INZRAK

Enhanced environmental protection inspection for efficient control of air quality monitoring and of all entities under obligation within system of greenhouse gas emission allowance trading, in order to achieve better air quality in Republic of Croatia

REPUBLIKA HRVATSKA
MINISTARSTVO ZAŠTITE OKOLIŠA I ENERGETIKE

EKONERG

safu SREDIŠNJA AGENCIJA ZA FINANCIRANJE I UGOVARANJE

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INZRAK

12. Air quality data

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12.1 DATA TYPES

- **There are different types of data**
  - Network and Station information (Metadata)
  - Measurement data
    - Source data
    - Validated data
  - Statistical data

12.1 DATA TYPES

MEASUREMENT DATA

- **Source data**
  - These are individual hourly "raw" values obtained by automatic continuous air quality measurement (UTD - Up To Date Data (NRT Near Real Time)

- **Validated data**
  - measured values obtained by automatic continuous measurement of air quality that have passed the validation process
  - measured values obtained by sampling of 24 hours measurement

12.1 DATA TYPES

Types of measurement data (Agency's Portal of air quality)

- Hourly source data
- Hourly validated data
- Eight -hours sourse data
- Eight-hours validated data
- Daily source data
- Daily validated data
- Maximum daily 8-hour average value – source data
- Maximum daily 8-hour averages value - validated data
- Twelve months average - source data
- Twelve-month Average - validated vata
- Daily source sata - gravimetry
- Daily validated data - gravimetry

12.1 DATA TYPES

Hourly data (source and validated)

- One hour concentrations given by lower averaging time (baseline data for all pollutants given by automatic measurement)
- Some pollutants (SO_2, NO_2, H_2S) have prescribed hourly limit value (LV) and one-hour concentrations are compared with these limit values. These substances have prescribed LVs of higher averaging time (24-hour (SO2, H_2S) or average annual value (NO_2)) calculated from hourly values
- Some pollutants do not have prescribed hourly limits values but one-hour values calculate higher average values (24-hour value or average annual value) then comparing them with the prescribed LV or CV (benzene, CO, ozone, particulate matter PM_{10} and $PM_{2,5}$, metals As, Cd, Ni, Pb and BaP in PM_{10}, NH_3, mercaptan, metanal

12.1 DATA TYPES

Eight-hour data (sourse and validated)

- The eighth hour average is calculated based on hourly data that is updated every hour. Each osmosis average calculated in this way is attributed to the day it ends, ie. the first period of calculation for any day covers the period from 17:00 on the previous day until 1:00 pm that day; the last calculation period for any day is from 16:00 to 24:00 that day.

Daily maximum 8-hour average value (source and validated)

- The highest daily eighth hour average concentration is selected based on eight-hours moving averages (calculated from data obtained from one-hour values) - this value is taken for comparison with LV or CV (CO and O_3)

12.1 DATA TYPES

Daily data (24-hour) (sourse and validated)

- Average of 24 hourly values per day or
- One value given by sampling (given by old non-referential methods)

Twelve-month average source and validated)

- Average for the last twelve months (benzene)

12.1 DATA TYPES

Daily data –gravimetry (sourse and validated)

- These data were given by gravimetric method (PM_{10}, $PM_{2.5}$ and the composition in particulate matters). Every day a sample is taken from which the concentrations of the particulate matters are determined. From these samples chemical composition analyzes the composition within the particles
- PM_{10} is determined by:
  - Metals As, Ni, Cd, Pb
  - B(a)P and other PAUs
- PM2.5 is determined by:
  - Anions of Cations Cl, NO_3^-, SO_4^{2-}, Na^+, NH_4^+, K^+, Mg^{2+}, Ca^{2+}
  - Elemental Carbon and Organic Carbon EC/OC

12.1 DATA TYPES

Network and station information (Metadata)

- **Network information**
  - information about air quality monitoring networks (name, designation, network type, management authority
  - responsible person's name, address, fax, e-mail, and weather notice),
- **Station information**
  - sampling site and measurement range
  - time and pattern of sampling
  - used measurement methods and measuring equipment

12.1 DATA TYPES

- **Air quality monitoring network information (Metadata)**
  - name,
  - designation,
  - network type,
  - management authority
  - the name of the responsible person,
  - address,
  - phone, fax, e-mail,
  - and weather information

12.1 DATA TYPES

- **Air quality monitoring network information -example**
  - State network

PODACI O MREŽI ZA PRAĆENJE KVALITETE ZRAKA	
Name	Državna mreža za trajno praćenje kvalitete zraka
Designation	RH01
Network type	državna mreža
Management authority	DRŽAVNI HIDROMETEOROLOŠKI ZAVOD, GRIČ 3 , GRAD ZAGREB
Responsible person	Lukša Kraljević
Adress	Grič 3, Ibl_grad
Phone	01/4565685
Fax	
e-mail	kraljevic@cirus.dhz.hr
web	
Time zone	UTC+01
Valid from	11.02.2003
Valid to	

12.1 DATA TYPES

- **Air quality monitoring stations information (Metadata)**
  - name,
  - location,
  - the name of the professional institution responsible for the station,
  - management authority
  - measurement goals,
  - geographic coordinates,
  - measured pollutants
  - meteorological parameters,
  - area type,
  - station type relative to the source of the emission,
  - measuring equipment, sampling features, etc.

12.1 DATA TYPES

- **Air quality monitoring stations information (Metadata)**
  - Measurement methods and sampling data
    - measurement type
    - measurment method
    - measuring equipment,
    - proof of equivalence
    - start time
    - the frequency of data integration
    - time and pattern of sampling
    - etc.

12.1 DATA TYPES

Station for air quality monitoring data			
Basic information			
Name	OSIJEK-1		
Network	Državna mreža za trajno praćenje kvalitete zraka		
Zone/agglomeration	Osijek		
City	Osijek		
Location description	Raskrižje Ulice kneza Trpimira i Europske avenije.		
Designation	OSI001		
EOI designation	HR0003A		
AZO designation	RH0104		
Management authority	DRŽAVNI HIDROMETEOROLOŠKI ZAVOD, GRIČ 3 , GRAD ZAGREB		
Competent authority	Ministarstvo zaštite okoliša i prirode, Hrvatska agencija za okoliš i prirodu, Europska komisija		
Web adress			
Measurement goals	Impact assessment on human health and the environment, tracking the trend		
Coordinates		x	y
	WGS84	45º33´31,65´´	18º41´55,57´´
	Decimalni prikaz	45,558792	18,698769
	Gauss Kruger koordinate	5.046.280	6.554.958
Altitude (h)	109		
NUTS			
Pollutant	SO_2 - (µg/m3), NO_2 - (µg/m3), NO_x as NO_2 - (µg/m3), O_3 - ozone (µg/m3), CO (mg/m3), benzen (µg/m3), PM_{10} (<10µm) (µg/m3)		
Meteorological parameters	temperature (°C), wind speed (m / s), wind direction (°), relative humidity (%)		
E-reporting	yes		
Other information			
Aktiv from	12.01.2004	Aktivna do:	
Classification of stations			
Area type	city		
Type of station in relation to the source of emissions	traffic		
Main sources of emissions			
The area for which the station is representative			
Local area			
Regional area			
Town and suburban stations			
- population of town / village	114.616		
Traffic stations			
- estimated volume of traffic	0		
- distance from curb	25		
- the proportion of heavy motor vehicle traffic	0		

12.1 DATA TYPES

-traffic speed	0		
- building facade distance and the building height	100		
- street width	0		
Information on metering technique by pollutants			
Pollutant	Measurement type	Measurment method	Measuring equipment
SO_2 - sulphur dioxide (µg/m3)	Automatic analyzer	UV fluorescence	Horiba model APSA 360 SO2 analyser
NO_2 - nitrogen dioxide (µg/m3)	Automatic analyzer	Chemiluminescence	Horiba model APNA 360 NOx analyser
NO_x as NO_2 - nitrogen dioxide (µg/m3)	Automatic analyzer	Chemiluminescence	Horiba model APNA 360 NOx analyser
O_3 - ozone (µg/m3)	Automatic analyzer	Ultraviolet (UV) photometry	Teledyne API 400E UV photometric O3 analyser
CO - carbon monoksid (mg/m3)	Automatic analyzer	Non-dispersive infrared spectroscopy (NDIR)	Horiba model APMA 360 CO analyser
benzene (µg/m3)	Automatic analyzer	Gas chromatography followed by flame ionization detection (GC-FID)	AirmoVOC BTX
PM_{10} - particulate matter(<10µm) (µg/m3)	Automatic analyzer	BETA	Thermo Andersen ESM FH 62 I-R

12.2 DATA QUALITY TARGET

Annex 8., Regulation on Air Quality Monitoring

For the purpose of data quality and pollution assessment with regard to the minimum data coverage, measurement uncertainty of measurement and modeling, the criteria set out in Annex 8. of the Regulation on Air Quality Monitoring

	sulphur dioxide hydrogen sulfide, nitrogen dioxide and nitrogen oxide , ammonia and carbon monoksid	Benzene, mercaptan	Particulate matter (PM_{10}/$PM_{2,5}$) i lead	Ozone and ozone associated with NO i NO_2
Measurement at constant measuring sites[1]:				
Uncertainty	15%	25%	25%	15%
Minimum data coverage	90%	90%	90%	90% during the summer 75% during the winter
Minimum time coverage:				
- urban background and traffic metering point	-	35%[2]	-	-
- industrial measurement site	-	90%	-	-
Indicative measurements:				
Uncertainty	25%	30%	50%	30%
Minimum data coverage	90%	90%	90%	90%
Minimum time coverage:	14%[4]	14%[3]	14%[4]	> 10% during the summer
Uncertainty in the modeling:				
– hourly average	50%	-	-	50%
– eighth hour average	50%	-	-	50%
– daily average	50%	-	Not defined	-
– annual average	30%	50%	50%	-
Objective assessment:				
Uncertainty	75%	100%	100%	75%

12.2 DATA QUALITY TARGET

Permanent measurements

- the minimum data coverage is 90%, except for ozone when the minimum coverage is 90% during the summer and 75% during the winter

	Sulphur dioxide hydrogen sulfide, nitrogen dioxide and nitrogen oxide , ammonia and carbon monoksid	Benzene, mercaptan	Particulate matter (PM 10/PM 2,5) i lead	Ozone and ozone associated with NO i NO2
Measurement at constant measuring sites(1):				
Uncertainty	15%	25%	25%	15%
Minimum data coverage	90%	90%	90%	90% during the summer 75% during the winter
Minimum time coverage:				
- urban background and traffic metering point	-	35% (2)	-	-
- industrial measurement site	-	90%	-	-

[1]Random measurements may be used instead of continuous measurements of benzene, lead and particulate matters if the European Commission can prove that insecurity, including insecurity caused by random sampling, meets the 25% quality target and that the time range is still greater than the minimum time range for indicative measurements. (continued)

12.2 DATA QUALITY TARGET

Permanent measurements (continued)

Random sampling must be uniformly distributed throughout the year to avoid unbalanced results. Insecurity caused by random sampling can be determined by the procedure of HRN ISO 11222, Air quality - Determination of the uncertainty of the time average of air quality measurements (ISO 11222).

For the purposes of determining the data quality for the assessment of the pollution level with regard to the smallest data coverage, measurement uncertainty of measurement and modeling, the criteria set out in Annex 8 of the Air Quality Monitoring Regulation shall apply.

If random values for PM_{10} are used for estimating the limit value for PM_{10}, 90.4 percentiles (lower or equal to 50 µg / m3) should be evaluated instead of the number of exceedances that significantly affect the data coverage

[2]Reparated over the year to be representative of various climatic and anthropogenic activities.

12.2 DATA QUALITY TARGET

Indicative measurements

- the minimum data coverage is 90%
- The time coverage may be lower ....

	Sulphur dioxide hydrogen sulfide, nitrogen dioxide and nitrogen oxide , ammonia and carbon monoksid	Benzene, mercaptan	Particulate matter (PM10/PM2,5) i lead	Ozone and ozone associated with NO i NO2
Indicative measurements:				
Uncertainty	25%	30%	50%	30%
Minimum data coverage	90%	90%	90%	90%
Minimum time coverage:	14% (4)	14% (3)	14% (4)	> 10% tijekom ljeta

[3]One random daily measurement equally distributed throughout the year, or eight weeks equally distributed throughout the year.
[4]One random weekly measurement equally distributed throughout year, or eight weeks equally distributed throughout the year.

12.2 DATA QUALITY TARGET

Modeling

-Uncertainties in the modeling and objective assessment are large...

	Sulphur dioxide hydrogen sulfide, nitrogen dioxide and nitrogen oxide , ammonia and carbon monoksid	Benzene, mercaptan	Particulate matter (PM10/PM2,5) i lead	Ozone and ozone associated with NO i NO2
Uncertainty in the modeling:				
– hourly average	50%	-	-	50%
– eighth hour average	50%	-	-	50%
– daily average	50%	-	još nije definirano	-
– annual average	30%	50%	50%	-
Objective assessment:				
– uncertainty	75%	100%	100%	75%

12.2 DATA QUALITY TARGET

Annex 8., Regulation on Air Quality Monitoring (continued)

	Benzopyrene	Arsenic, cadmium and nickel	Polycyclic aromatic hydrocarbons other than benzopyrene, total gaseous mercury	Total sedimentation
Uncertainty:				
– measurements at constantlocations and measurements indicative	50%	40%	50%	70%
– modeling	60%	60%	60%	60%
Minimum data coverage	90%	90%	90%	90%
Minimum time coverage:				
– measurements at constant locations	33%	50%		
– Indicative measurements:(1)(2)	14%	14%	14%	33%

(1) Distributed over the years to be representative of different climatic conditions and anthropogenic activities.
(2) Indicative measurements are measurements that are performed less regularly but which meet other data quality objectives.

12.2 DATA QUALITY TARGET

Time Coverage

Definition: Share of days / hours in a calendar year (with special seasonal ozone provisions) during which measurements / sampling will be or have been carried out.

The time coverage must not be less than the minimum requirements in the table and always be expressed as a percentage.

Time Coverage Formula:

Time Coverage = Nmjer / Ngod

Where is:

Nmjer is the number of days / hours in which the measurements take place;

Ngod is the total number of days / hours in a calendar year.

Nmjer may include invalid measurements, regardless of what caused invalid measurement (eg, maintenance or malfunction).

12.2 DATA QUALITY TARGET

Time Coverage (continued)

For indicative ozone measurements, the time coverage is calculated only for the summer season, ie. Nmjer in the summer will take into account the actual measurement time during the summer season and Nljet (1.4. To 30.9.)w ill replace Ngod as the total number of days / hours in the summer season.

In practice, time coverage is a measure used for pre-planning measurement (frequency of measurements, coverage per year).

12.2 DATA QUALITY TARGET

Data Coverage

Definition: The proportion of valid measurements in relation to the required number of days / hours in which the measurements must be performed.

The data coverage should not be less than the minimum requirements in the table and always be expressed as a percentage.

The data coverage is defined by the following formula:

Data coverage = N_{valid} / $N_{MinVremPok}$ = N_{valid} / (N_{god} * MinVremPok%)

Where is:

N_{valid} is the number of valid hourly / day measurements in the measurement period is invalid;

$N_{MinVremPok}$ is requiring number of days / hours in which the measurements must be performed;

MinVremPo is time coverage requirement expressed as a percentage of the table

12.2 DATA QUALITY TARGET

Evaluation of the quality and measurement data, and display of the processing results, and evaluation of their quality, is performed at prescribed reference measurement methods and requirements harmonized standards for testing and calibration laboratories. (Regulation)

Requirements for minimum data coverage and time coverage do not include data lost due to regular calibration or regular maintenance of measuring instruments.

In order to ensure a minimum coverage of air pollution assessment data across the territory of the Republic of Croatia, spare or replacement measuring instruments must be provided for permanent measurement sites

12.3 VALIDATION OF MEASUREMENT DATA

Concentrations of hourly averaging data of air pollutants that are monitored by air quality measuring in the automatic stations, according to the adopted programs of measuring the air pollution level, the main source of data needed for reporting and exchange of information in accordance with the regulations of the Republic of Croatia and the EU.

As such, they must be valid and verified (validated).

12.3 VALIDATION OF MEASUREMENT DATA

Summarized description of all activities

The following provisions of Decision EC 2011/850 / EU, in accordance with HRN EN ISO / IEC 17025 and standards for individual pollutants, data validation is preformed on the basis of the QA / QC measurement implementation as well as the critical and logical measurment data check.

The procedure consists of checking the technical accuracy of instruments and measuring systems, checking the fulfillment of the criteria for quality measuring and the critical and logical verification of the measurement data.

These activities are performed daily for the last 24 hours on a central computer using database and direct access to computers or data loggers in each station. The database consists of all the QA / QC and network service information that is continually updated with the latest data.

12.3 VALIDATION OF MEASUREMENT DATA

Verification of the technical validity of the measuring equipment

Verification of the instrument status is performed by connecting directly to the computer via a communication station and a LAN connection to a computer in a verified station that is connected to all relevant components of the measuring system of the station. This allows insight into the status of the machine's technical suitability in accordance with the protocols set up by the equipment manufacturer.

12.3 VALIDATION OF MEASUREMENT DATA

Verifying compliance with the QC standard

All automatic air quality measurements within the QC measurements have automatic periodic (every 25 hours) check of the response to zero and span (conc.analytes in the amount of 80% of the measuring range) gas.

According to the default standards, each check will be marked as invalid if the verification results exceed the default limit.

Based on this check it can be concluded how the tested instrument reacts to the known gas concentration or the inaudibility of the same in the zero (filtered) air and there are trends in the instrument response . Generally, the information thus obtained represents a good insight into the functionality of the instrument and enables a timely reaction before data quality falls below the set limits.

12.3 VALIDATION OF MEASUREMENT DATA

Critical and logical measurment data check

The database application programs for communication from all stations allow access to all metering service and status information from the stations. This includes 10 minutes and hourly measurment values, percentage of results coverage, maintenance work, alarms, and more. Critical and logical data verification is an assessment of the dana validity , taking into account all parameters that can speak about data validity, such as exceptionally high results, results that change too quickly and results that deviate significantly from the expected conditions (meteorological, traffic, location, etc.). It also takes into account comparisons with previous measurements at similar conditions and measurements of other pollutants as well as measurements from other (nearby) stations in the network. Generally, this process represents the use of all knowledge, knowledge and experience in the area of air quality with the aim of providing a better quality data assessment.

12.3 VALIDATION OF MEASUREMENT DATA

Validity status marking of the measurement results

Marking the validity status of the measurement data must be clearly and unambiguously. Only valid results are included in the calculation of the data coverage.

For example:

LEGENDA		
zapis bez GV		
zapis < 0		
zapis < GV		
zapis > GV		
odr. zero/span		
QA postupak		_ instrument na redovnoj kalibraciji ili redovnom održavanju
obuhvat < 75%		
pogreška		
nema zapisa		
nevalidno	broj+N	_ može biti i u drugoj boji ove legende

12.3 VALIDATION OF MEASUREMENT DATA

Only valid results are included in the calculation of the data coverage.

For example:

Continuous measurement 1 g = 365x24 = 8760 hours

Within this 167 hours QA / QC is not included

Valid hourly concentrations - 8515

MinVremPok = 8760-167 / 8670 = 8593/8760 = 0.981

Data coverage = Nvalid / NMinVremPok = Nvalid / (Ngod * MinVremPok%)

Data coverage = 8515 / $N_{MinVremPok}$ = 8515 / (8760 * 0,981)= 8515/ 8593 = 0,9908 = 99,1%

12.4 MEARGING DATA CRITERIA AND THE CALCULATION OF STATISTICAL PARAMETERS

Criteria used for validation when collecting data and calculating statistical parameters in relation to the limits with regard to the protection of human health:

Parametar	Required ratio of valid data
hourly values	75% (i.e. 45 minutes)
eight-hourly values	75% of the value (i.e. six hours)
highest daily eighth-hourly value	75% consecutive eight-hour moving average calculated on the basis of hourly information (i.e. 18 eight-hour average on day)
daily values	75% of the hourly average (i.e. at least 18-hour values)
average annual value	90% (1) hourly values or (if it is not available) the daily value during the year

The requirements for the calculation of annual averages do not include data loss due to regular calibration or regular maintenance of measuring instruments.

12.4 MEARGING DATA CRITERIA AND THE CALCULATION OF STATISTICAL PARAMETERS

The criteria used to validate the collection of data and calculation of statistical parameters from the target value and the long-term goal of ozone

Parametar	Required ratio of valid data
hourly values	75% (tj. 45 minuta)
eight-hourly values	75% of the value (i.e. six hours)
highest daily eighth-hourly value	75% eight-hour moving average (i.e. 18 eight-hour day on average)
AOT40	90% of the hourly values over a certain period to calculate AOT40 value (1)
average annual value	75% of summertime values (April to September), and 75% in the winter period (January to March, October to December), separately
number of exceedances and maximum monthly value	90% of the highest daily osmotic averages (27 available daily values per month) 90% of the hourly value, measured between 8.00 and 20.00 on Central European Time
number of exceedances and maximum annual values	five out of six months during the summer period (April to September)

12.4 MEARGING DATA CRITERIA AND THE CALCULATION OF STATISTICAL PARAMETERS

AOT40 - parameter indicating the sum of the difference between one - hour concentrations of ozone higher than 80 µg / m3 and 80 µg / m3 during a given period (from May 1th to July 31th each year for the protection of vegetation, and from April 1th to September 30th for the protection of forests), taking into account only one-hour values measured every day between 8:00 and 20:00 on Central European Time. (accumulated exposure over a threshold of 40 ppb)

[1]In cases where all possible measured data are not available, the following factor is used to calculate the AOT40 value:
AOT40 (estimate) = AOT40 (measured) x total number of hours (*) / number of measured one-hour values

(*) This is the number of hours within the definition period for AOT40 (ie from 08:00 to 20:00 on Central European Time).

12.4 MEARGING DATA CRITERIA AND THE CALCULATION OF STATISTICAL PARAMETERS

- **Calculated statistical parameters - for each pollutant the same statistical parameters are not counted**
  - data coverage - for relevant time of averaging,
  - arithmetic mean (mean annual value, winter mean),
  - median (50 percentile),
  - the relevant percentile (for each pollutant, depending on the average time, a specific percentile is to be calculated)
  - maximum value,
  - the number of limit or target value exceedances
  - the number of warning thresholds and / or notification thresholds exceedances
  - the number of upper and lower estimation thresholds exceedances

12.4 MEARGING DATA CRITERIA AND THE CALCULATION OF STATISTICAL PARAMETERS

Statistical parameters being calculated - for each pollutant the same statistical parameters are not counted

Pollutants due to the protection of human health

Statistical parameters: **SO_2**

SO_2 ($\mu g/m^3$)									
1-satne koncentracije							24-satne koncentracije		
OP %	C_{godina}	C_{zima}	$C_{99.73}$* = max. 25 sat	C_{max}*	broj sati > GV	broj sati > PU	$C_{99.2}$* = max. 4 dan	C_{max}*	broj dana > GV

* Indicates the statistical parameter being calculated, but no assessment of the pollution is compared to that parameter

12.4 MEARGING DATA CRITERIA AND THE CALCULATION OF STATISTICAL PARAMETERS

Statistical parameters: **NO_2 i NOx**

NO_2 ($\mu g/m^3$)					
1-satne koncentracije					
OP %	C_{godina}	C_{max}^*	$C_{99.79}^*$ = max. 19 sat	broj sati > GV	broj sati > PU

NO_x ($\mu g/m^3$)	
1-satne koncentracije	
OP %	C_{godina}

* Indicates the statistical parameter being calculated, but no assessment of the pollution is compared to that parameter

12.4 MEARGING DATA CRITERIA AND THE CALCULATION OF STATISTICAL PARAMETERS

Statistical parameters: **CO i benzene**

CO (mg/m^3)			
OP %	1-satne koncentracije	8-satne koncentracije	
	C_{godina}*	C_{max}*	broj dana > GV

benzen (µg/m^3)		
1-satne koncentracije		
OP %	C_{godina}	C_{max}*

* Indicates the statistical parameter being calculated, but no assessment of the pollution is compared to that parameter

12.4 MEARGING DATA CRITERIA AND THE CALCULATION OF STATISTICAL PARAMETERS

Statistical parameters: **ozone i AOT40**

O_3 (µg/m^3)									
OP %		1-satne koncentracije				8-satne koncentracije			
ljeto	zima	C_{godina}*	C_{max}*	broj sati > PO	broj sati > PU	C_{max}*	$C_{93.15}$* = max. 26 dan	broj dana > CV	broj dana > CV prosjek 2014-2016

AOT40		
OP %	vrijednosti	
	izmjereni	procijenjeni

* Indicates the statistical parameter being calculated, but no assessment of the pollution is compared to that parameter

12.4 MEARGING DATA CRITERIA AND THE CALCULATION OF STATISTICAL PARAMETERS

Statistical parameters:: **PM_{10} i $PM_{2,5}$**

PM_{10} ($\mu g/m^3$)					
OP %	1-satne konc.	24-satne koncentracije			
	C_{godina}	C_{godina}	C_{max}^*	$C_{90.4}$ = max. 36 dan	broj dana > GV

$PM_{2,5}$ ($\mu g/m^3$)				
OP %	1-satne konc.		24-satne koncentracije	
	C_{godina}	C_{max}^*	C_{godina}	C_{max}^*

* Indicates the statistical parameter being calculated, but no assessment of the pollution is compared to that parameter

12.4 MEARGING DATA CRITERIA AND THE CALCULATION OF STATISTICAL PARAMETERS

Statistical parameters:: **metals and B(a)P u PM_{10}**

Cd, Ni i As (ng/m^3) i Pb ($\mu g/m^3$) u PM_{10}		
24-satne koncentracije		
OP %	C_{godina}	C_{max}^*

B(a)P u PM_{10} (ng/m^3)		
24-satne koncentracije		
OP %	C_{godina}	C_{max}^*

* Indicates the statistical parameter being calculated, but no assessment of the pollution is compared to that parameter

12.4 MEARGING DATA CRITERIA AND THE CALCULATION OF STATISTICAL PARAMETERS

Statistical parameters:: **Total gaseous mercury Hg^0**

Ukupna plinovita živa (Hg) (ng/m^3)		
24-satne koncentracije		
OP %	C_{godina}	C_{max}*

* Indicates the statistical parameter being calculated, but no assessment of the pollution is compared to that parameter

12.4 MEARGING DATA CRITERIA AND THE CALCULATION OF STATISTICAL PARAMETERS

Pollutants due to the quality of life

Statistical parameters:: **H_2S i NH_3**

H_2S ($\mu g/m^3$)								
1-satne koncentracije						24-satne koncentracije		
OP %	C_{godina}	C_{zima}	$C_{99.73}^{*}$ = max. 25 sat	C_{max}^{*}	broj sati > GV	$C_{98.08}^{*}$ = max. 8 dan	C_{max}^{*}	broj dana > GV

NH_3 ($\mu g/m^3$)			
24-satne koncentracije			
OP %	$C_{98.08}^{*}$ = max. 8 dan	C_{max}^{*}	broj dana > GV

* Indicates the statistical parameter being calculated, but no assessment of the pollution is compared to that parameter

12.4 MEARGING DATA CRITERIA AND THE CALCULATION OF STATISTICAL PARAMETERS

Statistical parameters:: **mercaptans and methanal (formaldehyde)**

Merkaptani ($\mu g/m^3$)			
24-satne koncentracije			
OP %	$C_{98.08}$* = max. 8 dan	C_{max}*	broj dana > GV

Metanal (formaldehid) ($\mu g/m^3$)		
24-satne koncentracije		
OP %	C_{max}*	broj dana > GV

* Indicates the statistical parameter being calculated, but no assessment of the pollution is compared to that parameter

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INZRAK

THANK YOU FOR YOUR ATTENTION

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