

MINISTRY OF ENVIRONMENTAL PROTECTION, PHYSICAL PLANNING AND CONSTRUCTION

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Pursuant to Article 50 of the Air Protection Act (Official Gazette 178/04), the Minister of Environmental Protection, Physical Planning and Construction hereby passes the

ORDINANCE

ON MONITORING POLLUTANT EMISSIONS FROM STATIONARY SOURCES INTO THE AIR

Article 1

(1) This Ordinance prescribes the method for monitoring (measuring) emissions from stationary sources, measuring procedures, methods for verifying measuring instrument accuracy and checking of measuring instruments, procedure for the evaluation of results, method for delivery of data for the purpose of the emission information system and method for regularly informing the public on monitoring emissions.

(2) Provisions of this Ordinance refer to the first, random, special measurements (hereinafter referred to as: individual measurements) and continuous measurements of emissions from stationary sources.

(3) Stationary sources to which the provisions of this Ordinance apply are prescribed under the Regulation on limit values of pollutant emissions from stationary sources into the air (hereinafter referred to as: Regulation on ELVs).

Article 2

For the purposes of this Ordinance:

- *measuring procedure* means a set of procedures, described according to type, which is used to carry out individual measurements in accordance with a particular method,
- *emission dimensions* means mass concentrations of a pollutant in waste gas, emitted mass flow of a pollutant and emission factor,
- *waste gas parameters* means parameters of the state of waste gas (temperature, pressure), waste gas composition, blackening and smoke number, including other physical qualities for which limit emission values are determined by the Regulation on ELVs,
- *working conditions* means type of work, method and working regime, load, power i.e. capacity of installation or device, and type, amount and quality of the incoming materials (raw material, fuel and other additives), and functioning of the waste gas purification device,
- *waste gas sample* means part of the waste gas flow, analysed at a certain measurement site, within a certain period of time, in a certain way, and which is considered relevant for the waste gases of the pollutant source,
- *waste gas extractive analysis* means waste gas sampling from the sewer and analysis of gases outside of the sewer,
- *non-extractive waste gas analysis* means waste gas sampling in which gas analysis is carried out inside the sewer,

- *automatic measurement* means measurement of emission dimensions along with continuous extractive or non-extractive sample analysis, reading of the measured values over periods of time not longer than 10 s and storing the measured values. Values measured in such a way are instantaneous emission values,
- *manual measurement* means measurement of emission dimensions with single or repeated waste gas sampling of a certain volume and over a certain time, along with additional extractive analysis of the waste gases. Values measured in such a way are equal to the average values of the emission dimensions during sampling,
- *measuring instrument* means device designed to carry out measurement, individually or in relation to additional devices,
- *availability of the measuring instrument* means the proportion of working hours of the measuring instrument during the operating time of the stationary source and the total number of working hours of the stationary source over the monitoring period,
- *averaging period* means time period for which the average values of emission dimensions are calculated,
- *duration of the stationary source effective operating time* means duration of the stationary source activity, excluding the start-up and shut-off phases of the stationary source,
- *standard conditions* means conditions at the temperature of 273 K and absolute pressure of 101,3 kPa,
- *adjustment* means the procedure for bringing the measuring instrument into the technical condition appropriate for its usage,
- *measuring instrument checking* means a set of procedures that is used in certain conditions to establish a relation between the values of the dimensions displayed by the measuring instrument, or the values displayed by a substance measure or a reference substance, and the corresponding values determined as standard, which is carried out in accordance with a prescribed measurement procedure,
- *verification of measuring instrument accuracy* means a set of procedures designed to verify if the measuring instrument has a systematic error, which is carried out in compliance with measurement requirements.

Article 3

Monitoring pollutant emissions from stationary sources into the air shall be done by a legal person, which is professionally and technically equipped pursuant to requirements of the HRN EN ISO/IEC 17025 standard.

Article 4

- (1) Individual and/or continuous measurement of pollutant emissions into the air shall be carried out at the stationary source exhaust (hereinafter referred to as: measurement site), unless otherwise prescribed by the Regulation on ELVs.
- (2) Individual measurement of emission at the stationary source with predominantly stable working conditions shall be carried out at standard working conditions and during effective operating time of the stationary source.

Article 5

- (1) The measurement site must be accessible and equipped so as to ensure that the measurement is carried out properly and without any danger for the operator.
- (2) Individual and continuous emission measurements shall be conducted at the same measurement sites, unless otherwise prescribed by the Regulation on ELVs.
- (3) When conducting measurements of emission dimensions for an individual stationary source, it is necessary to ensure that the waste gases from this stationary source do not mix

with the waste gases from other stationary sources, unless otherwise prescribed by the Regulation on ELVs.

(4) Additional measuring instruments for supervising measurement shall not be positioned on the inner side of the waste gas pipeline so as to prevent the deposition of particles.

Article 6

Working conditions created in the course of measurement shall be determined by means of installed operating devices. In case the operating measurements do not include all working conditions which need to be determined, appropriate measuring equipment shall be required, or these values shall be determined in a different manner (e.g. by calculation).

Article 7

(1) Methods for measuring emission values and waste gas parameters from stationary sources shall be applied pursuant to requirements of the standards referred to in Annex 1 of this Ordinance.

(2) Apart from the prescribed measurement methods, other measurement methods may be used. Results obtained by other measurement methods must be equal to the results obtained through applying measurement methods referred to in Annex 1 of this Ordinance, which shall be confirmed by submitting a written report on the conducted measurement.

Article 8

(1) With regard to individual measurements, the owner and/or user of the stationary source shall be obligated to ensure the measuring of:

- emission dimensions for which the limit values for stationary sources are prescribed by the Regulation on ELVs, and
- waste gas parameters for which the limit emission values for stationary sources are prescribed by the Regulation on ELVs.

(2) With regard to individual measurements, unless otherwise prescribed by the Regulation on ELVs, the following does not need to be measured:

- oxygen volume share, if the Regulation on ELVs does not prescribe the oxygen volume share,
- mass flow, if the Regulation on ELVs does not prescribe the limit value for substance quantity in waste gas, and
- waste gas parameters if their values do not change or may be determined differently.

Article 9

(1) Individual measurements shall be carried out by automatic and/or manual measurement. Measuring instruments used for individual measurements of pollutant emissions shall meet the requirements of the standards referred to in Annex 1 of this Ordinance.

(2) The legal person conducting individual measurements shall ensure regular maintenance of the measuring instruments for individual measurement (servicing, adjustment, instrument checking, accuracy verification).

(3) A measuring instrument must have the confirmation on instrument checking for the individual measurement.

(4) Checking of the measuring instrument shall be carried out pursuant to prescribed measurement methods and requirements of the HRN EN ISO/IEC 17025 standard.

(5) In case there is no prescribed frequency for instrument checking of the measuring instruments used for individual measurements, instrument checking shall be conducted at least once a year.

(6) Data on the checking of the measuring instrument used for individual measurements shall be stored for five years.

Article 10

(1) A measuring instrument used for individual measurement of pollutant emissions from stationary sources shall be subject to accuracy verification at least twice a year.

(2) Data on accuracy verification of the measuring instrument used for individual measurement shall be stored for five years.

Article 11

(1) Continuous measurements shall be carried out by automatic measurement of the emission dimensions during uninterrupted operating time of the stationary source.

(2) The measuring system for continuous measurement of pollutant emissions shall comprise measuring instruments and an automatic system for continuous recording, storing, processing of the measured values and data transfer to the central unit.

(3) The measuring instrument for continuous emission measurement must comply with the following conditions:

- reliability and long-lasting continuous work,
- field of work of the measuring instrument must ensure recording of all figures of the measured dimension, provided that the minimum value of the upper measurement limit shall be at least 2,5 times greater than the ELV of the measured pollutant,
- the sampling system must ensure that the proper sample is taken to the measuring instrument (sufficient flow, proper purification, prevention of condensation, etc.),
- being equipped with an internal system for operational evaluation,
- ensuring manual testing of operation, functioning and accuracy,
- being equipped with a sound signal indicating the exceedence of the emission limit value.

(4) The automatic system for continuous recording, storing, processing and transfer of data must provide the following:

- record and storing of all measurement results and values of the relevant waste gas parameters and parameters of the operating regime of the stationary source,
- evaluation of the measurement results, i.e. values of determined emission dimensions and values of the waste gas parameters,
- daily, monthly and annual reporting.

Article 12

(1) The owner and/or user of the stationary source shall ensure the functioning and undisrupted work of the measuring system for continuous measurement and protection from unauthorised usage.

(2) The owner and/or user of the stationary source shall be obligated to ensure regular maintenance of the measuring instruments used for continuous measurement (servicing, adjustment, instrument checking, testing), and to keep records on important characteristics (irregularities during work, work interruptions, causes of malfunction, instrument checking, etc.)

(3) A measuring instrument used for continuous measurement must have the confirmation on instrument checking.

(4) Instrument checking of the measuring instrument used for continuous measurement shall be carried out pursuant to prescribed measurement methods and requirements of the HRN EN ISO/IEC 17025 standard.

(5) In case there is no prescribed frequency of instrument checking for the measuring instruments used for continuous measurements, instrument checking shall be conducted at least twice a year.

(6) Data on instrument checking of the measuring instrument used for continuous measurements shall be stored for five years.

Article 13

(1) A measuring instrument used for continuous measurement of pollutant emissions from stationary sources shall be subject to accuracy verification at least once a year.

(2) Data on accuracy verification of the measuring instrument used for continuous measurement shall be stored for five years.

Article 14

(1) Evaluation of results of the emission measurement shall be carried out by comparing the measurement results with prescribed limit values according to the Regulation on ELVs.

(2) In case the maximum value of the result of the E pollutant measurement (E_{mj}) is equal to or smaller than the prescribed limit value (E_{gr}), regardless of the expressed measurement uncertainty,

$$E_{mj} < E_{gr}$$

the stationary source of pollution shall be regarded as being compliant with the requirements of the Regulation on ELVs.

(3) If the maximum value of the result of the pollutant measurement is greater than the prescribed limit value, but remains within the area of measurement uncertainty, i.e. provided that:

$$E_{mj} + [\mu E_{mj}] \leq E_{gr}$$

where:

$[\mu E_{mj}]$ is the absolute measurement uncertainty value of the figure of the pollutant emission dimension, determined by measurement

the stationary source of pollution shall be regarded as being compliant with the requirements of the Regulation on ELVs.

(4)

If the maximum value of the pollutant measurement result increased by the measurement uncertainty is greater than the prescribed limit value, i.e. provided that:

$$E_{mj} + [\mu E_{mj}] > E_{gr}$$

where:

$[\mu E_{mj}]$ is the absolute measurement uncertainty value of the figure of the pollutant emission dimension, determined by measurement

the stationary source of pollution shall be regarded as not being compliant with the requirements of the Regulation on ELVs.

(5) The measurement uncertainty figure shall depend on measurement methods applied and characteristics of measuring instruments used, and shall be determined pursuant to measurement methods laid down in Annex 1 of this Ordinance.

Article 15

(1) Results of individual measurement shall be expressed as half hourly average values in accordance with the applied measurement method referred to in Annex 1 of this Ordinance.

(2) Half hourly average values shall be recalculated to the volume unit of dry or humid waste gases at standard conditions and reference oxygen volume share.

(a) Recalculation to dry waste gases:

Recalculation of mass concentration of pollutants in humid gases into dry gases shall be carried out according to the equation:

$$E_s = E_v \cdot \frac{100}{100 - e_{H_2O}}$$

where:

E_s is the mass concentration in dry waste gases in mg/m³

E_v is the mass concentration in humid waste gases in mg/m³

e_{H_2O} is the moisture content in waste gases in volume %

(b) *Recalculation to standardised situation (standard conditions):*

If mass concentrations of pollutants measured for the waste gas situation in the pipeline differ from the standardised situation, the recalculation to the standardised situation shall be carried out according to the equation:

$$E_N \leq E_{sk} \cdot \frac{101,3}{P} \cdot \frac{T}{273}$$

where:

E_N is the concentration for standardised situation in mg/m³

E_{sk} is the concentration for situation in the pipeline in mg/m³

P is the absolute pressure in the pipeline in kPa,

T is the absolute temperature in the pipeline in K

(c) *Recalculation to reference oxygen volume share:*

Recalculation of mass concentrations to reference oxygen volume share in waste gases shall be carried out according to the equation:

$$E_n \leq \frac{21 - O_{2n}}{21 - O_{2mj}} \cdot E_{mj}$$

where:

E_n is the mass concentration in mg/m³ for the reference oxygen volume share

E_{mj} is the mass concentration mg/m³ for the measured oxygen volume share

O_{2n} is the prescribed value of oxygen contained in the waste gas in volume %

O_{mj} is the measured oxygen share contained in the waste gas in volume %.

Article 16

(1) When referring to automatic individual measurement, the half hourly average value shall be valid if at least 50% of the instantaneous values within the half hourly period have been measured correctly. When referring to small combustion devices and other pollutant sources, if there is no possibility for the half hourly continuous operating time of the source, the averaging period may last less than half an hour.

(2) The half hourly average value in manual individual measurement shall equal to the average value measured during waste gas sampling, the duration of which may be different than half an hour. The sampling period shall comply with the prescribed measurement method.

(3) If the period of determining the average value for the individual pollutant from the stationary source, is prescribed by the Regulation on ELVs, the average value for the prescribed determination period may be calculated and expressed instead of the half hourly value.

Article 17

(1) In relation to small combustion devices using solid fuel and where fuelling is done manually, the emission measurement shall commence five minutes after supplying the device with an amount of fuel ensuring the required thermal load.

(2) Individual measurement referred to in paragraph 1 of this Article is based on the calculation of 15 minute average values. Determined emission dimensions shall represent the half hourly values.

Article 18

In relation to small combustion devices using liquid fuel, the emission measurement may commence two minutes after achieving the required thermal load.

Article 19

(1) Results of continuous measurement shall be expressed as half hourly and daily average values.

(2) Instantaneous mass concentration values for each pollutant included in measurement shall be recalculated to the volume unit of dry or humid waste gases at standard conditions.

(3) Half hourly average values shall be calculated pursuant to recalculated mass concentration values. Half hourly average values shall be recalculated to the reference oxygen volume share in the waste gases.

(4) The half hourly average value shall be valid if at least 50% of instantaneous values within the half hourly period have been measured correctly, and if all instantaneous values are measured during the stationary source effective operating time.

(5) The daily average value shall be calculated each day, using all valid half hourly average values. The daily average value shall be considered valid if at least twelve valid half hourly average values are available for the calculation of the daily average value.

Article 20

(1) In case of reasonable doubt on the reliability of the result and/or measurement, the user and/or owner of the stationary source shall ensure the special verification of the measuring instrument accuracy. Accuracy verification shall be carried out by the legal person authorised to evaluate compliance.

(2) The user and/or owner shall be obliged to store the report on verification of accuracy of the measuring instrument for five years.

Article 21

The verification method for the quality of measurement and data, method for analysis and presentation of results, and evaluation of their reliability and credibility shall be carried out according to requirements of the HRN EN ISO/IEC 17025 standard.

Article 22

(1) Report on each individual measurement shall comprise the following:

- data on the legal person conducting the measurement,
- data on the legal person, the owner and/or user the air pollution source and data on their field of work,
- data on the main technical characteristics of the pollution source, on the purpose and type of measurement, and on the emission dimensions subject to measurement,
- data on the measurement sites, sampling and measurement location, including illustration within the installation process scheme,
- data on applied provisions, measurement procedures and measuring instruments,
- data on conducting individual measurements, characteristics of the plant operations and operational details, operating conditions (type and quantity of used fuel, load, situation with the gas purification device etc.) and waste gas parameters,
- results of each individual measurement,
- comparison between measured emission dimensions and limit values,
- name and signature of the person in charge of measurement and drawing up the report .

(2) Confirmation on the accuracy verification of the measuring device or measurement system used for conducting measurement, and confirmation on conducted instrument checking, shall be enclosed to the report referred to in paragraph 1 of this Article.

Article 23

The results of continuous measurements shall be collected in daily, monthly and annual reports.

Article 24

(1) Daily report on continuous measurement in form of a table shall comprise the following:

- data on the legal person, the owner and/or user of the stationary source,
- date, mark of the stationary source exhaust and name of the installation,
- half hourly local time (from 00:00 to 24:00 hrs),
- operational parameters of included pollution sources, operating conditions, note on the start-up and shut-off phases, load, type and quantity of fuel),
- measured half hourly average values (including values outside of the period of effective operating time of the source) all measured dimensions (polluting substance, oxygen volume share in waste gases and waste gas temperature), reference oxygen content, limit values for all measured substances,
- daily average value of the relevant working conditions,
- valid daily average value of the measured dimensions,
- emission limit value allowed for all measured pollutants.

(2) Monthly report on continuous measurement in the form of a table shall comprise the following:

- data on the legal person, the owner and/or user of the stationary source,
- calendar month, mark of the stationary source exhaust and name of the installation,
- total monthly operating time of the plant in hours, and duration of effective operating time,
- number and percentage of the valid half hourly average values greater than 1,2 ELV for each day and each pollutant separately,
- number and percentage of the valid half hourly average values greater than 2 ELV for each day and each pollutant separately,
- number and percentage of the valid daily average values exceeding the ELV for each pollutant,

- availability of the measuring instrument and total number of hours within the stationary source operating time, when there was no measurement conducted for each measured substance separately,
- the longest uninterrupted period of the stationary source operating time without measurements for each substance separately.

(3) Annual report on continuous measurement in the form of a table shall comprise the following:

- data on the legal person, the owner and/or user of the stationary source,
- calendar year, mark of the stationary source exhaust and name of the installation,
- total operating time of the plant in hours, duration of effective operating time, total number of days in which ELV exceedences occurred for each pollutant separately,
- data on the days in which ELV exceedences occurred: date, number and percentage of the valid half hourly average values greater than 1,2 ELV for each pollutant separately, number and percentage of the valid half hourly average values greater than 2 ELV for each pollutant separately, number and percentage of the valid daily average values exceeding the ELV for each pollutant separately,
- availability of the measuring instrument and total number of hours within the stationary source operating time, when there was no measurement conducted for each measured substance separately,
- the longest uninterrupted period of the stationary source operating time without measurements for each substance separately.

(4) With regard to processes of thermal waste treatment, monthly and annual reports must contain the number and percentage of half hourly average values exceeding the ELV.

Article 25

The owner and/or user of the stationary source shall be obligated to store daily and monthly reports for two years, whilst the report on individual measurement and annual report on continuous measurement shall be stored for five years.

Article 26

The owner and/or user of the stationary source shall submit the annual report on individual measurements and continuous measurement to the Environmental Protection Agency no later than 31 March of the current year for the previous calendar year.

Article 27

(1) The information system on monitoring emissions shall be lead by the Environmental Protection Agency and supervised by the Ministry of Environmental Protection, Physical Planning and Construction.

(2) The owner and/or user of the measuring system for continuous emission measurement shall be obligated to ensure continuous data transfer by the computer network into the information system on monitoring emissions.

Article 28

The Environmental Protection Agency shall produce the annual report on monitoring emissions on the territory of the Republic of Croatia on the basis of collected and analysed data from the annual reports on measuring pollutant emissions from stationary sources into the air and other available data on emissions, and shall submit it to the Ministry of Environmental Protection, Physical Planning and Construction of the current year for the previous calendar year.

Article 29

The Ministry of Environmental Protection, Physical Planning and Construction and the Environmental Protection Agency shall publish on their websites the annual report on monitoring emissions of pollutants into the air on the territory of the Republic of Croatia.

Transitional and final provisions

Article 30

The annual report referred to in Article 26 of this Ordinance shall be produced in the year 2006 according to available data from the year 2005.

The annual report on monitoring pollutant emissions from stationary sources into the air on the territory of the Republic of Croatia referred to in Article 28 of this Ordinance shall be produced in the year 2006 according to data referred to in paragraph 1 of this Article.

Article 31

The provisions of Article 3 of this Ordinance shall apply as of 1 January 2007.

Article 32

The provisions of Article 27 paragraph 2 of this Ordinance shall apply as of 1 January 2007.

Article 33

Annex 1 with its corresponding content shall be published along with this Ordinance and shall form a constituent part thereof.

Article 34

This Ordinance shall enter into force on the eighth day from its publication in the Official Gazette.

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Zagreb, 27 December 2005

Minister

Marina Matulović Dropulić, m.p.

ANNEX 1

LIST OF STANDARDS FOR MEASURING EMISSION DIMENSIONS AND WASTE GAS PARAMETERS

Emission dimensions and parameters	Standard ⁽¹⁾
Measuring velocity and volumetric gas flow in the pipeline	HRN ISO 10780:1997
Determining oxygen volume share – reference method: paramagnetism	HRN EN 14789:2005
Determining mass concentration of solid particles – manual gravimetric method	HRN ISO 9096:1997 HRN EN 13284-1:2001
Determining mass concentration of solid particles – automatic monitoring of mass substance concentrations	HRN ISO 10155:1997 HRN EN 13284-2:2004

Smoke number	DIN 51402-1
Waste gas blackening	BS 2742
Determining mass concentration of sulphur dioxide – hydrogen peroxide/barium perchlorate/thorin method	HRN ISO 7934:1997
Determining mass concentration of sulphur dioxide	HRN EN 14791:2005
Determining mass concentration of sulphur dioxide – working characteristics of automatic measurement methods	HRN ISO 7935:1997
Determining gas concentrations:	
– sampling for automatic determination	HRN ISO 10396:1997
– averaging	HRN ISO 9169:1998
Determining the total emission of As, Cd, Cr, Co, Cu, Mn, Ni, Pb, Sb, Tl and V	HRN EN 14385:2004
Manual method for determining HCl – gas sampling	HRN EN 1911-1:1998
Manual method for determining HCl – absorption of gas compounds	HRN EN 1911-2:1998
Manual method for determining HCl – absorption analysis and calculation	HRN EN 1911-3:1998
Determining mass concentration of oxides of nitrogen – working characteristics of automatic measurement methods	HRN ISO 10849:1996
Determining mass concentration of oxides of nitrogen – reference method: chemiluminescence	HRN EN 14792:2005
Determining mass concentration of total organic carbon in small waste gas concentration – reference method: continuous flame ionisation	HRN EN 12619:1999
Determining mass concentrations of total organic carbon in waste gas during processes in which solvents are used – reference method: continuous flame ionisation	HRN EN 13526:2001
Determining mass concentration of certain gaseous organic compounds – reference method: active carbon and solvent desorption	HRN EN 13649:2001
Manual method for determining concentration of total mercury	HRN EN 13211:2001
Determining mass concentration of dioxins and furans:	

– sampling	HRN EN 1948-1:1996
– extraction	HRN EN 1948-2:1996
– identification and quantification	HRN EN 1948-3:1996
Ensuring quality of automatic measurement systems	HRN EN 14181:2004

⁽¹⁾ For monitoring pollutant emissions from stationary sources into the air for which there are no CEN standards, national or ISO measurement methods may be used instead. Other measurement methods may be used if proved equivalent.

PROVISIONAL TRANSLATION