



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 quality of air in Republic of Croatia



REPUBLIKA HRVATSKA

MINISTARSTVO ZAŠTITE
OKOLIŠA I ENERGETIKE



 **safu** | SREDIŠNJA AGENCIJA ZA
FINANCIRANJE I UGOVARANJE



This project is funded by the European Union



EKONERG

Energy research and Environmental Protection Institute

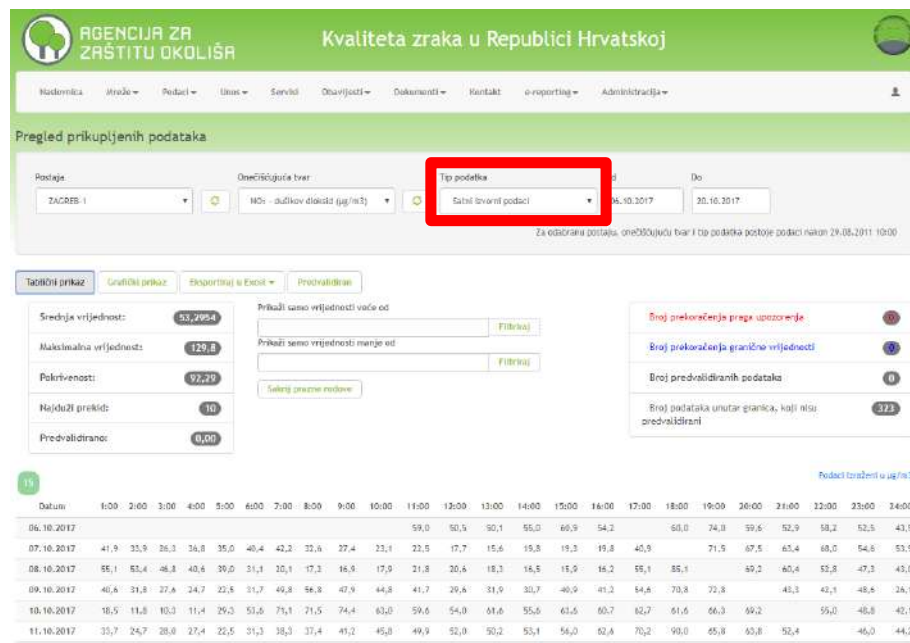


TOPIC 16: Data usage practical implementation

16.1 INTERPRETATION OF AIR QUALITY DATA BEFORE AND AFTER VALIDATION

- Air quality portal in RC – possibility of three types of data :
 - Original (current measuring values)
 - Validated data (past validation process)
 - Pre-validated (currently they are not on portal as no one submits validated data continuously)

Depending on pollutant, data can be of hourly, daily, 8-hourly or maximum 8-hourly daily value



<http://iszz.azo.hr/iskzl/podatak.htm>

16.1 INTERPRETATION OF AIR QUALITY DATA BEFORE AND AFTER VALIDATION

• Comparison of original and validated data - Air quality portal in RC

Example: Sisak-1 – Benzene – 2016 – difference in data

Original data

Validated data

AGENCIJA ZA ZAŠTITU OKOLIŠA Kvaliteta zraka u Republici Hrvatskoj

Haselovnica Hruše Podaci Servisi Obavijesti Dokumenti Kontakt e-reporting Prijavite se

Pregled prikupljenih podataka

Postaja: SISAK-1 Onečisćujuća tvar: benzen (ug/m3) Tip podatka: Svi izvorni podaci Od: 01.01.2016 Do: 31.12.2016

Za odabranu postaju, onečisćujuću tvar i tip podatka postoje podaci nakon 02.02.2012 10:00

Tablični prikaz Grafički prikaz Izvoziti u Excel

Srednja vrijednost: **5,4892**
 Maksimalna vrijednost: **158,2**
 Pokrivenost: **51,08**
 Najduži prekid: **2,999**
 Predvalidirano: **0,00**

Prikaži samo vrijednosti veće od: Filtriraj
 Prikaži samo vrijednosti manje od: Filtriraj
 Sadržaj prazne redove:

Broj predvalidiranih podataka: **0**
 Broj podataka unutar granica, koji nisu predvalidirani: **4487**

AGENCIJA ZA ZAŠTITU OKOLIŠA Kvaliteta zraka u Republici Hrvatskoj

Haselovnica Hruše Podaci Servisi Obavijesti Dokumenti Kontakt e-reporting Prijavite se

Pregled prikupljenih podataka

Postaja: SISAK-1 Onečisćujuća tvar: benzen (ug/m3) Tip podatka: Svi validirani podaci Od: 01.01.2016 Do: 31.12.2016

Za odabranu postaju, onečisćujuću tvar i tip podatka postoje podaci nakon 13.02.2006 00:00

Tablični prikaz Grafički prikaz Izvoziti u Excel

Srednja vrijednost: **9,7238**
 Maksimalna vrijednost: **156,7**
 Pokrivenost: **19,62**
 Najduži prekid: **6,113**
 Predvalidirano: **0,00**

Prikaži samo vrijednosti veće od: Filtriraj
 Prikaži samo vrijednosti manje od: Filtriraj
 Sadržaj prazne redove:

Broj predvalidiranih podataka: **0**
 Broj neispravnih podataka: **5222**
 Broj podataka unutar granica, koji nisu predvalidirani: **1723**

366 Podaci izražen u µg/m3

Datum	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	24:00		
01.01.2016	9,577	17,12	28,22	34,78	31,47	18,81	18,99	16,33	16,48	22,42	13,12	5,931	7,196	12,91	13,35	8,315	13,91	26,63	27,48	26,5	23,39					
02.01.2016	23,32	22,15	18,03	11,87	8,17	13,05	12,03	16,34	11,07	11,79	16,63	13,56	12,68	5,048	10,78	13,08	12,66	14,66	12,48	15,15	11,62	8,605				
03.01.2016	11,16	4,058	4,146	5,756	4,211	4,865	4,16	4,483	4,911	5,277	5,14	5,411	5,238	6,205	7,198	6,286	5,444	6,766	5,932	6,728	9,344	7,489				
04.01.2016	3,76	3,048	2,251	2,287	2,119	6,701	5,555	4,765	8,897	8,362	7,368	7,054	6,197	4,74	10,68	6,374	5,753	7,095	7,288	10,95	7,336	19,13				
05.01.2016	8,718	7,528	7,188	12,11	11,5	16,29	10,59	14,28	10,32	20,32	18,54	17,05	12,7	32,76	11,7	8,666	7,981	7,833	7,244	10,8	11,05	12,75				
06.01.2016	13,35	12,37	5,883	7,77	8,456	8,014	5,576	9,86	10,03	10,61	11,97	13,86	28,57	25,99	20,3	11,99	9,749	10,26	9,96	8,82	8,72	8,384				
07.01.2016	7,04	6,896	5,784	6,184	7,465	6,193	11,01	59,57	40,55	18,74	21,86	13,98	20,23	16,94	22,16	15,04	40,83	14,48	17,55	24,91	25,75	26,31				
08.01.2016	19,93	16,1	21,6	25,11	34,72	32,1	33,92	31,27	33,92	31,27	33,92	30,25	20,55	28,06	29,63	16,35	14,67	17,72	17,48	19,81	23,48	19,0	18,9	23,16	23,24	25,84
09.01.2016	23,55	24,27	35,61	28,09	27,67	22,96	22,73	22,2	23,0	25,56	32,61	65,58	32,44	23,7	21,68	26,6	23,08	22,6	28,63	36,22	22,72	40,87	48,78	82,64		

384 Podaci izražen u µg/m3

Datum	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	24:00		
01.01.2016	9,577	13,68	24,15	17,7	17,12	28,22	34,78	31,47	18,81	18,99	16,33	16,48	22,42	13,12	5,931	7,196	12,91	13,35	8,315	13,91	26,63	27,48	26,5	23,39		
02.01.2016	23,32	15,44	17,5	23,15	18,03	11,87	8,17	13,05	22,02	16,34	11,07	11,79	16,63	13,56	12,66	5,048	10,78	13,08	12,66	14,66	12,48	15,15	11,62	8,605		
03.01.2016	11,16	5,883	7,027	4,054	4,145	5,756	4,211	4,865	4,16	4,463	4,911	5,277	5,14	5,411	5,238	6,205	7,198	6,286	5,444	6,766	5,932	6,728	9,344	7,489		
04.01.2016	3,76	1,98	7,032	3,048	2,251	2,287	2,119	6,701	6,565	4,765	4,897	8,362	7,368	7,054	6,197	4,74	10,68	6,374	5,753	7,095	7,288	10,95	7,336	19,13		
05.01.2016	8,718	9,73	13,6	7,928	7,188	12,11	11,5	16,29	10,29	14,28	10,32	20,32	18,54	17,05	12,7	12,79	11,7	8,666	7,981	7,833	7,244	10,8	11,05	12,75		
06.01.2016	13,35	15,94	11,52	12,37	8,883	7,77	8,466	8,014	8,576	9,86	10,03	10,61	13,97	13,84	20,57	25,99	20,3	11,99	9,749	10,26	9,96	8,82	8,72	8,384		
07.01.2016	7,04	7,242	8,88	6,884	5,784	6,184	7,465	6,193	11,51	59,57	40,55	18,74	21,86	13,98	20,23	16,94	22,16	15,04	40,83	14,48	17,55	24,91	25,75	26,31		
08.01.2016	19,93	16,1	21,6	25,11	34,72	32,1	33,92	31,27	33,92	30,25	20,55	28,06	29,63	16,35	14,67	17,72	17,48	19,81	23,48	19,0	18,9	23,16	23,24	25,84		
09.01.2016	23,55	24,27	35,61	28,09	27,67	22,96	22,73	22,2	23,0	25,56	32,61	65,58	32,44	23,7	21,68	26,6	23,08	22,6	28,63	36,22	22,72	40,87	48,78	82,64		

16.1 INTERPRETATION OF AIR QUALITY DATA BEFORE AND AFTER VALIDATION

- **Comparison of original and validated data** - Air quality portal in RC
Example: Sisak-1 – Benzene – 2016 – difference in data

Original data

Coverage: 51.08 %

No. of data: 4487

Mean value: 5.4892

Maximum value: 156.2

Longest interruption: 2999

Pre-validated: 0.00

Validated data

Coverage: 19.62 %

No. of data: 1723

Mean value: 9.7238

Maximum value: 156.2

Longest interruption: 6113

Pre-validated: 0.00

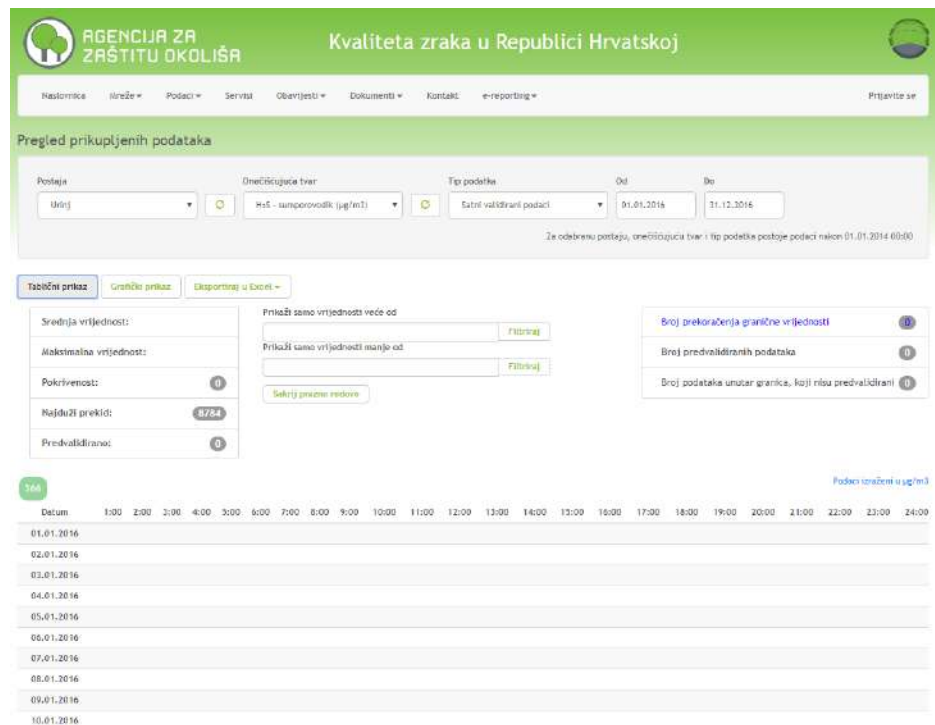
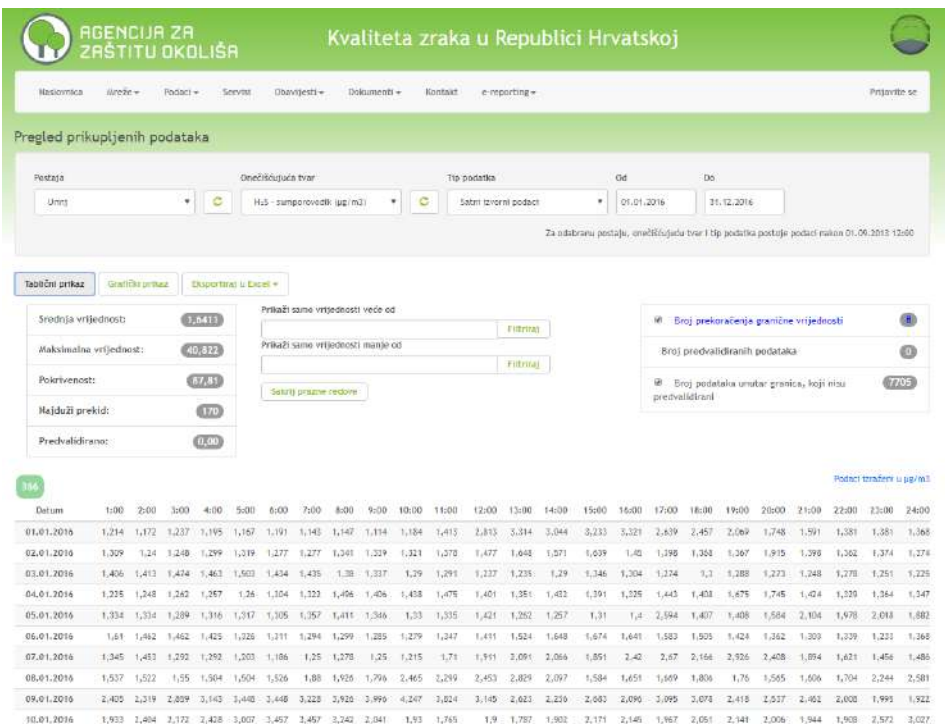
<http://iszz.azo.hr/iskzl/podatak.htm>

16.1 INTERPRETATION OF AIR QUALITY DATA BEFORE AND AFTER VALIDATION

- Comparison of original and validated data - Air quality portal in RC
- Example: Urinj – H₂S – 2016 – often case, no validated data at all

Original data

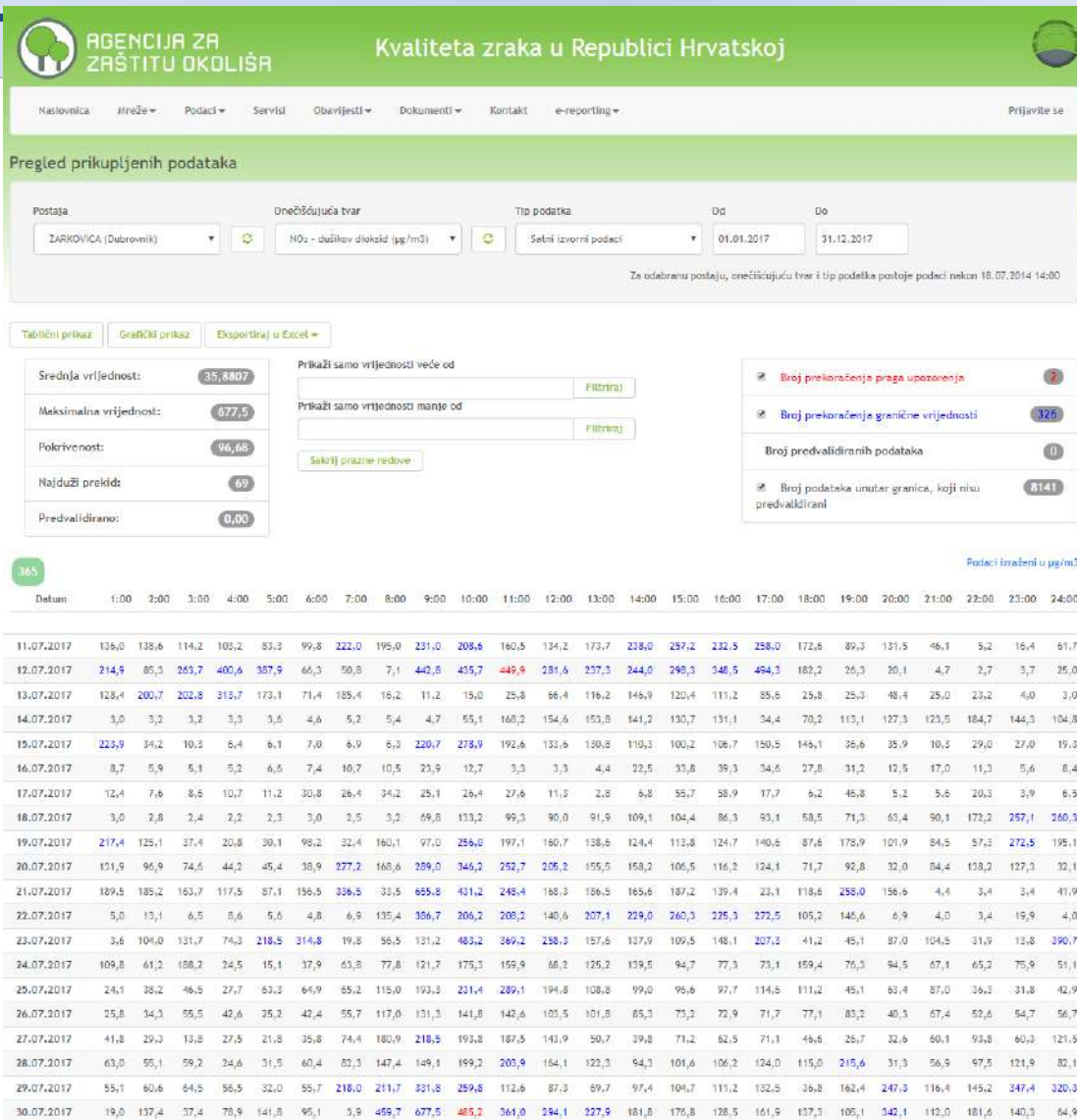
Validated data



16.1 INTERPRETATION OF AIR QUALITY DATA BEFORE AND AFTER VALIDATION

Original data - example

Žarkovica – NO₂ – 2017



Exceeding of alert threshold were registered two times.

The question arise – are these data correct/valid (still there are no validated data for 2017)

- if yes, did anyone react according to APA and Regulation on the Pollutant Levels in Air

- if they are not correct/valid, then what

- No. of exceeding of LV = 326???

16.1 INTERPRETATION OF AIR QUALITY DATA BEFORE AND AFTER VALIDATION

- **Comparison of original and validated data** - Air quality portal in RC

Example: Osijek-1 – PM₁₀ – 2016 – validated data are corrected by correcting factors from the equivalency study

Original data

Hourly

Coverage: **89.01 %**

Mean value: **27.1672**

Maximum value: 624.3

Daily

Coverage: 92.35 %

Mean value: 26.854

Maximum value: **81.946**

No. of exceeding of LV: **26**

Validated data

Hourly

Coverage: **95.75 %**

Mean value: **38.7737**

Maximum value: 224.737

Daily

Coverage: 96.17 %

Mean value: 38.87

Maximum value: **125.518**

No. of exceeding of LV: **82**

16.1 INTERPRETATION OF AIR QUALITY DATA BEFORE AND AFTER VALIDATION

Notices

On station web page there are notices on interruption of every measuring instrument e.g.:

11.08.2017:

Devices for measuring the concentrations of carbon monoxide (CO) are dismantled due to a regular servicing and calibration.

04.09.2017:

After calibration, the device for CO measurement is returned to the station and measurements are continued.

Postaja ZAGREB-1

Državno mreža za trajno praćenje kvalitete zraka / ZAGREB-1 / ZAGREB-1 - Detaljni podaci o postaji

Mreža:
Državno mreža za trajno praćenje kvalitete zraka
Postaja:
ZAGREB-1
Odgovorne institucije:
DRŽAVNI HIDROMETEOROLOŠKI ZAVOD, GRADSKI GRAD ZAGREB
Grad:
Zagreb

Oređujuće tvari mjerene na postaji:
SO₂ [µg/m³], Automatski analizator
NO_x [µg/m³], Automatski analizator
NO, izražen kao NO_x [µg/m³], Automatski analizator
CO [mg/m³], Automatski analizator
C₆H₆ [µg/m³], Automatski analizator
PM₁₀ [µg/m³], Aktivno sakupljanje
PM₁₀ [µg/m³], Automatski analizator
Pb u PM₁₀ [ng/m³], Aktivno sakupljanje
Cd u PM₁₀ [ng/m³], Aktivno sakupljanje
As u PM₁₀ [ng/m³], Aktivno sakupljanje
Ni u PM₁₀ [ng/m³], Aktivno sakupljanje
BaP u PM₁₀ [ng/m³], Aktivno sakupljanje
Benzo(a)piren u PM₁₀ [ng/m³], Aktivno sakupljanje
Benzo(b)fluorantilen u PM₁₀ [ng/m³], Aktivno sakupljanje
Benzo(k)fluorantilen u PM₁₀ [ng/m³], Aktivno sakupljanje
Indeno(1,2,3-cd)piren u PM₁₀ [ng/m³], Aktivno sakupljanje
Dibenz(a,h)antracen u PM₁₀ [ng/m³], Aktivno sakupljanje
Hg²⁺ - Hg-reactive [ng/m³], Aktivno sakupljanje

Posljednje izmjerene vrijednosti za onečujuće tvari s indeksom

Naziv	Vrijeme usrednjavanja	Vrijeme	Indeks	Izmjerena vrijednost
dušikov dioksid	1 sat	09.01.2018 12:00	22,90	45,70 µg/m ³
leboće čestice (<10µm)	1 sat	09.01.2018 13:00	39,50	39,50 µg/m ³
sumporov dioksid	1 sat	09.01.2018 13:00	1,60	3,30 µg/m ³
ugljičkov monoksid	8-satni klizni prosjek	09.01.2018 13:00	3,60	0,73 mg/m ³
leboće čestice (<10µm)	24 sata	08.01.2018 00:00	79,10	58,20 µg/m ³

Najveći satni jučerašnji indeks: **75,8**

Posljednje izmjerene vrijednosti za ostale onečujuće tvari

Naziv	Vrijeme usrednjavanja	Vrijeme	Izmjerena vrijednost
ugljičkov monoksid	1 sat	09.01.2018 13:00	0,70 mg/m ³
benzen	1 sat	22.12.2017 12:00	6,70 µg/m ³
dušikov dioksid	24 sata	08.01.2018 00:00	73,80 µg/m ³
sumporov dioksid	24 sata	08.01.2018 00:00	5,24 µg/m ³
ugljičkov monoksid	24 sata	08.01.2018 00:00	1,62 mg/m ³
benzen	24 sata	21.12.2017 00:00	3,56 µg/m ³
ugljičkov monoksid	najveći osmatrani klizni prosjek, prethodnog dana	08.01.2018 00:00	3,14 mg/m ³
benzen	12 mjeseci	01.12.2017 00:00	1,99 µg/m ³
leboće čestice (<10µm)	24 sata - gran.	31.12.2010 00:00	101,75 µg/m ³



21.12.2017:
Uređaj za mjerenje koncentracija benzena deinstaliran za rad redovitog servisa i umjeravanja.

04.09.2017:
Nakon umjeravanja uređaj za mjerenje CO vraćen je na postaju te su mjerenja nastavljena.

29.08.2017:
Nakon završene dodatne provjere rada i umjeravanja uređaj za mjerenje dušikovih oksida (NO_x) vraćen je na postaju te su mjerenja nastavljena.

23.08.2017:
Uređaj za mjerenje dušikovih oksida (NO_x) deinstaliran je radi dodatne provjere rada i umjeravanja.

11.08.2017:
Uređaji za mjerenje koncentracija ugljikovog monoksida (CO) deinstalirani su radi redovitog servisa i umjeravanja.

<http://iszz.azo.hr/iskzl/postaja.html?id=155>

16.1 INTERPRETATION OF AIR QUALITY DATA BEFORE AND AFTER VALIDATION

- **Measuring result and measuring uncertainty**

Every measuring result can be indicated with certain measuring uncertainty.

The question arises:

How to evaluate measuring result with its measuring uncertainty as regarding the limit value?

If there is no specification for certain technical area regarding the evaluation of result with measuring uncertainty, then the accreditation documents are used :

- ILAC-G8:03/2009 - Guidelines on the Reporting of Compliance with Specification
- HAA Up-1-4 – Instructions for indicating the statement of conformity

16.1 INTERPRETATION OF AIR QUALITY DATA BEFORE AND AFTER VALIDATION

- Measuring result and measuring uncertainty

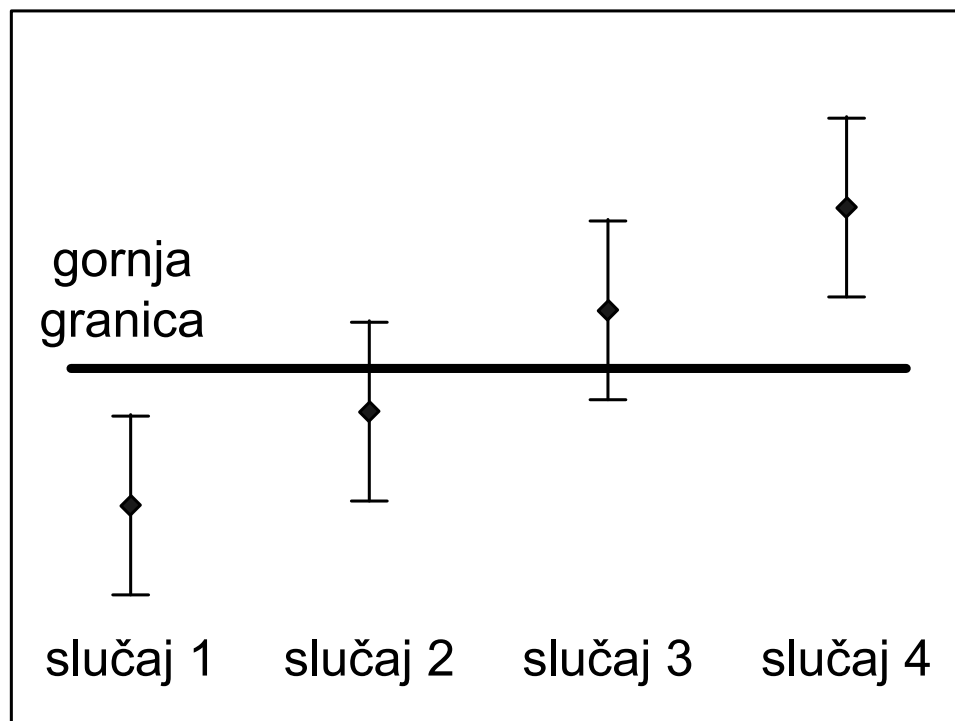
In general, there are 4 possible cases:

Case 1 and Case 4 are completely clear :

Case 1 = result is complied with specification

Case 4 = result is not complied with specification

Case 2 and Case 3 represent limit cases which could be interpreted in various ways.



16.1 INTERPRETATION OF AIR QUALITY DATA BEFORE AND AFTER VALIDATION

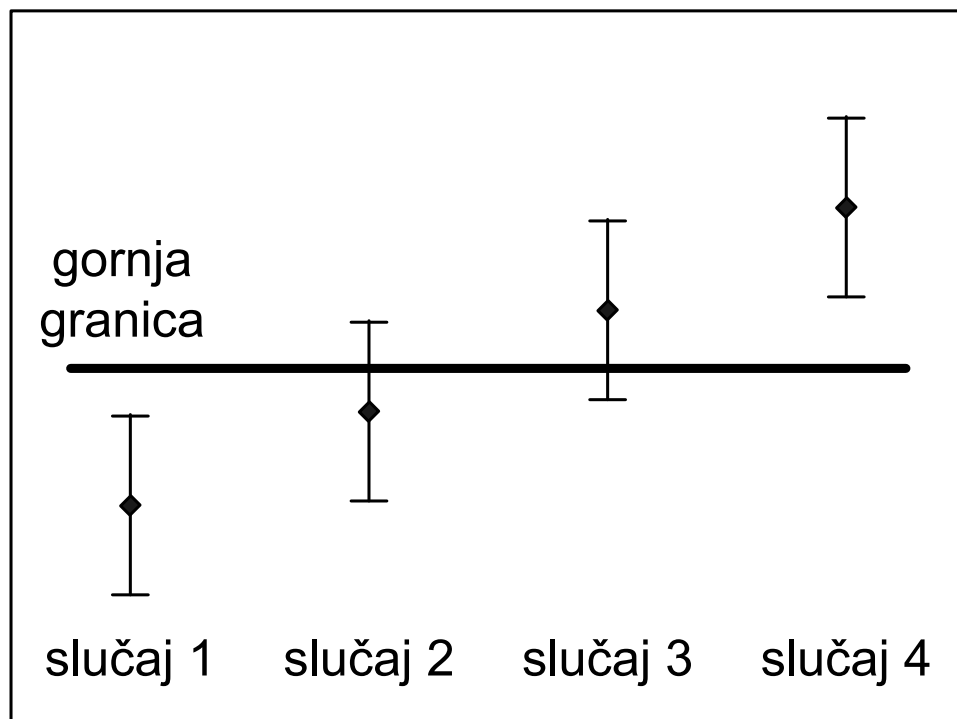
- Measuring result and measuring uncertainty

According to ILAC G8:

- compliance cannot be indicated for Case 2 and Case 3.

According to HAA-Up-1/4:

- for Case 2 and Case 3 is not possible to state the compliance using 95-percentage probability of coverage for extended uncertainty, but the measuring result is under/above the limit.



16.1 INTERPRETATION OF AIR QUALITY DATA BEFORE AND AFTER VALIDATION

- **Measuring result and measuring uncertainty**

According to the Regulation on Pollutant Emission Monitoring into the Air from Stationary Sources, OG 129/12, Article 18:

(1) Evaluation of emission measuring results is carried out by comparing the measuring results with prescribed limit values according to the Regulation on ELV or Decision on integrated environmental protection requirements.

(2) If the highest value of pollutant measuring result (E_{mj}) is equal to or less than prescribed ELV (E_{gr}), regardless the indicated measuring uncertainty,
 $E_{mj} \leq E_{gr}$

– stationary source complies with prescribed ELV from paragraph 1 of this Article.

16.1 INTERPRETATION OF AIR QUALITY DATA BEFORE AND AFTER VALIDATION

- **Measuring result and measuring uncertainty**

According to the Regulation on Pollutant Emission Monitoring into the Air from Stationary Sources, OG 129/12, Article 18:

(3) If the highest value of pollutant measuring result is higher than prescribed ELV, but within the area of measuring uncertainty, i.e. if:

$$E_{mj} - \mu E_{mj} \leq E_{gr}$$

where:

μE_{mj} – value of measuring uncertainty by measuring the established amount of pollutant value

– it is accepted that stationary source complies with prescribed ELV from paragraph 1 of this Article.

16.1 INTERPRETATION OF AIR QUALITY DATA BEFORE AND AFTER VALIDATION

- **Measuring result and measuring uncertainty**

According to the Regulation on Pollutant Emission Monitoring into the Air from Stationary Sources, OG 129/12, Article 18:

(4) If the highest value of pollutant measuring result reduced by measuring uncertainty is higher than prescribed ELV, i.e. if:

$$E_{mj} - \mu E_{mj} > E_{gr}$$

where:

μE_{mj} – value of measuring uncertainty by measuring the established amount of pollutant value

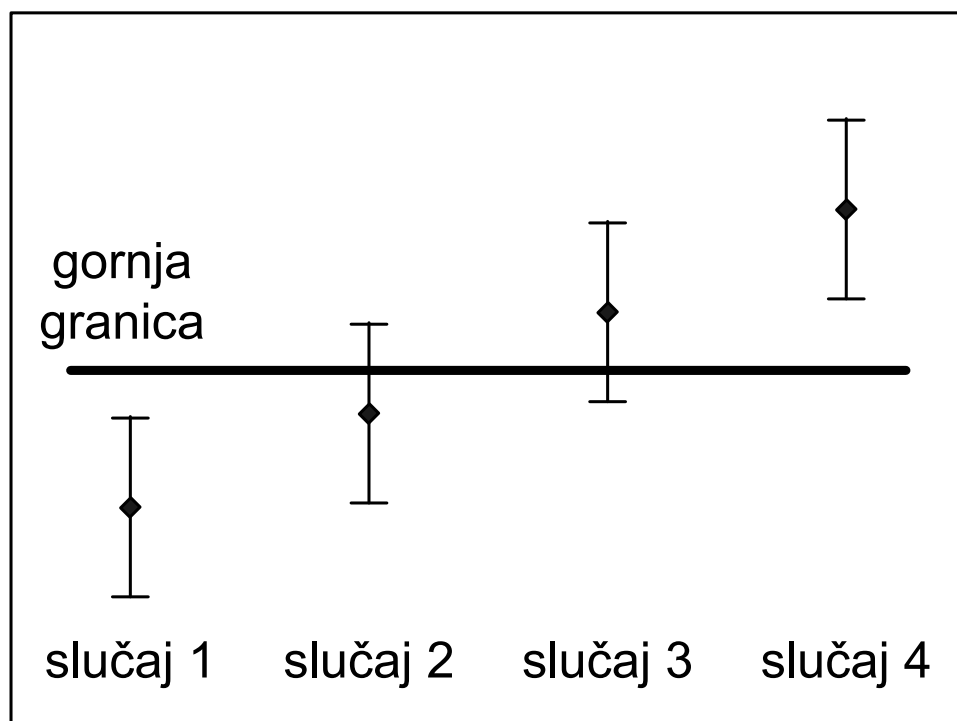
– stationary source does not comply with prescribed ELV from paragraph 1 of this Article.

16.1 INTERPRETATION OF AIR QUALITY DATA BEFORE AND AFTER VALIDATION

- Measuring result and measuring uncertainty

In summary, according to the Regulation on Pollutant Emission Monitoring into the Air from Stationary Sources, OG 129/12, Article 18:

Case 1, Case 2 and Case 3 are satisfactory!



16.1 INTERPRETATION OF AIR QUALITY DATA BEFORE AND AFTER VALIDATION

- **Measuring result and measuring uncertainty**

According to the Ordinance on the Air Quality Monitoring, OG 3/13, Appendix 8:

Measuring uncertainty at permanent measuring points :

SO ₂ , NO _x , CO, O ₃	Benzene, fly particles
15%	25%

16.1 INTERPRETATION OF AIR QUALITY DATA BEFORE AND AFTER VALIDATION

- **Measuring result and measuring uncertainty**

According to the Ordinance on the Air Quality Monitoring, OG 3/13, Appendix 8, the value of measuring uncertainty is defined and may not exceed the defined value.

According to ILAC G8, item 2.6:

“In testing, specification or documented practice may require a statement of conformity with specification in testing report, which does not take into consideration the effect of measuring uncertainty. In that case, specification usually contains **implicite assumption that uncertainty of contractual measuring method does not vary** (e.g. due to prescribed instrument classes that are used for testing).

16.1 INTERPRETATION OF AIR QUALITY DATA BEFORE AND AFTER VALIDATION

- **Measuring result and measuring uncertainty**

In standard or specification it should be clearly indicated that measuring uncertainty is taken into consideration when defining the limits. Specification may also be determined by national regulations in order to set up a reasonable value of measuring uncertainty („Ordinance on the Air Quality Monitoring – 15% or 25%”).

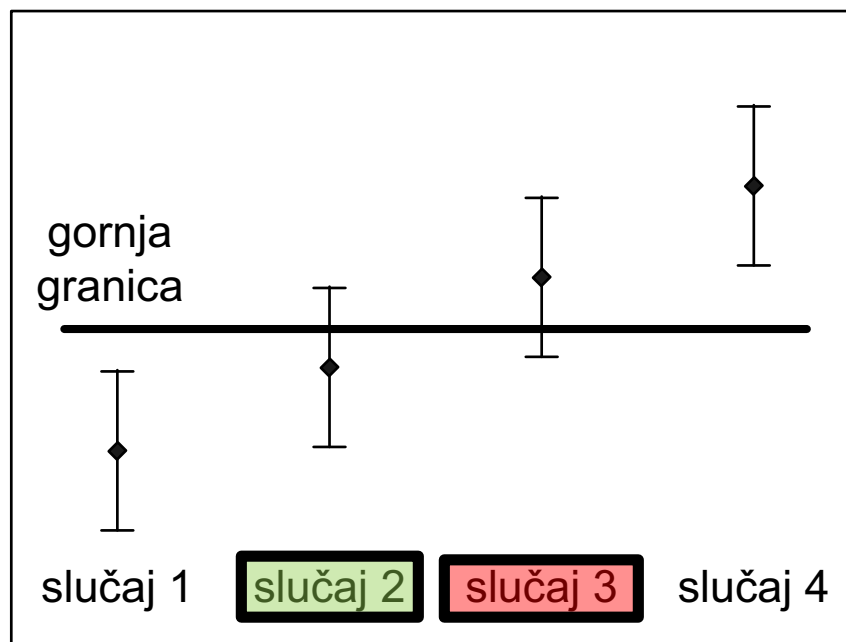
Whenever the measuring uncertainty is not taken into consideration, it should **pay a special attention** when reporting. Laboratories should give remarks and explanations that would ensure unambiguous reporting.”

16.1 INTERPRETATION OF AIR QUALITY DATA BEFORE AND AFTER VALIDATION

- Measuring result and measuring uncertainty

According to ILAC G8, item 2.7:

“If national or other regulations would require a decision making on accepting or rejecting the results, then the Case 2 may be indicated as complied, while the Case 3 as not complied with limit value.”



16.2 INTERPRETATION OF ANNUAL REPORTS ON AIR QUALITY

Annual reports on air quality monitoring can be found on Air quality in RC portal, on links:

Annual reports in RS (state and local networks)

<http://iszz.azo.hr/iskzl/godizvrpt.htm?pid=0&t=0>

Annual reports of state network:

<http://iszz.azo.hr/iskzl/godizvrpt.htm?pid=0&t=1>

Annual reports of local networks:

<http://iszz.azo.hr/iskzl/godizvrpt.htm?pid=0&t=2>

16.2 INTERPRETATION OF ANNUAL REPORTS ON AIR QUALITY

Content of annual reports on air quality monitoring is prescribed by Article 22 of the Ordinance on the Air Quality Monitoring (OG 79/17).

Annual reports contain or should contain data on:

- **legal person – testing laboratory or reference laboratory** carrying out the air quality monitoring
- **sampling measuring points and scope of measuring**
- **used measuring methods and measuring equipment**
- **data quality assurance** according to the requirement of complied standard for testing and calibration laboratories
- other data in the field of **quality assurance**, such as continuity assurance, participation in parallel measuring, deviation from prescribed methodology and reasons.

16.2 INTERPRETATION OF ANNUAL REPORTS ON AIR QUALITY

Annual reports contain or should contain data on: (continuation)

- **on levels of air pollution** and on dates and periods of air pollution which exceed the limit values, target values and long-term objectives for ground-level ozone razinama onečišćenosti zraka
- on exceeding the **informing threshold and alert thresholds** and on dates and periods
- on calculated statistic parameters of air pollution for pollutants according to the meters defined in Appendix 8 of the Ordinance on the Air Quality Monitoring – arithmetic mean, median, relevant percentile and maximum value, data range – percentage of total possible number of data and number of data, for relevant averaging times
- on level of air pollution in relation to the **upper and lower assessment threshold**

16.2 INTERPRETATION OF ANNUAL REPORTS ON AIR QUALITY

The most important is to check the air quality categories!

Based on pollution levels, two air quality categories are identified:

- **first air quality category** – clean or slightly polluted air: no limit values (LV), target values and target values for ground-level ozone have been exceeded,
- **second air quality category** – polluted air: limit values (LV), target values and target values for ground-level ozone have been exceeded.

The air quality categories are identified (once a year for the past calendar year) for each pollutant separately and they are related to **human health, living quality, vegetation and ecosystem protection**.

16.2 INTERPRETATION OF ANNUAL REPORTS ON AIR QUALITY

- **Verification with data quality objectives**

From the Guidebook for implementation of Decision 2011/850/EU

Time coverage may not be less than the minimum requirements, which means that time coverage shall be fulfilled in all cases, which means that only range of data is verified.

Range of data shall be rounded just before it is compared with the requirement regarding the minimum range of data. The objectives for time coverage and range of data are fulfilled if:

Range of data (%) (after rounding) \geq minimum requirement

Since Directive indicates that requirements for the minimum **range of data** and time coverage **do not include data loss due to a regular calibration or normal maintenance of instruments**, the requirements for the minimum range of data shall be corrected before the verification.

16.2 INTERPRETATION OF ANNUAL REPORTS ON AIR QUALITY

- **Verification with data quality objectives (continuation)**

From the Guidebook for implementation of Decision 2011/850/EU

Based on the Guidebook for Annexes to Decision 97/101/EC on information exchange, as well as the amendment of Decision 2001/752/EC, **5% is good approximation of time share** in calendar year dedicated for planned equipment maintenance and calibration.

It is confirmed on several EIONET meetings in 2008. Therefore, it is possible to **reduce the requirement for minimum data range by 5%, as a reasonable amount of time, for data loss which is considered as regular maintenance.**

For pragmatic reasons it is recommended to take **85% instead of 90%** as the **minimum data range** which will be used for conformity assessment, for all measurements, **except of ozone measurement in winter**, where it should **take 70% instead of 75%.**

http://ec.europa.eu/environment/air/quality/legislation/pdf/IPR_guidance1.pdf

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16.2 INTERPRETATION OF ANNUAL REPORTS ON AIR QUALITY

• Number of data

Maximum number of data in a year

Pollutant	Nyear (regular year)		Nyear (leap year)	
	hourly values	daily values	hourly values	daily values
All pollutants except ozone	8760	365	8784	366
Ozone: summer (April – September)	4392	183	4392	183
Ozone: winter (January - March, October - December)	4368	182	4392	183

Minimum required number of data

These numbers include deduction of 5% for maintenance

Pollutant	Continuous measurements			
	Minimum number of hours		Minimum number of days	
	Regular year	Leap year	Regular year	Leap year
SO ₂	7403	7423	309	310
NO ₂	7403	7423	309	310
NO _x	7403	7423	309	310
Benzene (industry)	6662	6681	278	279
Benzene (background, traffic)	2591	2598	108	109
CO	7403	7423	309	310
O ₃ (summer)	3712	3712	155	155
O ₃ (winter)	3036	3053	127	128
Pb	7403	7423	309	310
PM ₁₀	7403	7423	309	310
PM _{2.5}	7403	7423	309	310
As	3702	3712	155	155
Cd	3702	3712	155	155
Ni	3702	3712	155	155
BaP	2443	2450	102	103

Comparison of number of data (regular year): max. number of data in a year, 90% and 85%

	Hourly data			Daily data		
	85%	90%	100%	85%	90%	100%
Number of data	7403	7841	8760	309	327	365

16.2 INTERPRETATION OF ANNUAL REPORTS ON AIR QUALITY

- **Rounding**

From the Guidebook for implementation of Decision 2011/850/EU

Data submitted to EEA/EC shall be submitted with equal number of digits used in air quality monitoring network.

Rounding shall be the last step of calculation, i.e. just before the comparison of results aiming at environmental protection (comparison with LV, TV...), it shall be carried out only once by following so called **commercial rounding rules**.

Comparison with environmental protection objectives (i.e. LV, TV, etc.) is carried out in the same numeric accuracy which is used for environmental protection objective in Directive.

It means that if LV or TV is prescribed as a whole number, it is rounded on a whole number.

http://ec.europa.eu/environment/air/quality/legislation/pdf/IPR_guidance1.pdf

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16.2 INTERPRETATION OF ANNUAL REPORTS ON AIR QUALITY

- **Rounding (continuation)**

From the Guidebook for implementation of Decision 2011/850/EU

Examples:

1) Daily value of PM₁₀ of 50,486 µg/m³ is rounded to 50 µg/m³ by applying the commercial rounding rules.

If no commercial rounding rules are applied, then various possibilities of rounding can be applied: e.g. rounding of this value to one digit gives 50.5 µg/m³ in the first step, and rounding in the second step gives 51 µg/m³.

When comparing this value with daily limit value of 50 µg/m³ a result would be an exceeding. Therefore, it is important to follow commercial rounding rules.

http://ec.europa.eu/environment/air/quality/legislation/pdf/IPR_guidance1.pdf

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16.2 INTERPRETATION OF ANNUAL REPORTS ON AIR QUALITY

- **Rounding (continuation)**

From the Guidebook for implementation of Decision 2011/850/EU

Examples:

2) Hourly value of ozone (O_3) of $180.49 \mu\text{g}/\text{m}^3$ is rounded to $180 \mu\text{g}/\text{m}^3$. When this value is compared with informing threshold of $180 \mu\text{g}/\text{m}^3$, it will not be exceeded by alert threshold.

3) Hourly value of ozone (O_3) of $180.50 \mu\text{g}/\text{m}^3$ is rounded to $181 \mu\text{g}/\text{m}^3$. When this value is compared with informing threshold of $180 \mu\text{g}/\text{m}^3$, a result will be an exceeding of informing threshold.

4) Annual value of benzo(a)anthracene of $1.428 \text{ng}/\text{m}^3$ is rounded to $1.4 \text{ng}/\text{m}^3$.

[Note: benzo(a)anthracene is pollutant which has no prescribed environmental protection objective (LV, TV ...), therefore the following table is applied

16.2 INTERPRETATION OF ANNUAL REPORTS ON AIR QUALITY

- **Rounding (continuation)**

From the Guidebook for implementation of Decision 2011/850/EU

For pollutants **without prescribed environmental protection objective** (LV, TV,...), rounding shall be carried out based on rules described in the table:

Value x	Number of decimal digits to which it is rounded	Example: Before rounding	Example: After rounding
$x \geq 10$	Whole number	17.83	18
$1 \leq x < 10$	1 decimal digit	2.345	2.3
$0.1 \leq x < 1$	2 decimal digits	0.865	0.87
$0.01 \leq x < 0.1$	3 decimal digits	0.0419	0.042
Etc...			

http://ec.europa.eu/environment/air/quality/legislation/pdf/IPR_guidance1.pdf

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