

Ordinance on Requirements for the Discharge of Waste Water into Waters¹ (*Abwasserverordnung – AbwV**)

of 17 June 2004

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¹ hereinafter referred to as Waste Water Ordinance

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Section 1 Scope

- (1) This Ordinance specifies the minimum requirements for the discharge of waste water into waters from the source activities listed in the Appendices and the requirements for the construction, operation and use of waste water plants.
- (2) The general requirements of this Ordinance, the operator obligations listed in the Appendices and the emission limit values specified in the Appendices must be complied with by the discharger, except where more extensive requirements are stipulated in the permit for discharge of waste water. The other requirements contained in the Appendices to this Ordinance are to be stipulated when issuing the permit for discharge of waste water. Requirements are only included in the permit for discharge for those parameters which may be expected to occur in the waste water.
- (3) More extensive requirements pursuant to other legal provisions remain unaffected.

Section 2 Definitions

Within the meaning of this Ordinance:

1. Random sample means a single sample taken from a waste water stream
2. Composite sample means a sample taken continuously over a given period, or a sample consisting of several samples taken either continuously or discontinuously over a given period and blended
3. Qualified random sample means a composite sample of at least five random samples taken over a maximum period of two hours at intervals of no less than two minutes and blended
4. Output-based environmental performance value means the level (e.g. m³/t, g/t, kg/t) in relation to the production capacity on which the permit for discharge is based, except where stipulated otherwise in the respective Appendix
5. Point of origin means the place where the waste water was treated prior to blending with other waste water; otherwise, the place where it is first collected
6. Blending means the merging of waste water streams from different sources
7. Parameter means a chemical, physical or biological measured variable as listed in Annex 1
8. Alligation means the calculation of a permissible level or concentration derived from the requirements of this Ordinance concerning the individual waste water streams
9. Inventory of waste water streams means the documentation of the basic data and processes of a plant or of two or more plants merged at one site which influence the volume and properties of the waste water and the associated environmental aspects
10. Production log means the documentation of all operational and plant-related data for self-monitoring and servicing which are required for checking, controlling and regulating waste water plants and for reviewing compliance with the requirements of this Ordinance and the permit for discharge
11. Annual report means a brief summary of the most important information relating to the waste water situation of the plant and a summary and evaluation of the data which has been continually documented throughout the year and which is required for reviewing compliance with the requirements of this Ordinance and the permit for discharge

Section 3 General requirements

- (1) Except where otherwise specified in the Appendices, waste water may only be discharged into waters if the pollution load, based on an examination of the conditions in each individual case, is kept as low as possible by means of
 1. the use of water-saving methods during washing and purification processes

2. indirect cooling
3. the use of low-pollutant operating and auxiliary materials and
4. process-integrated recovery of materials

Except where otherwise specified in the Appendices, compliance with the requirements in sentence 1 is documented in an inventory of waste water streams, a production log or in another appropriate form. The contents of the inventory of waste water streams and the production log may make reference to existing documentation. Operators of plants within the meaning of section (1) (3) of the Ordinance on licensing and monitoring industrial waste water treatment plants (*Industriekläranlagen-Zulassungs- und Überwachungsverordnung*) of 2 May 2013 (Federal Law Gazette I pp. 973, 1011, 3756), as amended by Article 321 of the Ordinance of 31 August 2015 (Federal Law Gazette I p. 1474), must, in addition to the requirements in sentence 2, write up an annual report in accordance with the requirements laid down in Part H of the sector-specific Appendices. The contents of the inventory of waste water streams, the production log and the annual report are specified in Annex 2.

(2) The requirements of this Ordinance may not be met by means of procedures whereby environmental pollution is transferred to other environmental media such as air or soil contrary to the state of the art. Chemical use, exhaust air emissions and the amount of sludge generated are minimised.

(2a) Waste water plants are constructed, operated and used in a way that facilitates energy-efficient operations. Any energy potential generated during waste water management is to be harnessed wherever technically possible and economically reasonable.

(3) Requirements specified in the form of concentration levels may not be met through dilution contrary to the state of the art.

(4) If requirements prior to blending are specified, blending is permissible for the purpose of joint treatment, provided at least the same overall reduction of the pollution load per parameter is achieved as would be the case if the respective requirements were complied with separately.

(5) If requirements are specified for the point of origin of waste water, blending is only permissible provided these requirements are complied with.

(6) If waste water streams which are subject to different requirements are discharged jointly, the relevant definitive requirement for each parameter is determined by means of alligation and specified in the permit for discharge. If the applicable Appendices contain any requirements for the point of origin of waste water or requirements prior to blending, subsections (4) and (5) above remain unaffected.

Section 4 Analysis and measurement procedures

(1) The requirements in the Appendices refer to the analysis and measurement procedures specified in Annex 1. The Standard German Procedures (DEV) for the analysis of water, waste water and sludge, the DIN, DIN EN, DIN ISO and DIN EN ISO standards and the technical regulations of the Water Chemistry Society (*Wasserchemische Gesellschaft*) – all as cited in Annex 1 and the Appendices – are published by Beuth Verlag GmbH, Berlin and by the Water Chemistry Society (*Wasserchemische Gesellschaft*) in the German Chemical Society (*Gesellschaft Deutscher Chemiker*), Wiley-VCH Verlag, Weinheim (Bergstraße). The cited procedural regulations are archived at the German Patent Office in Munich.

(2) Other, equivalent monitoring standards may be specified in the permit for discharge.

Section 5 Reference point of requirements

(1) Requirements refer to the point at which the waste water is discharged into waters and also, where specified in the Appendices to this Ordinance, to the point of origin of the waste water or the point prior to blending.

(2) The point of discharge is equivalent to the effluent from the waste water plant at which the waste water was last treated. The point prior to blending is also the point of discharge into a public waste water plant.

(3) Where there is no blending of waste water with other waste water, requirements referring to the point prior to blending apply to the point of discharge into waters.

Section 6 Compliance with requirements

(1) If a value to be complied with pursuant to this Ordinance or specified in the permit for discharge is not complied with based on the results of an analysis conducted as part of public monitoring, it is nevertheless deemed to have been complied with provided the results of this and the four preceding public analyses do not

exceed the relevant value in four cases and no result exceeds the value by more than 100 percent. Analyses which were conducted more than three years ago are not taken into account.

(2) To determine compliance with a value to be complied with pursuant to this Ordinance or specified in the permit for discharge, the number of significant digits, as specified in the procedural regulation, of the relevant analysis and measurement procedure for determining the relevant parameter pursuant to Annex 1, and at least two significant digits, with the exception of the values for the dilution factor, is decisive. The values specified in the Appendices take due account of the measurement uncertainties of the analysis and sampling procedures.

(3) With due regard for subsection (1) above, a chemical oxygen demand (COD) value to be complied with pursuant to this Ordinance or specified in the permit for discharge is also deemed to have been complied with provided the quadruple amount of the measured total organic carbon (TOC), specified in milligrams per litre, does not exceed this value.

(3a) With due regard for subsection (1) above, a total value for nitrogen, as the sum of ammoniacal, nitrite and nitrate nitrogen (N_{tot}), to be complied with pursuant to this Ordinance or specified in the permit for discharge, is also deemed to have been complied with provided the measured value of total bound nitrogen (TN_b) does not exceed the value specified for N_{tot} .

(4) If monitoring determines that a value for toxicity to fish eggs, daphnia, algae and luminescent bacteria pursuant to numbers 401 to 404 of Annex 1, to be complied with pursuant to this Ordinance or specified in the permit for discharge, is exceeded, this value is nevertheless deemed to have been complied with provided the preconditions in sentences 2 to 7 above are met; subsection (1) remains unaffected. The exceedance identified pursuant to sentence 1 must be based on a sulphate and chloride content that exceeds the effective threshold. The organism-specific effective threshold pursuant to sentence 2 is 3 grams per litre for fish eggs, 2 grams per litre for daphnia, 0.7 grams per litre for algae and 15 grams per litre for luminescent bacteria. Additionally, the corrected measured value may not exceed the value to be complied with. The corrected measured value pursuant to sentence 4 is calculated from the difference between the measured value and the correction value. The correction value is calculated from the sum of chloride and sulphate levels in the waste water, expressed in grams per litre, divided by the respective organism-specific effective threshold. Where the determined correction value does not correspond with a dilution factor of the dilution sequence defined in the determination procedure, the next highest dilution factor applies as the correction value.

(5) Except where otherwise specified in the Appendices, the *Länder* may concede that results obtained by the discharger on the basis of an officially recognised monitoring procedure are considered equal to the results of public monitoring.

(6) If the minimum number of measurements an operator has to undertake pursuant to Part H of a sector-specific Appendix in order to identify the actual annual or monthly averages for certain parameters is exceeded, all values are to be taken into account when determining the average. To this end,

1. before determining an annual average, all measurements within a calendar month are first aggregated into a monthly average
2. before determining a monthly average, all measurements within one-third of the calendar month are first aggregated into an average for one-third of the month; for calendar months with 31 days, the last third of the month comprises 11 days; in February, the first and second thirds of the month comprise ten days each.

The averages calculated in accordance with nos. 1 and 2 above are notified to the competent authority as part of the annual report pursuant to Annex 2 no. 3 (a).

Section 7 Regulatory offences

A regulatory offence within the meaning of section 103 (1) sentence 1 no. 3 (a) of the Federal Water Act (*Wasserhaushaltsgesetz*) is deemed to have been committed by anyone who wilfully or negligently discharges waste water in contravention of section 3 (1) sentence 1 of this Ordinance.

Annex 1
(to section 4 (1) sentences 1 and 2)

Analysis and measurement procedures

No.	Parameter	Procedure*
I	General procedures	
1	Guidance on sampling techniques	DIN EN ISO 5667-1 (A4) (April 2007 edition)
2	Sampling of waste water	DIN 38402-11 (A11) (February 2009 edition)
3	Volumetric flow of waste water	DIN 19559 (July 1983 edition)
4	Pre-treatment, homogenisation and aliquotation of non-homogeneous water samples	DIN 38402-30 (A30) (July 1998 edition)
5	Preservation and handling of water samples	DIN EN ISO 5667-3 (A21) (July 2019 edition) This standard applies unless otherwise provided in the standard relevant to the analysis procedure in question. For the determination of parameters 401 to 404, 410 and 412, samples are analysed immediately after removal. Samples may be preserved for up to 48 hours by immediate cooling to a temperature of 2°C to 5°C in the dark. If longer storage is necessary, samples are frozen immediately after removal and preserved at a temperature of –18°C or lower for up to two months.
6	Presentation of numerical data	DIN 1333 (February 1992 edition)
II	Analysis procedure	
1	Anions/elements	
101	Not assigned	
102	Chloride	DIN EN ISO 10304-1 (D20) (July 2009 edition) DIN 38405-D1-1 (D1) (December 1985 edition) DIN 38405-D1-2 (D1) (December 1985 edition) DIN EN ISO 15682 (D31) (January 2002 edition) DIN ISO 15923-1 (D49) (July 2014 edition)
103	Readily liberated cyanide	DIN 38405-D13-2 (D13) (February 1981 edition), subject to the following stipulation: for preservation, add NaOH up to a pH >12; store samples in the dark or use dark bottles DIN EN ISO 14403-1 (D2) (October 2012 edition), subject to no. 506 DIN EN ISO 14403-2 (D3) (October 2012 edition), subject to no. 506
104	Total cyanide in the original sample	DIN 38405-D13-1 (D13) (February 1981 edition), subject to the following stipulation: for preservation, add NaOH up to a pH >12; store samples in the dark or use dark bottles DIN EN ISO 14403-1 (D2) (October 2012 edition), subject to no. 506 DIN EN ISO 14403-2 (D3) (October 2012 edition), subject to no. 506

105	Total fluoride in the original sample	DIN 38405-D4-2 (D4) (July 1985 edition)
106	Nitrate nitrogen (NO ₃ -N)	DIN EN ISO 10304-1 (D20) (July 2009 edition), subject to no. 503 DIN 38405-9 (D9) (September 2011 edition), subject to no. 503 DIN EN ISO 13395 (D28) (December 1996 edition) DIN ISO 15923-1 (D49) (July 2014 edition) All the above procedures apply subject to no. 507.
107	Nitrite nitrogen (NO ₂ -N)	DIN EN 26777 (D10) (April 1993 edition) DIN EN ISO 10304-1 (D20) (July 2009 edition) DIN EN ISO 13395 (D28) (December 1996 edition) DIN ISO 15923-1 (D49) (July 2014 edition) All the above procedures apply subject to no. 507.
108	Total phosphorus in the original sample	DIN EN ISO 6878 (D11) (September 2004 edition), subject to the following stipulation: digestion in accordance with section 7.4 of that standard DIN EN ISO 15681-2 (D46) (May 2019 edition), subject to the following stipulation: digestion in accordance with section 7.4 of DIN EN ISO 6878 (D11) (September 2004 edition) DIN EN ISO 15681-1 (D45) (May 2005 edition), subject to the following stipulation: digestion in accordance with section 7.4 of DIN EN ISO 6878 (D11) (September 2004 edition) DIN EN ISO 11885 (E22) (September 2009 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 17294-2 (E29) (January 2017 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition)
109	Not assigned	
110	Sulphate	DIN EN ISO 10304-1 (D20) (July 2009 edition) DIN 38405-D5-2 (D5) (January 1985 edition) DIN ISO 15923-1 (D49) (July 2014 edition)
111	Readily liberated sulphide	DIN 38405-27 (D27) (October 2017 edition)
112	Sulphite	DIN EN ISO 10304-3 (D22) (November 1997 edition)
113	Dissolved fluoride	DIN EN ISO 10304-1 (D20) (July 2009 edition) DIN 38405-D4-1 (D4) (July 1985 edition)
114	Thiocyanate	DIN EN ISO 10304-3 (D22) (November 1997 edition)
115	Chlorate	DIN EN ISO 10304-4 (D25) (July 1999 edition)
2	Cations/elements	
201	Aluminium in the original sample	DIN EN ISO 11885 (E22) (September 2009 edition), subject to the following stipulation: digestion in

		accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 17294-2 (E29) (January 2017 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 12020 (E25) (May 2000 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition)
202	Ammoniacal nitrogen (NH ₄ -N)	DIN EN ISO 11732 (E23) (May 2005 edition) DIN 38406-E5-1 (E5) (October 1983 edition) DIN 38406-E5-2 (E5) (October 1983 edition) DIN ISO 15923-1 (D49) (July 2014 edition) All the above procedures apply subject to no. 507.
203	Antimony in the original sample	DIN EN ISO 11885 (E22) (September 2009 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN 38405-D32-1 (D32) (May 2000 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN 38405-D32-2 (D32) (May 2000 edition), subject to the following stipulation: digestion in accordance with section 5.6.2 of that standard DIN EN ISO 17294-2 (E29) (January 2017 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 15586 (E4) (February 2004 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition)
204	Arsenic in the original sample	DIN EN ISO 11969 (D18) (November 1996 edition), subject to the following stipulation: digestion in accordance with section 8.3.1 of that standard DIN EN ISO 11885 (E22) (September 2009 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 17294-2 (E29) (January 2017 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 15586 (E4) (February 2004 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN 38405-D35 (D35) (September 2004 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition)
205	Barium in the original sample	DIN EN ISO 11885 (E22) (September 2009 edition), subject to the following stipulation: digestion in

		accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 17294-2 (E29) (January 2017 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition)
206	Lead in the original sample	DIN EN ISO 11885 (E22) (September 2009 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 17294-2 (E29) (January 2017 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 15586 (E4) (February 2004 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN 38406-E6 (E6) (July 1998 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition)
207	Cadmium in the original sample	DIN EN ISO 11885 (E22) (September 2009 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 17294-2 (E29) (January 2017 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 15586 (E4) (February 2004 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 5961 (E19) (May 1995 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition)
208	Not assigned	
209	Total chromium in the original sample	DIN EN ISO 11885 (E22) (September 2009 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 17294-2 (E29) (January 2017 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 15586 (E4) (February 2004 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 1233 (E10) (August 1996 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition)
210	Chromium VI	DIN 38405-D24 (D24) (May 1987 edition)

		DIN EN ISO 10304-3 (D22) (November 1997 edition), subject to the following stipulation: determination in accordance with section 6 of that standard, use of UV detection DIN EN ISO 23913 (D41) (September 2009 edition)
211	Cobalt in the original sample	DIN EN ISO 11885 (E22) (September 2009 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 17294-2 (E29) (January 2017 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 15586 (E4) (February 2004 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN 38406-E24 (E24) (March 1993 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition)
212	Iron in the original sample	DIN EN ISO 11885 (E22) (September 2009 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 15586 (E4) (February 2004 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN 38406-E32 (E32) (May 2000 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 17294-2 (E29) (January 2017 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition)
213	Copper in the original sample	DIN EN ISO 11885 (E22) (September 2009 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 17294-2 (E29) (January 2017 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 15586 (E4) (February 2004 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN 38406-E7 (E7) (September 1991 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition)
214	Nickel in the original sample	DIN EN ISO 11885 (E22) (September 2009 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition)

		DIN EN ISO 17294-2 (E29) (January 2017 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 15586 (E4) (February 2004 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN 38406-E11 (E11) (September 1991 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition)
215	Mercury in the original sample	DIN EN ISO 12846 (E12) (August 2012 edition) DIN EN ISO 17852 (E35) (April 2008 edition)
216	Silver in the original sample	DIN EN ISO 11885 (E22) (September 2009 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition); exception: samples covered by Appendix 53 (Photographic processes) without acidification and without digestion DIN EN ISO 17294-2 (E29) (January 2017 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition); exception: samples covered by Appendix 53 without acidification and without digestion DIN EN ISO 15586 (E4) (February 2004 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition); exception: samples covered by Appendix 53 without acidification and without digestion DIN 38406 (E18) (May 1990 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition); exception: samples covered by Appendix 53 without acidification and without digestion
217	Thallium in the original sample	DIN EN ISO 17294-2 (E29) (January 2017 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 15586 (E4) (February 2004 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN 38406 (E26) (July 1997 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition)
218	Vanadium in the original sample	DIN EN ISO 11885 (E22) (September 2009 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 17294-2 (E29) (January 2017 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition)

219	Zinc in the original sample	DIN EN ISO 11885 (E22) (September 2009 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 17294-2 (E29) (January 2017 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 15586 (E4) (February 2004 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN 38406-E8 (E8) (October 2004 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition)
220	Tin in the original sample	DIN EN ISO 11885 (E22) (September 2009 edition), subject to the following stipulation: digestion in accordance with Annex A 1 of that standard DIN EN ISO 17294-2 (E29) (January 2017 edition), subject to the following stipulation: digestion in accordance with Annex A 1 of DIN EN ISO 11885 (E22) (September 2009 edition)
221	Titanium in the original sample	DIN EN ISO 11885 (E22) (September 2009 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition); for waste water containing titanium dioxide, digestion in accordance with Annex A 2 of DIN EN ISO 11885 (E22) (September 2009 edition)
222	Selenium in the original sample	DIN EN ISO 11885 (E22) (September 2009 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 17294-2 (E29) (January 2017 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 15586 (E4) (February 2004 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN 38405-23-1 (D23) (October 1994 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN 38405-23-2 (D23) (October 1994 edition), subject to the following stipulation: digestion in accordance with section 3.7.2 of that standard
223	Not assigned	
224	Indium in the original sample	DIN EN ISO 11885 (E22) (September 2009 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 17294-2 (E29) (January 2017 edition), subject to the following stipulation: digestion in

		accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition)
225	Not assigned	
226	Boron	DIN EN ISO 11885 (E22) (September 2009 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 17294-2 (E29) (January 2017 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition)
227	Cerium	DIN EN ISO 17294-2 (E29) (January 2017 edition)
228	Germanium	DIN EN ISO 17294-2 (E29) (January 2017 edition)
229	Gold	DIN EN ISO 17294-2 (E29) (January 2017 edition)
230	Hafnium	DIN EN ISO 17294-2 (E29) (January 2017 edition)
231	Molybdenum	DIN EN ISO 11885 (E22) (September 2009 edition), subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition) DIN EN ISO 17294-2 (E29) (January 2017 edition) subject to the following stipulation: digestion in accordance with DIN EN ISO 15587-2 (A32) (July 2002 edition)
232	Palladium	DIN EN ISO 17294-2 (E29) (January 2017 edition)
233	Praseodymium	DIN EN ISO 17294-2 (E29) (January 2017 edition)
234	Ruthenium	DIN EN ISO 17294-2 (E29) (January 2017 edition)
235	Tungsten	DIN EN ISO 11885 (E22) (September 2009 edition) DIN EN ISO 17294-2 (E29) (January 2017 edition)
236	Zirconium	DIN EN ISO 11885 (E22) (September 2009 edition) DIN EN ISO 17294-2 (E29) (January 2017 edition)
237	Platinum	DIN EN ISO 17294-2 (E29) (January 2017 edition)
3	Individual substances, sum parameters, group parameters	
301	Filterable matter (suspended solids) in the original sample	DIN EN 872 (H33) (April 2005 edition), subject to the following stipulation: flush filter three times, with 50 ml of distilled water per flush
302	Adsorbable organically bound halogens (AOX) in the original sample, expressed as chloride	For chloride content of up to 5.0 g/l in the original sample: DIN EN ISO 9562 (H14) (February 2005 edition), subject to no. 501; adsorption in accordance with section 9.3.4 of that standard (column method – separate combustion of columns required) For chloride content of more than 5.0 g/l in the original sample: DIN EN ISO 9562 (H14) (February 2005 edition) in accordance with Annex A of that standard; adsorption in accordance with section 9.3.4 of that standard

		(column method – separate combustion of columns required)
303	Chemical oxygen demand (COD) in the original sample	DIN 38409-41 (H41) (December 1980 edition), subject to no. 510
304	Not assigned	
305	Total organic carbon (TOC) in the original sample	DIN EN 1484 (H3) (April 2019 edition), direct determination of TOC in accordance with section 8.3 of that standard and, subject to no. 502 DIN EN ISO 20236 (H62) (April 2023 edition)
306	Total bound nitrogen (TN _b) in the original sample	DIN EN ISO 12260 (H34) (December 2003 edition), subject to the following stipulation: If combination devices are used to determine TN _b and TOC simultaneously, control measurements are taken, subject to no. 502, when analysing samples containing particulates. DIN EN ISO 11905-1 (H36) (August 1998 edition) DIN EN ISO 20236 (H62) (April 2023 edition)
307 and 308	Not assigned	
309	Total hydrocarbons in the original sample	DIN EN ISO 9377-2 (H53) (July 2001 edition)
310	Not assigned	
311	Phenol index after distillation and dye extraction in the original sample	DIN 38409-H16-2 (H16) (June 1984 edition) DIN EN ISO 14402 (H37) (December 1999 edition) plus the stipulation that the procedure set out in section 4 of that standard must be followed
312	Not assigned	
313	Free chlorine	DIN EN ISO 7393-2 (G4-2) (March 2019 edition)
314	Hexachlorobenzene in the original sample	DIN 38407-2 (F2) (February 1993 edition) DIN EN ISO 6468 (F1) (February 1997 edition) DIN 38407-37 (F37) (November 2013 edition)
315	Trichloroethene in the original sample	DIN EN ISO 10301 (F4) (August 1997 edition) DIN 38407-43 (F43) (October 2014 edition) DIN EN ISO 15680 (F19) (April 2004 edition)
316	1,1,1-trichloroethane in the original sample	DIN EN ISO 10301 (F4) (August 1997 edition) DIN 38407-43 (F43) (October 2014 edition) DIN EN ISO 15680 (F19) (April 2004 edition)
317	Tetrachloroethene in the original sample	DIN EN ISO 10301 (F4) (August 1997 edition) DIN 38407-43 (F43) (October 2014 edition) DIN EN ISO 15680 (F19) (April 2004 edition)
318	Trichloromethane in the original sample	DIN EN ISO 10301 (F4) (August 1997 edition) DIN 38407-43 (F43) (October 2014 edition) DIN EN ISO 15680 (F19) (April 2004 edition)
319	Tetrachloromethane in the original sample	DIN EN ISO 10301 (F4) (August 1997 edition) DIN 38407-43 (F43) (October 2014 edition)

		DIN EN ISO 15680 (F19) (April 2004 edition)
320	Dichloromethane in the original sample	DIN EN ISO 10301 (F4) (August 1997 edition) DIN 38407-43 (F43) (October 2014 edition) DIN EN ISO 15680 (F19) (April 2004 edition)
321	Hydrazine	DIN 38413-1 (P1) (March 1982 edition)
322	Chlorobenzene	DIN EN ISO 10301 (F4) (August 1997 edition) DIN 38407-43 (F43) (October 2014 edition)
323	Dichlorobenzene summated across all isomers	DIN EN ISO 10301 (F4) (August 1997 edition) DIN 38407-37 (F37) (November 2013 edition) DIN 38407-43 (F43) (October 2014 edition)
324	Vinyl chloride	DIN EN ISO 10301 (F4) (August 1997 edition) DIN 38407-43 (F43) (October 2014 edition)
325	Not assigned	
326	Aniline in the original sample	DIN 38407-16 (F16) (June 1999 edition), subject to the following stipulation: extraction with dichloromethane at pH 12; gas chromatography (GC) separation using a mass spectrometer; when using a nitrogen phosphorus detector (NPD), two GC columns of different polarities must be used
327	Hexachlorocyclohexane summated across all isomers	DIN 38407-2 (F2) (February 1993 edition), subject to no. 504 DIN EN ISO 6468 (F1) (February 1997 edition), subject to no. 504 DIN 38407-37 (F37) (November 2013 edition), subject to no. 504
328	Hexachlorobutadiene (HCBD) in the original sample	DIN EN ISO 10301 (F4) (August 1997 edition) DIN 38407-2 (F2) (February 1993 edition) DIN 38407-43 (F43) (October 2014 edition) DIN 38407-37 (F37) (November 2013 edition) DIN EN ISO 15680 (F19) (April 2004 edition)
329	Aldrin, dieldrin, endrin, isodrin (drins) in the original sample	DIN 38407-2 (F2) (February 1993 edition), subject to no. 504 DIN EN ISO 6468 (F1) (February 1997 edition), subject to no. 504 DIN 38407-37 (F37) (November 2013 edition), subject to no. 504
330	Not assigned	
331	1,2-dichloroethane in the original sample	DIN EN ISO 10301 (F4) (August 1997 edition) DIN 38407-43 (F43) (October 2014 edition) DIN EN ISO 15680 (F19) (April 2004 edition)
332	Trichlorobenzene summated across all isomers in the original sample	DIN 38407-2 (F2) (February 1993 edition), subject to no. 504 DIN 38407-43 (F43) (October 2014 edition)

		DIN EN ISO 6468 (F1) (February 1997 edition), subject to no. 504 DIN 38407-37 (F37) (November 2013 edition), subject to no. 504 DIN EN ISO 15680 (F19) (April 2004 edition)
333	Endosulfan summated across all isomers in the original sample	DIN 38407-2 (F2) (February 1993 edition), subject to no. 504 DIN EN ISO 6468 (F1) (February 1997 edition), subject to no. 504 DIN 38407-37 (F37) (November 2013 edition), subject to no. 504
334	Benzene and derivatives in the original sample	DIN 38407-43 (F43) (October 2014 edition), subject to nos. 504 and 505 DIN EN ISO 15680 (F19) (April 2004 edition), subject to nos. 504 and 505
335	Organic complexing agents in the original sample (EDTA, NTA, DTPA, MGDA, β -ADA, 1,3-PDTA)	DIN EN ISO 16588 (P10) (February 2004 edition)
336	Polycyclic aromatic hydrocarbons (PAH) in the original sample (fluoranthene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, indeno(1,2,3-cd)pyrene	DIN EN ISO 17993 (F18) (March 2004 edition), subject to no. 504 DIN 38407-39 (F39) (September 2011 edition), subject to no. 504 DIN ISO 28540 (F40) (May 2014 edition), subject to no. 504
337	Chlorine dioxide and other oxidants, expressed as chlorine	DIN 38408-5 (G5) (June 1990 edition), subject to the following stipulation: the corrective maintenance measures provided for in section 4 of that standard must not be performed. As an alternative to the DIN 38408-5 (G5) procedure without corrective maintenance, parameter 337 may be determined using DIN EN ISO 7393-2 (G4-2) (March 2019 edition) in accordance with parameter 313.
338	Colour	DIN EN ISO 7887 (C1) (April 2012 edition), section 5
339	Polychlorinated dibenzodioxins (PCDD) and polychlorinated dibenzofurans (PCDF) and international toxic equivalents (I-TEQ)	DEV F33 (52 nd delivery, 2002); the figure in international toxic equivalents (I-TEQ) for limiting polychlorinated dibenzodioxins (PCDD) and polychlorinated dibenzofurans (PCDF) is defined as the sum of the products of the individual concentrations of each substance in accordance with no. 339 of Annex 1 to section 4 of this Ordinance and the relevant toxic equivalence factors (TEF) set out in Part 2 of Annex VI to Directive 2010/75/EU
340	Per- and polyfluorinated substances (PFAS) in the original sample	DIN 38407-42 (F42) (March 2011 edition)
341	pH	DIN EN ISO 10523 (C5) (April 2012 edition)
342	Redox potential	DIN 38404 (C6) (May 1984 edition); NB: The German terms ' <i>Redoxpotential</i> ', used here, and ' <i>Redox-Spannung</i> ', defined in section 2 of that standard, are identical in meaning.
4	Bioassay procedures	

	For the procedures under nos. 401 to 404, 410 and 412, due regard must be paid to no. 509. The requirements of DIN EN ISO 5667-16 (L1) (March 2019 edition) apply only where the testing procedures do not provide otherwise.	
400	Biotesting of samples	DIN EN ISO 5667-16 (L1) (March 2019 edition)
401	Toxicity to fish eggs (lowest ineffective dilution – LID _{egg}) in the original sample	DIN EN ISO 15088 (T6) (June 2009 edition)
402	Toxicity to daphnia (LID _D) in the original sample	DIN 38412-L 30 (L30) (March 1989 edition)
403	Toxicity to algae (LID _A) in the original sample	DIN 38412-L 33 (L33) (March 1991 edition), subject to the following stipulation: In section 3.5 of that standard, the caveat for inhibition not exceeding 20% at higher dilution factors does not apply, and in section 11.1 of that standard, the note does not apply.
404	Toxicity to luminescent bacteria (LID _{LB}) in the original sample	DIN EN ISO 11348-1 (L51) (May 2009 edition), subject to the following stipulation, or DIN EN ISO 11348-2 (L52) (May 2009 edition), subject to the following stipulation: the examination of waste water must be carried out in accordance with Annex B of those standards
405	Ready biodegradability of substances	Section C.4 of the Annex to Council Regulation (EC) No 440/2008 of 30 May 2008 laying down test methods pursuant to Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (OJ L 142/144 of 31 May 2008)
406	Aerobic biodegradability of substances	DIN EN ISO 9888 (L25) (November 1999 edition), subject to the following stipulation: biodegradability is expressed as the degree of dissolved organic carbon (DOC) degradation achieved over 28 days. The quantity of activated sludge inoculum is 1 g/l of dry mass per test system. The hardness of the test water may be less than or equal to 2.7 mmol/l. The stripped and adsorbed shares of each substance are disregarded in the result. The result is expressed as a level of degradation. Pre-adapted inocula are not permitted.
407	Aerobic biodegradability (bioeliminability) of filtered samples in biological treatment plants	DIN EN ISO 9888 (L25) (November 1999 edition), subject to the following stipulation: biodegradability is expressed as the degree of chemical oxygen demand (COD) or DOC degradation (degree of elimination). The inoculum from the real waste water treatment plant is used at a rate of 1 g/l of dry mass per test system (section 8.3 of that standard). The duration of the elimination test corresponds to the time required in the test simulation to achieve for the total waste water the degree of elimination achieved by the real treatment plant for the total waste water. The COD concentration in each test system (COD between 100 and 1000 mg/l) should broadly correspond to the real waste water in the plant influent. The hardness of the test water is not to exceed the hardness of the relevant real waste water. The stripped shares of each substance are disregarded in the result. The rates of elimination are calibrated to the COD concentration at the start of the test after deduction of the stripped share. The result is expressed as the degree of elimination.

408	Aerobic biodegradability (bioeliminability) of the filtered sample in biological treatment plants within a maximum of seven days	DIN EN ISO 9888 (L25) (November 1999 edition), subject to the following stipulation: biodegradability is expressed as the degree of COD or DOC degradation (degree of elimination) over a maximum of seven days. The inoculum from the real waste water treatment plant is used at a rate of 1 g/l of dry mass per test system (section 8.3 of that standard). The COD concentration in each test system (COD between 100 and 1000 mg/l) should broadly correspond to the real waste water in the plant influent. The hardness of the test water is not to exceed the hardness of the relevant real waste water. The stripped shares of each substance are disregarded in the result. The rates of elimination are calibrated to the COD concentration at the start of the test after deduction of the stripped share. The result is expressed as the degree of elimination.
409	Biochemical oxygen demand over five days in the original sample	DIN EN ISO 5815-1 (H50) (November 2020 edition)
410	Mutagenic potential (umu test)	DIN 38415-T 3 (T3) (December 1996 edition)
411	Not assigned	
412	Toxicity to duckweed (LID _{DW}) in the original sample	DIN EN ISO 20079 (L49) (December 2006 edition)
III	Instructions and explanations	
501	Instructions for the AOX procedure (no. 302) 1. Periodate content If the sample contains periodates, the sodium sulphite must be added hyperstoichiometrically and permitted to have a reducing effect for at least 24 hours. 2. Chloride content Where the chloride content exceeds 1.0 g/l, the sample is diluted so as to bring the chloride concentration to less than 1.0 g/l in the sample for analysis. The blank-corrected measurement is multiplied by the dilution factor. The pertinent blank value is the reading for a solution of 1.0 g/l chloride, as obtained on the relevant working day. Where the chloride content is below 1.0 g/l in the undiluted sample, deionised water is used for the blank reading. 3. Results: The AOX content of the pre-filter and of the first and second adsorption columns are added together in the results.	
502	Instructions for the TOC and TN_b procedure (nos. 305 and 306) A device with thermal catalytic combustion (minimum temperature: 670°C) is used. The provisions on homogenisation set out in DIN 38402-30 (A30) (July 1998 edition) apply, particularly sections 8.3 and 8.4.5. For analysis of waste-water samples containing particles, control measurements are taken in accordance with Annex C of DIN EN 1484 (August 1997 edition).	
503	Instructions for the nitrate nitrogen procedure (no. 106) When implementing the procedure set out in DIN EN ISO 10304-1 (D20) (July 2009 edition), chromatographic disturbances caused by high chloride or sulphate content are reduced by diluting the samples or filtering them using Ag or Ba cartridges. DIN 38405-9 (D9) (September 2011 edition) is applicable only to slightly polluted waste water.	
504	Instruction for determination limits: Measurements of individual components are taken into account only if they are equal to or greater than the determination limit for the relevant analysis procedure.	
505	Instructions for the benzene and derivatives procedure (no. 334) The result to be recorded for analysis of benzene and derivatives is the sum of the individual results for benzene, toluene, ethyl benzene and the xylenes o-xylene, m-xylene and p-xylene.	

506	Instruction for the readily liberated cyanide and total cyanide in the original sample procedures (nos. 103 and 104) DIN EN ISO 14403-1 (D2) (October 2012 edition) and DIN EN ISO 14403-2 (D3) (October 2012 edition) are only to be used for preliminary analysis as to whether the waste-water sample contains more cyanide than the threshold for application of those standards. If preliminary analysis finds that the cyanide content of the waste-water sample is below the threshold for application of those standards, there is no need to implement DIN 38405-D13-2 (D13) (February 1981 edition) or DIN 38405-D13-1 (D13) (February 1981 edition); if not, then those standards are implemented.
507	On-site filtration may be dispensed with if the samples are filtered immediately upon arrival in the laboratory or if they are determined within 24 hours of sampling.
508	Not assigned
509	Instructions for determination in bioassay procedures (nos. 401 to 404, 410 and 412) Volume changes that result from the addition of neutralising agents and have a significant effect on measurements are documented when reporting the results. Suitable acids and alkalis are selected to ensure that the sample undergoes no significant chemical or physical changes, particularly precipitation and dissolution. Neutralising agents must be added in such a way as to keep local differences in pH within the sample to a minimum, such as by rapid stirring or slow input. The dilution factors are derived from nested geometric series on the basis of models 2 and 3 set out in section 8.3, Table 1 of DIN EN ISO 15088 (T6) (June 2009 edition).
510	Deviations from the methodology for the dilution of samples described as part of the scope of the procedure are permitted. A dilution factor may be selected in line with common laboratory practice. For dilution factors higher than 10, the samples are diluted in more than one step. Samples for analysis obtained by dilution must have a COD value of at least 100 mg/l.
* The designation of each procedure within the system of Standard German Procedures (DEV) for the analysis of water, waste water and sludge is given in brackets.	

Annex 2

(to section 3 (1) sentences 2 to 5)

Content of establishment documentation

1. Inventory of waste water streams

The inventory of waste water streams serves as evidence that compliance with the general requirements concerning waste water set out in section 3 of and Part B of the sector-specific Appendix to this Ordinance is possible in principle.

The contents of the inventory of waste water streams as defined in section 2 no. 9 of this Ordinance usually comprise the following:

- general information on the establishment, in particular the number of installations within the meaning of the Federal Immission Control Act (*Bundes-Immissionsschutzgesetz*) or of section 60 of the Federal Water Act, the production or machine capacities covered by the relevant permits and the products made, unless the installations in questions are independently run industrial waste water treatment plants within the meaning of section 60 (3) sentence 1 no. 1 of the Federal Water Act;
- a description of the production system, the processes relating to waste water and the waste water pre-treatment procedures, including an overview, a drainage plan, flow sheets for the technical installations, a representation of material flows and information on the nature and quantity of feedstocks and auxiliary materials which may affect waste water;
- a description of and accounting record for the tributary waste water streams, including a depiction of flow paths from the point of origin of the waste water to the point of discharge or hand-over with data on volumetric flows and pollutant concentrations and loads;
- an overview of waste-water-related mass flows per year, e.g. in kilograms of pollutant per kilogram of product, if the relevant Appendix specifies output-based environmental performance values;
- a description of the waste water treatment installations and discharges, measurement equipment and sampling points;

- (f) a list of the permits for discharge of waste water held.

In the event of changes which affect waste water, the inventory is updated.

2. Production log

The contents of the production log as defined in section 2 no. 10 of this Ordinance usually comprise the following:

- (a) data on process-related water consumption and the energy consumption of the waste water plants;
- (b) data on production quantities and production capacity used;
- (c) data on the waste water quantities which have actually occurred and been discharged, for the overall stream and for each tributary stream;
- (d) sampling protocols and self-monitoring analysis results and measurements;
- (e) documentation of feedstocks and auxiliary materials used which may affect waste water, including nature, quantity and dosage;
- (f) data on operational procedures affecting waste water, particularly on commissioning and decommissioning, servicing and maintenance, repairs, monitoring for leaks, plant cleaning, sludge disposal, the disposal of residues with monitoring and disposal documentation, as well as data on disruptions to operation compliant with the relevant provisions and their effects on waste water discharge;
- (g) data on the measures undertaken to uphold the general requirements relating to materials and quantities set out in section 3 of and Part B of the sector-specific Appendix to this Ordinance.

3. Annual report

The annual report referred to in section 2 no. 11 of this Ordinance may take the form of a summary and evaluation of the production log; the annual report is written on the basis of the reports produced pursuant to section 61 of the Federal Water Act or the reports produced under the *Land* regulations regarding the self-monitoring of waste water discharges. The annual report is submitted to the competent monitoring authority within the first quarter of the year following the reference period.

The contents of the annual report comprise the following:

- (a) a summary and evaluation of the results of in-house waste water analysis conducted in accordance with the operator obligations set out in Part H of the relevant sector-specific Appendix to this Ordinance, including data on the concentrations and loads of each pollutant. Where available, self-monitoring data may be used on the basis of *Land* regulations. The summary must facilitate comparison with the emission limit values established in the permit for discharge or directly applicable under section 1 (2) sentence 1 of this Ordinance;
- (b) an overview of major waste-water-related material flows and mass flows per year, e.g. in kilograms of pollutant per kilogram of product, and an overview of output in terms of number of units manufactured per year, if the relevant sector-specific Appendix to this Ordinance prescribes output-based environmental performance values, and an overview of the waste water quantities in cubic metres per year and of process-related water consumption;
- (c) a summary of special operating conditions for the production and waste water treatment plant, such as batch operation, start-up and shut-down operations and decommissioning of parts of a plant, as well as disruptions to operation compliant with the relevant provisions and their effects on waste water discharge;
- (d) a summary, description and evaluation of the measures undertaken to uphold the general requirements set out in section 3 of this Ordinance and Part B of the relevant sector-specific Appendix.

List of repealed appendices

Appendices 4-8, 11, 14, 18, 21, 30, 34, 44, 48

Appendix 1

Domestic and urban waste water

A Scope

This Appendix applies to waste water

1. originating primarily from households or similar establishments such as communal accommodation, hotels, restaurants, campsites, hospitals or office buildings (domestic waste water) or from facilities serving some purpose other than those stated, provided it is equivalent to domestic waste water;
2. collected in the sewage system and originating primarily from the establishments and facilities specified in no. 1 and from facilities serving commercial or agricultural purposes, provided that the harmfulness of this waste water can be reduced by biological means with the same degree of success as for domestic waste water (urban waste water) or
3. treated in a river treatment plant and originating from a source corresponding to no. 1 or 2.

B General requirements

Section 3 (1) of this Ordinance does not apply.

C Requirements for waste water at the point of discharge

(1) The following requirements apply to waste water at the point of discharge into waters:

Samples by size category of waste water treatment plant	Chemical oxygen demand (COD) (mg/l)	Biochemical oxygen demand over five days (BOD ₅) (mg/l)	Ammoniacal nitrogen (NH ₄ -N) (mg/l)	Total nitrogen as the sum of ammoniacal, nitrite and nitrate nitrogen (N _{tot}) (mg/l)	Total phosphorus (P _{tot}) (mg/l)
Qualified random sample or two-hour composite sample					
Size category 1 <60 kg/day of BOD ₅ (untreated)	150	40	–	–	–
Size category 2 60 to 300 kg/day of BOD ₅ (untreated)	110	25	–	–	–
Size category 3 >300 and up to 600 kg/day of BOD ₅ (untreated)	90	20	10	–	–
Size category 4 >600 and up to 6,000 kg/day of BOD ₅ (untreated)	90	20	10	18	2
Size category 5 >6,000 kg/day of BOD ₅ (untreated)	75	15	10	13	1

For small discharges within the meaning of section 8 in conjunction with section 9 (2) sentence 2 of the Waste Water Charges Act (*Abwasserabgabengesetz*), a random sample may be taken instead of a qualified random sample or a two-hour composite sample.

The requirements apply to ammoniacal nitrogen and total nitrogen, at a waste water temperature of 12°C and above in the effluent from the biological reactor of the waste water treatment plant. The 12°C threshold may be replaced by a temporal restriction to between 1 May and 31 October. The permit for discharge may authorise a higher total nitrogen concentration of up to 25 mg/l, if the reduction in the total nitrogen load is at least 70%. The reduction refers to the ratio between the nitrogen load in the influent and that in the effluent

over a representative period of time not exceeding 24 hours. The load in the influent is based on the sum of organic and inorganic nitrogen.

(2) The allocation of each discharger to one of the size categories specified in paragraph (1) depends on the assessment values for the waste water treatment plant based on the BOD₅ load of the untreated waste water – BOD₅ (untreated). In cases where the assessment value for a waste water treatment plant is based only on the BOD₅ value of the sedimented waste water, categorisation is determined by the following scale:

Size category 1	<40 kg/day of BOD ₅ (sed.)
Size category 2	40 to 200 kg/day of BOD ₅ (sed.)
Size category 3	>200 and up to 400 kg/day of BOD ₅ (sed.)
Size category 4	>400 and up to 4,000 kg/day of BOD ₅ (sed.)
Size category 5	>4,000 kg/day of BOD ₅ (sed.)

(3) If a sample from a waste stabilisation lagoon designed for a retention time of 24 hours or more is noticeably coloured by algae, COD and BOD₅ are determined from the sample without algae. In such cases, the levels specified in paragraph (1) are reduced by 15 mg/l for COD and by 5 mg/l for BOD₅.

(4) For discharges of less than 8 m³ of waste water per day from waste water treatment plants of size category 1 as defined by paragraph (1) which are covered by the harmonised standard DIN EN 12566-3 (September 2013 edition) or DIN EN 12566-6 (May 2013 edition) or correspond to one of the European Technical Assessments issued for the plants and which have a CE marking, sentences 2 to 4 and paragraphs (5) to (7) apply. The requirements set out in paragraph (1) are deemed to have been met if

1. the plant is capable, according to the purification capacity specified in the manufacturer's declaration of capacities, of satisfying the requirements set out in paragraph (1);
2. the plant, according to the manufacturer's declaration of capacities, satisfies the following performance requirements:
 - (a) watertightness: pass
 - (b) stability: data as specified in the harmonised standard DIN EN 12566-3 (September 2013 edition) or DIN EN 12566-6 (May 2013 edition) or in the European Technical Assessment
 - (c) durability: pass;
3. no more than one sludge removal procedure has been carried out during the entire monitoring procedure set out in the harmonised standard DIN EN 12566-3 (September 2013 edition) or DIN EN 12566-6 (May 2013 edition) or in the European Technical Assessment and
4. the plant is installed, operated and serviced in accordance with the requirements set out in sections 9, 12 and 13 of datasheet DWA-A 221 (December 2019 edition: DWA (Deutsche Vereinigung für Wasserwirtschaft, Abwasser und Abfall e. V.), Hennef, Germany, 2019), which is archived with the German National Library and can be accessed in the library of the Federal Environment Ministry; if a European Technical Assessment has been issued for the plant, this provision applies only in so far as compliance is possible in light of the nature of the plant.

Training or expertise at the same level obtained in another European Union Member State or in another Contracting Party of the Agreement on the European Economic Area is equivalent to the expertise specified in sections 9, 12 and 13 of datasheet DWA-A 221 (December 2019 edition: DWA, Hennef 2019). Where sections 9, 12 and 13 of datasheet DWA-A 221 (December 2019 edition: DWA, Hennef 2019) refer to requirements set out in DIN 1986-30, DIN 4261-1 or DIN 4261-5, requirements set out in other standards may be substituted which provide equivalent or comparable levels of safety, performance and/or reliability.

(5) The requirement set out in paragraph (4) sentence 2 no. 1 is met if

1. the plant is nominally equipped for daily influent of 150 litres and a daily load of 60 grams of BOD₅ per population equivalent and
2. the purification capacity specified in the declaration of capacities,
 - (a) is at least 90% for COD and at least 95% for BOD₅ for plants covered by harmonised standard DIN EN 12566-3 (September 2013 edition) or for which a European Technical Assessment has been issued;
 - (b) is at least 85% for COD and at least 90% for BOD₅, for plants covered by harmonised standard DIN EN 12566-6 (May 2013 edition) or for which a European Technical Assessment has been issued.

By way of derogation from paragraph (4) sentence 2 no. 1, if effluent concentrations are specified in the declaration of capacities, they are decisive and must fulfil the requirements set out in paragraph (1). By way of derogation from paragraph (1) sentence 1, if those effluent concentrations were determined by way of a 24-hour composite sample, they must not exceed 100 mg/l for COD and 25 mg/l for BOD₅.

(6) The *Länder* may adopt provisions derogating from the requirements set out in paragraph (4) sentence 2 no. 4; if they do so, paragraph (4) sentence 2 no. 4 applies subject to those provisions.

(7) For discharges as specified in paragraph (4) sentence 1, the requirements set out in paragraph (1) are also deemed to have been met if

1. a valid general building control permit is in place for the plant at the time of installation or, for an existing plant which had already been installed on 12 March 2020, a valid general building control permit was in place for the plant at the time of installation and
2. the plant is installed, operated and serviced in accordance with the requirements set out in the general building control permit.

(8) For discharges of less than 8 m³ of waste water per day from waste water treatment plants of size category 1 as defined by paragraph (1) which do not come within the scope of paragraph (4) sentence 1, the requirements set out in paragraph (1) are deemed to have been met if a waste water treatment plant authorised by a general building control permit or otherwise authorised under *Land* legislation is installed, operated and serviced in accordance with that authorisation. The authorisation must specify installation, operational and servicing requirements sufficient to ensure proper functioning which satisfies the requirements set out in paragraph (1).

(9) For small discharges within the meaning of section 8 in conjunction with section 9 (2) sentence 2 of the Waste Water Charges Act, the *Länder* may set derogating requirements if connection to a public waste water plant is expected in the near future.

(10) For domestic waste water occurring in mountain areas more than 1,500 metres above mean sea level, derogating requirements may be set in the permit for discharge of waste water.

Appendix 2

Lignite briquette production

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from lignite briquette production or occurring in connection with production.

(2) This Appendix does not apply to waste water from indirect cooling systems, process-water treatment or flue-gas scrubbing.

B General requirements

There are no requirements supplementing those set out in section 3.

C Requirements for waste water at the point of discharge

(1) The following requirements apply to waste water at the point of discharge into waters:

	Qualified random sample or two-hour composite sample	
	Concentration (mg/l)	Load (g/t)
Filterable matter	50	18
Chemical oxygen demand (COD)	50	30

(2) The output-based environmental performance values (g/t) relate to the installed maximum dryer capacity, expressed as a quantity of dry coal with a water content of between 16% and 18% by mass over two hours. If production capacities relate to dry coal with a water content other than 16% to 18% by mass, then a figure of 17% is used as a basis for calculating dryer capacity. The pollution load is derived from the concentrations in two-hour composite samples or qualified random samples and the volumetric flow of waste water during dry weather (dry-weather flow) over two hours.

Appendix 3

Production of food and animal feed

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from the treatment or processing of raw materials of plant or animal origin in the following areas of food, drink, milk and milk derivatives or animal feed production:

1. production of alcohol and alcoholic beverages;
2. breweries;
3. manufacture and bottling of soft drinks;
4. processing of fish, molluscs and crustaceans;
5. meat processing, including manufacture of prepared meals and dishes;
6. drying of plant-based products for the manufacture of animal feed;
7. potato processing;
8. malthouses;
9. processing of milk and milk derivatives;
10. production of fruit and vegetable products and manufacture of prepared meals and dishes;
11. processing of oilseed and refining of edible oils and fats;
12. manufacture of starches;
13. extraction of solid and liquid sugars and syrup from sugar beet and sugar cane;
14. production of yeast and
15. other food and animal feed production processes in plants coming within the scope of section 1 (3) of the Ordinance on licensing and monitoring industrial waste water treatment plants.

This Appendix also applies to rainwater contaminated as a result of operational activities.

(2) This Appendix also applies to waste water

1. with a pollution load originating primarily from the production of bottled water and/or the abstraction and bottling of natural mineral water, spring water and medicinal waters or
2. with a pollution load originating from the processing of fish, molluscs and crustaceans and/or from households and/or facilities as specified in Part A of Appendix 1, if the COD load in the untreated waste water from the processing of fish, molluscs and crustaceans is usually more than two thirds of the total load and the BOD₅ load is at least 600 kg per day.

(3) This Appendix does not apply to

1. waste water from milk processing establishments with a pollution load when untreated of less than 3 kg of BOD₅ per day;
 2. waste water from meat processing with a pollution load when untreated of less than 10 kg of BOD₅ per week;
 3. waste water with a pollution load originating primarily from the slaughtering of animals;
 4. waste water from small-scale flat-rate distilleries within the meaning of section 9 of the Alcohol Duty Act (*Alkoholsteuergesetz*) or from facilities for the production of wine and fruit wine or facilities for the production of alcohol from molasses which do not come within the scope of section 1 (3) of the Ordinance on licensing and monitoring industrial waste water treatment plants;
 5. waste water with a pollution load originating primarily from the production of ethanol from plant biomass in facilities coming within the scope of no. 4.1.2 of Annex 1 to the Ordinance on Installations Subject to Licensing (*Verordnung über genehmigungsbedürftige Anlagen*), including the production of co-products;
 6. waste water from pectin production;
 7. waste water from the production of gelatine and of glue from hides, skin and bones;
 8. waste water with a pollution load generated primarily
- (a) in the course of collecting, transporting, storing, treating and processing animal by-products not intended for human consumption or

- (b) in storage establishments, intermediate plants and processing establishments for Category 1, Category 2 or Category 3 material within the meaning of Regulation (EC) No 1069/2009 of the European Parliament and of the Council of 21 October 2009 laying down health rules as regards animal by-products and derived products not intended for human consumption and repealing Regulation (EC) No 1774/2002 (OJ L 300 of 14 November 2009, p. 1) and
9. waste water from indirect cooling systems, process-water treatment or steam generation.
- (4) The requirements set out in Part C (1), (2) sentences 1 and 2 and (3) are emission limit values within the meaning of section 1 (2) sentence 1 of this Ordinance.

B General requirements

(1) The volume and pollution load of waste water are kept as low as possible by means of the following measures and with due consideration to the requirements set out in legislation on hygiene and the safety of food and animal feed:

1. multiple use and recirculation, e.g. for cleaning, washing, cooling or use as process water;
2. use of water-saving or water-free methods to clean production facilities and pipes;
3. needs-led dosing of chemicals to clean production facilities and pipes and
4. avoidance or minimisation of the use of cleaning agents or disinfectants which are harmful to the aquatic environment, particularly of priority substances listed in column 8 of Table 1 in Annex 8 to the Ordinance for the Protection of Surface Waters (*Oberflächengewässerverordnung*).

(2) Waste water not requiring treatment is channelled separately from waste water which does require treatment.

(3) For plants coming within the scope of section (1) (3) of the Ordinance on licensing and monitoring industrial waste water treatment plants, retention capacities are provided for waste water and measures are put in place for the proper reuse, treatment or disposal of retained waste water to prevent uncontrolled emissions in the event of unplanned operating conditions. The scale of the retention capacities and the measures must be commensurate with the risk. The discharger undertakes a risk assessment to that end.

(4) For the processing of oilseed and the refining of edible oils and fats, the following additional provisions apply:

1. the pollution load is kept low by using low-phosphorus raw materials and
2. the waste water from cleaning and disinfection processes may contain only surfactants which attain a degree of DOC degradation of 80% after 28 days in accordance with the procedure set out in no. 405 of Annex 1 to this Ordinance. Surfactants are organic surface-active agents with washing and wetting properties which, at a concentration of 0.5% and a temperature of 20°C, reduce the surface tension of distilled water to 0.045 N/m or less.

(5) For sugar production plants, the additional provision applies that the waste water may not contain organically bound halogens originating from the use of chlorine or chlorine-releasing compounds, with the exception of chlorine dioxide, in the condensation cycle. Compliance with this requirement may be demonstrated by

1. setting out the operating and auxiliary materials used in a production log and
2. while information from the manufacturer states that the waste water contains none of the substances or groups of substances specified.

C Requirements for waste water at the point of discharge

(1) The following requirements apply to waste water at the point of discharge into waters:

Parameter	Qualified random sample or two-hour composite sample (mg/l)
Biochemical oxygen demand over five days (BOD ₅)	20
Chemical oxygen demand (COD)	100
Total organic carbon (TOC)	35 ¹
Filterable matter	30 ^{2, 3}
Ammoniacal nitrogen (NH ₄ -N)	5.0

Total nitrogen as the sum of ammoniacal, nitrite and nitrate nitrogen (N_{tot})	15
Total bound nitrogen (TN_b)	18
Total phosphorus (P_{tot})	2.0
¹ The permit for discharge may authorise a different concentration for TOC if a site-specific factor for the ratio of COD to TOC can be derived from suitable series of measurements for the site. In such cases, the TOC concentration is calculated by dividing the COD concentration derived from paragraph (1), (5), (6) or (7) by the site-specific factor for the ratio of COD to TOC. ² The requirement for filterable matter applies only to waste water with a load originating primarily from plants coming within the scope of section 1 (3) of the Ordinance on licensing and monitoring industrial waste water treatment plants. ³ For waste water from the extraction of solid and liquid sugars or the extraction of syrup from sugar beet and sugar cane, the applicable value is 50 mg/l.	

(2) The requirements for ammoniacal nitrogen ($NH_4\text{-N}$), total bound nitrogen (TN_b) and total nitrogen (N_{tot}) apply if the raw load of total nitrogen (N_{tot}) in the influent entering the waste water treatment plant on which the permit for discharge is based is greater than 100 kg per day or if the plant comes within the scope of section 1 (3) of the Ordinance on licensing and monitoring industrial waste water treatment plants. Moreover, the requirements apply only at a waste water temperature of 12°C and above in the effluent from the biological reactor.

The permit for discharge may authorise a higher total nitrogen (N_{tot}) concentration of up to 25 mg/l and a higher total bound nitrogen (TN_b) concentration of up to 30 mg/l, if the reduction in the total bound nitrogen (TN_b) load is at least 80%. The reduction refers to the ratio between the nitrogen load in the influent and that in the effluent from the waste water treatment plant over a representative period of time not exceeding 24 hours.

(3) The requirements for total phosphorus apply if the raw load of total phosphorus on which the permit for discharge is based is greater than 20 kg per day or if the plant comes within the scope of section 1 (3) of the Ordinance on licensing and monitoring industrial waste water treatment plants.

(4) For waste water originating from the processing of fish, molluscs and crustaceans, a maximum permissible total phosphorus concentration of 0.70 mg/l applies if the raw load of total phosphorus on which the permit for discharge is based is greater than 200 kg per day in the influent entering the waste water treatment plant.

(5) By way of derogation from paragraph (1), for waste water originating from the manufacture of starches, the permit for discharge may authorise higher concentrations of up to 185 mg/l for COD and up to 65 mg/l for TOC if the reduction in the COD load is at least 95%. The reduction refers to the ratio between the COD load in the influent and that in the effluent over a representative period of time not exceeding 24 hours.

(6) By way of derogation from paragraph (1), for waste water originating from the extraction of solid and liquid sugars or the extraction of syrup from sugar beet and sugar cane, the permit for discharge may authorise higher concentrations of up to 155 mg/l for COD and up to 55 mg/l for TOC outside the beet campaign, if the reduction in the COD load is at least 95%. The reduction refers to the ratio between the COD load in the influent and that in the effluent over a representative period of time not exceeding 24 hours.

(7) By way of derogation from paragraph (1), for waste water originating from the production of yeast, the permit for discharge may authorise higher concentrations for some parameters as follows:

- up to 250 mg/l for COD and up to 85 mg/l for TOC, if the reduction in the COD load is at least 95%. The reduction refers to the ratio between the COD load in the influent and that in the effluent over a representative period of time not exceeding 24 hours;
- up to 2.5 mg/l for P_{tot} .

(8) By way of derogation from paragraph (1), for waste water originating from installations for the drying of plant-based products for the manufacture of animal feed, the permit for discharge may dispense with the requirements for filterable matter and TN_b .

(9) If a sample from a waste stabilisation lagoon designed for a retention time of 24 hours or more and with a permit for discharge based on a daily waste water volume not exceeding 500 m³ is noticeably coloured by algae, COD, TOC and BOD₅ are determined from the sample without algae. In such cases, the levels specified in paragraph (1) are reduced by 15 mg/l for COD, by 5 mg/l for TOC and by 5 mg/l for BOD₅.

(10) For storage lagoons, the requirements relate to random samples.

D Requirements for waste water prior to blending

Sealing water and condensate occurring during the extraction of solid and liquid sugars or the extraction of syrup from sugar beet and sugar cane, if it cannot be reused in-house, may not be blended with waste water from other sources for the purpose of joint treatment unless the concentrations in the untreated waste water for the parameters set out in Part C (1) exceed the values stipulated there.

E Requirements for waste water at the point of origin

The waste water is subject to no additional requirements at the point of origin.

F Requirements for established discharges

(1) By way of derogation from Part B (2), in existing plants for the channelling of waste water requiring treatment which were lawfully in operation before 20 April 2024 or the construction of which had lawfully been started on that date, waste water not requiring treatment and waste water which does require treatment may be channelled together, with the consent of the competent authority.

(2) By way of derogation from Part B (3), for existing plants which were lawfully in operation before 20 April 2024 or the construction of which had lawfully been started on that date, the requirement concerning waste water retention capacities may be waived, with the consent of the competent authority, if that requirement is disproportionate for reasons of space or the configuration of the plant.

(3) For established discharges of waste water from plants not coming within the scope of section (1) (3) of the Ordinance on licensing and monitoring industrial waste water treatment plants which were lawfully in operation before 20 April 2024 or the construction of which had lawfully been started on that date and requirements for which were stipulated in the Waste Water Ordinance before 20 April 2024, the requirements set out in Part C apply from 1 January 2027. Until that date, the requirements set out in Part C of Appendix 3, 4, 5, 6, 7, 8, 10, 11, 12, 14, 18 or 21 to the Waste Water Ordinance in the version in force on and before 19 April 2024 apply.

G Requirements under waste legislation

No requirements under waste legislation apply.

H Operator obligations

(1) The requirements set out in paragraphs (2) to (5) apply in respect of the discharge of waste water from plants coming within the scope of section (1) (3) of the Ordinance on licensing and monitoring industrial waste water treatment plants.

(2) At the point of discharge into waters, at least the following measurements are taken in the waste water:

1. continuous measurement of pH, temperature and volumetric flow of waste water and
2. measurement of the following parameters in qualified random samples or two-hour composite samples:

Parameter	Minimum frequency
TOC	once a day ¹
Filterable matter	once a day ¹
TN _b	once a day ¹
P _{tot}	once a day ¹
BOD ₅	once a month
Chloride	once a month
¹ If available data series demonstrate marked stability in the readings, the frequency of measurement may be reduced by official decision. Measurements are taken at least once a month.	

(3) An annual report is written in accordance with no. 3 of Annex 2.

(4) Measurements of the parameters set out in paragraph (2) are taken in accordance with the analysis and measurement procedures set out in Annex 1 or officially recognised monitoring procedures. *Land* regulations regarding self-monitoring remain unaffected by the operator obligations set out in paragraphs (2) and (3).

(5) Proof of compliance with the general requirements is recorded in an inventory of waste water streams in accordance with Annex 2. In addition to the data specified in no. 1 of Annex 2, the inventory of waste water streams contains the following information:

1. tributary streams affecting waste water and their characteristics;

2. retention capacities provided and measures in place in accordance with the requirements set out in Part B (3) and
3. data on the cleaning agents and disinfectants used in accordance with the requirements set out in Part B (1) no. 4.

Appendix 9

Manufacture of coating preparations

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from the manufacture of coating preparations by physical processes, such as aqueous dispersion paints, synthetic-resin wall coatings, water-soluble coating preparations, or solvent-based coating preparations with the associated ancillary enterprises.

(2) This Appendix does not apply to waste water from the manufacture of coating preparations by chemical synthesis, such as the manufacture of organic pigments, inorganic pigments, and paint and varnish resins. This Appendix does not apply to waste water from indirect cooling systems or process-water treatment.

B General requirements

(1) If the manufacturing process involves the creation of vacuums, the volume of waste water is kept low by means of waste-water-free processes.

(2) The waste water may not contain mercury compounds or organotin compounds originating from the use of preservatives and/or microbicial additives. The absence of mercury compounds and organotin compounds from the waste water may be demonstrated by information from the manufacturers stating that the feedstocks and auxiliary materials used for preservation or microbicial process termination do not contain such compounds.

(3) Waste water from the manufacture of solvent-based coating preparations with ancillary enterprises which originates from the quenching of distillation bottoms resulting from solvent recovery may not be discharged.

C Requirements for waste water at the point of discharge

(1) The following requirements apply to waste water at the point of discharge into waters:

Parameter	Qualified random sample or two-hour composite sample
Chemical oxygen demand (COD)	120 mg/l
Biochemical oxygen demand over five days (BOD ₅)	20 mg/l
Toxicity to fish eggs (LID _{egg})	2

(2) In the case of waste water streams with COD concentrations greater than 50 g/l at the point of origin, COD is reduced to 500 mg/l or lower.

D Requirements for waste water prior to blending

(1) Waste water from the following areas is subject to the following requirements prior to blending with other waste water:

Parameter	Aqueous dispersion paints, synthetic-resin wall coatings and water-soluble coating preparations	Container cleaning using lye (lye cleaning) from the manufacture of solvent-based coating preparations with ancillary enterprises
	Qualified random sample or two-hour composite sample (mg/l)	
Barium	2.0	2.0
Lead	0.50	0.50
Cadmium	0.10	0.10
Total chromium	0.50	0.50
Cobalt	1.0	1.0

Parameter	Aqueous dispersion paints, synthetic-resin wall coatings and water-soluble coating preparations	Container cleaning using lye (lye cleaning) from the manufacture of solvent-based coating preparations with ancillary enterprises
	Qualified random sample or two-hour composite sample (mg/l)	
Copper	0.50	0.50
Nickel	0.50	0.50
Zinc	2.0	2.0
Tin	–	1.0
Adsorbable organically bound halogens (AOX)	1.0	1.0
Highly volatile halogenated hydrocarbons (VHHC)	0.10	–

(2) The requirements for AOX and VHHC (sum of trichloroethene, tetrachloroethene, 1,1,1-trichloroethane and dichloromethane – calculated as chlorine) relate to random samples. The requirement for VHHC is deemed to have been met if it is demonstrated that no highly volatile halogenated hydrocarbons are used in the manufacture processes or for cleaning purposes.

Appendix 10 Slaughtering of animals

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from the slaughtering of animals and the processing of intestines.

(2) This Appendix does not apply to waste water from small discharges within the meaning of section 8 of the Waste Water Charges Act with a pollution load when untreated of less than 10 kg of BOD₅ per week or from indirect cooling systems or process-water treatment.

B General requirements

There are no requirements supplementing those set out in section 3.

C Requirements for waste water at the point of discharge

(1) The following requirements apply to waste water at the point of discharge into waters:

	Qualified random sample or two-hour composite sample (mg/l)
Biochemical oxygen demand over five days (BOD ₅)	25
Chemical oxygen demand (COD)	110
Ammoniacal nitrogen (NH ₄ -N)	10
Total nitrogen as the sum of ammoniacal, nitrite and nitrate nitrogen (N _{tot})	18
Total phosphorus	2

(2) The requirements for ammoniacal nitrogen and total nitrogen apply at a waste water temperature of 12°C and above in the effluent from the biological reactor of the waste water treatment plant and only if the raw load of total nitrogen on which the permit for discharge is based is greater than 100 kg per day. The permit for discharge may authorise a higher total nitrogen concentration of up to 25 mg/l, if the reduction in the total nitrogen load is at least 70%. The reduction refers to the ratio between the nitrogen load in the influent and that in the effluent over a representative period of time not exceeding 24 hours. Those loads are calculated on the basis of total bound nitrogen (TN_b).

(3) The requirement for total phosphorus applies if the raw load of total phosphorus on which the permit for discharge is based is greater than 20 kg per day.

(4) If a sample from a waste stabilisation lagoon designed for a retention time of 24 hours or more and with a permit for discharge based on a daily waste water volume not exceeding 500 m³ is noticeably coloured by algae, COD and BOD₅ are determined from the sample without algae. In such cases, the levels specified in paragraph (1) are reduced by 15 mg/l for COD and by 5 mg/l for BOD₅.

Appendix 12

Production of bioethanol

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from the production of ethanol from biomass in facilities coming within the scope of no. 4.1.2 of Annex 1 to the Ordinance on Installations Subject to Licensing, including the production of co-products in connection with the production of ethanol.

This Appendix also applies to rainwater contaminated as a result of operational activities.

This Appendix does not apply to waste water from indirect cooling systems or process-water treatment.

(3) The requirements set out in Part C (1), (2) and (3) are emission limit values within the meaning of section 1 (2) sentence 1 of this Ordinance.

B General requirements

(1) The volume and pollution load of waste water are kept as low as possible by means of the following measures:

1. multiple use and recirculation;
2. use of waste-water-free processes to generate vacuums and purify exhaust air and
3. retention or recovery of substances by means of the preparation of mother liquors and optimised processes.

(2) Waste water not requiring treatment is channelled separately from waste water which does require treatment.

(3) Retention capacities are provided for waste water and measures are put in place for the proper reuse, treatment or disposal of retained waste water to prevent uncontrolled emissions in the event of unplanned operating conditions. The scale of the retention capacities and the measures must be commensurate with the risk. The discharger undertakes a risk assessment to that end.

(4) If there are two or more establishments generating waste water on one site, the holder of the permit for discharge establishes with those operationally responsible within the other establishments generating waste water, in an appropriate form, the tasks, responsibilities and interactions relating to proper waste water management.

(5) Proof of compliance with the general requirements is provided in an inventory of waste water streams. In addition to the data specified in no. 1 of Annex 2, the inventory of waste water streams contains information on the retention capacities provided or measures in place in accordance with paragraph (3).

(6) Waste water treatment plants within the meaning of section 60 (3) sentence 1 no. 2 of the Federal Water Act and the associated sewage systems and facilities for the dewatering of sewage sludge in connection with waste water management are constructed and operated in such a way as to avoid odour and noise emissions.

(7) If waste water as referred to in Part A (1) which meets the requirements set out in Part C (1) is used as make-up water in cooling systems for the indirect cooling of industrial processes, the properties of that make-up water are considered prior pollution within the meaning of Part B (4) of Appendix 31.

C Requirements for waste water at the point of discharge

(1) The following requirements apply to waste water at the point of discharge into waters:

Parameter	Qualified random sample or two-hour composite sample (mg/l)
Biochemical oxygen demand over five days (BOD ₅)	25
Chemical oxygen demand (COD)	100

Total organic carbon (TOC)	33
Filterable matter	30
Ammoniacal nitrogen (NH ₄ -N)	10
Total nitrogen as the sum of ammoniacal, nitrite and nitrate nitrogen (N _{tot})	18
Total bound nitrogen (TN _b)	20
Total phosphorus (P _{tot})	2.0

(2) The requirements for ammoniacal nitrogen (NH₄-N), total nitrogen (N_{tot}) and total bound nitrogen (TN_b) set out in paragraph (1) apply at a waste water temperature of 12°C and above in the effluent from the biological reactor.

(3) If the annual loads specified below are exceeded, the concentration must not exceed the following annual averages:

Parameter	Annual load	Concentration (mg/l) (annual average)
TN _b	2.5 t/year	25 ¹
AOX	100 kg/year	1.0
Total chromium	2.5 kg/year	0.025
Copper	5.0 kg/year	0.050
Nickel	5.0 kg/year	0.050
Zinc	30 kg/year	0.30

¹ The annual average for TN_b may be up to 40 mg/l if the average rate of elimination is at least 70% over the year.

(4) The parameters set out in paragraph (3) are measured in accordance with Part H (1). The results of that measurement are equivalent to the results of public monitoring. Section 6 (1) of this Ordinance does not apply.

D Requirements for waste water prior to blending

The waste water is subject to no additional requirements prior to blending with other waste water.

E Requirements for waste water at the point of origin

The waste water is subject to no additional requirements in respect of the point of origin.

F Requirements for established discharges

(1) By way of derogation from Part B (2), in existing plants for the channelling of waste water requiring treatment which were lawfully in operation before 20 April 2024 or the construction of which had lawfully been started on that date, waste water not requiring treatment and waste water which does require treatment may be channelled together, with the consent of the competent authority.

(2) By way of derogation from Part B (3), for existing plants which were lawfully in operation before 20 April 2024 or the construction of which had lawfully been started on that date, the requirement concerning waste water retention capacities may be waived, with the consent of the competent authority, if that requirement is disproportionate for reasons of space or the configuration of the plant.

G Requirements under waste legislation

No requirements under waste legislation apply.

H Operator obligations

(1) Operators measure the following parameters in the waste water at the point of discharge into waters in 24-hour composite samples collected proportionately according to flow as follows:

Parameter	Minimum frequency
TOC	once a day

Filterable matter	once a day
TN _b	once a day
P _{tot}	once a day
BOD ₅	once a month
AOX	once a month
Total chromium, copper, nickel, zinc, lead	once a month
Other heavy metals for which limits are set in the permit for discharge	once a month

For waste water streams which are demonstrated to fluctuate little in volumetric flow and concentration, the measurements may also be taken in qualified random samples or two-hour composite samples, subject to official decision. If available data series demonstrate marked stability in the readings, the frequency of measurement may be reduced by official decision. However, measurements for which the minimum frequency given above is once a day must be taken at least once a month, and all others must be taken at least once a year.

(2) The annual average for the parameters set out in Part C (3) are derived from the results of the measurements specified in paragraph (1).

(3) An annual report is written in accordance with no. 3 of Annex 2.

(4) The parameters set out in paragraph (1) are measured in accordance with the analysis and measurement procedures set out in Annex 1 or officially recognised monitoring procedures. *Land* regulations regarding self-monitoring remain unaffected by the operator obligations set out in paragraphs (1) to (3).

Appendix 13

Manufacture of wood chipboard, wood fibreboard or wood fibre matting

A Scope

(1) The Appendix applies

1. to waste water with a pollution load originating primarily from the manufacture of wood chipboard, wood fibreboard or wood fibre matting and
2. to rainwater contaminated as a result of operational activities.

This Appendix does not apply to waste water from indirect cooling systems or process-water treatment.

(3) The requirements set out in Part C (1) and (5) are emission limit values within the meaning of section 1 (2) sentence 1 of this Ordinance.

B General requirements

(1) The volume and pollution load of waste water are kept as low as possible by means of the following measures:

1. collection of the rainwater contaminated as a result of operational activities, including the rainwater from hard-surfaced areas for the storage of any wood except roundwood and slabs;
2. extensive recycling of process water from the washing, cooking and pulping of woodchips to make wood fibres;
3. extensive recycling of water from wet waste-gas scrubbing systems; waste water occurring as a result of wet waste-gas scrubbing is subject to biological treatment or other suitable waste water treatment.

(2) Process waste water and rainwater contaminated as a result of operational activities are treated separately.

C Requirements for waste water at the point of discharge

(1) For plants with a production capacity of 600 m³ or more per day, the annual average of filterable matter in rainwater contaminated as a result of operational activities, measured in qualified random samples at the point of discharge into waters, must not exceed 40 mg/l. Filterable matter is measured in accordance with Part H (1) no. 1. The results of the measurements taken in accordance with sentence 2 are equivalent to the results of public monitoring. Section 6 (1) of this Ordinance does not apply.

(2) The following requirements apply to process waste water from the manufacture of wood fibreboard and wood fibre matting at the point of discharge into waters:

	Qualified random sample or two-hour composite sample	
Biochemical oxygen demand over five days (BOD ₅)	kg/t	0.20
Total organic carbon (TOC)	kg/t	0.30
Chemical oxygen demand (COD)	kg/t	1.0
Phenol index after distillation and dye extraction	g/t	0.30
Toxicity to fish eggs (LID _{egg})		2

(3) By way of derogation from paragraph (2), for process waste water from the manufacture of wet-processed wood fibreboards with a density greater than 900 kg/m³ which have a moisture content greater than 20% at the board-forming stage, the applicable values are 2.0 kg/t for COD and 0.70 kg/t for TOC.

(4) The requirements set out in paragraphs (2) and (3) relate to the wood fibreboard or wood fibre matting production capacity in oven-dry tonnes per 0.5- or 2-hour period on which the permit for discharge is based. The pollution load is calculated by multiplying the concentration in a qualified random sample or two-hour composite sample by the volume of the waste water stream corresponding to the sampling.

(5) Without prejudice to the requirements set out in paragraph (2), process waste water from plants with a production capacity of 600 m³ or more per day must not exceed the following annual averages at the point of discharge into waters:

	Annual average mg/l
Chemical oxygen demand (COD)	200
Filterable matter	35

The requirement for COD is deemed to have been met if the annual average for TOC does not exceed 70 mg/l. COD or TOC and filterable matter are measured in accordance with Part H (1) no. 2 (a) and (b). The results of the measurements taken in accordance with sentence 3 are equivalent to the results of public monitoring. Section 6 (1) of this Ordinance does not apply.

D Requirements for waste water prior to blending

Prior to blending with other waste water, the level of adsorbable organically bound halogens (AOX) in the process waste water must not exceed 0.30 g/t. That requirement relates to the wood fibreboard and wood fibre matting production capacity in oven-dry tonnes per 0.5- or 2-hour period on which the permit for discharge is based. The pollution load is calculated by multiplying the concentration in a random sample by the volume of the waste water stream corresponding to the sampling.

E Requirements for waste water at the point of origin

The waste water is subject to no additional requirements in respect of the point of origin.

F Requirements for established discharges

By way of derogation from Part B (2), in existing waste water treatment plants which were lawfully in operation before 24 June 2020 or the construction of which had lawfully been started on that date, process waste water and rainwater contaminated as a result of operational activities may be treated together, with the consent of the competent authority.

G Requirements under waste legislation

No requirements under waste legislation apply.

H Operator obligations

(1) Operators of wood chipboard, wood fibreboard and wood fibre matting manufacturing plants with a production capacity of 600 m³ or more per day take at least the following measurements in the waste water at the point of discharge into waters:

1. For rainwater contaminated as a result of operational activities, filterable matter is measured in qualified random samples during discharge; provided rainwater occurs, these measurements are taken at least once every three months.
 2. For process waste water, the following parameters are measured at least once a week in two-hour composite samples or qualified random samples:
 - (a) filterable matter;
 - (b) COD or TOC.
 3. For process waste water, the following parameters are measured at least once every six months in two-hour composite samples or qualified random samples:
 - (a) arsenic;
 - (b) total chromium;
 - (c) copper;
 - (d) nickel;
 - (e) lead and
 - (f) zinc.
- (2) The annual averages referred to in Part C (1) sentence 1 and (5) sentences 1 and 2 are calculated on the basis of the measurements set out in paragraph (1) nos. 1 and 2.
- (3) Operators of wood chipboard, wood fibreboard and wood fibre matting manufacturing plants with a production capacity of 600 m³ or more per day write an annual report in accordance with no. 3 of Annex 2.
- (4) The parameters set out in paragraph (1) are measured in accordance with the analysis and measurement procedures set out in Annex 1 or officially recognised monitoring procedures. *Land* regulations regarding self-monitoring remain unaffected by the operator obligations set out in paragraphs (1) to (3).

Appendix 15

Production of gelatine and of glue from hides, skin and bones

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from the processing of slaughter by-products and residues from leather production into glue, gelatine or collagen casing.

This Appendix does not apply to waste water from indirect cooling systems or process-water treatment.

B General requirements

There are no requirements supplementing those set out in section 3.

C Requirements for waste water at the point of discharge

(1) The following requirements apply to waste water at the point of discharge into waters:

	Qualified random sample or two-hour composite sample (mg/l)
Biochemical oxygen demand over five days (BOD ₅)	25
Chemical oxygen demand (COD)	110
Ammoniacal nitrogen (NH ₄ -N)	10
Total nitrogen as the sum of ammoniacal, nitrite and nitrate nitrogen (N _{tot})	30
Total phosphorus	2

(2) The requirements for ammoniacal nitrogen and total nitrogen apply at a waste water temperature of 12°C and above in the effluent from the biological reactor of the waste water treatment plant and only if the raw load of total nitrogen on which the permit for discharge is based is greater than 100 kg per day. The permit for discharge may authorise a higher total nitrogen concentration of up to 50 mg/l, if the reduction in the total

nitrogen load is at least 85%. The reduction refers to the ratio between the nitrogen load in the influent and that in the effluent over a representative period of time not exceeding 24 hours. Those loads are calculated on the basis of total bound nitrogen (TN_b).

(3) The requirement for total phosphorus applies if the raw load of total phosphorus on which the permit for discharge is based is greater than 20 kg per day.

Appendix 16

Preparation of hard coal

A Scope

This Appendix applies to waste water with a pollution load originating primarily from the preparation of hard coal.

B General requirements

There are no requirements supplementing those set out in section 3.

C Requirements for waste water at the point of discharge

The following requirements apply to waste water discharge at the point of discharge into waters:

Chemical oxygen demand (COD)	100 mg/l	Qualified random sample or two-hour composite sample
Filterable matter	80 mg/l	Random sample

Appendix 17

Manufacture of ceramic products

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from the commercial manufacture of ceramic products.

(2) This Appendix does not apply to waste water from indirect cooling systems, process-water treatment or sanitary facilities.

B General requirements

(1) Waste water from refractory facilities and/or from the manufacture of grinding tools, bricks, flags and tiles may not be discharged into waters. Sentence 1 does not apply in respect of the cleaning and servicing of manufacturing facilities or the washing of raw materials.

(2) Waste water may not be discharged unless it originates from the manufacture of

1. piezoceramics, and at least 50% of it has been reused;
2. crockery, and at least 50% of it has been reused, and
3. ceramic sanitary fixtures, and at least 30% of it has been reused.

C Requirements for waste water at the point of discharge

The following requirements apply to waste water at the point of discharge into waters:

	Qualified random sample or two-hour composite sample (mg/l)
Filterable matter	50
Chemical oxygen demand (COD)	80
Total phosphorus	1.5

D Requirements for waste water prior to blending

(1) The waste water is subject to the following requirements prior to blending with other waste water:

	Qualified random sample or two-hour composite sample (mg/l)
Adsorbable organically bound halogens (AOX)	0.1
Lead	0.3
Cadmium	0.07
Total chromium	0.1
Cobalt	0.1
Copper	0.1
Nickel	0.1
Zinc	2

The values specified for AOX relate to random samples.

(2) The requirements set out in paragraph 1 do not apply if the volume of waste water occurring per day does not exceed 4 m³ and no waste water is generated by glazing activities.

(3) For volumes of waste water of up to 8 m³ per day, the requirements set out in Part D (1) and the requirement for filterable matter specified in Part C are also deemed to have been met if a waste water treatment plant authorised by a general building control permit or otherwise authorised under *Land* legislation is installed and operated, serviced on a regular basis in accordance with that authorisation and inspected in accordance with *Land* legislation, both before commissioning and at regular intervals not exceeding five years, to verify that it is in proper working order.

E Requirements for the point of origin

The waste water is subject to no additional requirements in respect of the point of origin.

F Requirements for established discharges

For established discharges of waste water from plants which were lawfully in operation before 1 June 2000 or the construction of which had lawfully been started on that date, the requirements set out in Parts B, C and D apply only if no derogating requirements are set in paragraphs (1) to (4).

(1) By way of derogation from Part B (1), waste water from the manufacture of tiles may be discharged if at least 50% of it has been reused in the manufacturing process.

(2) By way of derogation from Part B (2) no. 1, waste water from the manufacture of piezoceramics may be discharged if at least 30% of it has been reused.

(3) By way of derogation from Part B (2) nos. 2 and 3, waste water from the manufacture of sanitary fixtures and/or crockery may be discharged without reuse.

(4) If more water is reused than required by paragraphs (1), (2) and (3), higher concentrations of AOX and COD than those specified in Parts C and D may be permitted provided the relevant load derived from paragraph (1), (2) or (3) is not exceeded.

Appendix 19

Pulp production

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from the production of bleached pulp using the sulphite or kraft (sulphate) processes.

(2) This Appendix does not apply to waste water from the production of pulp from annual plants or to waste water from indirect cooling systems or process-water treatment.

(3) The requirements set out in Parts C (1) and (3) and D (1) and (3) are emission limit values within the meaning of section 1 (2) sentence 1 of this Ordinance.

B General requirements

(1) The volume and pollution load of waste water are kept as low as possible by means of the following measures:

1. reduction of water consumption, such as by optimisation of water management by means of metering of the main areas of water consumption, curbing of water cycles, counter-current exchange processes, and reuse of used process water;
2. largely waste-water-free debarking;
3. suitable in-house handling procedures to avoid contamination of the bark and wood with sand and stones;
4. optimised pulping of wood by means of extended cooking and oxygen delignification;
5. closed-loop washing and screening of unbleached pulp;
6. collection of at least 98% of the organic matter dissolved in the digestion process by means of water-saving washing techniques;
7. use of pulp-washing by-products, such as tall oil extracted in the kraft pulping process;
8. neutralisation and evaporation of the scrubbing solution;
9. use of the concentrate following evaporation (concentrated liquor) and recovery of pulping chemicals;
10. stripping and subsequent reuse of highly concentrated condensate following evaporation;
11. pulp bleaching without the use of elemental chlorine and chlorine-containing bleaching chemicals, except chlorine dioxide during elemental-chlorine-free (ECF) kraft pulping;
12. partial closure of the loop in the bleaching plant;
13. recovery of all spills;
14. sizing of evaporation facilities with due attention to peaks in activity;
15. non-use of organic complexing agents which do not attain a degree of DOC degradation of 80% after 28 days in accordance with the procedure set out in no. 406 of Annex 1 to this Ordinance; if non-use is not possible, the quantities used are kept to a minimum and the pollution load is reduced as much as technically possible.

(2) Waste water treatment plants are constructed and operated in such a way as to avoid odour emissions, such as by optimal mixing and continuous dewatering of sludge.

C Requirements for waste water at the point of discharge

(1) The following requirements apply to waste water at the point of discharge into waters:

	24-hour composite samples	
Total organic carbon (TOC)	kg/t	12
Chemical oxygen demand (COD)	kg/t	25
Biochemical oxygen demand over five days (BOD ₅)	mg/l	30
Total phosphorus	mg/l	2.0
Total nitrogen as the sum of ammoniacal, nitrite and nitrate nitrogen (N _{tot})	mg/l	10
Total bound nitrogen (TN _b)	mg/l	20
Toxicity to fish eggs (LID _{egg})		2

The requirement for toxicity to fish eggs (LID_{egg}) relates to random samples.

(2) The output-based environmental performance values (kg/t) set out in paragraph (1) are derived from the ratio of pollution load to production capacity, in terms of tonnes of air-dry pulp per day, on which the permit for discharge is based. The pollution load is calculated by multiplying the concentration in a 24-hour composite sample by the volume of the waste water stream over 24 hours corresponding to the sampling.

(3) Without prejudice to the requirements set out in paragraphs (1) and (2), the waste water must not exceed the following annual averages in kilograms per tonne of air-dry pulp produced:

	Bleached kraft kg/t	Bleached sulphite pulp kg/t
Chemical oxygen demand (COD)	13	30
Filterable matter	1.5	1.5
Total bound nitrogen (TN _b)	0.25	0.30
Total phosphorus	0.030	0.050

(4) The parameters set out in paragraph (3) are measured in accordance with Part H (1) no. 1 (a) and (b). The output-based environmental performance values (kg/t) for the parameters set out in paragraph (3) are derived from the ratio of pollution load to air-dry pulp production which can be attributed to the sampling period. The pollution load is calculated by multiplying the concentration in a 24-hour composite sample by the volume of the waste water stream over 24 hours corresponding to the sampling. The results of the measurements taken in accordance with sentence 1 are equivalent to the results of public monitoring. Section 6 (1) of this Ordinance does not apply.

D Requirements for waste water prior to blending

(1) Prior to blending with other waste water, the waste water may not contain chlorine, chlorine-containing bleaching agents or adsorbable organically bound halogens (AOX) from bleaching. By way of derogation from sentence 1, waste water from elemental-chlorine-free kraft pulping may contain up to 0.25 kg of AOX per tonne of pulp in 24-hour composite samples.

(2) The output-based environmental performance value for AOX (kg/t) to be measured under paragraph (1) sentence 2 is derived from the ratio of pollution load to production capacity, in terms of tonnes of air-dry pulp per day, on which the permit for discharge is based. The pollution load is calculated by multiplying the concentration in a 24-hour composite sample by the volume of the waste water stream over 24 hours corresponding to the sampling.

(3) Without prejudice to the requirements set out in paragraph (1), the annual average for AOX in the waste water must not exceed 0.20 kg per tonne of kraft or 1.5 mg/l from sulphite pulping. The value for sulphite pulping does not apply if totally chlorine-free (TCF) bleaching is used in the sulphite pulp production process. AOX are measured in accordance with Part H (1) no. 2 (a) or (b). The output-based environmental performance value (kg/t) is derived from the ratio of pollution load to air-dry pulp production which can be attributed to the sampling period. The pollution load is calculated by multiplying the concentration in a 24-hour composite sample by the volume of the waste water stream over 24 hours corresponding to the sampling. The results of the measurements taken in accordance with sentence 3 are equivalent to the results of public monitoring. Section 6 (1) of this Ordinance does not apply.

E Requirements for waste water at the point of origin

The waste water is subject to no additional requirements in respect of the point of origin.

F Requirements for established discharges

By way of derogation from Part C (1), for established discharges of waste water from plants which were lawfully in operation before 1 August 2001 or the construction of which had lawfully been started on that date, the applicable value for COD is 40 kg/t.

G Requirements under waste legislation

No requirements under waste legislation apply.

H Operator obligations

(1) At least the following measurements are taken in the waste water:

- At the point of discharge into waters, the following parameters are measured in 24-hour composite samples as follows:
 - daily measurement of COD and filterable matter;
 - weekly measurement of BOD₅, TN_b and total phosphorus;
 - monthly measurement of ethylene diamine tetraacetic acid (EDTA) and diethylene triamine pentaacetic acid (DTPA), if those substances are used in the process.
- Prior to blending with other waste water, the following parameters are measured in 24-hour composite samples as follows:

- (a) for the production of pulp with elemental-chlorine-free bleaching, monthly measurement of AOX;
 - (b) for the production of pulp with totally chlorine-free bleaching, measurement of AOX every two months, if AOX are generated by the input of chemicals or raw materials;
 - (c) annual measurement of lead, cadmium, copper, nickel, mercury and zinc.
- (2) The annual averages for the parameters set out in Part C (3) and the annual average for AOX expressed in relation to quantities of kraft produced, as referred to in Part D (3) sentence 1, are derived from the average output-based environmental performance values, weighted for daily production quantities, which are calculated on the basis of the results of the measurements set out in paragraph (1). The annual average for AOX expressed in relation to sulphite pulping, as referred to in Part D (3) sentence 1, is calculated on the basis of results of the measurements set out in paragraph (1).
- (3) An annual report is written in accordance with no. 3 of Annex 2. At least every three years, that report also demonstrates that
1. a repeat review has been carried out to consider whether non-use of the substances referred to in Part B (1) no. 15 is possible;
 2. use of those substances remains necessary;
 3. available alternatives have been evaluated and
 4. feasible measures have been implemented to keep the quantities used to a minimum.
- Estimates are provided of the residual pollution load from the use of those substances.
- (4) The parameters set out in paragraph (1) are measured in accordance with the analysis and measurement procedures set out in Annex 1 or officially recognised monitoring procedures. *Land* regulations regarding self-monitoring remain unaffected by the operator obligations set out in paragraphs (1) to (3).

Appendix 20

Processing of animal by-products

A Scope

- (1) This Appendix applies to waste water with a pollution load generated primarily in the course of collecting, transporting, storing, treating and processing animal by-products not intended for human consumption, in storage establishments, intermediate plants and processing establishments for Category 1, Category 2 or Category 3 material within the meaning of Regulation (EC) No 1774/2002 of the European Parliament and of the Council of 3 October 2002 laying down health rules concerning animal by-products not intended for human consumption (OJ L 273 of 10 October 2002, p. 1).
- (2) This Appendix does not apply to waste water from indirect cooling systems.

B General requirements

The pollution load is kept as low as possible by means of the following measures:

1. refrigeration of raw materials while stowing and procedures to ensure swift processing;
2. use of undenatured salt for the preservation of hides, skins and pelts;
3. retention of brine from the salting of hides and skins by means of suitable procedures such as dry disposal or recirculation into the production process.

C Requirements for waste water at the point of discharge

- (1) The following requirements apply to waste water at the point of discharge into waters:

	Qualified random sample or two-hour composite sample (mg/l)
Chemical oxygen demand (COD)	150
Biochemical oxygen demand over five days (BOD ₅)	25
Total nitrogen as the sum of ammoniacal, nitrite and nitrate nitrogen (N _{tot})	50

- (2) The requirement for total nitrogen applies at a waste water temperature of 12°C and above in the effluent from the biological reactor of the waste water treatment plant.

(3) If a sample from a waste stabilisation lagoon designed for a retention time of 24 hours or more is noticeably coloured by algae, COD and BOD₅ are determined from the sample containing no algae. In such cases, the levels specified in paragraph (1) are reduced by 15 mg/l for COD and by 5 mg/l for BOD₅.

D Requirements for waste water prior to blending

Prior to blending with waste water from other sources, the adsorbable organically bound halogens (AOX) in the waste water must not exceed 0.1 mg/l in random samples. This requirement is also deemed to have been met if the cleaning agents and disinfectants used and any other operating and auxiliary materials contain no organically bound halogen compounds or halogen-releasing substances. Compliance with this requirement may be demonstrated by setting out the operating and auxiliary materials used in a production log while information from the manufacturers states that they contain none of the substances or groups of substances specified in sentence 1.

Appendix 22 Chemical industry

Division 1: General provisions

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from the production of substances by means of chemical, biochemical or physical processes, including the concomitant pre-treatment, intermediate operations and after-treatment. It also applies to rainwater contaminated as a result of operational activities in that area.

(2) This Appendix does not apply to waste water discharges into public waste water plants of less than 10 m³ per day. This Appendix likewise does not apply to waste water originating from the production of soda ash or potassic fertilisers.

(3) For waste water originating from the production of substances and preparations by mixing, dissolution or bottling (formulation) which is discharged into waters or a waste water plant without being merged with another waste water stream coming within the scope of this Appendix, only the provisions of Part B (1) and (5) apply. The requirements set out in sentence 1 apply to the point of origin of the waste water.

(4) The requirements set out in Part C (3) no. 1 sentence 1, nos. 2 and 3, (4) and (5) are emission limit values within the meaning of section 1 (2) sentence 1 of this Ordinance.

B General requirements

(1) The volume and pollution load of waste water are kept as low as possible by means of the following measures:

1. multiple use and recirculation;
2. use of waste-water-free processes to generate vacuums and purify exhaust air;
3. retention or recovery of substances by means of the preparation of mother liquors and optimised processes and
4. pre-treatment of tributary waste water streams containing pollutants which
 - (a) may impair the function of the final biological treatment or
 - (b) cannot be adequately treated in the final waste water treatment, particularly organic compounds which have low biodegradability or cannot be eliminated by the final waste water treatment, volatile pollutants such as benzene and volatile halogenated organic compounds.

(2) Waste water not requiring treatment is channelled separately from waste water which does require treatment.

(3) Retention capacities are provided for waste water and measures are put in place for the proper reuse, treatment or disposal of retained waste water to prevent uncontrolled emissions in the event of unplanned operating conditions. The scale of the retention capacities and the measures must be commensurate with the risk. The discharger undertakes a risk assessment to that end.

(4) If there are two or more establishments generating waste water on the site, the holder of the permit for discharge establishes with those operationally responsible within the other establishments generating waste water, in an appropriate form, the tasks, responsibilities and interactions relating to proper waste water management.

(5) Proof of compliance with the general requirements is provided in an inventory of waste water streams. In addition to the data specified in no. 1 of Annex 2, the inventory of waste water streams contains the following information:

1. data on waste-water-generating synthesis processes, procedures and installations, including a representation of the main chemical reactions, in the form of chemical equations, and the most important side reactions and
2. data on the bioeliminability of the organic pollution load of the waste water streams.

(6) Waste water treatment plants within the meaning of section 60 (3) sentence 1 no. 2 of the Federal Water Act and the associated sewage systems and facilities for the dewatering of sewage sludge in connection with waste water management are constructed and operated in such a way as to avoid odour and noise emissions.

C Requirements for waste water at the point of discharge

(1) The requirements set out in paragraphs (2) to (6) apply to waste water at the point of discharge into waters.

(2) The permit for discharge restricts the following:

1. the maximum permitted total load of TOC per 0.5- or 2-hour period;
2. the maximum permitted TOC concentration in a qualified random sample or a two-hour composite sample and
3. the maximum permitted COD concentration in a qualified sample or a two-hour composite sample, calculated by multiplying the TOC concentration specified pursuant to no. 2 by three or by multiplying the TOC concentration specified pursuant to no. 2 by a site-specific factor for the ratio of COD to TOC to be established.

The figures established pursuant to sentence 1 are based on a calculation of the permitted total annual load of TOC. That is derived from the sum of the annual loads in the individual waste water streams. The TOC concentrations of individual waste water streams are reflected in the calculation of the permissible total annual load as follows:

For a waste water stream with a TOC concentration at the point of origin of the waste water

1. greater than 16,000 mg/l, a TOC concentration of 800 mg/l is included in the sum;
2. greater than 250 mg/l, a TOC concentration equivalent to a 90% reduction in TOC is included in the sum;
3. of 250 mg/l or less, a TOC concentration of 25 mg/l is included in the sum;
4. of less than 25 mg/l, the actual TOC concentration at the point of origin is included in the sum.

If, with the consent of the competent authority, process-integrated measures are implemented to reduce the TOC load, the TOC load at the point of origin of the waste water is used as the basis for the load-calculation measure.

To monitor the maximum permitted total load of TOC specified pursuant to sentence 1 no. 1, the TOC concentration is measured in qualified random samples or two-hour composite samples. The actual total load of TOC is calculated by multiplying the measured TOC concentration by the volume of the waste water stream over 0.5 or 2 hours corresponding to the sampling.

The requirements for the maximum permitted total load of TOC specified pursuant to sentence 1 no. 1 are deemed to have been met if, with due regard for Part B, the TOC concentration in qualified random samples or two-hour composite samples does not exceed 25 mg/l and the permit for discharge contains no derogating requirements.

(3) In addition, the following requirements apply to waste water in qualified random samples and two-hour composite samples respectively:

1. Total nitrogen as the sum of ammoniacal, nitrite and nitrate nitrogen (N_{tot}): 50 mg/l
The permit for discharge may specify a higher concentration of up to 75 mg/l, if the reduction in the total nitrogen load is at least 75%.
2. Total phosphorus: 2.0 mg/l
3. Toxicity

Toxicity to fish eggs	$LID_{egg} = 2$
Toxicity to daphnia	$LID_D = 8$
Toxicity to algae	$LID_A = 16$

Toxicity to luminescent bacteria

$LID_{LB} = 32$

Mutagenic potential (umu test)

$LID_{GM} = 1.5$

(4) For TOC, filterable matter, TN_b and N_{tot} , if the annual loads specified below are exceeded, the concentration must not exceed the following annual averages:

Parameter	Annual load	Concentration (annual average)
TOC	3.3 t/year	33 mg/l ^{1, 2, 3}
Filterable matter	3.5 t/year	35 mg/l
TN_b	2.5 t/year	25 mg/l ^{4,5,6}
N_{tot}	2.0 t/year	20 mg/l ^{4,5,6}

¹ The annual average for TOC may be up to 100 mg/l if

- (a) the average rate of elimination over the year is at least 90% in pre-treatment and final treatment and,
- (b) in the case of biological treatment, at least one of the following conditions is satisfied:
 - (aa) the BOD_5 value of the effluent is no greater than 20 mg/l and the COD affecting the sludge is no greater than 0.25 kg per kilogram of dry organic matter in the sludge or
 - (bb) the configuration and operation of the treatment plant are designed for targeted nitrification.

² The annual average for TOC may exceed 100 mg/l if

- (a) the average rate of elimination over the year is at least 95% in pre-treatment and final treatment,
- (b) one of the conditions set out in footnote 1 (b) is satisfied and
- (c) the annual average of TOC in the influent entering the waste water treatment is greater than 2.0 g/l and the influent contains a high proportion of persistent organic compounds.

³ The annual average for TOC does not apply to waste water with a main pollution load originating from the production of methyl cellulose.

⁴ Either the annual average for TN_b or the annual average for N_{tot} applies.

⁵ The annual averages for TN_b and N_{tot} do not apply to waste water treatment plants without biological waste water treatment.

⁶ The annual averages for TN_b and N_{tot} may be up to 40 mg/l and 35 mg/l respectively if the average rate of elimination over the year is at least 70% in both pre-treatment and final treatment.

(5) For adsorbable organically bound halogens (AOX) and heavy metals, if the annual loads specified below are exceeded, the concentration must not exceed the following annual averages:

Parameter	Annual load	Concentration (annual average)
AOX	100 kg/year	1.0 mg/l ¹
Total chromium	2.5 kg/year	0.025 mg/l ^{2,3,4}
Copper	5.0 kg/year	0.050 mg/l ^{2,3,5}
Nickel	5.0 kg/year	0.050 mg/l ^{2,3}
Zinc	30 kg/year	0.30 mg/l ^{2,3,6}

¹ The annual average does not apply to waste water with a main pollution load originating from the production of iodinated X-ray contrast agents or from the production of propylene oxide or epichlorohydrin via the chlorohydrin process.

² The annual average does not apply to inorganic waste water with a main pollution load originating from the production of inorganic heavy metal compounds.

³ The annual average does not apply to waste water with a main pollution load originating from the processing of solid inorganic raw materials that are contaminated with metals.

⁴ The annual average does not apply to waste water with a main pollution load originating from the production of chromium-organic compounds.

⁵ The annual average does not apply to waste water with a main pollution load originating from the production of copper-organic compounds or the production of vinyl chloride monomer or 1,2-dichloroethane via the oxychlorination process.

⁶ The annual average does not apply to waste water with a main pollution load originating from the production of viscose fibres.

(6) The parameters set out in paragraphs (4) and (5) are measured in accordance with Part H (1). The results of those measurements are equivalent to the results of public monitoring. Section 6 (1) of this Ordinance does not apply.

D Requirements for waste water prior to blending

(1) The requirements set out in paragraphs (2) to (4) apply to waste water prior to blending with other waste water.

(2) The permit for discharge restricts the following:

1. the maximum permitted total load of AOX per 0.5- or 2-hour period and
2. the maximum permitted AOX concentration in a qualified random sample or a two-hour composite sample.

The figures established pursuant to sentence 1 are based on a calculation of the permissible total annual load of AOX. That is derived from the sum of the annual loads in the individual waste water streams. The AOX concentrations and loads of individual waste water streams are reflected in the calculation of the permissible total annual load as follows:

1. waste water from the production of epichlorohydrin, propylene oxide and butylene oxide: 3.0 mg/l
2. waste water from the single-stage production of acetaldehyde: 30 g/t
3. waste water from the production of AOX-affecting organic dyes, organic pigments and aromatic intermediate products primarily used for the production of organic dyes: 8.0 mg/l
4. waste water from the manufacture of AOX-affecting pharmaceutical active ingredients: 8.0 mg/l
5. waste water from the production of C1-chlorinated hydrocarbons by means of methane chlorination and methanol esterification and the production of tetrachloromethane and tetrachloroethene by means of perchlorination: 10 g/t
6. waste water from the manufacture of 1,2-dichloroethane (DCE), including further processing to make vinyl chloride monomer (VCM): 2.0 g/t

The environmental performance value relates to the capacity for production of purified DCE. That capacity is determined with reference to the proportion of DCE which remains unconverted in the VCM batch associated with each quantity of DCE and is returned to the production cycle in the DCE purification unit.

7. waste water from the manufacture of polyvinyl chloride (PVC): 5.0 g/t
8. waste water streams in which the AOX concentration is higher than 0.10 mg/l and, without targeted measures, lower than 1.0 mg/l: 0.30 mg/l
9. waste water streams from the production, further processing or application of substances not covered by other special provisions in which the concentration is higher than 1.0 mg/l or is lower than that as a result of targeted measures: 1.0 mg/l or 20 g/t

The environmental performance value relates to production capacity expressed as tonnes of organic target product. It does not apply to the application of substances.

To monitor the maximum permitted total load of AOX specified pursuant to sentence 1 no. 1, the AOX concentration is measured in qualified random samples or two-hour composite samples. The actual total load of AOX is calculated by multiplying the measured AOX concentration by the volume of the waste water stream over 0.5 or 2 hours corresponding to the sampling. The requirements for AOX set out in sentences 1 to 6 do not apply to organiodides in waste water from the production and bottling of X-ray contrast agents.

(3) The permit for discharge restricts the following:

1. the maximum permitted total loads per 0.5- or 2-hour period for mercury, cadmium, copper, nickel, lead, total chromium, zinc and tin and
2. the maximum permitted concentration of the substances set out in no. 1 in qualified random samples or two-hour composite samples.

The figures established pursuant to sentence 1 are based on a calculation of the permissible total annual load for each substance. That is derived from the sum of the annual loads in the individual waste water streams. The concentrations of individual waste water streams are reflected in the calculation of the permissible total annual load as follows:

Parameter	Concentration for calculating annual loads (mg/l)	
	I	II

Mercury	0.050	0.0010
Cadmium	0.20	0.0050
Copper	0.50	0.10
Nickel	0.50	0.050
Lead	0.50	0.050
Total chromium	0.50	0.050
Zinc	2.0	0.20
Tin	2.0	0.20

The values in column I are used for waste water streams from the production, further processing or application of those substances. The values in column II are used for waste water streams not originating from the production, further processing or application of those substances but nevertheless contaminated with them.

To monitor the maximum permitted total load of each substance specified pursuant to sentence 1 no. 1, the concentration is measured in qualified random samples or two-hour composite samples. The actual total load of each substance is calculated by multiplying the measured concentration by the volume of the waste water stream over 0.5 or 2 hours corresponding to the sampling.

(4) A waste water stream may be merged with another waste water stream coming within the scope of this Appendix or blended with other waste water if

1. it is demonstrated that the TOC load of that waste water determined at its point of origin is reduced by at least 80% or
2. the residual load of TOC discharged into waters from the waste water stream in question is lower than 20 kg per day, 300 kg per year or 1 kg per tonne of production capacity of the organic target product.

For aerobic biological waste water treatment plants, proof of the reduction in load referred to in sentence 1 no. 1 is based on the result of an assessment under no. 407 of Annex 1 to this Ordinance; for other waste water treatment plants, that proof must be based on the degree of TOC elimination determined for those plants.

E Requirements for waste water at the point of origin

The concentration of chromium VI in random samples must not exceed 0.10 mg/l.

F Requirements for established discharges

(1) By way of derogation from Part B (2), in existing plants for the channelling of waste water requiring treatment which were lawfully in operation before 24 June 2020 or the construction of which had lawfully been started on that date, waste water not requiring treatment and waste water which does require treatment may be channelled together, with the consent of the competent authority.

(2) For established discharges from plants which were lawfully in operation before 1 January 1999 or the construction of which had lawfully been started on that date, the requirement for mutagenic potential (umu test) set out in Part C (3) no. 3 applies from 24 June 2024.

(3) The competent authority may exempt the following from the requirements set out in Part D (4) for discharges of waste water from plants which were lawfully in operation before 1 January 1999 or the construction of which had lawfully been started on that date:

1. waste water from spray-drying of liquid and solid polycondensates resulting from the reaction of phenolsulphonic acid with formaldehyde;
2. waste water from the production of arylides and from the production of azo, isoindoline, quinacridone and dioxazine pigments;
3. waste water from the production of metamizole on the basis of aniline and sodium nitrite.

G Requirements under waste legislation

No requirements under waste legislation apply.

H Operator obligations

(1) Operators measure the following parameters in the waste water at the point of discharge into waters in 24-hour composite samples collected proportionately according to flow as follows:

Parameter	Minimum frequency
TOC	once a day
Filterable matter	once a day
N _{tot} or TN _b	once a day
P _{tot}	once a day
AOX	once a month
Total chromium, copper, nickel, zinc, lead	once a month
Other heavy metals for which limits are set in the permit for discharge	once a month

For waste water streams which are demonstrated to fluctuate little in volumetric flow and concentration, the measurements may also be taken in 24-hour composite samples proportionately collected across regular intervals, subject to official decision. If available data series demonstrate marked stability in the readings, the frequency of measurement may be reduced by official decision.

(2) The annual average for the parameters set out in Part C (4) and (5) are derived from the results of the measurements specified in paragraph (1).

(3) An annual report is written in accordance with no. 3 of Annex 2.

(4) The parameters set out in paragraph (1) are measured in accordance with the analysis and measurement procedures set out in Annex 1 or officially recognised monitoring procedures. *Land* regulations regarding self-monitoring remain unaffected by the operator obligations set out in paragraphs (1) to (3).

Division 2: Requirements for waste water from particular sources

For waste water from the production of bulk organic chemicals within the meaning of Part A (Scope) below, the requirements set out in Parts B to H below apply in addition to the requirements set out in Division 1.

A Scope

(1) This Division applies to waste water from the production of 1,2-dichloroethane (DCE), vinyl chloride monomer (VCM), dinitrotoluene (DNT), toluene diamine (TDA), toluene diisocyanate (TDI), methylene diphenyl diamine (MDA) and methylene diphenyl diisocyanate (MDI).

(2) The requirements set out in Part C (1) are emission limit values within the meaning of section 1 (2) sentence 1 of this Ordinance.

B General requirements

In the case of DCE production by means of oxychlorination in fluidised bed reactors, the discharge of catalyst particulates into the waste water are reduced as much as possible by suitable procedural measures.

C Requirements for waste water at the point of discharge

(1) In waste water from the production of DCE, the following annual averages, expressed as grams or micrograms per tonne of DCE produced by oxychlorination, must not be exceeded:

Parameter	Requirement (annual average)
Copper ¹	0.20 g/t
Copper ²	0.040 g/t
PCDD/PCDF	0.30 µg I-TEQ/t

The requirements for copper apply if the copper load in the waste water originates primarily from the production of DCE by oxychlorination using

¹ fluidised bed reactors;

² fixed-bed reactors.

For DCE, an annual average of 0.05 grams per tonne of purified DCE must not be exceeded. Purified DCE is the sum of the quantity of DCE produced and the quantity of DCE recirculated for purification following VCM production.

(2) The annual averages set out in paragraph (1) are derived from the measurements taken in accordance with Part H (1). To calculate the output-based environmental performance values, the annual averages are first determined for concentrations of copper, DCE and PCDD/PCDF. Each of those annual averages is multiplied by the annual waste water quantity at the point of discharge and divided by the quantity of product made in the year in question. The annual average for the concentration of DCE is calculated using daily averages derived from the measurements taken on each sampling day.

(3) The parameters set out in paragraph (1) are measured in accordance with Part H (1). The results of those measurements are equivalent to the results of public monitoring. Section 6 (1) of this Ordinance does not apply.

D Requirements for waste water prior to blending

There are no requirements supplementing those set out in Part D of Division 1.

E Requirements for waste water at the point of origin

(1) In waste water from the production of DCE and from the production of VCM, after the waste water stripper, the monthly average must not exceed the following concentrations:

Parameter	Concentration (monthly average)
DCE	0.40 mg/l
VCM	0.050 mg/l

The parameters are measured in accordance with Part H (2).

The monthly averages are derived from the results of the measurements set out in Part H (2). The monthly averages are calculated using the daily averages derived from the measurements taken on each sampling day.

(2) In waste water from the production of DCE by oxychlorination using fluidised bed technology, the annual average must not exceed the following concentration at the outlet from the pre-treatment facility:

Parameter	Concentration (monthly average)
Copper	0.60 mg/l
PCDD/PCDF	0.80 ng I-TEQ/l
Filterable matter	30 mg/l

The parameters are measured in accordance with Part H (2).

The annual averages are derived from the results of the measurements set out in Part H (2).

(3) In the case of production of DNT, at the outlet from the waste water pre-treatment facility of a DNT plant, the output-based environmental performance value for TOC must not exceed a monthly average of 1.0 kg per tonne of DNT produced.

TOC is measured in accordance with Part H (2).

To calculate the output-based environmental performance value for TOC, the monthly average is first determined for TOC concentration. That monthly average is multiplied by the waste water quantity determined for the same month and divided by the quantity of DNT produced in the same month.

(3a) By way of derogation from section 3 (5) of this Ordinance, blending is possible if it is demonstrated by comparative analysis that joint waste water pre-treatment prior to discharge into waters will on the whole achieve at least equivalent reductions in load for copper, PCDD/PCDF and filterable matter. If so, the requirements set out in paragraph (3) are deemed to have been met.

(4) In the case of production of TDI, at the outlet from the production plant, the output-based environmental performance value for TOC must not exceed an annual average of 0.10 kg per tonne of TDI produced.

TOC is measured in accordance with Part H (2).

(5) In the case of production of MDI, at the outlet from the production plant, the output-based environmental performance value for TOC must not exceed an annual average of 0.20 kg per tonne of MDI produced.

TOC is measured in accordance with Part H (2).

(6) To calculate the output-based environmental performance value for TOC in accordance with paragraphs (5) and (6), the monthly average is first determined for TOC concentration. That annual average

is multiplied by the waste water quantity determined for the same year and divided by the quantity of product made in the same year.

(7) The results of the measurements taken in accordance with paragraphs (1) to (5) are equivalent to the results of public monitoring. In respect of the monthly averages referred to in paragraphs (1) to (5), section 6 (1) of this Ordinance does not apply.

F Requirements for established discharges

If established discharges from plants which were lawfully in operation before 1 March 2024 or the construction of which had lawfully been started on that date do not satisfy the requirements set out in Part E (1) sentence 1, (4) sentence 1, (5) sentence 1 or (6) sentence 1, the necessary adaptation measures are undertaken within reasonable timeframes to be set by the competent authority.

G Requirements under waste legislation

No requirements under waste legislation apply.

H Operator obligations

(1) Operators measure the following parameters in the waste water at the point of discharge into waters as follows, if waste water from plants engaged in the specified forms of production is discharged:

Parameter	Production	Minimum frequency
Copper	DCE (oxychlorination)	once a month
Aniline	MDA	once a month
Chlorinated solvents	MDI, TDI	once a month
DCE	DCE, VCM	once a month
PCDD/PCDF	DCE (oxychlorination)	every three months

Unless otherwise specified, the measurements are taken in 24-hour composite samples collected proportionately according to flow. For waste water streams which are demonstrated to fluctuate little in volumetric flow and concentration, the measurements may also be taken in 24-hour composite samples proportionately collected across regular intervals, subject to official decision. If available data series demonstrate marked stability in the readings, the frequency of measurement may be reduced by official decision.

DCE is determined using the daily average derived from at least three random samples collected on one day at intervals of at least 30 minutes.

(2) Operators measure the following parameters in the waste water at the specified sampling or measurement point as follows:

Parameter	Production	Minimum frequency
TOC	DNT	once a week ¹
TOC	MDI, TDI	once a month
DCE	DCE, VCM	once a day
VCM	DCE, VCM	once a day
PCDD/PCDF	DCE	every three months
Copper	DCE	once a day
Filterable matter	DCE	once a day

¹ In the case of discontinuous discharge of waste water, the minimum monitoring frequency is once per discharge.

DCE and VCM are determined using the daily average derived from at least three random samples collected on one day at intervals of at least 30 minutes. For waste water streams which are demonstrated to fluctuate little in volumetric flow and concentration, the measurements may also be taken in 24-hour composite samples proportionately collected across regular intervals, subject to official decision.

The minimum frequency may be reduced to once a month for copper and filterable matter if the elimination rate is adequately verified by the monitoring of suitable core parameters.

(3) Proof of compliance with the requirements set out in this division is part of the annual report referred to in Part H (3) of Division 1.

(4) The parameters set out in paragraphs (1) and (2) are measured in accordance with the analysis and measurement procedures set out in Annex 1 or officially recognised monitoring procedures. *Land* regulations regarding self-monitoring remain unaffected by the operator obligations set out in paragraphs (1) to (3).

Appendix 23

Plants for the biological treatment of waste

A Scope

(1) This Appendix applies to

1. waste water with a pollution load originating primarily from plants for the biological treatment of municipal waste and other waste to be treated like municipal waste and
2. rainwater contaminated as a result of operational activities on the sites of those plants.

(2) This Appendix does not apply to waste water from plants for the treatment of separately collected bio-waste, compost production plants, indirect cooling systems or process-water treatment.

B General requirements

(1) The volumetric flow and the pollution load of the waste water from plants coming within the scope of Part A (1) are kept as low as possible by means of the following measures:

1. extensive recirculation and multiple use of process water;
2. prevention of inputs of rainwater into waste storage and waste treatment areas by enclosing, roofing or covering them.

(2) Waste water may be discharged into waters only in so far as process water from the treatment of process and exhaust air in plants for the mechanical and aerobic biological treatment of waste cannot all be used within their own processes. In such cases, the requirements set out in Parts C and D apply.

C Requirements for waste water at the point of discharge

(1) The following requirements apply to waste water at the point of discharge into waters:

	Qualified random sample or two-hour composite sample	
Chemical oxygen demand (COD)	mg/l	200
Biochemical oxygen demand over five days (BOD ₅)	mg/l	20
Total nitrogen as the sum of ammoniacal, nitrite and nitrate nitrogen (N _{tot})	mg/l	70
Total phosphorus	mg/l	3
Total hydrocarbons	mg/l	10
Toxicity to fish eggs (LID _{egg})	2	

The requirement for total hydrocarbons relates to random samples.

(2) A value specified for total nitrogen is also deemed to have been complied with if it is determined and complied with as "total bound nitrogen (TNb)".

D Requirements for waste water prior to blending

(1) The waste water is subject to the following requirements prior to blending with other waste water:

	Qualified random sample or two-hour composite sample (mg/l)
Adsorbable organically bound halogens (AOX)	0.5
Mercury	0.05

	Qualified random sample or two-hour composite sample (mg/l)
Cadmium	0.1
Total chromium	0.5
Chromium VI	0.1
Nickel	1
Lead	0.5
Copper	0.5
Zinc	2
Arsenic	0.1
Readily liberated cyanide	0.2
Readily liberated sulphide	1

The values specified for AOX, chromium IV, readily liberated cyanide and sulphide relate to random samples.

(2) The waste water may not be blended with other waste water, except waste water originating from the above-ground landfill of waste, for the purpose of joint biological treatment unless fulfilment of at least one of the following conditions can be expected:

1. With regard to toxicity to fish eggs, luminescent bacteria and daphnia in representative waste water samples, the following values are not exceeded following an elimination test conducted using a laboratory-scale continuous-flow biological treatment system (coming within the scope, for example, of DIN 38412-L 26):

Toxicity to fish eggs	$LID_{egg} = 2$
Toxicity to daphnia	$LID_D = 4$ and
Toxicity to luminescent bacteria	$LID_{LB} = 4$

Measures such as nitrification in laboratory-scale biological treatment systems or maintenance of pH levels are used to ensure that ammonia (NH_3) does not cause the LID_{egg} value to be exceeded. Waste water may be diluted as required to start up the laboratory-scale biological treatment system. In the event of a lack of nutrients, nutrients may be added. No dilution water may be added during the test period.

2. A 75% degree of DOC elimination is achieved in accordance with the procedure set out in no. 408 of Annex 1 to this Ordinance.
3. Prior to joint biological treatment with other waste water, the waste water already has a COD concentration of less than 400 mg/l.

In the event of major changes and at least every two years, proof of compliance with those conditions is provided.

Appendix 24

Iron and steel foundry

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from one of the following areas of cast iron and steel production:

1. smelting;
2. casting, cooling and shake-out;
3. fettling;
4. moulding and sand reconditioning;
5. core-making;

6. system cleaning.

This Appendix does not apply to waste water from indirect cooling systems or process-water treatment.

B General requirements

(1) The waste water may not contain organically bound halogens originating from solvents and cleaning agents. Compliance with this requirement may be demonstrated by setting out all the solvents and cleaning agents used in a production log while information from the manufacturers states that those solvents and cleaning agents contain no organically bound halogens.

(2) Waste water from sand reclamation may not be discharged.

(3) Waste water from core-making may not be discharged unless it meets at least the requirements for size category 4 set out in Part C of Appendix 1.

C Requirements for waste water at the point of discharge

(1) The following requirements apply to waste water from the areas specified in Part A (1) in respect of the point of discharge into waters:

	Qualified random sample or two-hour composite sample	
Chemical oxygen demand (COD)	g/t	100
Iron	g/t	5
Total hydrocarbons	g/t	5
Phenol index after distillation and dye extraction	g/t	2.5
Readily liberated cyanide	g/t	0.5
Toxicity to fish eggs (LID _{egg})	2	

(2) The output-based environmental performance values (g/t) relate to the production capacity on which the permit for discharge is based (good castings produced). The pollution loads are derived from the concentrations in qualified random samples or two-hour composite samples and the volumetric flow of waste water corresponding to the sampling.

(3) Toxicity to fish eggs (LID_{egg}) relates to an output-based volumetric flow of waste water from the plant concerned of 0.5 m³ per tonne of good castings produced. If the output-based numerical value calculated for the volumetric flow of waste water does not correspond with a dilution factor of the dilution sequence defined in the determination procedure, the next highest dilution factor applies.

D Requirements for waste water prior to blending

(1) The following requirements apply to waste water from the areas specified in Part A prior to blending with waste water from other sources:

	Qualified random sample or two-hour composite sample g/t
Arsenic	0.05
Cadmium	0.05
Lead	0.25
Total chromium	0.25
Copper	0.25
Nickel	0.25
Zinc	1
Adsorbable organically bound halogens (AOX)	0.5

(2) The output-based environmental performance values (g/t) relate to the production capacity on which the permit for discharge is based (good castings produced). The pollution loads are derived from the concentrations in qualified random samples or two-hour composite samples – or, for AOX, in random samples – and the volumetric flow of waste water corresponding to the sampling.

Appendix 25

Leather manufacture, fur finishing, leather substitute manufacture

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from leather manufacture, fur finishing, leather substitute manufacture and/or the preservation of hides, skins and pelts.

(2) This Appendix does not apply to waste water from indirect cooling systems or to waste water discharges of less than 100 m³ per year unless these come from one of the following waste water streams:

1. waste water from liming using sulphides;
2. waste water from chromium tanning;
3. waste water from the use of dyes which contain copper or chromium;
4. waste water containing volatile organic halogen compounds from the use of solvents and cleaning agents.

(3) The requirements set out in Parts C (1), (3), (5) and (6), D and E are emission limit values within the meaning of section 1 (2) sentence 1 of this Ordinance.

B General requirements

(1) The volume and pollution load of waste water are kept as low as possible by means of the following measures:

1. reduction of water consumption in all wet process steps by
 - (a) optimisation of water management;
 - (b) use of batch washing and
 - (c) use of short floats;
2. reduction of the pollution load in the untreated waste water arising from the process steps of hide, skin and pelt preservation, in particular by
 - (a) use of hides, skins and pelts which are free from ectoparasiticides for which or for components of which environmental quality standards are in place under Directive 2013/39/EC of the European Parliament and of the Council of 12 August 2013 amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy (OJ L 226 of 24 August 2013, p. 1):
 - (aa) DDT;
 - (bb) cyclodiene pesticides: aldrin, dieldrin, endrin, isodrin;
 - (cc) chlorpyrifos;
 - (dd) cypermethrin and hexachlorocyclohexane, including lindane.

Compliance may be demonstrated by including a provision in the supply contract stating that the hides, skins and pelts must contain none of the specified ectoparasiticides.

- (b) use of fresh hides, skins and pelts which have been kept chilled during transport and storage;
- (c) use of preserved hides, skins and pelts which have been preserved using only biocides which have been approved in accordance with the provisions of Regulation (EU) No 528/2012 of the European Parliament and of the Council of 22 May 2012 concerning the making available on the market and use of biocidal products (OJ L 167 of 27 June 2012, p. 1) for product-type 9 within the meaning of Annex V to that regulation or which are reviewed for such use within the existing active substances programme pursuant to Commission Delegated Regulation (EU) No 1062/2014 of 4 August 2014 on the work programme for the systematic examination of all existing active substances contained in biocidal products referred to in Regulation (EU) No 528/2012 of the European Parliament and of the Council (OJ L 294 of 10 October 2014, p. 1).

Compliance may be demonstrated by including a provision in the supply contract stating that the hides, skins and pelts must contain only biocides which have been reviewed or which have been approved for product-type 9;

- (d) use of undenatured salt;
- 3. reduction of the pollution load in the untreated waste water from the beamhouse process steps, in particular by
 - (a) use of clean hides, skins and pelts;
 - (b) retention of salt from the salting of hides and skins by mechanical means;
 - (c) use of suitable treatment procedures such as dry disposal of salt or reuse;
 - (d) hair-saving liming, if use of the hair is possible;
 - (e) use of organic sulphur compounds or enzymes for the unhairing of bovine hides to reduce the use of inorganic sulphides;
 - (f) reduced use of ammonium during deliming;
- 4. reduction of the pollution load in the untreated waste water from the tanyard process steps, in particular by
 - (a) maximisation of uptake of chromium tanning agents;
 - (b) recovery of chromium III if reuse in the tannery is possible;
 - (c) optimised vegetable-tanning methods, e.g. by use of drum tanning or pretanning agents;
- 5. reduction of the pollution load in the untreated waste water from the post-tanning and wet process steps by optimisation of retanning, dyeing, and fatliquoring, e.g. by use of amphoteric polymers;
- 6. non-use of complexing agents which do not attain a degree of DOC degradation of at least 80% after 28 days in accordance with the procedure set out in no. 406 of Annex 1 to this Ordinance. If non-use is not possible, the quantities used are kept to a minimum and the emissions reduced as much as technically possible;
- 7. non-use of per- and polyfluoroalkyl substances. If non-use is not possible, the quantities used are kept to a minimum and the emissions reduced as much as technically possible.
- (2) The contamination of the waste water with adsorbable organically bound halogens (AOX) is kept as low as possible by means of selecting and using suitable cleaning agents, disinfectants and other operating and auxiliary materials.
- (3) The waste water may not contain
 - (a) volatile organic halogen compounds from the use of solvents and cleaning agents;
 - (b) alkylphenol ethoxylates (APEO) from detergents and cleaning agents used in the process.

With regard to the degreasing of furs, the requirements of Part E (1) apply in respect of volatile organic halogen compounds by way of derogation from the above.

C Requirements for waste water at the point of discharge

- (1) The following requirements apply to waste water at the point of discharge into waters:

	Qualified random sample or two-hour composite sample	
Chemical oxygen demand (COD)	mg/l	250
Biochemical oxygen demand over five days (BOD ₅)	mg/l	25
Ammoniacal nitrogen (NH ₄ -N)	mg/l	10
Total phosphorus	mg/l	2.0
Adsorbable organically bound halogens (AOX)	mg/l	0.50
Toxicity to fish eggs (LID _{egg})	2	

- (2) The requirement for ammoniacal nitrogen applies at a waste water temperature of 12°C and above in the effluent from the biological reactor of the waste water treatment plant. The 12°C threshold may be replaced by a temporal restriction to dates between 1 May and 31 October.

(3) By way of derogation from paragraph (1), for waste water which may be expected to have a monthly average of more than 2,500 mg/l of chemical oxygen demand (COD) in the influent entering the biological treatment stage, the concentration of COD in the effluent must represent a reduction of at least 90% and amount to no more than 500 mg/l, in two-hour composite samples or qualified random samples.

(4) The reduction in COD refers to the difference between the pollution load in the influent entering the biological treatment stage and the pollution load in the effluent from the central waste water treatment plant 24 hours later. The pollution load in the influent is determined in accordance with the expected capacity of the microorganisms on which the permit for discharge is based. The scale of the reduction is assessed on the basis of measurements and the mode of operation of the waste water treatment plant.

(5) For the discharge of waste water from fur finishing, the applicable value in respect of toxicity to fish eggs is $LID_{egg} = 4$.

(6) At the point of discharge into waters, the monthly average for filterable matter in the waste water to be determined in accordance with Part H (2) no. 1 (d) and (3) must not exceed 35 mg/l. The results of the measurements taken by the discharger are equivalent to the results of public monitoring. Section 6 (1) of this Ordinance does not apply. Sentences 1 and 2 apply to facilities for the tanning of animal hides, skins and pelts, including post-tanning processes, with a processing capacity of 12 tonnes or more of finished products per day.

D Requirements for waste water prior to blending

The waste water is subject to the following requirements prior to blending with other waste water:

1. For waste water from soaking, liming and deliming, including the associated rinsing, readily liberated sulphide must not exceed 2.0 mg/l in qualified random samples or two-hour composite samples.
2. For waste water from tanyard processes including samming and wet processes (neutralisation, retanning, dying, fatliquoring), including the associated rinsing, total chromium must not exceed 1.0 mg/l in qualified random samples or two-hour composite samples.

E Requirements for waste water at the point of origin

(1) Waste water from the degreasing of furs may contain only those halogenated solvents which are permitted under the Second Ordinance on the Implementation of the Federal Immission Control Act (*Zweite Verordnung zur Durchführung des Bundes-Immissionsschutzgesetzes*) as amended. This requirement is also deemed to have been met if it is demonstrated that only permitted halogenated solvents are used. Moreover, VHHC (sum of trichloroethene, tetrachloroethene, 1,1,1-trichloroethane and dichloromethane – calculated as chlorine) must not exceed 0.10 mg/l in random samples.

(2) For waste water from mordants used in fur dying, including the associated rinsing, chromium VI must not exceed 0.050 mg/l in random samples. Section 6 (1) of this Ordinance does not apply.

F Requirements for established discharges

For established discharges of waste water, the requirements set out in Part C (6) must be met by 16 February 2017 at the latest.

G Requirements under waste legislation

No requirements under waste legislation apply.

H Operator obligations

(1) The requirements set out in Part H apply to operators of facilities for the tanning of animal hides, skins and pelts, including post-tanning processes, with a processing capacity of 12 tonnes or more of finished products per day.

(2) The following measurements are taken in the waste water:

1. At the point of discharge, the following parameters are measured at least once a week in two-hour composite samples or two-hour random samples:
 - (a) chemical oxygen demand (COD)
 - (b) biochemical oxygen demand over five days (BOD_5)
 - (c) ammoniacal nitrogen (NH_4-N) and
 - (d) filterable matter.
2. Prior to blending, the following parameters are measured at least once a week in two-hour composite samples or in qualified random samples:
 - (a) readily liberated sulphide and

(b) total chromium.

(3) The monthly average referred to in Part C (6) is derived from the results of at least four measurements taken in accordance with paragraph (2) no. 1 (d).

(4) An annual report is written in accordance with no. 3 of Annex 2. The annual report contains the monthly quantities of waste water from individual processes for which requirements are set out in Parts C and D of this Appendix.

(5) The parameters set out in paragraph (2) are measured in accordance with Annex 1 or officially recognised monitoring procedures. *Land* regulations regarding self-monitoring remain unaffected by the operator obligations set out in paragraphs (1) to (4).

Appendix 26

Stone and earth

A Scope

(1) This Appendix applies to waste water, including rainwater contaminated as a result of operational activities, with a pollution load originating primarily from the following areas of production:

1. quarrying and preparation of stone, quartz, sand and gravel and production of activated earth, lime and dolomite;
2. manufacture of sand-lime bricks;
3. production of concrete and concrete products and
4. production of fibre cement.

(2) This Appendix does not apply to

1. waste water channelled into above-ground waters created by the quarrying of mineral resources, if the water is used only to wash the products quarried there and contains no substances other than those quarried and if those substances do not enter other waters;
2. sanitary waste water;
3. waste water from indirect cooling systems and process-water treatment or
4. waste water from flue-gas scrubbing.

B General requirements

There are no requirements supplementing those set out in section 3.

C Requirements for waste water at the point of discharge

(1) The following requirements apply to waste water from the areas specified in Part A (1) in respect of the point of discharge into waters:

	Area 1	Area 2
	Qualified random sample or two-hour composite sample (mg/l)	
Filterable matter	100	100
Chemical oxygen demand (COD)	–	150

(2) In the case of production of concrete and concrete products, waste water from the industrial process may not be discharged.

(3) In the case of production of fibre cement, waste water may not be discharged.

(4) The requirement set out in paragraph (3) does not apply in the event of routine cleaning or servicing of the production unit. In such cases, the following requirements apply:

	Qualified random sample or two-hour composite sample (mg/l)
Chemical oxygen demand (COD)	80
Filterable matter	30

D Requirements for waste water prior to blending

Waste water from the cleaning and servicing of facilities for the production of fibre cement is subject to the following requirements prior to blending with other waste water:

	Qualified random sample or two-hour composite sample (mg/l)	Random sample (mg/l)
AOX	–	0.1
Total chromium	0.4	–
Chromium VI	–	0.1

Appendix 27

Physico-chemical treatment of waste (PCT plants) and waste oil processing

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from plants operating in the following areas:

1. pre-treatment and processing of waste oils;
2. treatment of waste;
3. regeneration of saturated ion exchangers and adsorption materials and
4. interior cleaning of casks and containers after storage and transport.

It also applies to rainwater contaminated as a result of operational activities in those areas.

(2) This Appendix does not apply to waste water originating from indirect cooling systems, process-water treatment, biological treatment of waste, segregated treatment of liquid waste from processes of silver-halide photography and waste incineration. It likewise does not apply to waste water which originates from plants coming within the scope of paragraph (1) nos. 2, 3 and 4 and run in connection with industrial processes in other areas for which requirements are set out in other Appendices to this Ordinance and the properties of which compare with those of waste water from those areas.

B General requirements

The pollution load is kept as low as possible by reducing the volume of waste water from cask cleaning after storage and transport by means of multiple use and extensive recirculation of cleaning water and retention and recovery of products.

C Requirements for waste water at the point of discharge

(1) The following requirements apply to waste water at the point of discharge into waters:

	Qualified random sample or two-hour composite sample	
Chemical oxygen demand (COD)	mg/l	200
Nitrite nitrogen (NO ₂ -N)	mg/l	2
Total nitrogen as the sum of ammoniacal, nitrite and nitrate nitrogen (N _{tot})	mg/l	30
Aluminium	mg/l	3
Iron	mg/l	3
Total fluoride	mg/l	30
Total phosphorus	mg/l	2

Phenol index after distillation and dye extraction	mg/l	0.15
Toxicity to fish eggs (LID _{egg})	2	
Toxicity to luminescent bacteria (LID _{LB})	4	
Toxicity to daphnia (LID _D)	4	

(2) A value specified for total nitrogen is also deemed to have been complied with if it is determined and complied with as “total bound nitrogen (TN_b)”.

D Requirements for waste water prior to blending

(1) The waste water is subject to the following requirements prior to blending with other waste water:

	Random sample (mg/l)	Qualified random sample or two-hour composite sample (mg/l)
Adsorbable organically bound halogens (AOX)	1	–
Arsenic	–	0.1
Lead	–	0.5
Cadmium	–	0.2
Total chromium	–	0.5
Chromium VI	0.1	–
Copper	–	0.5
Nickel	–	1
Mercury	–	0.05
Zinc	–	2
Readily liberated cyanide	0.1	–
Readily liberated sulphide	1	–
Free chlorine	0.5	–
Benzene and derivatives	–	1
Total hydrocarbons	20	–

(2) The waste water may not be blended with other waste water for the purpose of joint biological treatment unless fulfilment of at least one of the following conditions can be expected:

1. With regard to toxicity to fish eggs, luminescent bacteria and daphnia in representative waste water samples, the following values are not exceeded following an elimination test conducted using a laboratory-scale continuous-flow biological treatment system (coming within the scope, for example, of DIN 38412-L 26):

Toxicity to fish eggs LID_{egg} = 2

Toxicity to daphnia LID_D = 4 and

Toxicity to luminescent bacteria LID_{LB} = 4

Measures such as nitrification in laboratory-scale biological treatment systems or maintenance of pH levels are used to ensure that ammonia (NH₃) does not cause the LID_{egg} value to be exceeded. Waste water may be diluted as required to start up the laboratory-scale biological treatment system. In the event of a lack of nutrients, nutrients may be added. No dilution water may be added during the test period.

2. A 75% degree of DOC elimination is achieved in accordance with the procedure set out in no. 408 of Annex 1 to this Ordinance.

In the event of major changes and at least every two years, proof of compliance with the conditions is provided.

E Requirements for waste water at the point of origin

Waste water occurring in PCT plants may not be discharged into waters if it originates from the joint treatment of liquid waste from processes of silver-halide photography and other sources and contains organic complexing agents which do not attain a degree of DOC degradation of 80% after 28 days in accordance with the procedure set out in no. 406 of Annex 1 to this Ordinance. The requirement set out in sentence 1 is deemed to have been met if it is demonstrated that information from the manufacturers and suppliers is available stating that no complexing agents within the meaning of sentence 1 have been used in feedstocks or auxiliary materials or steps are in place ensuring that aqueous waste from photographic processes is incinerated.

F Requirements for established discharges

For established discharges of waste water from plants which were lawfully in operation before 1 August 2002 or the construction of which had lawfully been started on that date, the requirements for COD do not apply to waste water from the treatment of bilge, slop and ballast water on board bilge oil collection and treatment vessels.

Appendix 28

Manufacture of paper and cardboard

A Scope

- (1) This Appendix applies to waste water with a pollution load originating primarily from the manufacture of paper and cardboard.
- (2) This Appendix does not apply to waste water from
 1. indirect cooling systems;
 2. process-water treatment;
 3. fibre production using chemicals to separate out non-cellulose components of wood or annual plants or
 4. further processing of paper and cardboard.
- (3) The requirements set out in Parts C (8) sentence 1 and D (4) sentence 1 are emission limit values within the meaning of section 1 (2) sentence 1 of this Ordinance.

B General requirements

- (1) The volume and pollution load of waste water are kept as low as possible by means of the following measures:
 1. collection and treatment of contaminated rainwater from the waste paper storage area of the waste water treatment plant prior to discharge into waters, including hard surfacing to stabilise the waste paper storage area;
 2. non-use of organic complexing agents which do not attain a degree of DOC degradation of 80% after 28 days in accordance with the procedure set out in no. 406 of Annex 1 to this Ordinance; if non-use is not possible, the quantities used is kept to a minimum and the pollution load reduced as much as technically possible;
 3. non-use of wet-strength agents containing or contributing to the formation of adsorbable organically bound halogens; if non-use is not possible, the quantities used are kept to a minimum and the pollution load reduced as much as technically possible;
 4. non-use of chemical additives containing or contributing to the formation of per- and polyfluorinated substances; if non-use is not possible, the quantities used are kept to a minimum and the pollution load reduced as much as technically possible;
 5. in the case of oxidative bleaching of mechanical pulp,
 - (a) use of high consistency bleaching;
 - (b) use of calcium hydroxide or magnesium hydroxide instead of sodium hydroxide or
 - (c) application of other suitable procedures to reduce pollution loads;
 6. reduction of water consumption, such as by optimisation of water management by means of metering of the main areas of water consumption, segregation and curbing of water circuits, counter-current exchange processes, or reuse of used process water;

7. reduced use of additives containing nutrients;
 8. minimisation of pulp losses;
 9. pre-treatment of waste water containing coating colours or recovery of coating colours.
- (2) The waste water may not contain
1. organic halogen compounds, benzene, toluene or xylenes originating from the use of solvents and cleaning agents or
 2. alkylphenol ethoxylates (APEO).
- (3) A production log is written in accordance with no. 2 of Annex 2. Compliance with the requirements set out in paragraphs (1) nos. 2 to 4 and (2) is demonstrated in the production log by listing all feedstocks while information from their manufacturers states that they contain none of the substances or groups of substances specified in paragraphs (1) nos. 2 to 4 and (2).
- (4) When a waste water treatment plant is being installed, various alternative treatment processes are compared and their respective advantages assessed. Preference is given to those treatment processes which, for the same level of successful treatment, show the best results in the following areas:
1. energy efficiency;
 2. keeping chemical use, exhaust gas emissions and quantity of sludge to a minimum;
 3. recoverability of sludge.

The conduct of those comparisons and assessments and the grounds for the decision are documented.

(5) Waste water treatment plants are constructed and operated in such a way as to avoid odour emissions, such as by optimal mixing of the waste water and continuous dewatering of sludge.

C Requirements for waste water at the point of discharge

(1) The following requirements apply to waste water at the point of discharge into waters:

	Qualified random sample or two-hour composite sample	
	mg/l	kg/t
Filterable matter	50	–
Biochemical oxygen demand over five days (BOD ₅)	25	–
Total bound nitrogen (TN _b)	20	–
Total nitrogen as the sum of ammoniacal, nitrite and nitrate nitrogen (N _{tot})	10	–
Total phosphorus	2.0	–
Total organic carbon (TOC)	–	0.90
Chemical oxygen demand (COD)	–	3.0

(2) The requirement for filterable matter set out in paragraph (1) does not apply if the waste water is biologically treated.

(3) For the production of wood-free paper, the permit for discharge may authorise a BOD₅ concentration of up to 50mg/l if the output-based environmental performance value for BOD₅ does not exceed 1 kg/t.

(4) By way of derogation from paragraph (1), the permit for discharge may authorise a TN_b concentration of up to 25 mg/l, and a TN_b concentration of over 25 mg/l for waste water from the manufacture of chipboard, if the discharger explains and documents the necessity of the higher value.

(5) By way of derogation from paragraph (1), if the waste water originates from the manufacture of paper more than 50% of the pulp for which is deinked or bleached pulp, the permit for discharge may authorise higher loads of up to 1.8 kg/t for TOC and up to 5 kg/t for COD.

(6) By way of derogation from paragraph (1), if the waste water originates from the manufacture of highly refined or speciality papers, the permit for discharge may authorise higher loads of up to 2.0 kg/t for TOC and up to 5 kg/t for COD.

(7) The output-based environmental performance values (kg/t) set out in paragraphs (1), (3), (5) and (6) are derived from the ratio of pollution load to machine capacity, in terms of tonnes per day, on which the permit for discharge is based. The pollution load is calculated by multiplying the concentration in a qualified random sample or two-hour composite sample by the volume of the waste water stream corresponding to the sampling.

(8) Without prejudice to the requirements set out in paragraphs (1) to (7), waste water from paper and cardboard manufacturing plants with a production capacity of 20 tonnes or more per day must not exceed the following annual averages in kilograms per tonne of products made:

	Manufacture of paper containing mechanical pulp	Manufacture of paper mainly using waste paper without deinking	Manufacture of paper mainly using waste paper with deinking	Non-integrated paper mills and board mills except speciality paper mills	Non-integrated speciality paper mills
kg/t					
Chemical oxygen demand (COD)	4.0 ¹	1.4	3.0 ²	1.5	3.0 ³
Filterable matter	0.45	0.20	0.30 ⁴	0.35	1.0
Total bound nitrogen (TN _b)	0.10 ⁵	0.090	0.10 ⁶	0.10 ⁶	0.40
Total phosphorus	0.010	0.0050 ⁷	0.010 ⁸	0.012	0.040
¹ In the case of manufacture of paper more than 70% of the pulp for which is bleached, COD must not exceed 6 kg/t. ² In the case of manufacture of tissue paper, COD must not exceed 4 kg/t. ³ In the case of manufacture of highly refined paper and paper mills which change paper grades more than once a day on average over the year, COD must not exceed 5 kg/t. ⁴ In the case of manufacture of tissue paper, filterable matter must not exceed 0.4 kg/t. ⁵ In the case of unavoidable use of organic complexing agents, the permit for discharge may authorise a higher value for TN _b if the discharger explains and documents the necessity of the higher value. ⁶ In the case of manufacture of tissue paper, TN _b must not exceed 0.15 kg/t. ⁷ In the case of paper mills with a specific waste water volume of 5 m ³ or more per tonne of product, phosphorus must not exceed 0.0080 kg/t. ⁸ In the case of manufacture of tissue paper, phosphorus must not exceed 0.015 kg/t.					

(9) In the case of paper mills designed for the manufacture of more than one product, the relevant definitive requirement for each parameter is determined by means of alligation, taking into account the quantity of the waste water stream in question, and specified in the permit for discharge.

(10) The parameters set out in paragraph (8) are measured in accordance with Part H (1) no. 1 (a) and (b). The output-based environmental performance values (kg/t) for the parameters set out in paragraph (8) are derived from the ratio of pollution load to products made which can be attributed to the sampling period. The pollution load is calculated by multiplying the concentration in a 24-hour composite sample by the volume of the waste water stream over 24 hours corresponding to the sampling. The results of the measurements taken in accordance with sentence 1 are equivalent to the results of public monitoring. Section 6 (1) of this Ordinance does not apply.

D Requirements for waste water prior to blending

(1) Notwithstanding the provisions of paragraph (2), for waste water prior to blending with other waste water, adsorbable organically bound halogens (AOX) must not exceed 10 g/t in qualified random samples or two-hour composite samples.

(2) For AOX, with due regard for Part B (1) no. 3, higher loads may be authorised in the following areas as follows:

	Wet-strength paper (less than 25% relative wet strength)	Wet-strength paper (at least 25% relative wet strength)	Decor paper
	Qualified random sample or two-hour composite sample (g/t)		
Adsorbable organically bound halogens (AOX)	50	80	80

(3) The output-based environmental performance values (g/t) set out in paragraphs (1) and (2) are derived from the ratio of pollution load to machine capacity, in terms of tonnes per day, on which the permit for discharge is based. The pollution load is calculated by multiplying the concentration in a qualified random sample or two-hour composite sample by the volume of the waste water stream corresponding to the sampling.

(4) Without prejudice to the requirements set out in paragraphs (1) and (2), in waste water from the manufacture of wet-strength paper and decor paper in plants with a production capacity of 20 tonnes or more per day, AOX must not exceed an annual average of 50 g per tonne of products made. AOX are measured in accordance with Part H (1) no. 2 (a). The output-based environmental performance values (g/t) are derived from the ratio of pollution load to products made which can be attributed to the sampling period. The pollution load is calculated by multiplying the concentration in a 24-hour composite sample by the volume of the waste water stream over 24 hours corresponding to the sampling. The results of the measurements taken in accordance with sentence 2 are equivalent to the results of public monitoring. Section 6 (1) of this Ordinance does not apply.

E Requirements for waste water at the point of origin

The waste water is subject to no additional requirements in respect of the point of origin.

F Requirements for established discharges

There are no derogating requirements for established discharges.

G Requirements under waste legislation

No requirements under waste legislation apply.

H Operator obligations

(1) Operators of paper and cardboard manufacturing plants with a production capacity of 20 tonnes or more per day take at least the following measurements in the waste water at the point of discharge:

1. At the point of discharge into waters, the following parameters are measured in 24-hour composite samples as follows:
 - (a) daily measurement of COD and filterable matter;
 - (b) weekly measurement of BOD₅, TN_b and total phosphorus;
 - (c) monthly measurement of ethylene diamine tetraacetic acid (EDTA) and diethylenetriamine pentaacetic acid (DTPA), if those substances are used in the process.
2. Prior to blending with other waste water, the following parameters are measured in 24-hour composite samples as follows:
 - (a) in the case of manufacture of wet-strength paper and decor paper, AOX is measured once every two months; if the operator demonstrates that no AOX are generated by the process and no additives or raw materials containing AOX are used, measurement of AOX may be dispensed with subject to official decision;
 - (b) lead, cadmium, copper, nickel, mercury and zinc are measured once a year.

(2) The annual averages for the parameters set out in Parts C (8) and D (4) are derived from the average output-based environmental performance values, weighted for daily production quantities, which are calculated on the basis of the results of the measurements set out in paragraph (1).

(3) Operators of paper and cardboard manufacturing plants with a production capacity of 20 tonnes or more per day write an annual report in accordance with no. 3 of Annex 2. At least every three years, that report also demonstrates that

1. a repeat review has been carried out to consider whether non-use of the substances referred to in Part B (1) no2. 2 to 4 is possible;
2. use of those substances remains necessary;
3. available alternatives have been evaluated and
4. feasible measures have been implemented to keep the quantities used to a minimum.

Estimates are provided of the residual pollution load from the use of those substances.

(4) The parameters set out in paragraph (1) are measured in accordance with the analysis and measurement procedures set out in Annex 1 or officially recognised monitoring procedures. *Land* regulations regarding self-monitoring remain unaffected by the operator obligations set out in paragraphs (1) to (3).

Appendix 29

Iron and steel production

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from one or more of the following areas of production:

1. sinter plants;
2. production of pig-iron in blast furnaces and slag granulation;
3. desulphurisation of pig iron;
4. crude steel production;
5. secondary metallurgy;
6. continuous casting, hot working;
7. hot-finishing of tubes and pipes;
8. cold-finishing of strip;
9. cold-finishing of tubes and pipes, profiles, cold-drawn bars and wire;
10. continuous surface-finishing of semi-finished steel products.

(2) This Appendix does not apply to waste water from coke ovens, indirect cooling systems or process-water treatment.

(3) The requirements set out in Parts C (1) and (2), D (1), (4) and (5) and F (1) and (2) are emission limit values within the meaning of section 1 (2) sentence 1 of this Ordinance.

B General requirements

(1) Waste water from sinter plants, desulphurisation of pig iron or crude steel production may not be discharged into waters.

(2) The waste water may not contain organically bound halogens originating from solvents and cleaning agents.

(3) The pollution load is kept as low as possible by means of the following measures:

1. extensive recirculation of process and cooling water from scrubbers and other process water;
2. reuse of process water;
3. slag granulation using process or cooling water;
4. collection and use of contaminated rainwater run-off from hard-surfaced areas;
5. multiple use of rinsing water by means of suitable procedures such as cascade rinsing or recirculation rinsing technology using ion exchangers;
6. recovery or recirculation of suitable bath constituents from rinsing baths into process baths;
7. reduction of the release of substances from surface-treatment baths by means of suitable procedures such as splash protection and wiping down;
8. bath maintenance measures to extend service life, such as membrane filtration, ion exchange or electrolysis.

C Requirements for waste water at the point of discharge

(1) The following requirements apply to waste water from areas of production 2 and 5 to 10 set out in Part A (1) in respect of the point of discharge into waters:

Area of production	2	5	6	7	8	9	10
Qualified random sample or two-hour composite sample (mg/l)							
Chemical oxygen demand (COD)	100	50	40	200	200	300	300
Filterable matter	30	–	20	–	–	–	–
Iron	5.0	5.0	5.0	5.0	3.0	5.0	5.0
Total hydrocarbons	–	–	5.0	10	10	10	5.0
Nitrite nitrogen (NO ₂ -N)	–	–	–	–	5.0	5.0	–
Total phosphorus	–	–	–	–	2.0	2.0	2.0
Dissolved fluoride	–	–	–	–	30	30	–
Toxicity to fish eggs (LID _{egg})	6	2	2	2	6	6	6

(2) For crude steel production with coal injection and the production of foundry pig iron predominantly using secondary ferrous raw materials, the applicable value for COD is 200 mg/l.

(3) For area of production 10, the phosphorus requirement applies only in the event of surface finishing with integrated phosphating.

(4) The requirements for total hydrocarbons relate to random samples.

D Requirements for waste water prior to blending

(1) The following requirements apply to waste water from areas of production 2 and 5 to 10 set out in Part A (1) prior to blending with other waste water:

Area of production	2	5	6	7	8	9	10
Qualified random sample or two-hour composite sample (mg/l)							
Lead	0.5	0.5	–	–	–	–	0.5
Total chromium	–	0.5	0.5	0.5	0.5	0.5	0.5
Chromium VI	–	–	–	–	0.1	0.1	0.1
Copper	–	–	–	–	–	–	0.5
Nickel	–	0.5	0.5	0.5	0.5	0.5	0.5
Zinc	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Tin	–	–	–	–	–	–	2.0
Readily liberated cyanide	0.4	–	–	–	–	–	0.2
Adsorbable organically bound halogens (AOX)	–	–	–	–	–	–	1.0

(2) The requirements for AOX, chromium VI and readily liberated cyanide relate to random samples.

(3) For area of production 2, the permit for discharge may authorise a higher concentration of readily liberated cyanide of up to 0.8 mg/l if the output-based environmental performance value for cyanide does not exceed 0.12 g/t.

(4) By way of derogation from the requirements for area of production 6, for plants manufacturing hot-rolled wide strip, the applicable value for total chromium and nickel is 0.2 mg/l each.

(5) By way of derogation from the requirements for area of production 2, for the production of foundry pig iron predominantly using secondary ferrous raw materials, the applicable value for zinc is 4.0mg/l.

E Requirements for waste water at the point of origin

(1) Waste water may not contain organic complexing agents which do not attain a degree of DOC degradation of 80% after 28 days in accordance with the procedure set out in no. 406 of Annex 1 to this Ordinance.

(2) The requirement set out in Part B (2) must be met at the point of discharge.

(3) Compliance with the requirements set out in paragraphs (1) and (2) may be demonstrated by setting out all the operating and auxiliary materials used in a production log while information from the manufacturers states that they contain none of the substances or groups of substances specified in paragraphs (1) and (2).

F Requirements for established discharges

(1) For established discharges of waste water, the requirements referred to in Part A (3) must be met by 8 March 2016 at the latest. By way of derogation from sentence 1, the requirements set out in Part C (1) for chemical oxygen demand (COD), total phosphorus and toxicity to fish eggs (LID_{egg}) must be met by 6 September 2014.

(2) By way of derogation from Part B (1), for established discharges of waste water from plants which were lawfully in operation before 1 August 2002 or the construction of which had lawfully been started on that date, waste water from exhaust gas purification in connection with crude steel production is permitted. In such cases, the following requirements apply:

1. Requirements for waste water at the point of discharge into waters

Qualified random sample or two-hour composite sample		
Chemical oxygen demand (COD)	mg/l	50
Iron	mg/l	5.0
Toxicity to fish eggs (LID _{egg})	2	

2. Requirements for waste water prior to blending

Qualified random sample or two-hour composite sample (mg/l)	
Lead	0.5
Total chromium	0.5
Nickel	0.5
Zinc	2.0

Appendix 31

Water treatment, cooling systems, steam generation

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from

1. treatment of drinking water, water for swimming pools (filling and recirculation water) and process water;
2. power plant cooling systems and systems for the indirect cooling of industrial and commercial processes and

3. other points of origin associated with steam generation.

(2) This Appendix does not apply to waste water from the scrubbing of flue gases from combustion plants, the scrubbing of flue and exhaust gases from the incineration and co-incineration of waste, and controlled areas of nuclear power plants. It also does not apply to waste water discharges of less than 10 m³ per week. It likewise does not apply to waste water generated by the emptying of swimming pools.

B General requirements

(1) The waste water may not contain the following substances or groups of substances originating from the use of operating and auxiliary materials:

1. organic complexing agents (except phosphonates and polycarboxylates) which do not attain a degree of DOC degradation of 80% after 28 days in accordance with the procedure set out in no. 406 of Annex 1 to this Ordinance.
2. chromium and mercury compounds, nitrite, organometallic compounds (metal-carbon bonds) and mercaptobenzothiazole;
3. zinc compounds from cooling-water conditioning agents released in the draining of main cooling circuits in power plants;
4. microbicidal agents used in once-through power plant cooling systems.

(2) Waste water from once-through or wet-recirculating systems for the cooling of industrial and commercial processes, wet-recirculating power plant cooling systems, or the draining of closed-loop cooling systems may contain microbicidal agents only following shock treatment. This does not apply to the use of hydrogen peroxide or ozone.

(3) Compliance with the requirements set out in paragraph (1) may be demonstrated by setting out all the operating and auxiliary materials used in a production log while information from the manufacturers states that they contain none of the substances or groups of substances specified in paragraph (1).

(4) For each parameter, the permit for discharge may take into account the pre-existing pollution load present in the water at the time of abstraction from waters (prior pollution) if the subtracted load is still present at the time of discharge into waters.

(5) For holding tanks, all the values specified in Parts C, D and E relate to random samples. Those values relate to the properties of the waste water prior to release.

C Requirements for waste water at the point of discharge

The following requirements apply to waste water at the point of discharge into waters:

1. Water treatment
 - (a) For filterable matter, the applicable value is 50 mg/l in qualified random samples or two-hour composite samples. This requirement does not apply to the discharge of waste water originating from the treatment of water from flowing waters in which the flow rate (Q) at the time of abstraction exceeds the mean flow rate (MQ); it likewise does not apply to water used to clear filter screens.
 - (b) Waste water from the back-flushing of filters is recirculated into the treatment process. This does not apply to filter backwash from the treatment of process water from surface waters, boreholes and mines which has been mechanically treated without additives or from the treatment of drinking water and water for swimming pools.
 - (c) For waste water from the treatment of water for swimming pools, the applicable value for chemical oxygen demand (COD) is 30 mg/l in qualified random samples or two-hour composite samples.
2. Cooling systems

	Draining of main cooling circuits in power plants (drainage of closed-loop cooling systems)	Draining of other cooling circuits
	Random sample (mg/l)	
Chemical oxygen demand (COD)	30	40 After cleaning with dispersants, the applicable value is 80.

Total phosphorus	1.5 If only inorganic phosphorus compounds are used, the applicable value is 3.	3 If only zinc-free cooling-water conditioning agents are used, the applicable value is 4. If the zinc-free cooling-water conditioning agents used contain only inorganic phosphorus compounds, the applicable value is 5.
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3. Steam generation

	Waste water from other points of origin associated with steam generation
	Qualified random sample or two-hour composite sample (mg/l)
Chemical oxygen demand (COD)	50 For waste water from the desalination of condensate, the applicable value is 80.
Total phosphorus	3
Total nitrogen as the sum of ammoniacal, nitrite and nitrate nitrogen (N _{tot})	10

The requirement for total nitrogen applies only to power plants with an installed thermal output of at least 1,000 MW. A value specified for total nitrogen is also deemed to have been complied with if it is determined and complied with as “total bound nitrogen (TNb)”.

D Requirements for waste water prior to blending

The waste water is subject to the following requirements prior to blending with other waste water:

1. Water treatment

	Qualified random sample or two-hour composite sample (mg/l)	Random sample (mg/l)
Arsenic	0.1	–
Adsorbable organically bound halogens (AOX)	–	0.2
Adsorbable organically bound halogens (AOX) in the regeneration water of ion exchangers	–	1

These requirements do not apply to discharges of water used to clear filter screens.

2. Cooling systems with draining of other cooling circuits

	Random sample mg/l
Zinc	4
Adsorbable organically bound halogens (AOX)	0.15

3. Steam generation

	Waste water from other points of origin associated with steam generation	
	Qualified random sample or two-hour composite sample (mg/l)	Random sample (mg/l)
Zinc	1	–
Total chromium	0.5	–
Cadmium	0.05	–
Copper	0.5	–
Lead	0.1	–
Nickel	0.5	–
Vanadium	4	–
Hydrazine	–	2
Free chlorine	–	0.2
Adsorbable organically bound halogens (AOX)	–	0.5

E Requirements for waste water at the point of origin

(1) Waste water from any of the following areas is subject to the following requirements following shock treatment with microbicidal agents:

		Waste water from open cooling systems for industrial and commercial processes and wet-recirculating power plant cooling systems	Draining of main cooling circuits in power plants (drainage of closed-loop cooling systems)	Draining of other cooling circuits
		Random sample		
Adsorbable organically bound halogens (AOX)	mg/l	0.15	0.15	0.5
Chlorine dioxide and other oxidants (expressed as chlorine)	mg/l	0.2	0.3	0.3
Toxicity to luminescent bacteria (LID _{LB})		–	12	12

(2) The requirement for toxicity to luminescent bacteria (LID_{LB}) is also deemed to have been met if the drained water remains contained until, in accordance with information from the manufacturers regarding operating concentration and decomposition behaviour, an LID_{LB} value of 12 or less is achieved and this is demonstrated in a production log.

F Requirements for established discharges

For established discharges of waste water from plants for the treatment of water for swimming pools (recirculation water) which were lawfully in operation before 1 August 2002 or the construction of which had lawfully been started on that date, only the requirements set out in Parts B and C apply.

Appendix 32

Processing of rubber and latex, production and processing of vulcanised rubber

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from one or more of the following areas:

1. Processing of high-consistency rubber
 - 1.1 Rubber compounds, blanks and rubber solutions
 - 1.2 Extruded products
 - 1.3 Rubber and rubber-metal components, using forming equipment
 - 1.4 Rubberised fabrics and other reinforcement materials
 - 1.5 Tyres
2. Processing of latex

(2) This Appendix does not apply to waste water from the treatment of metal parts prior to bonding with rubber, indirect cooling systems, the application of backings to textile floor coverings and other fabrics, or process-water treatment.

(3) For waste water discharges of less than 1 m³ per day, only Part B of this Appendix applies. Part B applies to the point of origin of the waste water.

B General requirements

The pollution load is kept as low as possible, based on an examination of the conditions in each individual case, by means of the following measures:

1. use of water-saving methods for the direct cooling of rubber compounds, including associated applications of aqueous mould-release agents;
2. use of waste-water-free processes to clean internal mixers (kneaders);
3. application of water-saving methods to wash and clean rubber products;
4. reduction of waste water contamination by means of mechanical removal of salt adhesions following salt bath vulcanisation;
5. multiple use of rinsing water to clean moulds and mandrels;
6. use of water-saving methods to treat exhaust air arising in connection with rubber solutions, rubberised fabrics and other reinforcement materials in areas 1.1 and 1.4;
7. waste-water-free floor cleaning in area 1.1;
8. avoidance of macromolecular water-soluble releasing agents (polyglycoles) which do not attain a degree of DOC elimination of 80% after 7 days in accordance with the procedure set out in no. 408 of Annex 1 to this Ordinance.

C Requirements for waste water at the point of discharge

(1) The following requirements apply to waste water at the point of discharge into waters:

	Qualified random sample or two-hour composite sample	
Chemical oxygen demand (COD)	mg/l	150
Biochemical oxygen demand (BOD ₅)	mg/l	25
Total nitrogen as the sum of ammoniacal, nitrite and nitrate nitrogen (N _{tot})	mg/l	20
Total phosphorus	mg/l	2
Toxicity to fish eggs (LID _{egg})		2

(2) For waste water from salt bath vulcanisation, the additional requirement applies that the concentration of nitrite nitrogen (NO₂-N) must not exceed 3 mg/l.

D Requirements for waste water prior to blending

(1) The waste water is subject to the following requirements prior to blending with other waste water:

	Qualified random sample or two-hour composite sample (mg/l)
Zinc	2
Lead	0.5
Adsorbable organically bound halogens (AOX)	1

The requirement for AOX applies in respect of random samples.

(2) For waste water from areas 1.1 and 1.4 as referred to in Part A (1), a concentration of 0.1 mg/l applies for benzene and derivatives, and for toxicity to luminescent bacteria (LID_{LB}) in waste water from the draining of direct cooling-water circuits, a dilution factor of LID_{LB} = 12 applies in qualified random samples or two-hour composite samples.

Appendix 33

Scrubbing of exhaust gases from the incineration of waste

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from the scrubbing of flue and exhaust gases from the incineration of waste within the meaning of Article 42 of Directive 2010/75/EC of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (OJ L 334 of 17 December 2010, p. 17).

(2) This Appendix does not apply to waste water from other industrial systems for the scrubbing of exhaust gases, circuit systems for the cooling of power plants or industrial processes, other points of origin associated with steam generation or the scrubbing of flue gases from combustion plants.

B General requirements

Waste water from the purification of exhaust gases from the incineration of household waste may not be discharged into waters.

C Requirements for waste water at the point of discharge

(1) The following requirements apply to waste water at the point of discharge into waters:

	Qualified random sample or two-hour composite sample (mg/l)
Chemical oxygen demand – use of quicklime (COD)	80
– use of limestone	150
Sulphate	2,000
Sulphite	20
Dissolved fluoride	30
Toxicity to fish eggs (LID _{egg})	2

(2) By way of derogation from section 6 (3) of this Ordinance, the COD requirement is also deemed to have been met if the TOC measurement in mg/l, multiplied by three, does not exceed the value specified for COD. By way of derogation from section 6 (1) of this Ordinance, the greatest permissible degree by which any

parameter may be exceeded is 50%. The requirements for chemical oxygen demand apply to COD measurements after subtraction of the prior pollution introduced with the process water.

D Requirements for waste water prior to blending

(1) The waste water is subject to the following requirements prior to blending with other waste water:

	24-hour composite samples	
Mercury	mg/l	0.03
Cadmium	mg/l	0.05
Thallium	mg/l	0.05
Arsenic	mg/l	0.15
Lead	mg/l	0.1
Total chromium	mg/l	0.5
Copper	mg/l	0.5
Nickel	mg/l	0.5
Zinc	mg/l	1.0
Dioxins and furans as the sum of the individual dioxins and furans calculated in accordance with Part 2 of Annex VI to Directive 2010/75/EU	ng/l	0.3

(2) Filterable matter measured in 24-hour composite samples must not exceed a concentration of 30 mg/l across 95% of measurements and 45 mg/l across all measurements; section 6 (1) of this Ordinance does not apply.

(3) For each of the parameters set out in paragraphs (1) and (2), the permit for discharge restricts the total load per 24-hour period. The pollution loads are derived from the concentrations in 24-hour composite samples and the volumetric flow of waste water corresponding to the sampling.

(4) By way of derogation from section 6 (1) of this Ordinance, the requirements for heavy metals are deemed to have been met if the values specified are exceeded no more than once per year or, in the event that more than 20 samples are taken per year, in no more than 5% of cases. By way of derogation from section 6 (1) of this Ordinance, the value specified for dioxins and furans must not be exceeded if only two measurements are taken per year.

E Requirements for waste water at the point of origin

The waste water is subject to no additional requirements in respect of the point of origin.

F Requirements for established discharges

(1) For established discharges of waste water from the purification of exhaust gases from plants for the incineration of household waste which were lawfully in operation before 1 August 2002 or the construction of which had lawfully been started on that date, Part B does not apply if the waste occurring during operation of the exhaust gas purification system cannot be properly and safely recovered or otherwise disposed of in keeping with the public interest.

In such cases, Parts C and D and the following additional requirements apply:

	Load in milligrams per tonne of waste
Cadmium	15
Mercury	9
Total chromium	150
Nickel	150
Copper	150

Lead	30
Zinc	300
Readily liberated sulphide	60

(2) The quantity of waste used to calculate load ratios relates to the capacity of the domestic waste incineration plant on which the permit for discharge is based.

(3) By way of derogation from section 6 (1) of this Ordinance, the greatest permissible degree by which any parameter may be exceeded is 50%. The pollution loads (mg/l) are derived from the concentrations in qualified random samples or two-hour composite samples and the volumetric flow of waste water corresponding to the sampling.

Appendix 35

Chip manufacture

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from chip manufacture, including

1. the concomitant pre-treatment, intermediate operations and after-treatment;
2. mask manufacture and cleaning of components, in so far as the waste water is similar in composition to waste water from chip manufacture, and
3. in-house recycling of wafers, in so far as the waste water is similar in composition to waste water from chip manufacture.

(2) This Appendix does not apply to waste water from

1. indirect cooling systems;
2. treatment of process water, including ultrapure water and
3. production of monocrystalline silicon and slicing of ingots into wafers.

B General requirements

(1) The volume and pollution load of waste water are kept as low as possible by means of the following measures:

1. extension of the service life of process solutions;
2. minimisation of rinsing water demand by
 - (a) use of water-saving rinsing technologies such as
 - (aa) cascade rinsing or
 - (bb) recirculation rinsing technology using ion exchangers;
 - (b) filtration methods or
 - (c) other processes producing similar effects;
3. multiple use of suitable rinsing water in the manufacturing process or use of suitable rinsing water in other operational areas once treated by means of recirculation through ion exchangers, filtration methods or other processes producing similar effects;
4. recovery of useful materials from spent process solutions and suitable tributary waste water streams;
5. segregation and separate treatment of tributary waste water streams, if the resultant sludge lends itself to material recovery and no requirements under other legislation preclude such measures;
6. minimisation of the volume of waste water generated by the capture and treatment of exhaust gas;
7. minimisation of the formation of adsorbable organically bound halogens (AOX) by
 - (a) use of hydrochloric acid no more contaminated with organic halogen compounds than permitted under DIN EN 939 (September 2016 edition);

- (b) use of iron salts and aluminium salts in waste water treatment which contain 100 mg or less of organic halogen compounds per kilogram of iron or aluminium, respectively, in the treatment agents used or
 - (c) use of cyanide-free process solutions instead of cyanidic process solutions;
8. non-use of photoresists for photolithographic processes which contain per- or polyfluorinated substances (PFAS); if such non-use is not possible, the quantities used in production and the pollution load are reduced as much as technically possible;
 9. non-use of organosulphides in waste water treatment; if non-use of organosulphides is not possible, the quantities used are kept to a minimum and any excess present in the waste water is retained in full by precipitation using metal salts or by other suitable means.
- (2) Compliance with the requirements set out in paragraph (1) is documented in an inventory of waste water streams in accordance with no. 1 of Annex 2.

C Requirements for waste water at the point of discharge

The following requirements apply to waste water at the point of discharge into waters:

	Qualified random sample or two-hour composite sample	
Aluminium	mg/l	2.0
Total organic carbon (TOC)	mg/l	20
Chemical oxygen demand (COD)	mg/l	60
Biochemical oxygen demand over five days (BOD ₅)	mg/l	15
Dissolved fluoride	mg/l	30
Total phosphorus	mg/l	1.0
Ammoniacal nitrogen (NH ₄ -N)	mg/l	10
Nitrite nitrogen (NO ₂ -N)	mg/l	2.0
Iron	mg/l	3.0
Filterable matter (suspended solids)	mg/l	15
Toxicity to fish eggs (LID _{egg})		2

D Requirements for waste water prior to blending

The waste water is subject to the following requirements prior to blending with other waste water:

	Qualified random sample or two-hour composite sample* (mg/l)
Antimony	0.50
Adsorbable organically bound halogens (AOX)	0.10
Arsenic	0.20
Barium	3.0
Lead	0.50
Cerium	0.50
Total chromium	0.20
Cobalt	1.0

Germanium	0.50
Gold	0.50
Hafnium	0.50
Copper	0.50
Molybdenum	0.50
Nickel	0.50
Palladium	0.50
Platinum	0.50
Praseodymium	0.50
Ruthenium	0.50
Readily liberated sulphide	1.0
Titanium	1.0
Tungsten	2.0
Zinc	2.0
Tin	2.0
Zirconium	0.50

* For batch-processing plants, all requirements relate to random samples.

** For AOX, the applicable measurement is taken in random samples.

E Requirements for waste water at the point of origin

(1) The following requirements apply to waste water at the point of origin:

	Random sample (mg/l)
Cadmium	0.050
Chromium VI	0.10
Readily liberated cyanide	0.20
Selenium	1.0
Silver	0.10
Thallium	0.50
Mercury	0.00050

(1) Waste water may not contain organic complexing agents which do not attain a degree of DOC degradation of at least 80% after 28 days in accordance with no. 406 of Annex 1 to this Ordinance.

(3) By way of derogation from section 2 (5) of this Ordinance, the point of origin of the waste water is the effluent from the pre-treatment facility for the parameter in question.

F Requirements for established discharges

For established discharges of waste water from plants which were lawfully in operation before 28 January 2022 or the construction of which had lawfully been started on that date, the requirements set out in this Appendix apply from 1 July 2022. Until the end of 30 June 2022, discharges as specified in sentence 1 are

subject to the requirements set out in Appendix 54 to the Waste Water Ordinance in the version in force on 27 January 2022.

G Requirements under waste legislation

No requirements under waste legislation apply.

H Operator obligations

If process chemicals containing PFAS are or have been used, the operator is required

1. to document the quantities of process chemicals containing PFAS used for each dosing point in the production log in accordance with no. 2 (e) of Annex 2 and
2. to measure PFAS in treated waste water prior to discharge at least once a year, unless the competent authority provides otherwise.

Appendix 36

Production of hydrocarbons

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from the following areas of hydrocarbon production:

1. production of certain hydrocarbons, primarily olefins with two to four carbon atoms, benzene, toluene and xylene, from petroleum feedstocks by means of steam cracking;
2. production of pure hydrocarbons or certain blends of hydrocarbons from petroleum feedstocks by means of physical separation methods;
3. conversion of hydrocarbons into other hydrocarbons by hydration, dehydration, alkylation, dealkylation, hydrodealkylation, isomerisation or disproportionation reactions.

It also applies to rainwater contaminated as a result of operational activities in those areas and contact with hydrocarbons in the processing areas of the production plants.

(2) This Appendix does not apply to waste water from the production of pure paraffins from slack wax, the refining of petroleum, indirect cooling systems or process-water treatment.

(3) The requirements set out in Parts C (2) to (4) and D (1) are emission limit values within the meaning of section 1 (2) sentence 1 of this Ordinance.

B General requirements

(1) The volume and pollution load of waste water are kept as low as possible by means of the following measures:

1. multiple use and recirculation;
2. use of waste-water-free processes to generate vacuums and purify exhaust air;
3. retention or recovery of substances by means of optimised processes;
4. pre-treatment of tributary waste water streams containing pollutants which
 - (a) may impair the function of the final biological treatment or
 - (b) cannot be adequately treated in the final waste water treatment, particularly organic compounds which have low biodegradability or cannot be eliminated by the final waste water treatment and volatile pollutants such as benzene.

(1a) In the case of aromatics production, aromatics extraction plants may not generate waste water from the use of wet solvents.

(1b) For the production of short-chain olefins, the following requirements apply:

1. recovery of hydrocarbons from the quench water of the primary fractionation stage is maximised and the quench water is reused to generate dilution steam and
2. the spent caustic scrubber liquor originating from the removal of hydrogen sulphide from cracked gases is stripped to reduce its organic load.

(2) Waste water not requiring treatment is channelled separately from waste water which does require treatment.

(3) On a scale commensurate with the risk, retention capacities are provided for waste water and measures are put in place for the proper reuse, treatment or disposal of retained waste water to prevent uncontrolled

emissions in the event of unplanned operating conditions. The discharger undertakes a risk assessment to that end.

(4) If there are two or more establishments generating waste water on the site, the holder of the permit for discharge establishes with those operationally responsible within the other establishments generating waste water, in an appropriate form, the tasks, responsibilities and interactions relating to proper waste water management.

(5) Proof of compliance with the general requirements is provided in an inventory of waste water streams. In addition to the data specified in no. 1 of Annex 2, the inventory of waste water streams contains the following information:

1. data on waste-water-generating synthesis processes, procedures and installations, including a representation of the main chemical reactions, in the form of chemical equations, and the most important side reactions and
2. data on the bioeliminability of the organic pollution load of the waste water streams.

(6) Waste water treatment plants within the meaning of section 60 (3) sentence 1 no. 2 of the Federal Water Act and the associated sewage systems and facilities for the dewatering of sewage sludge in connection with waste water management are constructed and operated in such a way as to avoid odour and noise emissions.

C Requirements for waste water at the point of discharge

(1) The requirements set out in paragraphs (1) to (4) apply to waste water at the point of discharge into waters.

Parameter	Qualified random sample or two-hour composite sample
TOC	33 mg/l
COD	100 mg/l
N _{tot}	20 mg/l
P _{tot}	1.3 mg/l
Total hydrocarbons	1.5 mg/l
Toxicity to fish eggs (LID _{egg})	2

(2) For filterable matter, if the discharged annual load exceeds 3.5 t/year, the annual average must not exceed 35 mg/l.

(3) For the following heavy metals, if the annual loads specified below are exceeded, the concentration must not exceed the following annual averages:

Parameter	Annual load	Concentration (annual average)
Total chromium	2.5 kg/year	0.025 mg/l
Copper	5.0 kg/year	0.050 mg/l
Nickel	5.0 kg/year	0.050 mg/l
Zinc	30 kg/year	0.30 mg/l

(4) The parameters set out in paragraphs (2) and (3) are measured in accordance with Part H (1). The results of those measurements are equivalent to the results of public monitoring. Section 6 (1) of this Ordinance does not apply.

D Requirements for waste water prior to blending

The waste water is subject to the following requirements prior to blending with other waste water:

Parameter	Qualified random sample or two-hour composite sample	Random sample
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Adsorbable organically bound halogens (AOX)		0.10 mg/l
Phenol index after distillation and dye extraction	0.10 mg/l	
Benzene and derivatives	0.050 mg/l	
Readily liberated sulphide	0.40 mg/l	

E Requirements for waste water at the point of origin

The waste water is subject to no additional requirements in respect of the point of origin.

F Requirements for established discharges

By way of derogation from Part B (2), in plants for the channelling of waste water requiring treatment which were lawfully in operation before 1 March 2024 or the construction of which had lawfully been started on that date, waste water not requiring treatment and waste water which does require treatment may be channelled together, with the consent of the competent authority.

G Requirements under waste legislation

No requirements under waste legislation apply.

H Operator obligations

(1) Operators measure the following parameters in the waste water at the point of discharge into waters in 24-hour composite samples collected proportionately according to flow as follows:

Parameter	Minimum frequency
TOC	once a day
Filterable matter	once a day
N _{tot} or TN _b	once a day
P _{tot}	once a day
AOX	once a month
Total chromium, copper, nickel, zinc, lead	once a month
Other heavy metals for which limits are set in the permit for discharge	once a month

For waste water streams which are demonstrated to fluctuate little in volumetric flow and concentration, the measurements may also be taken in samples proportionately collected across regular intervals, subject to official decision. If available data series demonstrate marked stability in the readings, the frequency of measurement may be reduced as specified by official decision.

(2) The annual average for the parameters set out in Part C (2) and (3) are derived from the results of the measurements specified in paragraph (1).

(3) An annual report is written in accordance with no. 3 of Annex 2.

(4) The parameters set out in paragraph (1) are measured in accordance with the analysis and measurement procedures set out in Annex 1 or officially recognised monitoring procedures. *Land* regulations regarding self-monitoring remain unaffected by the operator obligations set out in paragraphs (1) to (3).

Appendix 37

Production of inorganic pigments

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from the following areas of inorganic pigment production by means of chemical or physical processes, including the concomitant pre-treatment, intermediate operations and after-treatment:

1. lead and zinc pigments;
2. lithopone, zinc sulphide pigments and precipitated barium sulphate;
3. silicate fillers;
4. iron oxide pigments;
5. chromium oxide pigments;
6. mixed-phase pigments, stain or pigment mixtures and frits and
7. titanium dioxide:
 - 7.1 chloride process;
 - 7.2 sulphate process;
 - 7.2.1 phased nucleation process;
 - 7.2.2 combined nucleation process.

It also applies to rainwater contaminated as a result of operational activities in that area.

(2) This Appendix does not apply to waste water from

1. production of substances and preparations by mixing, dissolution or bottling (formulation);
2. production of highly disperse oxides;
3. production of clay extender pigments;
4. production of microrutile titanium dioxide;
5. indirect cooling systems and
6. process-water treatment.

(3) The requirements set out in Parts C (1), (3) and (4) and D (1) are emission limit values within the meaning of section 1 (2) sentence 1 of this Ordinance.

B General requirements

(1) The volume and pollution load of waste water are kept as low as possible by means of the following measures:

1. multiple use and recirculation;
2. use of waste-water-free processes to generate vacuums and purify exhaust air;
3. retention or recovery of substances by means of the preparation of mother liquors and optimised processes;
4. pre-treatment of tributary waste water streams containing pollutants which cannot be adequately treated in the final waste water treatment, particularly heavy metals.

(2) Waste water not requiring treatment is channelled separately from waste water which does require treatment.

(3) On a scale commensurate with the risk, retention capacities are provided for waste water and measures are put in place for the proper reuse, treatment or disposal of retained waste water to prevent uncontrolled emissions in the event of unplanned operating conditions. The discharger undertakes a risk assessment to that end.

(4) If there are two or more establishments generating waste water on the site, the holder of the permit for discharge establishes with those operationally responsible within the other establishments generating waste water, in an appropriate form, the tasks, responsibilities and interactions relating to proper waste water management.

(5) Proof of compliance with the general requirements is provided in an inventory of waste water streams. In addition to the data specified in no. 1 of Annex 2, the inventory of waste water streams contains the following information:

1. data on waste-water-generating synthesis processes, procedures and installations, including a representation of the main chemical reactions, in the form of chemical equations, and the most important side reactions;
2. data on the bioeliminability of the organic pollution load of the waste water streams.

(6) Waste water treatment plants within the meaning of section 60 (3) sentence 1 no. 1 of the Federal Water Act and the associated sewage systems and facilities for the dewatering of sewage sludge in connection with waste water management are constructed and operated in such a way as to avoid odour and noise emissions.

(7) Waste water from the production of titanium dioxide may not be discharged unless

1. targeted measures have been implemented to reduce iron, titanium and vanadium pollution and
2. the waste water contains no waste within the meaning of Article 67 of Directive 2010/75/EU.

C Requirements for waste water at the point of discharge

(1) The following requirements apply to waste water from the areas specified in Part A (1) in respect of the point of discharge into waters:

Area		1	2	3	4	5	6	7
Parameter	Qualified random sample or two-hour composite sample							
TOC	mg/l	33	33	33	33	25	33	33
COD	mg/l	100	100	100	100	70	100	100
NH ₄ -N	mg/l	–	–	–	10	–	–	–
Chloride	kg/t	–	–	–	–	–	–	1, 2
Sulphate	kg/t	–	–	600	1,600 ³	1,200	–	500 ⁴
Sulphite	mg/l	–	20	–	–	20	–	–
Iron	kg/t	–	–	–	0.50 ⁵	–	–	–
LID _{egg}		2	2	2	2	2	2	2

¹ For titanium dioxide production using the sulphate process, the following requirements apply in respect of the reuse of slag:

1. For production using the phased nucleation process, the applicable value is 70 kg/t.
2. For production using the combined nucleation process, the applicable value is 165 kg/t.

² For production of titanium dioxide using the chloride process in accordance with Part 1, point 2 (c) of Annex VIII to Directive 2010/75/EU, the following requirements apply:

1. When natural rutile is used, the applicable value is 130 kg/t.
2. When synthetic rutile is used, the applicable value is 228 kg/t.
3. When slag is used, the applicable value is 330 kg/t.
4. For discharges into coastal waters as defined in section 3 no. 2 of the Federal Water Act of 31 July 2009 (Federal Law Gazette I, p. 2585) and for Ordinance for the Protection of Surface Waters of 20 June 2016 (Federal Law Gazette I, p. 1373), an emission limit value of 450 kg/t may be set when slag is used.
5. If more than one feedstock is used, the emission limit values for chloride apply in proportion to the quantities of the feedstocks used.

³ This requirement applies to production of iron oxide pigments using the precipitation and Penniman processes. For production using the aniline process, the applicable value is 40 kg/t.

⁴ This requirement applies only to production of titanium oxide using the sulphate process.

⁵ This requirement applies to iron oxide pigments and technical iron oxides. For transparent and high-purity iron oxide pigments, the applicable value is 1 kg/t.

(2) The output-based environmental performance values (kg/t) set out in paragraph (1) are derived from the ratio of pollution load to the production capacity on which the permit for discharge is based. The pollution load is calculated by multiplying the concentration in a qualified random sample or two-hour composite sample by the volume of the waste water stream corresponding to the sampling.

(3) For filterable matter, if the load exceeds 3.5 t/year, the concentration must not exceed an annual average of 35 mg/l. This requirement does not apply to production of titanium dioxide (area 7).

(4) For the following heavy metals, if the annual loads specified below are exceeded, the concentration must not exceed the following annual averages:

Parameter	Annual load	Concentration (annual average)
Total chromium	2.5 kg/year	0.025 mg/l
Copper	5.0 kg/year	0.050 mg/l
Nickel	5.0 kg/year	0.050 mg/l
Zinc	30 kg/year	0.30 mg/l

The annual averages do not apply to waste water with a pollution load originating primarily from the production of inorganic heavy metal compounds or to waste water with a pollution load originating from the processing of solid inorganic raw materials contaminated with metals.

(5) The parameters set out in paragraphs (3) and (4) are measured in accordance with Part H (1). The results of those measurements are equivalent to the results of public monitoring. Section 6 (1) of this Ordinance does not apply.

D Requirements for waste water prior to blending

(1) The following requirements apply to waste water from the areas specified in Part A (1) prior to blending with other waste water:

Area		1	2	4	5	6	7.1	7.2
Parameter	Qualified random sample or two-hour composite sample							
Aniline	kg/t			0.20 ¹				
Barium	mg/l		2.0					
Lead	kg/t	0.040					0.0050	0.030
Cadmium	mg/l g/t		0.010				0.20	2.0
Total chromium	mg/l kg/t	0.030			0.020	0.50	0.010	0.50 ² 0.050 ²
Cobalt	mg/l					1.0		
Copper	mg/l kg/t					0.50	0.010	0.020
Nickel	mg/l kg/t					0.50	0.0050	0.015
Mercury	g/t						0.10	1.5
Readily liberated sulphide	mg/l		1.0					
Zinc	mg/l	2.0	2.0			0.50		

¹ This requirement applies only to production using the aniline process.

² Either the required concentration or the required output-based environmental performance value applies.

(2) The output-based environmental performance values (kg/t and g/t) set out in paragraph (1) are derived from the ratio of pollution load to the production capacity on which the permit for discharge is based. The pollution load is calculated by multiplying the concentration in a qualified random sample or two-hour composite sample by the volume of the waste water stream corresponding to the sampling.

E Requirements for waste water at the point of origin

The waste water is subject to no additional requirements in respect of the point of origin.

F Requirements for established discharges

By way of derogation from Part B (2), in existing plants for the channelling of waste water requiring treatment which were lawfully in operation before 1 March 2024 or the construction of which had lawfully been started on that date, waste water not requiring treatment and waste water which does require treatment may be channelled together, with the consent of the competent authority.

G Requirements under waste legislation

No requirements under waste legislation apply.

H Operator obligations

(1) Operators measure the following parameters in the waste water at the point of discharge into waters in 24-hour composite samples collected proportionately according to flow as follows:

Parameter	Minimum frequency
TOC	once a day
Filterable matter	once a day
Total chromium, copper, nickel, zinc, lead	once a month
Other heavy metals for which limits are set in the permit for discharge	once a month
N _{tot} or TN _b	once a day ¹

¹ This parameter is measured only for production of iron oxide pigments (area 4).

For waste water streams which are demonstrated to fluctuate little in volumetric flow and concentration, the measurements may also be taken in samples proportionately collected across regular intervals, subject to official decision. If available data series demonstrate marked stability in the readings, the frequency of measurement may be reduced as specified by official decision.

(2) The annual average for the parameters set out in Part C (3) and (4) are derived from the results of the measurements specified in paragraph (1).

(3) An annual report is written in accordance with no. 3 of Annex 2.

(4) The parameters set out in paragraph (1) are measured in accordance with the analysis and measurement procedures set out in Annex 1 or officially recognised monitoring procedures. *Land* regulations regarding self-monitoring remain unaffected by the operator obligations set out in paragraphs (1) to (3).

Appendix 38

Manufacture and finishing of textiles

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from the commercial and industrial working and processing of textile fibres and yarns and from textile finishing.

(2) This Appendix does not apply to waste water

1. from the washing of raw wool;
2. from photographic processes and electroplating (such as manufacture of printing templates and impression cylinders);
3. from the dry cleaning of textiles using solvents containing halogenated hydrocarbons in accordance with the Second Ordinance on the Implementation of the Federal Immission Control Act as amended;
4. from process-water treatment or indirect cooling systems.

(3) For discharges of less than 5 m³ of waste water per day, only Part B and the requirements for COD set out in Part C of this Appendix apply.

B General requirements

The pollution load is kept as low as possible, based on an examination of the conditions in each individual case, by means of the following measures:

1. treatment and reuse of washing water generated in the printing sector, from the washing of printing blankets and the cleaning of printing equipment (templates, rollers, inking system, preparation drums, etc.);

2. non-use of sizing chemicals which do not attain a degree of DOC elimination of 80% after 7 days in accordance with the procedure set out in no. 408 of Annex 1 to this Ordinance;
3. non-use of organic complexing agents which do not attain a degree of DOC degradation of 80% after 28 days in accordance with the procedure set out in no. 406 of Annex 1 to this Ordinance. Exceptions apply for the use of phosphonates, polyacrylates and maleic acid copolymers for textile finishing;
4. non-use of surfactants which do not attain a degree of DOC elimination of 80% after 7 days in accordance with the procedure set out in no. 408 of Annex 1 to this Ordinance. Surfactants are organic surface-active agents with washing and wetting properties which, at a concentration of 0.5% and a temperature of 20°C, reduce the surface tension of distilled water to 0.045 N/m or less;
5. non-use of chlorinating pre-treatment of wool and wool-blend substrates for printing;
6. non-use of alkylphenol ethoxylates (APEO), except polymer dispersions which are applied to fabrics and have an adhesion rate of 99%;
7. minimisation of quantities and retention or reuse of
 - 7.1 synthetic sizing chemicals from desizing;
 - 7.2 residues of pad-dyeing liquors;
 - 7.3 residues of pad-finishing liquors;
 - 7.4 residues of coating and laminating liquors;
 - 7.5 residues of liquors from the application of backings to textile floor coverings and other fabrics;
 - 7.6 residues of printing pastes;
8. treatment of the tributary waste water streams set out in no. 7, if reuse is not possible, using processes which guarantee at least 80% elimination of COD or TOC or, in the case of residues of pad-dyeing liquors or printing pastes, at least 95% elimination of colour.

Proof of compliance with the general requirements is provided in an inventory of waste water streams.

C Requirements for waste water at the point of discharge

- (1) The following requirements apply to waste water at the point of discharge into waters:

	Qualified random sample or two-hour composite sample	
Chemical oxygen demand (COD)	mg/l	160
Biochemical oxygen demand over five days (BOD ₅)	mg/l	25
Total phosphorus	mg/l	2
Ammoniacal nitrogen (NH ₄ -N)	mg/l	10
Total nitrogen as the sum of ammoniacal, nitrite and nitrate nitrogen (N _{tot})	mg/l	20
Sulphite	mg/l	1
Toxicity to fish eggs (LID _{egg})		2
Colour: spectral absorption coefficient at a wavelength of		
436 nm (yellow range)	m ⁻¹	7
525 nm (red range)	m ⁻¹	5
620 nm (blue range)	m ⁻¹	3

The requirements for ammoniacal nitrogen and total nitrogen at a waste water temperature of 12°C and above in the effluent from the biological reactor of the waste water treatment plant.

- (2) The requirement for total phosphorus does not apply to waste water from the use of organic phosphorus compounds for fire-retardant finishing.

D Requirements for waste water prior to blending

- (1) The waste water is subject to the following requirements prior to blending with other waste water:

	Qualified random sample or two-hour composite sample (mg/l)
Adsorbable organically bound halogens (AOX)	0.5
Readily liberated sulphide	1
Total chromium	0.5
Copper	0.5
Nickel	0.5
Zinc	2
Tin	2

The requirement for AOX applies in respect of random samples.

(2) The pollution loads in waste water from the following areas must not exceed the loads derived from the following concentrations and the volumetric flow of waste water determined on the basis of Part B:

	Total chromium mg/l	Copper mg/l	Nickel mg/l
Residues of pad-dyeing liquors	0.5	0.5	0.5
Exhaust-dyeing liquors with a more than 3% concentration and a less than 70% fixation rate	0.5	0.5	0.5
Residues of printing pastes, not reusable	0.5	0.5	0.5

Proof of compliance with the requirements is provided in an inventory of waste water streams.

(3) In the case of continuous pre-treatment of knitted or crocheted textiles made of synthetic fibres or predominantly synthetic fibre blends, the concentration of total hydrocarbons in the waste water must not exceed 20 mg/l.

E Requirements for waste water at the point of origin

(1) The waste water may not contain

1. chloroorganic carriers (dyeing accelerants);
2. chlorine-releasing bleaches, except sodium chlorite for bleaching synthetic fibres;
3. free chlorine from the use of sodium chlorite;
4. arsenic, mercury, compounds of either or organotin compounds from use as preservatives;
5. alkylphenol ethoxylates (APEO) from detergents and cleaning agents;
6. chromium VI compounds from use as oxidants for sulphur dyes and vat dyes;
7. EDTA, DTPA and phosphonates from use as water softeners in process water;
8. unused, unspent residues of chemicals, dyes or textile auxiliaries or
9. residues of printing pastes in printing equipment, from printing.

(2) Waste water may contain only those halogenated solvents which may be used in dry cleaning under the Second Ordinance on the Implementation of the Federal Immission Control Act of 10 December 1990 (Federal Law Gazette I, p. 2694). This requirement is deemed to have been met if it is demonstrated that only permitted halogenated hydrocarbons are used.

(3) The concentration of chromium VI in the waste water must not exceed 0.1 mg/l in random samples. Section 6 (1) of this Ordinance does not apply.

(4) Compliance with the requirements set out in paragraph (1) may be demonstrated by setting out all the operating and auxiliary materials used in a production log while information from the manufacturers states that they contain none of the substances or groups of substances specified in paragraph (1).

F Requirements for established discharges

For established discharges of waste water from plants which were lawfully in operation before 1 June 2000 or the construction of which had lawfully been started on that date, the following derogating requirements apply:

1. The requirements set out in Part D (2) for exhaust-dyeing liquors with a more than 3% concentration and a less than 70% fixation rate and Part E (1) no. 9 do not apply.
2. By way of derogation from Part D (1), the applicable value for AOX is 1 mg/l in random samples.
3. By way of derogation from Part D (1) and (2), the applicable value for copper is 1 mg/l.

Appendix 39

Non-ferrous metal production

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from the production and casting of the following non-ferrous metals, including the associated by-products, and the manufacture of semi-finished products in the following non-ferrous metals:

1. copper;
2. lead;
3. tin;
4. zinc;
5. cadmium;
6. precious metals;
7. nickel;
8. cobalt;
9. ferro-alloys;
10. aluminium.

(2) This Appendix does not apply to waste water from indirect cooling systems or process-water treatment.

(3) The requirements set out in Parts C sentence 1 and D (1) are emission limit values within the meaning of section 1 (2) sentence 1 of this Ordinance.

B General requirements

The volume and pollution load of waste water are kept as low as possible by means of the following measures:

1. extensive recirculation, reuse and cascading of washing, scrubber, cooling and process water;
2. multiple use of treated waste water and use of rainwater where suitable applications exist;
3. reuse of aqueous solutions such as pickling solutions and acidic or alkaline leaching liquors;
4. separation of waste water streams requiring treatment from those not requiring treatment;
5. non-use of process technologies which generate high volumes of waste water;
6. evaporative crystallisation of washing water from facilities for washing Waelz oxide;
7. recovery of metals from process solutions.

C Requirements for waste water at the point of discharge

The following requirements apply to waste water at the point of discharge into waters:

	Production and casting of the non-ferrous metals set out in Part A (1) nos. 1 to 9, including by-products and	Aluminium oxide production	Aluminium production	Aluminium casting and manufacture of aluminium semi-finished products
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		semi-finished products			
	Qualified random sample or two-hour composite sample				
Total organic carbon (TOC)	mg/l	50	20	15	20
Chemical oxygen demand (COD)	mg/l	200 ¹	60	60	80
Iron	mg/l	3.0	–	–	–
Total hydrocarbons	mg/l	–	–	2.0	5.0
Aluminium	mg/l	–	6.0	3.0	–
Dissolved fluoride	mg/l	–	–	30	30
Toxicity to fish eggs (LID _{egg})		4	–	–	–
¹ If primary zinc and lead production generates inorganic compounds which are susceptible to oxidation within the industrial process, such as sulphide, sulphite or thiosulphate, the concentration of COD in the waste water must not exceed 320 mg/l.					

The requirements for total hydrocarbons relate to random samples.

For each parameter, the permit for discharge may take into account the pre-existing pollution load present in the water at the time of abstraction from waters (prior pollution) if the subtracted load is still present at the time of discharge into waters.

By way of derogation from the entry for iron in the table set out in sentence 1, the applicable value for iron is 4.0 mg/l for activities within the scope of Part A (1) no. 1.

D Requirements for waste water prior to blending

(1) The waste water is subject to the following requirements prior to blending with other waste water:

	Production and casting ¹ of					
	Copper	Lead and tin	Zinc and cadmium	Precious metals	Nickel and cobalt	Ferro-alloys
	Qualified random sample or two-hour composite sample (mg/l)					
Cadmium	0.10	0.10	0.10	0.050	0.10	0.050
Mercury	0.020	0.020	0.020	0.020	0.020	0.020
Zinc	1.0	1.0	1.0	0.40	1.0	1.0
Lead	0.50	0.50	0.20	0.50	0.50	0.20
Copper	0.50	0.20	0.10	0.30	0.50	0.50
Arsenic	0.10	0.10	0.10	0.10	0.30	0.10
Nickel	0.50	0.50	0.10	0.50	2.0	2.0
Thallium	1.0	1.0	1.0	1.0	–	–
Total chromium	0.50	0.50	0.50	0.50	–	0.20

	Production and casting ¹ of					
	Copper	Lead and tin	Zinc and cadmium	Precious metals	Nickel and cobalt	Ferro-alloys
	Qualified random sample or two-hour composite sample (mg/l)					
Chromium VI	–	–	–	–	–	0.050
Cobalt	1.0	0.10	1.0	1.0	0.50	–
Silver	0.10	0.10	0.10	0.10	–	–
Tin	2.0	2.0	2.0	2.0	–	–
Readily liberated sulphide	1.0	1.0	1.0	1.0	–	–
Adsorbable organically bound halogens (AOX)	1.0	1.0	1.0	1.0	–	–
¹ including by-products and manufacture of semi-finished products						

The requirements for readily liberated sulphide and AOX relate to random samples.

(2) By way of derogation from section 6 (1) sentence 1 of this Ordinance, the greatest permissible degree by which the limits for cadmium and mercury may be exceeded is 50%.

E Requirements for waste water at the point of origin

(1) Waste water from the production and casting of lead, copper, zinc and precious metals, including the associated by-products and the manufacture of semi-finished products in those non-ferrous metals, the concentrations of chromium VI and readily liberated cyanide in random samples must not exceed 0.10 mg/l at the point of origin. Section 6 (1) of this Ordinance does not apply.

(2) Waste water from the treatment of exhaust gas from aluminium refinement using chlorine may not be discharged unless the volumes of chlorine, chlorine-releasing substances and intake water used are kept as low as possible. The following requirements apply:

Free chlorine	Random sample	0.50 mg/l
Hexachlorobenzene (HCB)	Qualified random sample or two-hour composite sample	0.0030 mg/l
Adsorbable organically bound halogens (AOX)	Random sample	1.0 mg/l

For hexachlorobenzene, an output-based environmental performance value of 0.30 mg per tonne of chlorinated aluminium (alloy) must not be exceeded.

F Requirements for established discharges

There are no derogating requirements for established discharges.

G Requirements under waste legislation

Metals and metal compounds in the sludge resulting from waste water treatment must be recovered wherever technically feasible and financially reasonable in light of the conditions in each individual case.

H Operator obligations

(1) The requirements set out in paragraphs (2) to (5) apply to operators of plants for the following industrial activities:

1. production of non-ferrous crude metals from ore, concentrates or secondary raw materials by metallurgical, chemical or electrolytic processes;
2. melting, alloying or refining of non-ferrous metals, with a capacity of 4 tonnes or more per day for lead and cadmium or 20 tonnes or more per day for other non-ferrous metals.

(2) In waste water from plants for the production of the following non-ferrous metals, including the associated by-products and manufacture of semi-finished products in each case, the following parameters are measured at least once a month in two-hour composite samples or qualified random samples:

1. at the point of discharge into waters:

Production of non-ferrous metals	Parameters to be measured
Copper, lead, tin, zinc, cadmium, precious metals, nickel and cobalt	Iron and sulphate
Ferro-alloys	Iron
Aluminium	Aluminium, dissolved fluoride and filterable matter

2. prior to blending with other waste water:

Production of non-ferrous metals	Parameters to be measured
Copper, lead and tin	Arsenic, cadmium, copper, nickel, lead, zinc, mercury, antimony and tin
Zinc and cadmium	Arsenic, cadmium, copper, nickel, lead, zinc and mercury
Precious metals	Arsenic, cadmium, copper, nickel, lead, zinc, mercury and silver
Nickel and cobalt	Arsenic, cadmium, copper, nickel, lead, zinc, mercury and cobalt
Ferro-alloys	Arsenic, cadmium, copper, nickel, lead, zinc, mercury, total chromium and chromium VI

If available data series demonstrate marked stability in the readings, the frequency of measurement may be reduced by official decision.

(3) The quantity of intake water required for industrial activity, the total quantity of waste water and the quantity of each of the waste water streams resulting from that activity are recorded on a daily basis.

(4) An annual report is written in accordance with no. 3 of Annex 2.

(5) The parameters set out in paragraph (2) sentence 1 are measured in accordance with the analysis and measurement procedures set out in Annex 1 or officially recognised monitoring procedures. *Land* regulations regarding self-monitoring remain unaffected by the operator obligations set out in paragraphs (1) to (4).

Appendix 40

Metal working and processing

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from the following sources, including the concomitant pre-treatment, intermediate operations and after-treatment:

1. electroplating;
2. pickling;
3. anodising;
4. black finishing;
5. hot-dip galvanisation and hot-dip tinning;
6. hardening;

7. manufacture of printed circuit boards;
8. manufacture of batteries;
9. enamelling;
10. mechanical workshops;
11. mass finishing;
12. paint shops.

(2) This Appendix does not apply to waste water from cooling systems or process-water treatment or to rainwater.

B General requirements

The pollution load is kept as low as possible by means of the following measures:

1. treatment of process baths by means of suitable procedures such as membrane filtration, ion exchange, electrolysis and thermal processes to extend the service life of the process baths as long as possible;
2. retention of bath constituents by means of suitable procedures such as goods transport protected from carry-over, spray protection and optimised bath composition;
3. multiple use of rinsing water by means of suitable procedures such as cascade rinsing or recirculation rinsing technology using ion exchangers;
4. recovery or recirculation of suitable bath constituents from rinsing baths into process baths;
5. recovery of ethylene diamine tetraacetic acid (EDTA) and its salts from electroless copper baths and the associated rinsing water.

C Requirements for waste water at the point of discharge

(1) The following requirements apply to waste water from the sources specified in Part A (1) in respect of the point of discharge into waters:

Source	1	2	3	4	5	6	7	8	9	10	11	12
	Qualified random sample or two-hour composite sample											
Aluminium mg/l	3	3	3	–	–	–	–	–	2	3	3	3
Ammoniacal nitrogen mg/l	100	30	–	30	30	50	50	50	20	30	–	–
Chemical oxygen demand (COD) mg/l	400	100	100	200	200	400	600	200	100	400	400	300
Iron mg/l	3	3	–	3	3	–	3	3	3	3	3	3
Dissolved fluoride mg/l	50	20	50	–	50	–	50	–	50	30	–	–
Nitrite nitrogen mg/l	–	5	5	5	–	5	–	–	5	5	–	–
Total hydrocarbons mg/l	10	10	10	10	10	10	10	10	10	10	10	10
Total phosphorus mg/l	2	2	2	2	2	2	2	2	2	2	2	2
Toxicity to fish eggs (LID _{egg})	6	4	2	6	6	6	6	6	4	6	6	6

(2) The requirement for hydrocarbons relates to random samples.

(3) In the case of electroplating of glass, only the requirement for toxicity to fish eggs – a dilution factor of LID_{egg} = 2 – applies.

D Requirements for waste water prior to blending

(1) Notwithstanding the provisions of paragraphs (2) to (5), the following requirements apply to waste water from the sources specified in Part A (1) prior to blending with other waste water:

Source	1	2	3	4	5	6	7	8	9	10	11	12
	Qualified random sample or two-hour composite sample											
AOX mg/l	1	1	1	1	1	1	1	1	1	1	1	1
Arsenic mg/l	0.1	–	–	–	–	–	0.1	0.1	–	–	–	–
Barium mg/l	–	–	–	–	–	2	–	–	–	–	–	–
Lead mg/l	0.5	–	–	–	0.5	–	0.5	0.5	0.5	0.5	–	0.5
Cadmium mg/l	0.2	–	–	–	0.1	–	–	0.2	0.2	0.1	–	0.2
kg/t	0.3	–	–	–	–	–	–	1.5	–	–	–	–
Free chlorine mg/l	0.5	0.5	–	0.5	–	0.5	–	–	–	0.5	–	–
Total chromium mg/l	0.5	0.5	0.5	0.5	–	–	0.5	–	0.5	0.5	0.5	0.5
Chromium VI mg/l	0.1	0.1	0.1	0.1	–	–	0.1	–	0.1	0.1	–	0.1
Readily liberated cyanide mg/l	0.2	–	–	–	–	1	0.2	–	–	0.2	–	–
Cobalt mg/l	–	–	1	–	–	–	–	–	1	–	–	–
Copper mg/l	0.5	0.5	–	–	–	–	0.5	0.5	0.5	0.5	0.5	0.5
Nickel mg/l	0.5	0.5	–	0.5	–	–	0.5	0.5	0.5	0.5	0.5	0.5
Mercury mg/l	–	–	–	–	–	–	–	0.05	–	–	–	–
kg/t	–	–	–	–	–	–	–	0.03	–	–	–	–
Selenium mg/l	–	–	–	–	–	–	–	–	1	–	–	–
Silver mg/l	0.1	–	–	–	–	–	0.1	0.1	–	–	–	–
Readily liberated cyanide mg/l	1	1	–	1	–	–	1	1	1	–	–	–
Tin mg/l	2	–	2	–	2	–	2	–	–	–	–	–
Zinc mg/l	2	2	2	–	2	–	–	2	2	2	2	2

(2) The requirements for AOX and free chlorine relate to random samples, as do all requirements in the case of batch-processing plants. In the case of electroless nickel plating, the applicable value for nickel is 1 mg/l.

(3) In the case of electroplating of glass, only the requirements for copper and nickel apply.

(4) In the case of manufacture of primary battery cells (source 8), the applicable value for cadmium is 0.1 mg/l.

(5) In the case of electroplating and mechanical workshops, the requirement for AOX is also deemed to have been met if

1. the hydraulic oils, greasing agents and water displacers used in the manufacturing processes contain no organic halogen compounds;
2. the hydrochloric acid used in the manufacturing processes and in waste water treatment is no more contaminated with organic halogen compounds and chlorine than permitted for hydrochloric acid used for process-water treatment under DIN EN 939 (April 2000 edition);
3. the iron salts and aluminium salts used in waste water treatment contain 100 mg or less of organic halogen compounds per kilogram of iron or aluminium, respectively, in the treatment agents used;
4. based on an assessment of feasibility in each individual case,

- (a) cyanide baths are replaced with cyanide-free baths;
 - (b) cyanides are detoxified without the use of sodium hypochlorite and
 - (c) only cutting fluids are used which contain no organic halogen compounds.
- (6) The requirements set out in terms of output-based environmental performance values for cadmium in column 1 and for cadmium and mercury in column 8 of the table in paragraph (1) relate to the quantity of cadmium or mercury used in the particular case. They are deemed to have been met if the requirements set out in Part B and E (2) or (4) and the cadmium and mercury concentrations set out in columns 1 and 2 of the table in paragraph (1) are not exceeded.

E Requirements for waste water at the point of origin

- (1) Waste water may contain only those halogenated solvents which are permitted under the Second Ordinance on the Implementation of the Federal Immission Control Act as amended. This requirement is also deemed to have been met if it is demonstrated that only permitted halogenated solvents are used. Moreover, VHHC (sum of trichloroethene, tetrachloroethene, 1,1,1-trichloroethane and dichloromethane – calculated as chlorine) must not exceed 0.1 mg/l in random samples.
- (2) For waste water containing mercury, the concentration of mercury must not exceed 0.05 mg/l in qualified random samples or two-hour composite samples.
- (3) Waste water from degreasing baths, demetallising baths and nickel baths may not contain EDTA.
- (4) For waste water from baths containing cadmium, including the associated rinsing, the concentration of cadmium must not exceed 0.2 mg/l in qualified random samples or two-hour composite samples.
- (5) The point of origin of the waste water is the effluent from the pre-treatment facility for the parameter in question.

Appendix 41

Manufacture and processing of glass and man-made mineral fibres

A Scope

- (1) This Appendix applies to waste water with a pollution load originating primarily from the manufacture and processing of glass and man-made mineral fibres, including working.
- (2) This Appendix does not apply to waste water from indirect cooling systems, process-water treatment, the electroplating of glass or the mechanical working of optical lenses in retail outlets for the purpose of adjusting them to spectacle frames.
- (3) The requirements set out in Parts C (1) and (2), D (1) no. 1 sentence 3, (1) no. 2 and (2) nos. 4 and 5 are emission limit values within the meaning of section 1 (2) sentence 1 of this Ordinance.

B General requirements

- (1) In addition to the requirements set out in section 3 of this Ordinance, the following general requirements for the reduction of water consumption apply:
- 1. leaks and losses are avoided as much as possible;
 - 2. cooling water and rinsing water are reused as much as possible, following treatment;
 - 3. water is extensively channelled in closed circuits.
- (2) Waste water may not contain halogenated hydrocarbons originating from auxiliary materials or additives such as cutting fluids. The absence of halogenated hydrocarbons from the waste water may be demonstrated by information from the manufacturers stating that the feedstocks and auxiliary materials used contain no halogenated hydrocarbons.
- (3) The waste water may not contain the following:
- 1. grinding sludge from the mechanical working of lead glass, special glass, optical glass and flat glass;
 - 2. etching sludge from chemical surface treatment of lead glass, special glass and optical glass;
 - 3. sludge containing silver or copper from the silvering and copper-plating of flat glass.
- (4) In the case of chemical surface treatment of lead glass, special glass and optical glass, waste gas scrubbing may not generate waste water.
- (5) In the case of manufacture of mineral fibres, waste gas scrubbing may not generate waste water.

C Requirements for waste water at the point of discharge

(1) The following requirements apply to waste water at the point of discharge into waters:

	Random sample (mg/l)	Qualified random sample or two-hour composite sample (mg/l)
Filterable matter	30	–
Chemical oxygen demand (COD)	–	130
Sulphate	–	1,000 ¹
Dissolved fluoride	–	6.0 ²
Total hydrocarbons ³	15	–
Ammoniacal nitrogen ⁴	–	10
¹ By way of derogation from this entry, for plants where only acid polishing takes place, the applicable value for sulphate is 3,000 mg/l. ² By way of derogation from this entry, for plants where only acid polishing takes place and plants producing and/or processing opal glass, the applicable value for dissolved fluoride is 30 mg/l. ³ This parameter applies only in respect of hydrocarbons containing no fluorine and only for plants treating compressed air condensate or using cutting fluids. ⁴ This parameter applies only in respect of plants for the manufacture and further processing of mineral fibres.		

(2) The pH of the waste water must not be lower than 6.5 or higher than 9.0 at the point of discharge into waters. Section 6 (1) of this Ordinance does not apply.

D Requirements for waste water prior to blending

(1) The following requirements apply to waste water from the mechanical working of lead glass, special glass, optical glass and flat glass prior to blending with other waste water:

1. Waste water is channelled in closed circuits unless it is generated by the operation of hand-held grinding equipment. Waste water may not be discharged unless, in the case of closed circuits, it is unavoidable as a result of carry-over, spray or complete replacement of the circuit contents rendered necessary by long periods of shutdown (e.g. holiday closure), servicing, cleaning or changes in production line or if, in the case of cutting and grinding machines, recirculation is impossible in view of its harmful effects on the machinery. If waste water is discharged, the following requirements apply:

	Qualified random sample or two-hour composite sample (mg/l)
Arsenic	0.3
Antimony	0.3
Barium	3.0
Lead	0.3

2. If auxiliary materials or additives are used which contain one or more of the heavy metals listed below, then the following requirements apply to the waste water:

	Qualified random sample or two-hour composite sample (mg/l)
Copper	0.3
Nickel	0.5
Total chromium	0.3

Cadmium	0.05
Tin ¹	0.5
Zinc ²	0.5
Boron ³	3.0
¹ This parameter applies only to plants where hot-end coating using tin compounds takes place. ² This parameter applies only to plants where zinc selenite is used for decolourising glass. ³ This parameter applies only to plants where borosilicate glass is manufactured and/or processed. The entry does not apply to plants producing or processing less than 20 t/day. In such cases, boron emissions are kept as low as technically possible.	

(2) The following requirements apply to waste water from the chemical surface treatment of lead glass, special glass and optical glass prior to blending with other waste water:

1. For lead and arsenic, the applicable environmental performance values are 50 g each per tonne of hydrofluoric acid used (HF).
2. For plants using less than one tonne of HF (100%) over four weeks, the applicable values for lead and arsenic are 250 grams each per tonne of HF used.
3. The requirements set out in nos. 1 and 2 relate to the concentration of each pollutant in a qualified random sample or two-hour composite sample (C) in grams per cubic metre, the volume of waste water occurring in the four weeks prior to sampling (Q) in cubic metres, the quantity of hydrofluoric acid used in the four weeks prior to sampling (HF) in tonnes and the concentration of that acid (P) as a percentage. The specific pollution load (F) is calculated using the following formula:

$$F = (C \times Q \times 100) / (HF \times P)$$

4. For barium, the applicable concentration is 3.0 mg/l in qualified random samples or two-hour composite samples.
5. If auxiliary materials or additives are used which contain one or more of the heavy metals listed below, then the following requirements apply to the waste water:

	Qualified random sample or two-hour composite sample (mg/l)
Copper	0.3
Nickel	0.5
Total chromium	0.3
Cadmium	0.05
Tin ¹	0.5
Zinc ²	0.5
Boron ³	3.0
¹ This parameter applies only to plants where hot-end coating using tin compounds takes place. ² This parameter applies only to plants where zinc selenite is used for decolourising glass. ³ This parameter applies only to plants where borosilicate glass is manufactured and/or processed. The entry does not apply to plants producing or processing less than 20 t/day. In such cases, boron emissions are kept as low as technically possible.	

(3) For waste water from the silvering and copper-plating of flat glass (mirror manufacture), the applicable values are 6.0 mg/m² for copper, 3.0 mg/m² for silver and 30 mg/m² for zinc, all relating to production capacity in square metres of flat glass per hour. The output-based environmental performance values relate to the production capacity on which the permit for discharge is based. The hourly pollution load is derived from the

concentration of each pollutant (in a qualified random sample or two-hour composite sample) and the volumetric flow of waste water per hour.

E Requirements for waste water at the point of origin

The requirements set out in Part B (3), (4) and (5) must be met at the point of origin.

F Requirements for established discharges

For established discharges of waste water, the requirements set out in Part A (3) must be met by 8 March 2016 at the latest. By way of derogation from sentence 1, the requirements set out in Part C (1) for chemical oxygen demand (COD) must be met by 6 September 2014.

Appendix 42

Chlor-alkali electrolysis

A Scope

- (1) This Appendix applies to waste water with a pollution load originating primarily from chlor-alkali electrolysis.
- (2) This Appendix does not apply to waste water from cooling systems, process-water treatment, electrolysis of molten sodium chloride or chlor-alkali electrolysis to produce alcoxides and dithionites.
- (2) The requirements set out in Parts C, E and F are emission limit values within the meaning of section 1 (2) sentence 1 of this Ordinance.

B General requirements

- (1) Waste water from chlor-alkali electrolysis units is recirculated into the manufacturing process whenever technically possible.
- (2) The waste water may not contain mercury or asbestos. These requirements are deemed to have been met if no mercury or asbestos is used in the production process in the chlor-alkali electrolysis unit.
- (3) The volume of waste water and chloride emissions are kept as low as possible. This is achieved by the following measures in particular:
 1. recycling of process streams from the chlor-alkali electrolysis unit;
 2. concentration of brine filtration sludges;
 3. recycling of salt-containing waste water from other production processes;
 4. use of waste water for solution mining.

In plants using membrane technology, the following additional measures are taken:

1. brine recirculation;
2. purification of the brine by nanofiltration or an equivalent process prior to recirculation into the electrolysis process.
- (4) Chlorate emissions are kept as low as possible. This is achieved by the following measures in particular:
 1. use of high-purity brine;
 2. brine acidification prior to electrolysis;
 3. acidic reduction of chlorate;
 4. catalytic reduction of chlorate;
 5. use of waste water streams containing chlorate in other production units.

In plants using membrane technology, the following additional measures are taken:

1. use of high-performance membranes;
2. use of high-performance electrodes and coatings.
- (5) On a scale commensurate with the risk, retention capacities are provided for waste water and measures are put in place for the proper reuse, treatment or disposal of retained waste water to prevent uncontrolled emissions in the event of unplanned operating conditions. The discharger undertakes a risk assessment to that end.
- (6) Proof of compliance with the general requirements is provided in an inventory of waste water streams. In addition to the data specified in no. 1 of Annex 2, the inventory of waste water streams contains information

on waste-water-generating synthesis processes, procedures and installations, including a representation of the main chemical reactions, in the form of chemical equations, and the most important side reactions.

(7) Waste water not requiring treatment is channelled separately from waste water which does require treatment.

C Requirements for waste water at the point of discharge

(1) The following requirements apply to waste water at the point of discharge into waters:

Parameter	Qualified random sample or two-hour composite sample
COD	50 mg/l
TOC	20 mg/l
Filterable matter	35 mg/l
Toxicity to fish eggs (LID _{egg})	2

D Requirements for waste water prior to blending

The waste water is subject to no requirements prior to blending with other waste water.

E Requirements for waste water at the point of origin

(1) The waste water must contain no more than 2.5 mg/l of adsorbable organically bound halogens (AOX) and 0.20 mg/l of free chlorine in random samples.

(2) The requirement set out in Part B (2) must be met at the point of origin.

F Requirements for established discharges

(1) By way of derogation from Part D, in respect of discharges from plants which were lawfully in operation before 1 March 2024 or the construction of which had lawfully been started on that date, the concentration of AOX in waste water from a chlor-alkali electrolysis unit using diaphragm technology must not exceed 3.0 mg/l in random samples prior to blending with other waste water.

(2) By way of derogation from Part B (7), in existing plants for the channelling of waste water requiring treatment which were lawfully in operation before 1 March 2024 or the construction of which had lawfully been started on that date, waste water not requiring treatment and waste water which does require treatment may be channelled together, with the consent of the competent authority.

G Requirements under waste legislation

No requirements under waste legislation apply.

H Operator obligations

(1) Operators measure the following parameters in the waste water at the point of discharge into waters in 24-hour composite samples collected proportionately according to flow as follows:

Parameter	Minimum frequency
TOC	once a week
Filterable matter	once a day
AOX	once a month
Heavy metals for which limits are set in the permit for discharge	once a month

For waste water streams which are demonstrated to fluctuate little in volumetric flow and concentration, the measurements may also be taken in samples proportionately collected across regular intervals, subject to official decision. If available data series demonstrate marked stability in the readings, the frequency of measurement may be reduced as specified by official decision.

(2) At least the following measurements are taken in the waste water at the point of origin:

Parameter	Sampling	Minimum frequency
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AOX, chlorate, chloride and free chlorine	Random sample	once a month
Copper, nickel, sulphate	Qualified random sample or two-hour composite sample	once a year
Free chlorine (redox potential)	continuous	continuous

(3) An annual report is written in accordance with no. 3 of Annex 2.

(4) The parameters set out in paragraphs (1) and (2) are measured in accordance with the analysis and measurement procedures set out in Annex 1 or officially recognised monitoring procedures. *Land* regulations regarding self-monitoring remain unaffected by the operator obligations set out in paragraphs (1) to (3).

Appendix 43

Manufacture of man-made fibres, films and sponge cloth using the viscose process and cellulose acetate fibres

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from one or more of the following areas of production, including the associated precursor stages:

1. viscose filament yarn;
2. viscose-based sponge cloth and artificial sausage casings;
3. cellophane;
4. cellulose acetate fibres.

It also applies to rainwater contaminated as a result of operational activities in that area.

(2) This Appendix does not apply to waste water from indirect cooling systems or process-water treatment.

(3) The requirements set out in Parts C (1), (3) and (4) and D (1) are emission limit values within the meaning of section 1 (2) sentence 1 of this Ordinance.

B General requirements

(1) The volume and pollution load of waste water are kept as low as possible by means of the following measures:

1. use of water-saving methods in washing and cleaning procedures (e.g. bobbin washing, tow washing, filtration cloth washing), such as multiple use of water, counter-current washing and recirculation;
2. condensation of vapours (e.g. arising from treatment of coagulation baths) by indirect cooling or a cooling-tower circuit;
3. use of waste-water-free processes to generate vacuums and purify exhaust air;
4. reduction of coagulation bath losses (e.g. arising from trough washing);
5. reprocessing and recirculation of excess lye;
6. recovery and reuse of acetic acid and acetone in the manufacture of cellulose acetate fibres;
7. use of pulp containing no more than 150 grams of organically bound halogens, measured as AOX (in accordance with Part 18 of DIN 38414 (July 2019 edition)) per tonne of pulp;
8. use of bleaching liquor which contain no chlorine or chlorine-releasing substances;
9. use of preparations which attain a degree of DOC elimination of 80% after 7 days in accordance with the procedure set out in no. 408 of Annex 1 to this Ordinance, or retention, recycling, separate disposal or treatment of unused preparations from the process of application to fibres and films, the preparation station and the delivery system;
10. pre-treatment of tributary waste water streams containing pollutants which cannot be adequately treated in the final waste water treatment, particularly organic compounds which have low biodegradability or cannot be eliminated by the final waste water treatment, volatile pollutants such as benzene and volatile halogenated organic compounds.

(2) Compliance with this requirement may be demonstrated by setting out the bleaching liquors used in a production log and providing evidence of their use while information from the manufacturers states that those bleaching liquors contain no chlorine or chlorine-releasing substances.

(3) Waste water not requiring treatment is channelled separately from waste water which does require treatment.

(4) On a scale commensurate with the risk, retention capacities are provided for waste water and measures are put in place for the proper reuse, treatment or disposal of retained waste water to prevent uncontrolled emissions in the event of unplanned operating conditions. The operator undertakes a risk assessment to that end.

(5) If there are two or more establishments generating waste water on the site, the holder of the permit for discharge establishes with those operationally responsible within the other establishments generating waste water, in an appropriate form, the tasks, responsibilities and interactions relating to proper waste water management.

(6) Proof of compliance with the general requirements is provided in an inventory of waste water streams. In addition to the data specified in no. 1 of Annex 2, the inventory of waste water streams contains the following information:

1. data on waste-water-generating synthesis processes, procedures and installations, including a representation of the main chemical reactions, in the form of chemical equations, and the most important side reactions;
2. data on the bioeliminability of the organic pollution load of the waste water streams.

(7) Waste water treatment plants within the meaning of section 60 (3) sentence 1 no. 2 of the Federal Water Act and the associated sewage systems and facilities for the dewatering of sewage sludge in connection with waste water management are constructed and operated in such a way as to avoid odour and noise emissions.

C Requirements for waste water at the point of discharge

(1) The following requirements apply to waste water from the areas specified in Part A (1) in respect of the point of discharge into waters:

Areas		1	2	3	4
Parameter	Qualified random sample or two-hour composite sample				
TOC	kg/t	7.0	7.0	17	0.70
COD	kg/t	20	20	50	2.0
N _{tot}	mg/l	10	50	10	10
P _{tot}	mg/l	2.0	2.0	2.0	2.0
Readily liberated sulphide	mg/l	0.30	0.30	0.30	–
LID _{egg}		2	2	2	2

(2) The output-based environmental performance value for COD in kg/t relates to the production capacity, expressed in tonnes of organic target product, on which the permit for discharge is based. The pollution loads are derived from the concentrations in qualified random samples or two-hour composite samples and the volumetric flow of waste water corresponding to the sampling.

(3) For TOC, filterable matter, TN_b and N_{tot}, if the annual loads specified below are exceeded, the concentration must not exceed the following annual averages:

Parameter	Annual load	Concentration (annual average)
TOC	3.3 t/year	33 mg/l ¹
Filterable matter	3.5 t/year	35 mg/l
TN _b ²	2.5 t/year	25 mg/l ^{3,4}
N _{tot} ²	2.0 t/year	20 mg/l ^{3,4}

¹ The annual average for TOC may be up to 100 mg/l if

- (a) the average rate of elimination over the year is at least 90% in pre-treatment and final treatment and,
- (b) in the case of biological treatment, at least one of the following conditions is satisfied:

- i. the BOD₅ value of the effluent is no greater than 20 mg/l and the COD affecting the sludge is no greater than 0.25 kg per kilogram of dry organic matter in the sludge or
- ii. the configuration and operation of the treatment plant are designed for targeted nitrification.

² Either the annual average for TN_b or the annual average for N_{tot} applies.

³ The annual averages for TN_b and N_{tot} do not apply to waste water treatment plants without biological waste water treatment or no waste water from areas of production 1, 3 or 4.

⁴ For waste water from area of production 2, the annual averages for TN_b and N_{tot} may be up to 40 mg/l and 35 mg/l respectively if the average rate of elimination over the year is at least 70% in both pre-treatment and final treatment.

(4) For adsorbable organically bound halogens (AOX) and heavy metals, if the annual loads specified below are exceeded, the concentration must not exceed the following annual averages:

Parameter	Annual load	Concentration
AOX	100 kg/year	1.0 mg/l
Total chromium	2.5 kg/year	0.025 mg/l
Copper	5.0 kg/year	0.050 mg/l
Nickel	5.0 kg/year	0.050 mg/l
Zinc	30 kg/year	0.30 mg/l ¹

¹ The annual average does not apply to waste water with a main pollution load originating from the production of viscose fibres.

(5) The parameters set out in paragraphs (3) and (4) are measured in accordance with Part H (1). The results of those measurements are equivalent to the results of public monitoring. Section 6 (1) of this Ordinance does not apply.

D Requirements for waste water prior to blending

(1) The following requirements apply to waste water from the areas specified in Part A (1) prior to blending with other waste water:

Areas		1	2	3	4
Parameter	Qualified random sample or two-hour composite sample				
Zinc	mg/l	1.0			
Copper	g/t				7.0
AOX	g/t	40	30	30	8.0

The values specified for AOX relate to random samples.

(2) For waste water from bobbin washing, tow washing, spinning and coagulation bath treatment in the manufacture of viscose filament yarn, the output-based environmental performance value for zinc must not exceed 8.0 kg/t.

(3) The output-based environmental performance values in g/t and kg/t relate to the production capacity, expressed in tonnes of organic target products, on which the permit for discharge is based. The pollution loads are derived from the concentrations in qualified random samples or two-hour composite samples – or, for AOX, in random samples – and the volumetric flow of waste water corresponding to the sampling.

E Requirements for waste water at the point of origin

Waste water from washing and rinsing baths must contain only surfactants which attain a degree of DOC degradation of 80% after 28 days in accordance with the procedure set out in no. 406 of Annex 1 to this Ordinance.

F Requirements for established discharges

(1) By way of derogation from Part D, for established discharges of waste water from bobbin washing, tow washing, spinning and coagulation bath treatment, when the manufacturing process applied involves integrated yarn washing within the spinning machine, the applicable output-based environmental performance value for zinc is 12 kg/t, calculated in accordance with Part D (3).

(2) By way of derogation from Part B (3), in existing plants for the channelling of waste water requiring treatment which were lawfully in operation before 1 March 2024 or the construction of which had lawfully been started on that date, waste water not requiring treatment and waste water which does require treatment may be channelled together, with the consent of the competent authority.

G Requirements under waste legislation

No requirements under waste legislation apply.

H Operator obligations

(1) Operators measure the following parameters in the waste water at the point of discharge into waters in 24-hour composite samples collected proportionately according to flow as follows:

Parameter	Minimum frequency
TOC	once a day
Filterable matter	once a day
N _{tot} or TN _b	once a day
P _{tot}	once a day
AOX	once a month
Total chromium, copper, nickel, zinc, lead	once a month
Other heavy metals for which limits are set in the permit for discharge	once a month

For waste water streams which are demonstrated to fluctuate little in volumetric flow and concentration, the measurements may also be taken in samples proportionately collected across regular intervals, subject to official decision. If available data series demonstrate marked stability in the readings, the frequency of measurement may be reduced as specified by official decision.

(2) The annual average for the parameters set out in Part C (3) and (4) are derived from the results of the measurements specified in paragraph (1).

(3) An annual report is written in accordance with no. 3 of Annex 2.

(4) The parameters set out in paragraph (1) are measured in accordance with the analysis and measurement procedures set out in Annex 1 or officially recognised monitoring procedures. *Land* regulations regarding self-monitoring remain unaffected by the operator obligations set out in paragraphs (1) to (3).

Appendix 45 Petroleum refining

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from the processing of petroleum (crude oil) and the resultant products in refineries. This includes refineries solely or partly engaged in the production of lubricating oils.

(2) This Appendix does not apply to waste water from hydrocarbon production, indirect cooling systems or process-water treatment.

(3) The requirements set out in Parts C (1) and (3) and D (1) and (3) are emission limit values within the meaning of section 1 (2) sentence 1 of this Ordinance.

B General requirements

The volume and pollution load of waste water are kept as low as possible by means of the following measures:

1. multiple use of tributary water streams;
2. pre-treatment of tributary waste water streams containing pollutants which cannot be adequately treated in the final waste water treatment;
3. segregation of waste water not requiring treatment from waste water which does require treatment;
4. recovery of solvents used in base oil production by means of closed-loop processes;
5. neutralisation of the hydrofluoric acid from the alkylation process or precipitation of the hydrofluoric acid by addition of CaCl₂, AlCl₃ or other suitable substances and separation of the resultant sediment;
6. regeneration of the sulphuric acid from the alkylation process and neutralisation of the resultant tributary waste water stream.

C Requirements for waste water at the point of discharge

(1) The following requirements apply to waste water at the point of discharge into waters:

	Qualified random sample or two-hour composite sample (mg/l)
Total organic carbon (TOC)	25
Chemical oxygen demand (COD)	80
Biochemical oxygen demand over five days (BOD ₅)	15
Total nitrogen as the sum of ammoniacal, nitrite and nitrate nitrogen (N _{tot})	20
Total phosphorus	1.3
Total hydrocarbons	1.5

(2) Without prejudice to the requirements set out in paragraph (1), the permit for discharge sets pollution loads calculated by multiplying those values by a specific waste water volume of 0.5 m³ per tonne of feedstock. For the production of lubricating oils, that calculation is based on a specific waste water volume of 1.3 m³ per tonne of feedstock.

(3) At the point of discharge into waters, the waste water must not exceed the following annual averages:

	mg/l
Filterable matter	25
Total bound nitrogen (TN _b)	25
Chemical oxygen demand (COD)	80

The parameters set out in sentence 1 are measured in accordance with Part H (1) sentence 1 no. 1 (a) and (c). The results of those measurements are equivalent to the results of public monitoring. Section 6 (1) of this Ordinance does not apply.

D Requirements for waste water prior to blending

(1) The waste water is subject to the following requirements prior to blending with other waste water:

	Qualified random sample or two-hour composite sample (mg/l)	Random sample (mg/l)
Phenol index after distillation and dye extraction	0.10	
Adsorbable organically bound halogens (AOX)		0.10
Readily liberated sulphide	0.40	
Readily liberated cyanide		0.070

(2) In addition to the requirements set out in paragraph (1), pollution loads are set on the basis of the concentrations specified there and a specific waste water volume of 0.5 m³ per tonne of feedstock. For the production of lubricating oils, that calculation is based on a specific waste water volume of 1.3 m³ per tonne of feedstock.

(3) Prior to blending with other waste water, the waste water must not exceed the following annual averages:

	mg/l
Lead	0.030
Cadmium	0.0080
Nickel	0.10
Mercury	0.0010
Benzene	0.050

The parameters set out in sentence (1) are measured in accordance with Part H (1) sentence 1 no. 2 (a) and (b). The results of those measurements are equivalent to the results of public monitoring. Section 6 (1) of this Ordinance does not apply. Sentences 1 to 4 do not apply in respect of refineries engaged in the production of lubricating oil.

E Requirements for waste water at the point of origin

For waste water from deparaffining, adsorbable organically bound halogens (AOX) must not exceed 0.5 mg/l in random samples.

F Requirements for established discharges

For established discharges of waste water from plants which were lawfully in operation before 31 August 2018 or the construction of which had lawfully been started on that date, the TOC requirements set out in Part C (1) and the COD requirements set out in Parts C (3) and H (1) no. 1 (c) apply from 31 August 2021. Until 31 August 2021, Part H (1) no. 1 (a) applies subject to the stipulation that COD is measured once a day instead of TOC.

G Requirements under waste legislation

No requirements under waste legislation apply.

H Operator obligations

(1) At least the following measurements are taken in the waste water:

1. At the point of discharge into waters, the following parameters are measured in two-hour composite samples or qualified random samples as follows:
 - (a) daily measurement of TOC, total hydrocarbons, filterable matter and TN_b;
 - (b) weekly measurement of BOD₅;
 - (c) annual measurement of COD.
2. Prior to blending with other waste water, the following parameters are measured in two-hour composite samples or qualified random samples as follows:
 - (a) monthly measurement of the phenol index, benzene, toluene, ethyl benzene and xylene;
 - (b) quarterly measurement of lead, cadmium, nickel, mercury and vanadium.

For refineries engaged in the production of lubricating oils, sentence 1 applies subject to the stipulation that only the phenol index is measured.

- (2) The annual average for the parameters set out in Parts C (3) and D (3) are derived from the results of the measurements specified in paragraph (1).
- (3) An annual report is written in accordance with no. 3 of Annex 2.
- (4) The parameters set out in paragraph (1) are measured in accordance with the analysis and measurement procedures set out in Annex 1 or officially recognised monitoring procedures. *Land* regulations regarding self-monitoring remain unaffected by the operator obligations set out in paragraphs (1) to (3).

Appendix 46 Hard coal coking

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from the carbonisation of hard coal.

(2) This Appendix does not apply to waste water from the processing of coal products, such as tar, phenolate lye, crude carboic acid and benzole, or to waste water from indirect cooling systems or process-water treatment.

(3) The requirements set out in Parts C (1) and D (1) are emission limit values within the meaning of section 1 (2) sentence 1 of this Ordinance.

B General requirements

(1) In the case of wet quenching of coke, the quantity of intake water used is kept to a minimum and the quenching water is reused as much as possible. Other process waters may be reused only if they do not exceed the concentrations set out in the tables in Parts C (1) and D (1).

(2) Activated sludge from waste water treatment facilities treating waste water within the meaning of Part A (1) is fed into the coal input system of the coking plant.

C Requirements for waste water at the point of discharge

(1) The following requirements apply to waste water at the point of discharge into waters:

	Qualified random sample or two-hour composite sample	
	g/t	mg/l
Biochemical oxygen demand over five days (BOD ₅)	9.0	20
Chemical oxygen demand (COD)	–	220
Total nitrogen as the sum of ammoniacal, nitrite and nitrate nitrogen (N _{tot})	9.0	35
Total bound nitrogen (TN _b)	12	–
Total phosphorus	–	2.0

(2) A concentration must be set for chemical oxygen demand (COD) in the effluent in qualified random samples or two-hour composite samples which represents a reduction in COD of at least 90%. The reduction refers to the ratio between the COD load in the influent and that in the effluent of the waste water treatment plant over a representative period of time not exceeding 24 hours.

(3) The output-based environmental performance values (g/t) relate to the coking capacity on which the permit for discharge is based, expressed as a quantity of coal feedstock with a water content of 10% by mass over two hours. If coal with a lower water content is used, the coking capacity figures are converted to reflect that water content. The pollution loads are derived from the concentrations in qualified random samples or two-hour composite samples and the volumetric flow of waste water corresponding to the sampling.

D Requirements for waste water prior to blending

(1) The waste water is subject to the following requirements prior to blending with other waste water:

	Qualified random sample or two-hour composite sample	
	g/t	mg/l
Benzene and derivatives	0.03	–
Readily liberated sulphide	0.03	0.1
Polycyclic aromatic hydrocarbons (PAH)	0.015	0.05
Phenol index after distillation and dye extraction	0.15	0.5
Thiocyanate (SCN ⁻)	–	4.0
Readily liberated cyanide	0.03	0.1
Toxicity to fish eggs (LID _{egg})	2	

(2) The requirements for readily liberated sulphide, phenol index, thiocyanate, readily liberated cyanide and toxicity to fish eggs (LID_{egg}) cease to apply if, prior to discharge, the waste water is additionally treated in a biological treatment system together with other waste water and, following that treatment, meets the requirements for size category 4 set out in Part C of Annex 1. In such cases, the discharger analyses those parameters at the point of discharge at least once a year and communicates the results of that analysis to the competent authority.

(3) The output-based environmental performance values (g/t) relate to the coking capacity, expressed as a quantity of coal feedstock with a water content of 10% by mass over two hours, on which the permit for discharge is based. If coal with a lower water content is used, the coking capacity figures are converted to reflect that water content. The pollution loads are derived from the concentrations in qualified random samples or two-hour composite samples and the volumetric flow of waste water corresponding to the sampling.

E Requirements for waste water at the point of origin

The waste water is subject to no additional requirements in respect of the point of origin.

F Requirements for established discharges

For established discharges of waste water, the requirements set out in Part A (3) must be met by 8 March 2016 at the latest. By way of derogation from sentence 1, the requirements set out in Part C (1) for total phosphorus and total nitrogen as the sum of ammoniacal, nitrite and nitrate nitrogen (N_{tot}) apply from 6 September 2014. Analyses within the meaning of Part D (2) sentence 2 must be carried out from 8 March 2016.

Appendix 47 Combustion plants

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from the operation of combustion plants.

(2) This Appendix does not apply to waste water from

1. cooling systems for power plants and industrial processes;
2. other points of origin associated with steam generation or process-water treatment;
3. plants where only waste is incinerated or
4. combustion plants without wet flue-gas scrubbing which have a rated thermal input of less than 50 MW.

(3) The requirements set out in Part C (1), except the TOC and COD requirements, and Part D are emission limit values within the meaning of section 1 (2) sentence 1 of this Ordinance.

B General requirements

(1) The volume and pollution load of waste water are kept as low as possible by means of the following measures:

1. recirculation of process water for multiple use;
2. operational use of rainwater requiring treatment;
3. operation of the flue-gas scrubber with the maximum concentration of chloride which the equipment permits, to reduce heavy metal pollution;
4. cooling of bottom ash by circulation of cooling water or by air cooling or
5. treatment of waste water using a suitable combination of precipitation, flocculation, neutralisation, filtration, ion exchange, membrane technology, addition of adsorbents and other suitable processes.

(2) Prior to treatment, waste water requiring treatment may not be blended with waste water which does not require treatment.

C Requirements for waste water at the point of discharge

(1) The following requirements apply to waste water from flue-gas scrubbing at the point of discharge into waters:

	Qualified random sample or two-hour composite sample
Filterable matter	30 mg/l

Chemical oxygen demand (COD) – use of quicklime	80 mg/l
– use of limestone	150 mg/l
Total organic carbon (TOC) – use of quicklime	25 mg/l
– use of limestone	50 mg/l
Sulphate	2,000 mg/l
Sulphite	10 mg/l
Dissolved fluoride	15 mg/l
Toxicity to fish eggs (LID _{egg})	2

(2) For COD and TOC, the permit for discharge may take into account the pre-existing pollution load present in the water at the time of abstraction from waters (prior pollution) if the subtracted pollution load is still present at the time of discharge into waters.

(3) By way of derogation from section 6 (1) sentence 1 of this Ordinance, the greatest permissible degree by which the parameters set out in paragraph (1) may be exceeded is 50%.

D Requirements for waste water prior to blending

The waste water from flue-gas scrubbing is subject to the following requirements prior to blending with other waste water:

	Qualified random sample or two-hour composite sample (mg/l)
Arsenic	0.050
Cadmium	0.0050
Mercury	0.0030
Total chromium	0.050
Nickel	0.050
Copper	0.050
Lead	0.020
Zinc	0.20
Thallium	0.050
Readily liberated sulphide	0.10

E Requirements for waste water at the point of origin

The waste water is subject to no additional requirements in respect of the point of origin.

F Requirements for established discharges

For established discharges of waste water, the requirement set out in Part B (1) no. 4 does not apply.

G Requirements under waste legislation

No requirements under waste legislation apply.

H Operator obligations

(1) Operators of combustion plants which have a rated thermal input equal to or greater than 50 MW take at least the following measurements in waste water at the point of discharge into waters:

1. continuous measurement of pH, temperature and volumetric flow of waste water;

2. monthly measurement in qualified random samples or two-hour composite samples of
 - (a) all the parameters set out in Parts C (1) and D except LID_{egg} and
 - (b) chloride and TN_b ;
 3. measurement of the volumetric flow of waste water corresponding to the sampling specified in no. 2.
- (2) An annual report is written in accordance with no. 3 of Annex 2.
- (3) The parameters set out in paragraph (1) are measured in accordance with the analysis and measurement procedures set out in Annex 1 or officially recognised monitoring procedures. *Land* regulations regarding self-monitoring remain unaffected by the operator obligations set out in paragraphs (1) and (2).

Appendix 49

Waste water containing mineral oils

A Scope

- (1) This Appendix applies to waste water with a pollution load originating primarily from establishments where the depreservation, cleaning, maintenance, repair and reclamation of vehicles and parts of vehicles regularly generate waste water containing mineral oils.
- (2) This Appendix does not apply to waste water from
1. the treatment of bilge, slop and ballast water from ships;
 2. metal working and processing and paint shops;
 3. interior cleaning of transport containers.

B General requirements

- (1) The pollution load is kept as low as possible by means of the following measures:
1. all possible recirculation of washing water in automated vehicle-cleaning facilities;
 2. avoidance of additional contamination of waste water resulting from measures to reduce the growth of micro-organisms in recirculation systems.
- (2) In addition to the provisions of paragraph (1), on the basis of an assessment of feasibility in each individual case, the pollution load is kept as low as possible by means of the following measures:
1. waste-water-free operation of the workshop;
 2. recirculation of washing water from the cleaning of vehicle parts and depreservation;
 3. minimisation of mineral-oil contamination of rainwater;
 4. prevention of waste water discharges from the recirculation systems of automated vehicle-cleaning facilities except via the post-treatment reservoir.
- (3) The waste water may not contain
1. organic complexing agents which do not attain a degree of DOC elimination of at least 80% after 28 days in accordance with the procedure set out in no. 406 of Annex 1 to this Ordinance;
 2. organically bound halogens originating from detergents, cleaning agents or other operating and auxiliary materials.

Compliance with these requirements may be demonstrated by setting out all the detergents, cleaning agents and other operating and auxiliary materials used in a production log while information from the manufacturers states that they contain none of the detergents, cleaning agents or other substances or groups of substances specified.

C Requirements for waste water at the point of discharge

The following requirements apply to waste water at the point of discharge into waters:

	Qualified random sample or two-hour composite sample (mg/l)
Chemical oxygen demand (COD)	150
Biochemical oxygen demand over five days (BOD_5)	40

D Requirements for waste water prior to blending

The waste water is subject to no additional requirements prior to blending with other waste water.

E Requirements for waste water at the point of origin

(1) The concentration of total hydrocarbons in the waste water must not exceed 20 mg/l in random samples. This requirement does not apply where the waste water volume is less than 1 m³ per day.

(2) The requirement set out in paragraph (1) sentence 1 is also deemed to have been met if a waste water treatment plant authorised by a general building control permit for the restriction of hydrocarbons in waste water containing mineral oils or otherwise authorised under *Land* legislation is installed, operated and serviced on a regular basis in accordance with that authorisation and inspected in accordance with *Land* legislation, both before commissioning and at regular intervals not exceeding five years, to verify that it is in proper working order.

(3) Only waste water which contains only detergents and cleaning agents conducive to separation and unstable emulsions which will not compromise the cleaning capacity of the system may be channelled into light liquid separators. "Conducive to separation" within the meaning of this Appendix refers to cleaning agents which form temporary or unstable emulsions in conjunction with light liquids; that is to say, emulsions which separate following the cleaning process.

(4) The requirement set out in paragraph (1) sentence 1 is also deemed to have been met in respect of waste water from automated vehicle-cleaning facilities if surplus water is removed from the recirculation system via the post-treatment reservoir.

(5) The point of origin of the waste water is the effluent from the pre-treatment facility for waste water containing hydrocarbons.

F Requirements for established discharges

For established discharges of waste water from plants which were lawfully in operation before 1 June 2000 or the construction of which had lawfully been started on that date, the following derogating requirements apply:

1. The pollution load requirement set out in Part B (1) no. 1 applies subject to an assessment of feasibility in each individual case.
2. In respect of waste water from automated vehicle-cleaning facilities, the requirement for total hydrocarbons set out in Part E (1) is deemed to have been met.
3. Calculations to determine waste water volume within the meaning of Part E (1) sentence 2 do not count waste water from automated vehicle cleaning.

Appendix 50 Dental treatment

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from treatment stations in dental practices and dental clinics where amalgam occurs.

(2) This Appendix does not apply to waste water from film development or sanitary facilities.

B General requirements

There are no requirements supplementing those set out in section 3.

C Requirements for waste water at the point of discharge

No additional requirements apply to waste water at the point of discharge into waters.

D Requirements for waste water prior to blending

The waste water is subject to no additional requirements prior to blending with other waste water.

E Requirements for waste water at the point of origin

(1) The amalgam load in untreated waste water from treatment stations is reduced by 95% at the point of origin.

(2) The requirements set out in paragraph (1) are deemed to have been met if

1. an amalgam separator authorised by a general building control permit or otherwise authorised under *Land* legislation is installed and operated at the waste water outlet of treatment stations prior to blending with other sanitary waste water and achieves a level of retention efficiency of at least 95%;
2. waste water arising during handling of amalgam is channelled via the amalgam separator;

3. techniques are used for the suctioning of waste water from treatment stations which keep the volume of water used low enough to allow the amalgam separator to maintain the prescribed level of efficiency;
4. the amalgam separator is serviced and emptied on a regular basis in accordance with the relevant authorisation, and a written record is kept of these activities in paper or electronic form (servicing reports, acceptance certificates for retained material) and
5. the amalgam separator is inspected in accordance with *Land* legislation, both before commissioning and at regular intervals not exceeding five years, to verify that it is in proper working order.

F Requirements for established discharges

There are no derogating requirements for established discharges.

G Requirements under waste legislation

The retained amalgam is collected in a suitable container and, in addition to the requirements set out in Part E, reclaimed for recycling in accordance with the applicable hygiene provisions and, if the retained material is waste within the meaning of the Circular Economy Act (*Kreislaufwirtschaftsgesetz*), the provisions of waste legislation.

Appendix 51

Above-ground landfill of waste

A Scope

This Appendix applies to waste water with a pollution load originating primarily from the above-ground landfill of waste.

B General requirements

The volumetric flow and pollution load of the leachate are kept as low as the state of the art permits by suitable measures employed during establishment and operation of landfill sites.

C Requirements for waste water at the point of discharge

- (1) The following requirements apply to waste water at the point of discharge into waters:

	Qualified random sample or two-hour composite sample	
Chemical oxygen demand (COD)	mg/l	200
Biochemical oxygen demand over five days (BOD ₅)	mg/l	20
Total nitrogen as the sum of ammoniacal, nitrite and nitrate nitrogen (N _{tot})	mg/l	70
Total phosphorus	mg/l	3
Total hydrocarbons	mg/l	10
Nitrite nitrogen (NO ₂ -N)	mg/l	2
Toxicity to fish eggs (LID _{egg})	2	

(2) By way of derogation from paragraph (1), for waste water which may be expected to contain more than 4,000 mg/l of chemical oxygen demand (COD) prior to treatment, the concentration of COD in the effluent must represent a reduction of at least 95% in qualified random samples or two-hour composite samples. The reduction in COD refers to the difference between the pollution load in the influent and the pollution load in the effluent from the waste water treatment plant 24 hours later. The pollution load in the influent is determined in accordance with the expected capacity of the plant on which the permit for discharge is based. The scale of the reduction is assessed on the basis of measurements and the mode of operation of the waste water treatment plant.

(3) The requirement for total hydrocarbons relates to random samples. It does not apply to waste water from the landfill of municipal waste.

(4) The requirement for total nitrogen applies at a waste water temperature of 12°C and above in the effluent from the biological reactor of the waste water treatment plant. A value specified for total nitrogen is also

deemed to have been complied with if it is determined and complied with as “total bound nitrogen (TN_b)”. The permit for discharge may authorise a higher total nitrogen concentration of up to 100 mg/l, if the reduction in the nitrogen load is at least 75%. The reduction refers to the ratio between the nitrogen load in the influent and that in the effluent over a representative period of time not exceeding 24 hours. Those loads are calculated on the basis of total bound nitrogen (TN_b).

D Requirements for waste water prior to blending

(1) The waste water is subject to the following requirements prior to blending with other waste water:

	Qualified random sample or two-hour composite sample (mg/l)
Adsorbable organically bound halogens (AOX)	0.5
Mercury	0.05
Cadmium	0.1
Total chromium	0.5
Chromium VI	0.1
Nickel	1
Lead	0.5
Copper	0.5
Zinc	2
Arsenic	0.1
Readily liberated cyanide	0.2
Readily liberated sulphide	1

The values specified for AOX, chromium IV, readily liberated cyanide and readily liberated sulphide relate to random samples.

(2) Waste water may not be blended with other waste water, except waste water originating from plants for the biological treatment of waste, for the purpose of joint biological treatment unless fulfilment of at least one of the following conditions can be expected:

1. With regard to toxicity to fish eggs, luminescent bacteria and daphnia in representative waste water samples, the following values are not exceeded following an elimination test conducted using a laboratory-scale continuous-flow biological treatment system (coming within the scope, for example, of DIN 38412-L 26):

Toxicity to fish eggs	LID _{egg} = 2
Toxicity to daphnia	LID _D = 4 and
Toxicity to luminescent bacteria	LID _{LB} = 4.

Measures such as nitrification in laboratory-scale biological treatment systems or maintenance of pH levels are used to ensure that ammonia (NH₃) does not cause the LID_{egg} value to be exceeded. Waste water may be diluted as required to start up the laboratory-scale biological treatment system. In the event of a lack of nutrients, nutrients may be added. No dilution water may be added during the test period.

2. A 75% degree of DOC elimination is achieved in accordance with the procedure set out in no. 408 of Annex 1 to this Ordinance.
3. Prior to joint biological treatment with other waste water, the waste water already has a COD concentration of less than 400 mg/l.

Appendix 52

Dry cleaning

A Scope

This Appendix applies to waste water with a pollution load originating primarily from the dry cleaning of textiles, carpets, and fur and leather goods using solvents containing halogenated hydrocarbons in accordance with the Second Ordinance on the Implementation of the Federal Immission Control Act as amended.

B General requirements

There are no requirements supplementing those set out in section 3.

C Requirements for waste water at the point of discharge

No additional requirements apply to waste water at the point of discharge into waters.

D Requirements for waste water prior to blending

(1) Prior to blending with other waste water, the adsorbable organically bound halogens (AOX) in the waste water must not exceed the following values:

Capacity of the dry-cleaning machine	Concentration in random samples (mg/l)	Per-hour pollution load relative to capacity for material to be treated and volume of water per hour (mg/kg)
Up to 50 kg of material to be treated	0.5	–
More than 50 kg of material to be treated	0.5	0.25

(2) If two or more dry-cleaning machines are run in the same establishment, the relevant size category is derived from the sum of all units' capacity for material to be treated.

(3) The relevant value set for AOX in paragraph (1) is also deemed to have been met if the halogenated hydrocarbon content of the waste water is determined via the individual substances used and the total, expressed as chlorine, does not exceed the value specified in paragraph (1).

(4) The values set out in paragraph (1) sentence 1 are also deemed to have been complied with if a waste water treatment plant authorised by a control permit or otherwise authorised under *Land* legislation is installed, operated and serviced in accordance with that authorisation and inspected in accordance with *Land* legislation, both before commissioning and at regular intervals not exceeding five years, to verify that it is in proper working order.

E Requirements for waste water at the point of origin

Waste water may contain only those halogenated solvents which may be used in dry cleaning under the Second Ordinance on the Implementation of the Federal Immission Control Act of 10 December 1990 (Federal Law Gazette I, p. 2694). This requirement is deemed to have been met if it is demonstrated that only permitted halogenated hydrocarbons are used.

Appendix 53

Photographic processes (silver-halide photography)

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from photographic processes associated with silver-halide photography or from the treatment of liquid waste from those processes. Part B applies to the point of origin of the waste water.

(2) This Appendix does not apply to waste water from

1. indirect cooling systems and process-water treatment;
2. other photochemical processes not covered by paragraph (1);
3. establishments with a throughput of film and paper not exceeding 200 m² per year and not generating waste water from the treatment of baths.

B General requirements

- (1) The pollution load is kept as low as possible by means of the following measures:
1. separate collection of fixing, developing, bleaching and bleach-fix baths and spillages for bath treatment;
 2. reduction of bath carry-over by means of suitable procedures such as spray protection and film and paper transport protected from carry-over;
 3. saving of rinsing water by means of suitable procedures such as cascade rinsing, water-saving programs and recirculation;
 4. recirculation of fixing baths for recycling where the throughput of film and paper exceeds 3,000 m² per year, except for X-ray and microfilm processing;
 5. recirculation of fixing baths, bleach-fix baths, bleaching baths and colour developers for recycling where the throughput of film and paper exceeds 30,000 m² per year.
- (2) Waste water from the treatment of bleaching and bleach-fix baths may not contain organic complexing agents which do not attain a degree of DOC degradation of 80% after 28 days in accordance with the procedure set out in no. 406 of Annex 1 to this Ordinance.
- (3) No chlorine or hypochlorite may be used to treat baths.
- (4) Compliance with the requirements set out in paragraphs (2) and (3) may be demonstrated by setting out the operating and auxiliary materials used in a production log and providing evidence of their use while information from the manufacturers states that the operating and auxiliary materials used contain none of the substances which must not occur in the waste water.

C Requirements for waste water at the point of discharge

No additional requirements apply to waste water at the point of discharge into waters.

D Requirements for waste water prior to blending

- (1) The waste water is subject to the following requirements prior to blending with other waste water:

1. Waste water from the treatment of baths

	Qualified random sample or two-hour composite sample (mg/l)	Random sample (mg/l)
Silver	0.7	–
Adsorbable organically bound halogens (AOX)	–	0.5
Total chromium	0.5	–
Chromium VI	–	0.1
Tin	0.5	–
Mercury	0.05	–
Cadmium	0.05	–
Total cyanide	2	–

2. Rinsing water

In establishments with a throughput of film and paper exceeding 3,000 m² per year, discharges of rinsing water must not exceed the following environmental performance values, differentiated according to size of establishment, for silver:

Throughput of film and paper in m ² per year	Silver content in mg/m ²
>3,000 and up to 30,000 – black-and-white and X-ray photography – colour photography	50 70
>30,000	30

(2) The requirement set for silver for establishments with a throughput of film and paper of more than 3,000 m² and up to 30,000 m² per year is also deemed to have been met if a waste water treatment plant authorised by a general building control permit or otherwise authorised under *Land* legislation or an equivalent facility for the reduction of silver pollution is installed and operated, serviced on a regular basis in accordance with that authorisation and inspected in accordance with *Land* legislation, both before commissioning and at regular intervals not exceeding five years, to verify that it is in proper working order.

Appendix 54

Manufacture of wafers and solar cells

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from the manufacture of wafers for semiconductor devices and solar cells, including the concomitant pre-treatment, intermediate operations and after-treatment.

(2) This Appendix does not apply to waste water from indirect cooling systems or process-water treatment, including retentates from the treatment of ultrapure water using membrane technology.

B General requirements

The pollution load is kept as low as possible, based on an examination of the conditions in each individual case, by means of the following measures:

1. use of water-saving rinsing methods (e.g. intermittent rinsing, dip-and-spray rinsing, low electrical conductivity);
2. multiple use of suitable rinsing water following appropriate processing, such as recirculation via ion exchangers or membrane technology;
3. multiple use of suitable rinsing water, including reuse in other areas, such as cooling and process water for steam generation or in recooling plants, electroplating shops or the manufacture of printed circuit boards;
4. recirculation of waste gas scrubbing water;
5. reuse or recycling of process baths (e.g. acids and organic solvents).

C Requirements for waste water at the point of discharge

At the point of discharge into waters, toxicity to fish eggs must not exceed a dilution factor of $LID_{egg} = 2$.

D Requirements for waste water prior to blending

The waste water is subject to the following requirements prior to blending with other waste water:

	Qualified random sample or two-hour composite sample (mg/l)	Random sample (mg/l)
Adsorbable organically bound halogens (AOX)	–	0.5
Arsenic	0.2	–
Benzene and derivatives	0.05	–

E Requirements for waste water at the point of origin

(1) At the point of origin, waste water from cleaning processes may contain only those halogenated solvents which are permitted under the Second Ordinance on the Implementation of the Federal Immission Control Act as amended. This requirement is also deemed to have been met if it is demonstrated that only permitted halogenated solvents are used. Moreover, VHHC (sum of trichloroethene, tetrachloroethene, 1,1,1-trichloroethane and dichloromethane – calculated as chlorine) must not exceed 0.1 mg/l in random samples.

(2) Without prejudice to the requirements set out in paragraph (1), waste water from electroplating processes must not exceed the following values:

	Random sample (mg/l)
Lead	0.5
Total chromium	0.5
Chromium VI	0.1
Copper	0.5
Nickel	0.5
Silver	0.1
Tin	2
Readily liberated sulphide	1
Readily liberated cyanide	0.2
Free chlorine	0.5

The values set for chromium VI and readily liberated cyanide must not be exceeded; section 6 (1) does not apply. The waste water must contain no ethylene diamine tetraacetic acid (EDTA) or salts thereof.

(3) The concentration of arsenic in the waste water must not exceed 0.3 mg/l in random samples.

(4) The concentrations of cadmium and selenium in the waste water must not exceed 0.2 mg/l and 1 mg/l respectively in random samples.

Appendix 55

Laundries

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from the washing of dirty textiles, carpets, mats and nonwovens in industrial establishments and public facilities.

(2) This Appendix does not apply to waste water from

1. wool-scouring plants;
2. textiles cleaning in non-aqueous liquors;
3. textiles manufacturing and finishing;
4. the preparation and processing of textile fibres, wool and animal hair;
5. the washing of filter textiles and filter fleece;
6. the washing of household textiles in coin-operated laundrettes with self-service washing machines;
7. the washing of household textiles, hotel and restaurant textiles or other comparable textiles where no chloroorganic or chlorine-releasing detergents and auxiliary washing preparations or elementary chlorine are used;
8. indirect cooling systems.

B General requirements

(1) The waste water may not contain

1. organic complexing agents (except phosphonates) which attain a degree of DOC elimination of less than 80% after 28 days in accordance with the procedure set out in no. 406 of Annex 1 to this Ordinance;
2. residues from filters or sieves or residues of detergent, auxiliary washing preparations or other auxiliary materials arising from the emptying of packets, containers or dispensing tanks;
3. biocides from laundry finishing dips;
4. organically bound halogens originating from the use as solvents during pre-cleaning of laundry;

5. chloroorganic and chlorine-releasing compounds or chlorine from the use of detergents and auxiliary washing preparations, unless they are used in a clear rinsing zone or clear rinsing bath for the washing of hospital or residential-home laundry or work clothes for the meat- and fish-processing industry.
- (2) If chlorination chemicals are used to treat process water, they are administered in such doses as to ensure a maximum anticipated free chlorine concentration of 1 mg/l in the influent to the washing machine.
- (3) Compliance with the requirements set out in paragraph (1) may be demonstrated by setting out all the detergents and auxiliary materials used in a production log while information from the manufacturers states that they contain none of the substances or groups of substances specified in paragraph (1).

C Requirements for waste water at the point of discharge

The following requirements apply to waste water at the point of discharge into waters:

	Qualified random sample or two-hour composite sample (mg/l)
Chemical oxygen demand (COD)	100
Biochemical oxygen demand over five days (BOD ₅)	25
Total nitrogen as the sum of ammoniacal, nitrite and nitrate nitrogen (N _{tot})	20
Total phosphorus	2

D Requirements for waste water prior to blending

- (1) Waste water from the following areas is subject to the following requirements prior to blending with other waste water:

Area	AOX g/t
Hospital and residential-home laundry	18
Work clothes from the meat- and fish-processing industry	40

These requirements do not apply if laundry of these categories makes up 10% or less of the establishment's washing capacity.

- (2) The requirements set out in paragraph (1) are also deemed to have been met if the discharger demonstrates that, as a result of the use of suitable washing procedures, the waste water stream can be expected not to exceed the value for AOX.
- (3) The specific environmental performance values set out in paragraph (1) relate to the washing capacity on which the permit for discharge is based (dry weight of laundry). In the case of continuous washing systems, the pollution load is derived from the concentrations in a random sample and the volumetric flow of waste water corresponding to the sampling; in the case of washer-extractors operating discontinuously, it is derived from the concentrations in a random sample of the combined waste water of the washing programme and the volumetric flow of that waste water.
- (4) The AOX requirement specified in paragraph (1) above for waste water from hospital and residential-home laundry does not apply in the event of an outbreak of a reportable infectious disease.
- (5) The following requirements apply to waste water from the washing of cleaning cloths, work clothes, carpets and mats prior to blending with other waste water:

	Qualified random sample or two-hour composite sample (mg/l)
Total hydrocarbons	20
AOX	2

Copper	0.5
Total chromium	0.5
Nickel	0.5
Lead	0.5
Cadmium	0.1
Mercury	0.05
Zinc	2
Arsenic	0.1

The requirements for total hydrocarbons and AOX relate to random samples.

(6) The requirements set out in paragraph (5) are also deemed to have been met if a waste water treatment plant authorised by a general building control permit for this field or otherwise authorised under *Land* legislation is installed, operated and serviced on a regular basis in accordance with that authorisation and inspected in accordance with *Land* legislation, both before commissioning and at regular intervals not exceeding five years, to verify that it is in proper working order.

Appendix 56

Production of printing blocks, printed materials and graphic products

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from the following areas, including the production of printing blocks and the concomitant pre-treatment, intermediate operations and after-treatment:

1. setting and reproduction;
2. relief printing;
3. offset printing (planographic printing);
4. screen printing (stencil printing) and
5. intaglio printing.

(2) This Appendix does not apply to waste water from textile print shops (except facilities for printing-block production, such as printing templates and cylinders), silver-halide photography, indirect cooling systems or process-water treatment.

(3) This Appendix likewise does not apply to waste water from establishments engaged in setting and reproduction, relief printing, offset printing and/or screen printing if their consumption of intake water is below 250 m³ per year, their waste water is treated in a biological treatment system and does not include the following waste water streams:

1. setting and reproduction:
 - waste water containing chromium or zinc from the processing of cartography transparencies or colour transparencies;
2. relief printing:
 - (a) waste water from the cleaning of machines, systems and printing blocks with adhesions of printing inks or waste water from cleaning processes using hydrocarbons;
 - (b) waste water from the manufacture of metal printing blocks;
3. offset printing:
 - (a) waste water from the etching of multi-metal plates;
 - (b) waste water from automated processes for cleaning machines, systems and printing blocks with adhesions of printing inks which involve simultaneous use of cleaning agents;
 - (c) negative-plate developers containing copper;

- (d) dampening water;
- 4. screen printing:
 - (a) waste water from cleaning or coating-removal processes when substances containing heavy metals are used (with the exception of copper from phthalocyanine pigments);
 - (b) waste water from cleaning or coating-removal processes which involve simultaneous use of hydrocarbons, halogenated hydrocarbons or active chlorine;
 - (c) waste water from the production of metal screens.

B General requirements

- (1) The pollution load is kept as low as possible by means of the following measures:
 - 1. multiple use or recirculation via regeneration or purification steps to extend the service life of process solutions;
 - 2. separation and treatment of aqueous and solvent-containing tributary streams in intaglio printing;
 - 3. avoidance of rinsing water consumption by recirculation into process baths in intaglio printing;
 - 4. separate collection and recycling of preheating water in intaglio printing;
 - 5. rinsing water saving in the processing of printing blocks in offset and screen printing by means of suitable procedures such as cascade rinsing or recirculation rinsing technology.
- (2) The waste water may not contain
 - 1. organic complexing agents which attain a degree of DOC degradation of less than 80% after 28 days in accordance with the procedure set out in no. 406 of Annex 1 to this Ordinance;
 - 2. operating or auxiliary materials containing chlorine or chlorine-releasing substances or organically bound halogens from solvents, detergents or cleaning agents;
 - 3. arsenic, mercury, cadmium or their compounds or pigments containing lead or chromium, except lead, cadmium and their compounds from pigments used in ceramic stencil printing;
 - 4. organic solvents from textile water-roller cleaning in offset printing or
 - 5. residues of process chemicals, inks or auxiliary substances arising from the emptying of packets, containers or dispensing tanks;

The requirements set out in nos. 1 to 4 are deemed to have been met if the operating and auxiliary materials and process chemicals used are set out in a production log, evidence of their use is provided and information from the manufacturers states that they contain none of the substances or groups of substances specified in sentence 1.

C Requirements for waste water at the point of discharge

The following requirements apply to waste water at the point of discharge into waters:

	Qualified random sample or two-hour composite sample	
Chemical oxygen demand (COD)	mg/l	160
Biochemical oxygen demand over five days (BOD ₅)	mg/l	25
Total phosphorus	mg/l	2
Total nitrogen as the sum of ammoniacal, nitrite and nitrate nitrogen (N _{tot})	mg/l	50
Total hydrocarbons	mg/l	10
Iron	mg/l	3
Aluminium	mg/l	3
Toxicity to fish eggs (LID _{egg})		4

The requirement for hydrocarbons relates to random samples.

D Requirements for waste water prior to blending

(1) The following requirements apply to waste water from the areas specified in Part A (1) prior to blending with other waste water:

Areas	1	2	3	4	5
	Qualified random sample or two-hour composite sample (mg/l)				
Adsorbable organically bound halogens (AOX)	–	1	1	1	1
Lead	–	–	–	1	–
Cadmium	–	–	–	0.1	–
Total chromium	1	1	1	1	1
Cobalt	–	–	1	1	–
Copper	1	1	1	1	1
Nickel	–	–	–	–	2
Silver	–	–	–	0.5	0.5
Zinc	2	2	2	2	2

The requirement for AOX relates to random samples, as do all requirements in the case of batch-processing plants.

(2) Where pigments containing heavy metals are used for ceramic screen printing in area 4, the applicable value for filterable matter is 30 mg/l in qualified random samples or two-hour composite samples.

E Requirements for waste water at the point of origin

(1) In waste water containing benzene and derivatives, these must not exceed a concentration of 10 mg/l in random samples.

(2) In waste water containing chromium, the concentration of chromium VI must not exceed 0.1 mg/l in random samples.

(3) In waste water from intaglio printing which contains cyanide, the concentration of readily liberated cyanide must not exceed 0.2 mg/l in random samples.

Appendix 57 Wool-scouring plants

A Scope

(1) This Appendix applies to waste water with a pollution load originating primarily from the scouring and carbonising of raw wool and the anti-felting finishing of wool top.

(2) This Appendix does not apply to waste water from process-water treatment or cooling systems or to rainwater.

B General requirements

(1) With the exception of rinsing water, waste water from the scouring of raw wool may not be discharged into waters.

(2) The pollution load is kept as low as possible by means of the following measures:

1. waste-water-free pre-cleaning of drums and containers;
2. use of organic complexing agents which attain a degree of DOC degradation of 80% after 28 days in accordance with the procedure set out in no. 406 of Annex 1 to this Ordinance.

(3) The waste water may not contain

1. alkylphenol ethoxylates (APEO) from detergents and cleaning agents;
 2. surfactants and other surface-active agents which do not meet the biodegradability requirements laid down in section 3 of the Detergents and Cleaning Products Act (*Wasch- und Reinigungsmittelgesetz*) read in conjunction with the Surfactants Ordinance (*Verordnung über die Abbaubarkeit anionischer und nichtionischer grenzflächenaktiver Stoffe in Wasch und Reinigungsmitteln*) of 30 January 1977 (Federal Law Gazette I, p. 244), as amended by the Ordinance of 4 June 1986 (Federal Law Gazette I, p. 851).
- (4) Compliance with the requirements set out in paragraph (3) may be demonstrated by setting out all the operating and auxiliary materials used in a production log while information from the manufacturers states that they contain none of the substances or groups of substances specified in paragraph (3).

C Requirements for waste water at the point of discharge

- (1) The following requirements apply to waste water at the point of discharge into waters:

	Qualified random sample or two-hour composite sample		
	mg/l	kg/t	
Chemical oxygen demand (COD)	150	1.5	
Biochemical oxygen demand over five days (BOD ₅)	10	0.1	
Total nitrogen as the sum of ammoniacal, nitrite and nitrate nitrogen (N _{tot})	30	0.3	
Total bound nitrogen (TN _b)	40	0.4	
Total phosphorus	2	0.02	
Toxicity to fish eggs (LID _{egg})			2
Toxicity to daphnia (LID _D)			2

- (2) The output-based environmental performance values (kg/t) set out in paragraph (1) relate to the raw-wool-processing capacity on which the permit for discharge is based.
- (3) The requirements for total nitrogen and total bound nitrogen (TN_b) apply at a waste water temperature of 12°C and above in the effluent from the biological reactor of the waste water treatment plant.

D Requirements for waste water prior to blending

Prior to blending with other waste water, toxicity to daphnia must not exceed a dilution factor of LID_D = 2. This requirement ceases to apply if toxicity to daphnia can be expected not to exceed a dilution factor of LID_D = 2 in a representative waste water sample – original or following an elimination test conducted using a laboratory-scale continuous-flow biological treatment system (coming within the scope, for example, of DIN 38412-L 26).

E Requirements for waste water at the point of origin

Waste water from anti-felting finishing of wool top may not contain chlorine or chlorine-releasing compounds from pre-treatment of the top. This requirement is deemed to have been met if it is demonstrated that no chlorine or chlorine-releasing compounds are used.

Amendments:

19 October 2007	Federal Law Gazette I, No 52, p. 2461 , entry into force: 26 October 2007
31 July 2009	Federal Law Gazette I, No 51, pp. 2585 and 2617 , entry into force: 1 March 2010 Act Revising Water Legislation (<i>Gesetz zur Neuregelung des Wasserrechts</i>)
24 February 2012	Federal Law Gazette I, No 10, pp. 212 and 249 , entry into force: 1 June 2012
2 May 2013	Federal Law Gazette I, No 21, pp. 973 and 1017 , entry into force: 2 May 2013
2 September 2014	Federal Law Gazette I, No 42, p. 1474 , entry into force: 6 September 2014
1 June 2016	Federal Law Gazette I, No 26, p. 1290 , entry into force: 9 June 2016
10 March 2017	Federal Law Gazette I, No 12, pp. 420 and 423 , entry into force: 1 January 2018 Article 16 of the Act Dissolving the Federal Spirits Monopoly Administration (<i>Branntweinmonopolverwaltung-Auflösungsgesetz</i>)
29 March 2017	Federal Law Gazette I, No 16, pp. 626 and 645 , entry into force: 5 April 2017 Article 121 of the Act Lifting Dispensable Hard-Copy Requirements in Federal Administrative Law (<i>Gesetz zum Abbau verzichtbarer Anordnungen der Schriftform im Verwaltungsrecht des Bundes</i>)
22 August 2018	Federal Law Gazette I, No 31, p. 1327 , entry into force: 31 August 2018
6 March 2020	Federal Law Gazette I, No 11, p. 485 , entry into force: 13 March 2020
16 June 2020	Federal Law Gazette I, No 28, p. 1287 , entry into force: 31 August 2018/24 June 2020
20 January 2022	Federal Law Gazette I, No 28, p. 1287 , entry into force: 28 January 2022 Eleventh Ordinance Amending the Waste Water Ordinance (<i>Elfte Verordnung zur Änderung der Abwasserverordnung</i>)
27 February 2024	Federal Law Gazette I 2024, No 66 , entry into force: 1 March 2024 Twelfth Ordinance Amending the Waste Water Ordinance (<i>Zwölfte Verordnung zur Änderung der Abwasserverordnung</i>)
17 April 2024	Federal Law Gazette I 2024, No 132 , entry into force: 20 April 2024 Ordinance Amending the Waste Water Ordinance and Amending the Radiation Protection Ordinance (<i>Verordnung zur Änderung der Abwasserverordnung und zur Änderung der Strahlenschutzverordnung</i>)

*) Parts of this Ordinance also serve to implement the following directives:

- Council Directive 82/176/EEC of 22 March 1982 on limit values and quality objectives for mercury discharges by the chlor-alkali electrolysis industry (Official Journal (OJ) 1982 L 81, p. 29)
- Council Directive 83/513/EEC of 26 September 1983 on limit values and quality objectives for cadmium discharges (OJ 1983 L 291, p. 1)
- Council Directive 84/156/EEC of 8 March 1984 on limit values and quality objectives for mercury discharges by sectors other than the chlor-alkali electrolysis industry (OJ 1984 L 74, p. 49 and L 99, p. 38)
- Council Directive 84/491/EEC of 9 October 1984 on limit values and quality objectives for discharges of hexachlorocyclohexane (OJ 1984 L 274, p. 11 and L 296, p. 11)
- Council Directive 86/280/EEC of 12 June 1986 on limit values and quality objectives for discharges of certain dangerous substances included in List I of the Annex to Directive 76/464/EEC (carbon tetrachloride, DDT, pentachlorophenol) (OJ 1986 L 181, p. 16)
- Council Directive 87/217/EEC of 19 March 1987 on the prevention and reduction of environmental pollution by asbestos (OJ 1987 L 855, p. 40)
- Council Directive 88/347/EEC of 16 June 1988 amending Annex II to Directive 86/280/EEC on limit values and quality objectives for discharges of certain dangerous substances included in List I of the Annex to Directive 76/464/EEC (aldrin, dieldrin, endrin, isodrin, hexachlorobenzene, hexachlorobutadiene and chloroform) (OJ 1988 L 158, p. 35)
- Council Directive 90/415/EEC of 27 July 1990 amending Annex II to Directive 86/280/EEC on limit values and quality objectives for discharges of certain dangerous substances included in list I of the Annex to Directive 76/464/EEC (1,2-dichloroethane, trichloroethylene, perchloroethylene and trichlorobenzene) (OJ 1990 L 219, p. 49)
- Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment (OJ 1991 L 135, p. 40)
- Council Directive 92/112/EEC of 15 December 1992 on procedures for harmonizing the programmes for the reduction and eventual elimination of pollution caused by waste from the titanium dioxide industry (OJ 1992 L 409, p. 11)
- Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control (OJ 1996 L 257, p. 26)
- Commission Directive 98/15/EC of 27 February 1998 amending Council Directive 91/271/EEC with respect to certain requirements established in Annex I thereof (OJ 1998 L 67, p. 29)

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- Directive 2000/76/EC of the European Parliament and of the Council of 4 December 2000 on the incineration of waste (OJ 2000 L 332, p. 91 and OJ 2001 L 145, p. 52)