *Competent authority or Technical service:*

Place, date:.....Signature: .....

## Part IV

### Type-approvals numbering system

#### 1. System

The number shall consist of four sections separated by the '\*' character.

Section 1: The small letter 'e' followed by the distinguishing number of the State issuing the type-approval:

1	for Germany	18	for Denmark
2	for France	19	for Romania
3	for Italy	20	for Poland
4	for the Netherlands	21	for Portugal
5	for Sweden	23	for Greece
6	for Belgium	24	for Ireland
7	for Hungary	26	for Slovenia
8	for the Czech Republic	27	for Slovakia
9	for Spain	29	for Estonia
11	for the United Kingdom	32	for Latvia
12	for Austria	34	for Bulgaria
13	for Luxembourg	36	for Lithuania
14	for Switzerland	49	for Cyprus
17	for Finland	50	for Malta

Section 2: The indication of the requirement level. The requirements regarding purification efficiency are likely to be stepped up in the future. The different requirement levels are denoted by Roman numerals, starting at level I.

Section 3: A four-digit sequential number (with leading zeroes as applicable) to denote the base type-approval number. The sequence shall start from 0001.

Section 4: A two-digit sequential number (with leading zero if applicable) to denote the extension. The sequence shall start from 01 for each number.

**2. Examples**

(a) Third type-approval (with as yet no extension) issued by the Netherlands corresponding to level I:

e 4\*I\*0003\*00

(b) Second extension to the fourth type-approval issued by Germany corresponding to level II:

e 1\*II\* 0004\*02

**Part V**  
**Summary of type approvals for on-board sewage treatment plant types**  
**(Model)**

Seal of the competent authority

List No.: .....

Period from ..... to .....

1	2	3	4	5	6	7
Make <sup>(1)</sup>	Manufacturer's designation	Type approval number	Date of type approval	Extension/ refusal/ withdrawal <sup>(2)</sup>	Reason for extension/refusal/withdrawal	Date of extension/ refusal/ withdrawal <sup>(2)</sup>

1) relevant type-approval certificate

2) specify as appropriate



**Part VI**  
**(Model)**

**Summary of on-board sewage treatment plants manufactured**

Seal of the competent authority

List No.: .....

For the period from: .....to: .....

The following information is supplied relating to on-board sewage treatment plant types and type approval numbers of on-board sewage treatment plants manufactured within the above period in accordance with the provisions of Directive 2006/87/EC:

Make (manufacturer's company name): .....

Manufacturer's designation for the on-board sewage treatment plant type: .....

.....

Type approval number: .....

Date of issue: .....

Date of first issue (in the case of extensions): .....

Serial number of the on-board sewage treatment plant:

... 001	... 001	... 001
... 002	... 002	... 002
.	.	.
.	.	.
.	.	.
..... m	..... p	..... q

**Part VII**

**Data sheet for on-board sewage treatment plants with type approval  
(Model)**

Seal of the competent authority

					On-board sewage treatment plant characteristics				Purification efficiency					
No.	Date of type approval	Type approval number	Make	On-board sewage treatment plant type	Daily vol. flow rate of sewage $Q_d$ (m <sup>3</sup> /d)	Daily BOD <sub>5</sub> pollution load (kg/d)			BOD <sub>5</sub>		COD		TOC	
									24 h composite sample	Random-sample	24 h composite sample	Random-sample	24 h composite sample	Random-sample

**Part VIII**

**On-board sewage treatment plant parameters record for special test  
(Model)**

**1. General**

1.1 Particulars of the on-board sewage treatment plant

1.1.1 Make: .....

1.1.2 Manufacturer's designation: .....  
.....

1.1.3 Type approval number: .....

1.1.4 Serial number of the on-board sewage treatment plant: .....  
.....

1.2 Documentation

The on-board sewage treatment plant shall be tested and the test results recorded on separate sheets which shall be individually numbered, signed by the inspector and attached to this record.

1.3 Testing

Testing shall be carried out on the basis of the manufacturer's guide to checking the components and parameters of the on-board treatment plant relevant to sewage treatment in accordance with Article 14a.01(10). In justified individual cases inspectors may at their own discretion dispense with checking certain plant components or parameters.

During the test at least one random sample shall be taken. The results of the random sample measurement shall be compared with the control values set out in Article 14a.02(2), Table 2.

1.4 This test report, together with the attached records, comprises a total of .....<sup>8</sup>..pages.

---

<sup>8</sup> To include by tester

**2. Parameters**

This is to certify that the on-board sewage treatment plant tested does not diverge to an inadmissible extent from the parameters and control values for operation specified in Article 14a.02(2), Table 2 are not exceeded.

Name and address of inspection body: .....

.....  
.....

Name of inspector: .....

Place and date: .....

Signature: .....

Test recognised by competent authority: .....

.....  
.....

Place and date: .....

Signature: .....

Seal of the competent authority

Name and address of inspection body: .....

.....  
.....

Name of inspector: .....

Place and date: .....

Signature: .....

Test recognised by competent authority: .....

.....  
.....

Place and date: .....

Signature: .....

Seal of the competent authority

Name and address of inspection body: .....

.....  
.....

Name of inspector: .....

Place and date: .....

Signature: .....

Test recognised by competent authority: .....

.....

.....

Place and date: .....

Signature: .....

Seal of the competent authority

### Addendum I

#### Appendix to the on-board sewage treatment plant parameters record

(Model)

Name of vessel: ..... Unique European Vessel Identification Number: .....

Manufacturer: ..... Plant type: .....

(Make/trademark/manufacturer's trade name)

(Manufacturer's designation)

Type approval No.: ..... Year of construction of on-board sewage treatment plant: .....

Serial number of on-board sewage treatment plant: ..... Site of installation: .....

(Serial number)

The on-board sewage treatment plant and its treatment-relevant components were identified from the data plate. The test was carried out on the basis of the manufacturer's guide to checking the plant components and parameters relevant to sewage treatment.

#### (A) Component testing

Additional treatment-relevant components which are listed in the manufacturer's guide to checking the plant components and parameters relevant to sewage treatment or Part II Annex 4 are to be entered here.

Component	Identified component number	Conformity <sup>9</sup>
-----------	-----------------------------	-------------------------

<sup>9</sup> specify as appropriate.

		<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> n/a
		<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> n/a
		<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> n/a
		<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> n/a
		<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> n/a
		<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> n/a
		<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> n/a
		<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> n/a
		<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> n/a

**(B) Results of random sample measurement:**

Parameter	Value obtained	Conformity <sup>(1)</sup>	
BOD <sub>5</sub>		<input type="checkbox"/> Yes	<input type="checkbox"/> No
COD		<input type="checkbox"/> Yes	<input type="checkbox"/> No
TOC		<input type="checkbox"/> Yes	<input type="checkbox"/> No

**(C) Comments:**

---

(The following deviating settings, modifications or alterations to the installed on-board sewage treatment plant were found.)

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---



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Name of inspector: \_\_\_\_\_

Place and date: \_\_\_\_\_

Signature: \_\_\_\_\_

<sup>(1)</sup> Place a cross in the appropriate box.

## **Part IX**

### **Equivalent type-approvals**

Type approvals in Resolution 2010-II-27 of the Central Commission for the Navigation on the Rhine of 9 December

**Appendix VII**  
**On-board sewage treatment plant**  
**- Test procedure -**

1 General

1.1 Basics

The test specification shall be used to verify the suitability of on-board sewage treatment plants on passenger vessels.

In this procedure, the process and treatment technology used shall be examined and approved by means of a test plant. Conformity of the test plant with the treatment plants in service later is assured by applying identical design and dimensioning criteria.

1.2. Responsibility and test location

The test plant for a range of on-board sewage treatment plant types shall be tested by a technical service. The test conditions at the test site are the responsibility of the technical service and must correspond to the conditions specified here.

1.3 Documents to be submitted

The test shall be carried out on the basis of the information document in accordance with Appendix VI, Part II.

1.4 Plant dimensioning specifications

The on-board sewage treatment plants shall be dimensioned and designed such that the limit values specified in Article 14a.02(2), Tables 1 and 2 in their outflow are not exceeded in the course of their operation.

2 Measures preparatory to testing

2.1 General

Prior to commencement of the test the manufacturer shall supply the technical service with structural and process specifications of the test plant, to include a complete set of drawings and supporting calculations in accordance with Appendix VI, Part II, and shall provide full information on the on-board sewage treatment plant's requirements in terms of installation, operation and maintenance. The manufacturer shall supply the technical service with information on the mechanical, electrical and technical safety of the on-board sewage treatment plant to be tested.

2.2 Installation and putting into service

For the purpose of the test, the manufacturer shall install the test plant in such a way as to correspond to the intended installation conditions on board passenger vessels. Prior to testing the manufacturer must assemble the on-board sewage treatment plant and put it into service. Start-up must be in accordance with the manufacturer's operating instructions and shall be checked by the technical service.

2.3 Run-in phase

The manufacturer shall notify the technical service of the nominal duration of the run-in phase up to normal operation in weeks. The manufacturer shall specify the point where the run-in phase is deemed to be complete and testing may commence.

2.4 Inflow characteristics

Domestic raw sewage shall be used for testing the test plant. The inflow characteristics as regards pollutant concentrations shall be obtained from the on-board sewage treatment plant manufacturer's dimensioning documentation in accordance with Appendix VI, Part II by forming the quotient for the flow rate of organic substances in the form of a BOD5 load in



kg/d and the design flow rate of sewage  $Q_d$  in  $m^3/d$ . The inflow characteristics shall be set accordingly by the inspection body.

Formula 1 – Calculation of the inflow characteristics

$$C_{BOD5,mean} = \frac{BOD_5}{Q_d} \left[ \frac{kgBOD_5/d}{m^3/d} \right]$$

Should application of formula 1 result in a lower average  $BOD_5$  concentration of less than  $C_{BOD5,mean} = 500$  mg/l, at least a mean  $BOD_5$  concentration in the inflow water of  $C_{BOD5,min} = 500$  mg/l shall be set.

The technical service must not break up the inflowing raw sewage in a comminatory. Removal of sand (e.g. by screening out) is permissible.

### 3. Test procedure

#### 3.1 Loading phases and hydraulic feeding

The test period shall comprise 30 test days. The test plant shall be fed on the test field with domestic waste water in accordance with the loading specified in Table 1. Various loading phases shall be covered, with the test sequence taking account of normal loading phases and special loading phases such as overload, underload and stand-by operation. The duration of each loading phase (number of test days) is set out in Table 1. The mean daily hydraulic load for each loading phase shall be set in accordance with Table 1. The mean pollutant concentration, to be set in accordance with point 2.4, shall be kept constant.

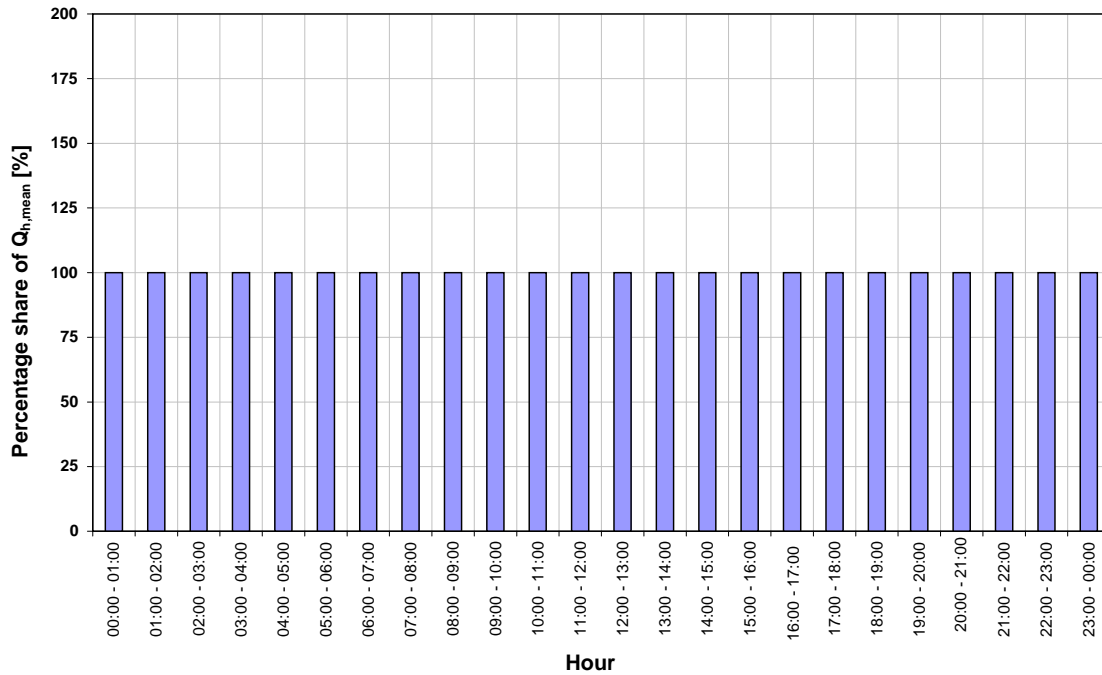
Table 1: Load settings for each loading phase

Phase	Number of test days	Daily hydraulic load	Pollutant concentration
Normal load	20 days	$Q_d$	$C_{BOD5}$ in accordance with 2.4
Overload	3 days	$1,25 Q_d$	$C_{BOD5}$ in accordance with 2.4
Underload	3 days	$0.5 Q_d$	$C_{BOD5}$ in accordance with 2.4
Stand-by	4 days	Day 1 and day 2: $Q_d=0$ Day 3 and day 4: $Q_d$	$C_{BOD5}$ in accordance with 2.4

The special load phases overload, underload and stand-by operation shall be carried out consecutively without interruption; the normal load phase shall be divided into several part phases. The test shall start and end with a normal load phase, of at least five days' duration in each case.

Daily hydraulic feeding hydrographs shall be set, depending on the specified operation of the on-board sewage treatment plant. The daily hydraulic feeding hydrograph shall be selected in accordance with the plant operation concept for the on-board sewage treatment plant. A distinction shall be made according to whether the on-board treatment plant is to be operated with or without an upstream sewage storage tank. The feeding hydrographs (daily hydrographs) are shown in Figure 1 and Figure 2.

Throughout the entire test period the hourly inflow must remain constant. The mean hourly volumetric flow rate of sewage  $Q_{h,mean}$  is equivalent to  $1/24$  of the daily hydraulic load according to Table 1. The inflow shall be measured continuously by the technical service. The daily hydrograph must keep within a  $\pm 5\%$  tolerance.



On-board sewage treatment plant with upstream sewage storage tank

Figure 1: Daily hydrograph for feeding of on-board sewage treatment plant with upstream sewage storage tank

On-board sewage treatment plant without upstream sewage storage tank

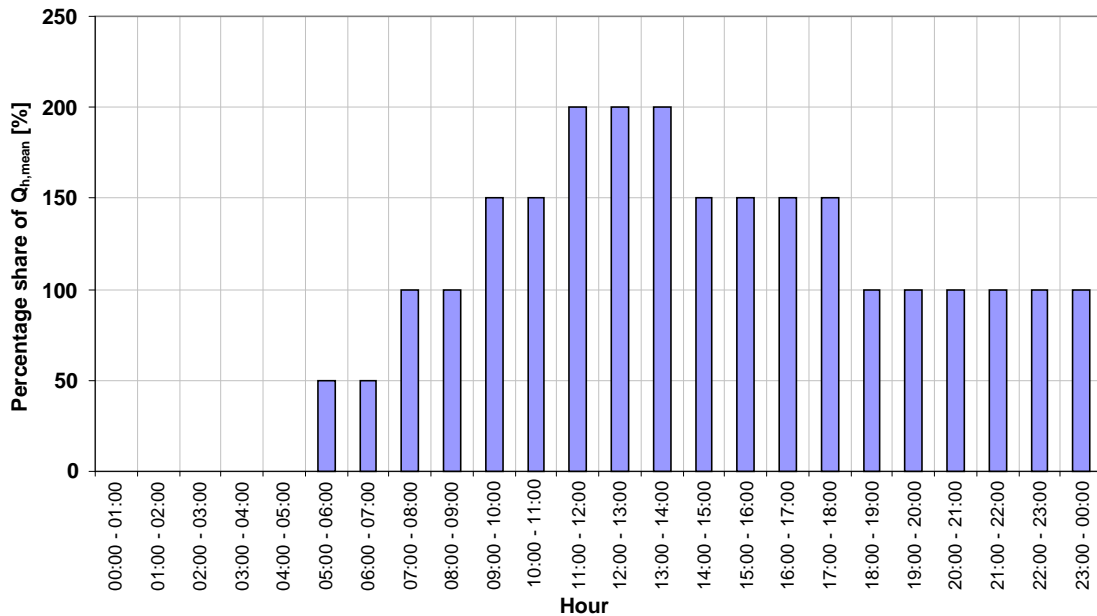


Figure 2: Daily hydrograph for feeding of on-board sewage treatment plant without upstream sewage storage tank

### 3.2 Interruption or cancellation of the test

It may be necessary to interrupt the test if the test plant can no longer be operated properly due to power failure or the malfunction of a subassembly. The test may be interrupted for the duration of the repair. In such cases it is not necessary to repeat the whole of the test, only the loading phase in which the subassembly malfunction took place.

After the test is interrupted for a second time, the technical service shall decide whether the test may be continued or must be cancelled. The grounds for the decision must be stated and documented in the test report. Should the test be cancelled it must be repeated in full.

### 3.3 Examinations of purification efficiency and compliance with outflow limit values

The technical service shall take samples from the inflow to the test plant and analyse them in order to confirm conformity with the inflow characteristics. Sewage samples shall be taken from the outflow of the test plant and analysed to determine the purification efficiency and compliance with the required outflow limit values. Sampling carried out shall include both simple random samples and 24h composite samples. In the case of the 24h composite samples, either time-proportional or flow-proportional sampling may be carried out. The type of 24h composite sample shall be specified by the inspection body. Sampling in the inflow and outflow shall be carried out simultaneously and to the same degree.

In addition to the control parameters BOD<sub>5</sub>, COD and TOC the following parameters for inflow and outflow shall be measured in order to describe and represent the environmental and test conditions:

- solids removable by filtration (SRF);
- pH;
- conductivity;
- temperature of liquid phases.

The number of examinations varies according to the relevant loading phase and is set out in Table 2. The number of samplings relates to the inflow or outflow of the test plant.

Table 2: Specification of the number and timing of samplings in the inflow and outflow of the test plant

Loading phase	Number of test days	Number of samplings	Specification of timing of samplings
Normal load	20 days	24h composite samples: 8 Random samples: 8	Sampling at regular intervals throughout the period
Overload	3 days	24h composite samples: 2 Random samples: 2	Sampling at regular intervals throughout the period
Underload	3 days	24h composite samples: 2 Random samples: 2	Sampling at regular intervals throughout the period
Stand-by	4 days	24h composite samples: 2 Random samples: 2	24h composite sample: Sampling after inflow switched on and 24h later. Random sample: 1 hour after inflow switched on and 24h later.
Total number of 24h composite samples: 14 Total number of random samples: 14			

Where applicable, the following operating parameters shall also be measured from the random samples taken:

- concentration of dissolved oxygen in the bioreactor;
- dry matter content in the bioreactor;
- temperature in the bioreactor;
- ambient temperature;
- other operating parameters in accordance with the manufacturer's operating instructions.

#### 3.4 Evaluation of examinations

In order to document the determined purification efficiency and to check adherence to process limit values, the minimum sample value (Min), the maximum sample value (Max) and the arithmetical mean (Mean) shall be specified as well as the individual measurement results for control parameters BOD<sub>5</sub>, COD and TOC.

The loading phase shall also be given for the maximum sample value. Evaluations shall be carried out for all loading phases jointly. The results shall be processed as shown in the following table:

Table 3a: Specification for the statistical processing of data gathered – evaluation to document compliance with outflow limit values

Parameter	Sampling type	Number of test that meet the limitvalues	Mean	Min	Max	
					Value	Phase
Inflow BOD <sub>5</sub>	24h composite samples	-- <sup>10</sup>				
Outflow BOD <sub>5</sub>	24h composite samples					
Inflow BOD <sub>5</sub>	random samples	--				
Outflow BOD <sub>5</sub>	random samples					
Inflow COD	24h composite samples	--				
Outflow COD	24h composite samples					
Inflow COD	random samples	--				
Outflow COD	random samples					
Inflow TOC	24h composite samples	--				
Outflow TOC	24h composite samples					
Inflow TOC	random samples	--				
Outflow TOC	random samples					
Inflow SRF	24h composite samples	--				
Outflow SRF	24h composite samples					
Inflow SRF	random samples	--				
Outflow SRF	random samples					

<sup>10</sup>

No limit values exist for the inflow

Table 3b: Specification for the statistical processing of data gathered – evaluation to document purification efficiency

Parameter	Sampling type	Mean	Min	Max
Elimination efficiency BOD <sub>5</sub>	24h composite samples			
Elimination efficiency BOD <sub>5</sub>	Random samples			
Elimination efficiency COD	24h composite samples			
Elimination efficiency COD	Random samples			
Elimination efficiency TOC	24h composite samples			
Elimination efficiency TOC	Random samples			
Elimination efficiency SRF	24h composite samples			
Elimination efficiency SRF	Random samples			

The remaining parameters in accordance with 3.3(b) to (d) and the operating parameters in accordance with 3.3 shall be summarised in a table specifying the minimum sample result (Min), the maximum sample result (Max) and the arithmetical mean (Mean).

### 3.5 Compliance with the requirements of Chapter 14a

The limit values in accordance with Article 14a.02(2) Tables 1 and 2 shall be deemed to be upheld, when each value for the parameters COD, BOD<sub>5</sub> and TOC:

- (a) the mean values of the total of 14 outflow samples, and
- (b) at least 10 of the total of 14 outflow samples do not exceed the specified limit values for 24h composite samples and random samples.

### 3.6 Operation and maintenance during testing

Throughout the testing the test plant shall be operated in accordance with the manufacturer's specifications. Routine checks and maintenance work shall be carried out in compliance with the manufacturer's operation and maintenance instructions. The excess sludge generated by the biological purification process may only be removed from the on-board sewage treatment plant if this is specified by the manufacturer in their operation and maintenance instructions. All maintenance work carried out shall be recorded by the technical service and documented in the test report. During the test no unauthorised persons may have access to the test plant.

### 3.7 Sample analysis / analysis method

The parameters to be studied shall be analysed using approved standard procedures. The standard procedure applied shall be specified.

### 4 Test report

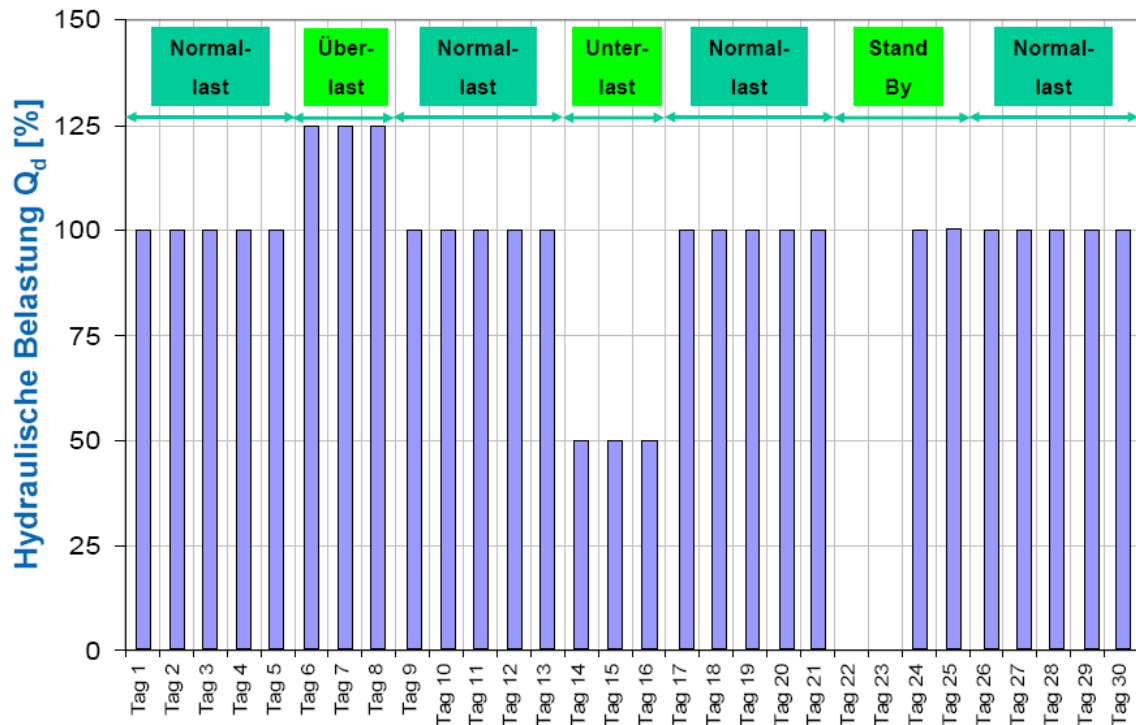
4.1 The inspection body is required to compile a report on the type test carried out. The report shall include at least the following information:

- details on the plant tested, such as its type, information on the nominal daily pollutant load and the dimensioning principles applied by the manufacturer;
- information on the conformity of the on-board sewage treatment plant tested with the documentation provided before the testing;
- information on individual measurement results, as well as on the evaluation of the plant's purification efficiency and compliance with the required outflow limit values;
- details on the removal of excess sludge, such as the size of the volumes removed and the frequency of removal;
- information on all operation, maintenance and repair work carried out during testing;
- information on any deterioration in the quality of the on-board sewage treatment plant occurring during testing as well as any interruptions of testing;
- information on any problems arising during testing;
- a list of responsible persons involved in the type testing of the on-board sewage treatment plant, giving their names and job titles;
- name and address of the laboratory which carried out the analysis of the waste water samples;
- analysis methods applied.

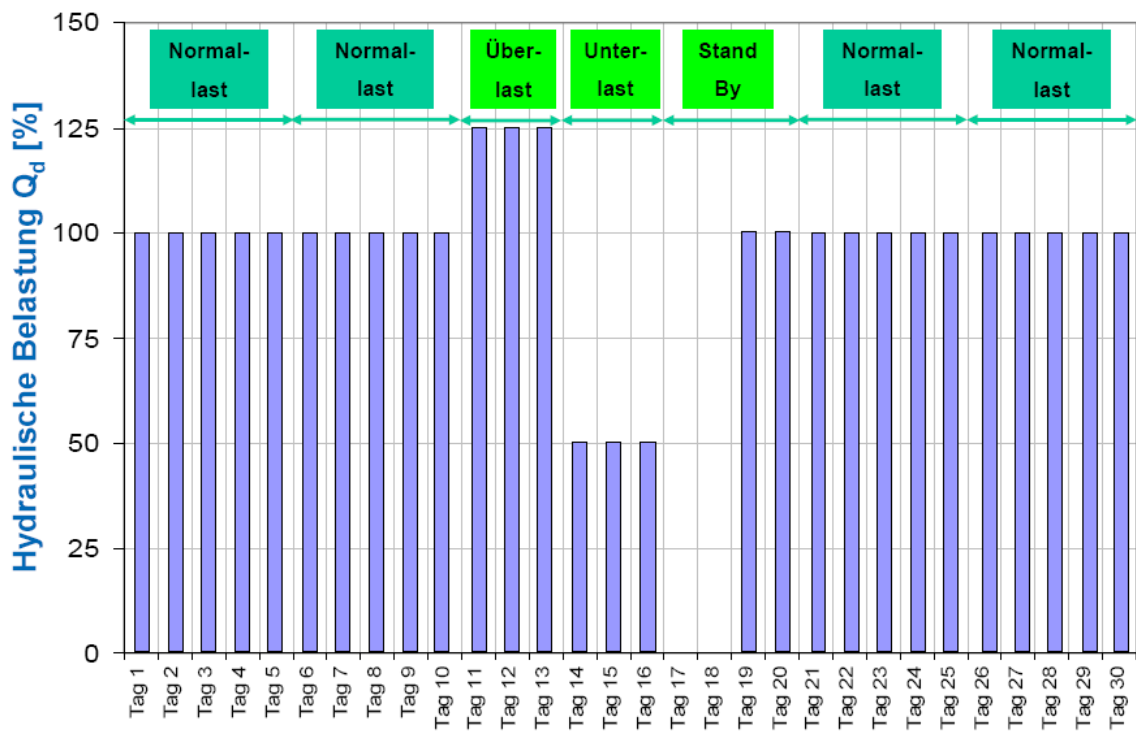


## Examples of test sequences

### Example 1



### Example 2



DE	EN
Normallast	Normal load

Überlast	Overload
Unterlast	Underload
Stand By	Stand-by
Hydraulische Belastung $Q_d$	Hydraulic load $Q_d$
Tag	Day

**Notes on determining biochemical oxygen demand after  
five days (BOD<sub>5</sub>) in 24h composite samples**

The International Standards ISO 5815 and 5815-2: 2003 stipulate that in order to carry out the analysis to determine biochemical oxygen demand after five days water samples should be stored immediately after sampling and up to the time of analysis in a brim-full, tightly sealed bottle at a temperature of 0–4 °C. The process of determining BOD<sub>5</sub> should be initiated as soon as possible or at least within twenty-four hours of completion of sampling.

In order to prevent biochemical degradation processes starting in the 24h composite sample, in practice the water sample is cooled to a maximum of 4 °C while sampling continues, and is stored at this temperature once the sampling process is complete.

Suitable sampling equipment is commercially available.