Umwelt 🎲 Bundesamt



CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000056505_01

Certified AMS:	T200P for NO, NO2 and NOx
Manufacturer:	Teledyne API 9970 Carroll Canyon Road San Diego, CA, 92131 USA
Test Institute:	TÜV Rheinland Energy GmbH
	This is to certify that the AMS has been tested and found to comply with the standards VDI 4202-1 (2018), EN 14211 (2012), EN 15267-1 (2009) and EN 15267-2 (2009).

Certification is awarded in respect of the conditions stated in this certificate (this certificate contains 10 pages). The present certificate replaces certificate 0000056505_00 dated 13 April 2018.



Publication in the German Federal Gazette (BAnz) of 26 March 2018

German Environment Agency Dessau, 22 March 2023

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Dr. Marcel Langner Head of Section II 4.1

Suitability Tested Complying with 2008/50/EC EN 15267 Regular Surveillance

www.tuv.com ID 0000056505

This certificate will expire on: 25 March 2028

TÜV Rheinland Energy GmbH Cologne, 21 March 2023

Pr. Pat Gin

ppa. Dr. Peter Wilbring

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Test institute accredited to EN ISO/IEC 17025 by DAkkS (German Accreditation Body). This accreditation is limited to the accreditation scope defined in the enclosure to the certificate D-PL-11120-02-00.

qal1.de

info@qal.de

page 1 of 10





Test report: Initial certification: Expiry date:

Certificate:

Publication:

936/21238687/A dated 12 September 2017 26 March 2018 25 March 2028 Renewal (of previous certificate 0000056505_00 of 13 April 2018 valid until 25 March 2023) BAnz AT 26.03.2018 B8, chapter III No. 1.1

Approved application

The tested AMS is suitable for continuous ambient air monitoring of NO, NO₂ and NO_x (stationary operation).

The suitability of the AMS for these applications was assessed based on a laboratory test and a 3-month field test.

The AMS is approved for an ambient temperature range of 0° to 30°C.

The notification of suitability of the AMS, performance testing and the uncertainty calculation have been effected on the basis of the regulations applicable at the time of testing. As changes in legal provisions are possible, any potential user should ensure that this AMS is suitable for monitoring the measured values relevant to the application.

Any potential user should ensure, in consultation with the manufacturer, that this AMS is suitable for the intended use.

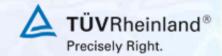
Basis of the certification

This certification is based on:

- Test report 936/21238687/A dated 12 September 2017 of TÜV Rheinland Energy GmbH
- Suitability announced by the German Federal Environment Agency (UBA) as the relevant body
- The ongoing surveillance of the product and the manufacturing process

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Certificate: 0000056505_01 / 22 March 2023



Publication in the German Federal Gazette: BAnz AT 26.03.2018 B8, chapter III No. 1.1, Announcement by UBA dated 21 February 2018:

AM S designation T200P for NO, NO₂ and NO_x

Manufacturer:

Teledyne API, San Diego, USA

Field of application:

For continuous ambient air monitoring of nitrogen oxide (stationary operation)

Measuring ranges during performance testing:

Component	Certification range	Unit
Nitrogen monoxide	0 – 1200	µg/m³
Nitrogen dioxide	0- 500	µg/m³

Software versions:

Package Version	1.1.5
Driver Version	1.0.15.22

Restrictions:

none

Note:

The test report on performance testing is available on the internet at www.gal1.de.

Test institute:

TÜV Rheinland Energy GmbH, Cologne Report no. 936/21238687/A dated 12 September 2017





Publication in the German Federal Gazette: BAnz AT 26.03.2019 B7, chap. IV notification 68, Announcement by UBA dated 27 February 2019:

68 Notification as regards Federal Environment Agency (UBA) notice of 21 February 2018 (BAnz AT 26.08.2018 B8, chapter III number 1.1)

The current software version of the T200P measuring system for NO, NO2 and NOxmanufactured by Teledyne Advanced Pollution Instrumentation is:Package version:1.3.0Driver version:1.0.15

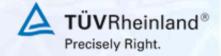
Statement issued by TÜV Rheinland Energy GmbH dated 5 September 2018

Publication in the German Federal Gazette: BAnz AT 24.03.2020 B7, chap. IV notification 68, Announcement by UBA dated 24 February 2020:

	ds Federal Environment Agency (UBA) notice BAnz AT 26.08.2018 B8, chapter III number 1. BAnz AT 26.03.2019 B7, chapter IV notificatio	1) and
The company name ha Teledyne API.	is changed from Teledyne Advanced Pollution In	strumen
The latest software ver manufactured by Teleo	sion of the T200P measuring system for NO, NO dyne API is:	2 and NO
Package versio		
Driver version:	1.0.21	
	14-14-14	
This includes the follow Package Version	14-14-14	
This includes the follow	ving versions:	
This includes the follow Package Version	ving versions: Driver Version	
This includes the follow Package Version 1.3.18	ving versions: Driver Version 1.0.21	
This includes the follow Package Version 1.3.18 1.3.17	Ving versions: Driver Version 1.0.21 1.0.20	
This includes the follow Package Version 1.3.18 1.3.17 1.3.12, build 162	Ving versions: Driver Version 1.0.21 1.0.20 1.0.18	
This includes the follow Package Version 1.3.18 1.3.17 1.3.12, build 162 1.3.11	Ving versions: Driver Version 1.0.21 1.0.20 1.0.18 1.0.17	

Statement issued by TÜV Rheinland Energy GmbH dated 2 September 2019





Publication in the German Federal Gazette: BAnz AT 31.07.2020 B10, chap. Il notification 22, Announcement by UBA dated 27 May 2020:

22 Notification as regards Federal Environment Agency (UBA) notices of 21 February 2018 (BAnz AT 26.08.2018 B8, chapter III number 1.1) and of 24 February 2020 (BAnz AT 24.03.2020 B7, chapter IV, notification 68)

The latest software version of the T200P measuring system for NO, NO₂ and NO_x manufactured by Teledyne API is:

Package Version:1.3.27Driver Version:1.0.22

This includes the following versions: Package Version / Driver Version

> 1.3.26/1.0.22 1.3.23/1.0.22 1.3.21/1.0.21.

Statement issued by TÜV Rheinland Energy GmbH dated 02 March 2020





Certified product

This certificate applies to automated measurement systems conforming to the following description:

Teledyne API's Model T200P is a photolytic NO/NO₂/NO_x-Analyser that uses a patented high efficiency Blue Light Converter (BLC) coupled with state-of-the-art microprocessor technology to provide true measurement of ambient nitrogen dioxide (NO₂). The BLC includes the latest technology in high powered LEDs and a Teflon cell with reflective properties that increase the overall conversion efficiency, which allows for better speciation of lower NO₂ levels.

In the analyser, sample gas flows to a solenoid valve unit via an inlet filter. At this point, the relevant inlet can be selected (sample, zero gas, test gas). The dryer between the dust filt er and the solenoid valves allows the removal of all interference caused by moisture.

For the NO-cycle, the sample is sucked into the reaction cell directly; for the NOx cycle it is sucked in via the NO₂ \rightarrow NO-BLC converter.

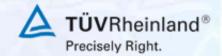
The ozoniser generates the necessary ozone for measurements from ambient air. Dust is removed from the air sucked in before the latter is transported through a drier. At the outlet of the ozone generator, the ozone passes through cleaning before it reaches the reaction chamber inside the measuring module. The ozoniser chip ensures the energy supply of the ozone gen-erator.

Furthermore, the dryer provides purge air for the conversion of the photomultiplier tube after flow through of the purge dryer filter. The vacuum distributor connected to the external pump connects all internal elements which require negative pressure.

The following main components are situated inside the analyser:

- Blue light converter (BLC)
- Photomultiplier tube (PMT)
- Optical filter
- Ozone dryer/sample dryer
- Ozone generator
- Vacuum pump





General notes

This certificate is based upon the equipment tested. The manufacturer is responsible for ensuring that on-going production complies with the requirements of the EN 15267. The manufacturer is required to maintain an approved quality management system controlling the manufacture of the certified product. Both the product and the quality management systems shall be subject to regular surveillance.

If a product of the current production does not conform to the certified product, TÜV Rheinland Energy GmbH must be notified at the address given on page 1.

A certification mark with an ID-Number that is specific to the certified product is presented on page 1 of this certificate. This certification mark may be applied to the product or used in advertising materials for the certified product.

This document as well as the certification mark remains property of TÜV Rheinland Energy GmbH. With revocation of the publication the certificate loses its validity. After the expiration of the certificate and on requests of the TÜV Rheinland Energy GmbH this document shall be returned and the certificate mark must not be employed anymore.

The relevant version of this certificate and its expiration is also accessible on the internet: **<u>qal1.de</u>**.





History of documents

Certification of T200P is based on the documents listed below and the regular, continuous monitoring of the Quality Management System of the manufacturer:

Initial certification according to EN 15267

Certificate No. 0000056505_00: 13 April 2018 Expiry date of the certificate: 25 March 2023 Test report 936/21238687/A dated 12 September 2017 TÜV Rheinland Energy GmbH Publication BAnz AT 26.03.2018 B8, chapter III number 1.1 UBA announcement dated 21 February 2018

Notifications

Statement issued by TÜV Rheinland Energy GmbH dated 5 September 2018 Publication BAnz AT 26.03.2019 B7, chapter IV notification 68 UBA announcement dated 27 February 2019 (Software changes)

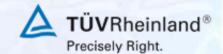
Statement issued by TÜV Rheinland Energy GmbH dated 2 September 2019 Publication BAnz AT 24.03.2020 B7, chapter IV notification 68 UBA announcement dated 24 February 2020 (Software changes and new manufacturer name)

Statement issued by TÜV Rheinland Energy GmbH dated 2 March 2020 Publication BAnz AT 31.07.2020 B10, chapter II notification 22 UBA announcement dated 27 May 2020 (Software changes)

Renewal of certificate

Certificate No. 0000056505_01:22 March 2023Expiry date of the certificate:25 March 2028





Expanded uncertainty laboratory, system 1

Measuring device:	T200P					Serial-No.:	SN: 59	
Measured component:	NO					1h-limit value:	104.6	nmol/mol
No.	Performance characteristic	Pe	erformance criterion	Result	Partia	I uncertainty	Square of partial uncertainty	
1	Repeatability standard deviation at zero	≤	1.0 nmol/mol	0.000	U _{r,z}	0.00	0.0000	1000
2	Repeatability standard deviation at 1h-limit value	≤	3.0 nmol/mol	1.230	U _{r,Ih}	0.06	0.0038	_
3	"lack of fit" at 1h-limit value	≤	4.0% of measured value	0.750	u _{l,lh}	0.45	0.2051	
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤	8.0 nmol/mol/kPa	0.990	u _{qp}	2.49	6.2057	
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤	3.0 nmol/mol/K	0.150	ugt	0.38	0.1425	
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤	3.0 nmol/mol/K	0.410	Ust	1.03	1.0644	
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤	0.30 nmol/mol/V	0.020	uv	0.06	0.0034	
	Interferent II Q with 21 mmel/mel	≤	10 nmol/mol (Zero)	-0.330		-0.41	0.1673	
8a	Interferent H ₂ 0 with 21 mmol/mol	≤	10 nmol/mol (Span)	-1.370	U _{H2O}	-0.41	0.1673	
8b	Interferent CO ₂ with 500 µmol/mol	≤	5.0 nmol/mol (Zero)	1.100	U _{int,pos}	5		
00		≤	5.0 nmol/mol (Span)	-0.500	or	0.93	0.8668	
8c	Interferent NH₃ mit 200 nmol/mol	≤	5.0 nmol/mol (Zero)	0.930	0.	0.00	0.0000	
		≤	5.0 nmol/mol (Span)	0.530	U _{int, neg}			
9	Averaging effect	≤	7.0% of measured value	-2.460	Uav	-1.49	2.2071	
18	Difference sample/calibration port	≤	1.0%	-0.240	U _{Δsc}	-0.25	0.0630	
21	Converter efficiency	2	98	99.60	UEC	0.42	0.1751	
23	Uncertainty of test gas	≤	3.0%	2.000	Ucg	1.05	1.0941	
1.1			Combined s	tandard u	ncertainty	uc	3.4931	nmol/mo
		Ī	E>	panded u	ncertainty	U	6.9863	nmol/mo
			Relative ex			W	6.68	%
			Maximum allowed ex	panded u	ncertainty	Wreq	15	%

Expanded uncertainty laboratory, system 2

Measuring device:	T200P					Serial-No.:	SN: 60	
Measured component:	NO					1h-limit value	104.6	nmol/mol
No.	Performance characteristic	F	Performance criterion	Result	Partial	uncertainty	Square of partial uncertainty	1.1.1
1	Repeatability standard deviation at zero	≤	1.0 nmol/mol	0.000	u _{r,z}	0.00	0.0000	
2	Repeatability standard deviation at 1h-limit value	≤	3.0 nmol/mol	1.460	U _{r,lh}	0.07	0.0054	
3	"lack of fit" at 1h-limit value	≤	4.0% of measured value	1.100	UI,Ih	0.66	0.4413	
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤	8.0 nmol/mol/kPa	0.910	Uap	2.29	5.2433	
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤	3.0 nmol/mol/K	0.130	u _{gt}	0.33	0.1070	
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤	3.0 nmol/mol/K	0.732	Ust	1.84	3.3927	
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤	0.30 nmol/mol/V	0.020	u _V	0.06	0.0034	
8a	Interferent H ₂ 0 with 21 mmol/mol	≤	10 nmol/mol (Zero)	-0.600		-0.36	0.1332	
oa		≤	10 nmol/mol (Span)	-0.070	U _{H2O}	-0.36	0.1332	
8b	Interferent CO ₂ with 500 µmol/mol	≤	5.0 nmol/mol (Zero)	1.470	Uint,pos			
00		≤	5.0 nmol/mol (Span)	-1.300	or	1.00	1.0063	
8c	Interferent NH₃ mit 200 nmol/mol	≤	5.0 nmol/mol (Zero)	0.830	01 1.00	1.00	1.0000	
00		≤	5.0 nmol/mol (Span)	0.970	U _{int, neg}			
9	Averaging effect	≤	7.0% of measured value	-3.720	u _{av}	-2.25	5.0469	
18	Difference sample/calibration port	≤	1.0%	-0.130	U∆sc	-0.14	0.0185	
21	Converter efficiency	≥	98	99.40	UEC	0.63	0.3939	
23	Uncertainty of test gas	≤	3.0%	2.000	Ucg	1.05	1.0941	
			Combined	standard u	ncertainty	uc	4.1099	nmol/mol
			E	xpanded u	ncertainty	U	8.2198	nmol/mol
			Relative e	xpanded u	ncertainty	W	7.86	%
			Maximum allowed e	xpanded u	ncertainty	Wreq	15	%





Combined uncertainty, laboratory and field, system 1

Measuring device:	T200P					Serial-No.:	SN: 59	
leasured component	NO NO					1h-limit value:	104.6	nmol/mo
No.	Performance characteristic		Performance criterion	Result	Pa	rtial uncertainty	Square of partial uncertainty	1
1	Repeatability standard deviation at zero	≤	1.0 nmol/mol	0.000	U _{r,z}	0.00	0.0000	
2	Repeatability standard deviation at 1h-limit value	4	3.0 nmol/mol	1.230	u _{r,lh}	not considered, as √2*ur,lh = 0.08 < ur,f		
3	"lack of fit" at 1h-limit value	≤	4.0% of measured value	0.750	U _{l,lh}	0.45	0.2051	
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	≤	8.0 nmol/mol/kPa	0.990	u _{gp}	2.49	6.2057	
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤	3.0 nmol/mol/K	0.150	ugt	0.38	0.1425	
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	≤	3.0 nmol/mol/K	0.410	Ust	1.03	1.0644	
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤	0.30 nmol/mol/V	0.020	uv	0.06	0.0034	
8a	Interferent H ₂ 0 with 21 mmol/mol	≤	10 nmol/mol (Zero)	-0.330	Unio	-0.41	0.1673	
oa		≤	10 nmol/mol (Span)	-1.370	U _{H2O}	-0.41	0.1873	
8b	Interferent CO ₂ with 500 µmol/mol	≤	5.0 nmol/mol (Zero)	1.100	Uint, pos		0.8668	
00		≤	5.0 nmol/mol (Span)	-0.500	or	0.93		
8c	Interferent NH ₃ mit 200 nmol/mol	≤	5.0 nmol/mol (Zero)	0.930	930			
		≤	5.0 nmol/mol (Span)	0.530	U _{int,neg}	_		
9	Averaging effect	≤	7.0% of measured value	-2.460	u _{av}	-1.49	2.2071	
10	Reproducibility standard deviation under field conditions	≤	5.0% of average over 3 months	3.830	u _{r,f}	4.01	16.0495	-
11	Long term drift at zero level	≤	5.0 nmol/mol	-2.210	U _{d,I,z}	-1.28	1.6280	
12	Long term drift at span level	≤	5.0% of max. of certification range	-0.940	U _{d,l,lh}	-0.57	0.3223	
18	Difference sample/calibration port	≤	1.0%	-0.240	U∆sc	-0.25	0.0630	
21	Converter efficiency	≥	98	99.600	UEC	0.42	0.1751	
23	Uncertainty of test gas	≤	3.0%	2.000	u _{cg}	1.05	1.0941	
			Combined s	standard u	ncertainty	Uc	5.4949	nmol/mo
			E	xpanded u	ncertainty	U	10.9898	nmol/m
			Relative ex	xpanded u	ncertainty	W	10.51	%
			Maximum allowed ex	xpanded u	ncertainty	Wreq	15	%

Combined uncertainty, laboratory and field, system 2

Measuring device:	T200P		1994 - A.M.		5 1	Serial-No.:	SN: 60	
Measured component:	NO					1h-limit value:	104.6	nmol/mo
No.	Performance characteristic		Performance criterion	Result	Pa	rtial uncertainty	Square of partial uncertainty	1
1	Repeatability standard deviation at zero	vi	1.0 nmol/mol	0.000	U _{r,z}	0.00	0.0000	
2	Repeatability standard deviation at 1h-limit value	4	3.0 nmol/mol	1.460	u _{r,lh}	not considered, as $\sqrt{2^*}$ ur,Ih = 0.1 < ur,f	1.00	
3	"lack of fit" at 1h-limit value	≤	4.0% of measured value	1.100	U _{l,lh}	0.66	0.4413	
4	Sensitivity coefficient of sample gas pressure at 1h-limit value	N	8.0 nmol/mol/kPa	0.910	u _{gp}	2.29	5.2433	
5	Sensitivity coefficient of sample gas temperature at 1h-limit value	≤	3.0 nmol/mol/K	0.130	u _{gt}	0.33	0.1070	
6	Sensitivity coefficient of surrounding temperature at 1h-limit value	s	3.0 nmol/mol/K	0.732	Ust	1.84	3.3927	
7	Sensitivity coefficient of electrical voltage at 1h-limit value	≤	0.30 nmol/mol/V	0.020	uv	0.06	0.0034	
	Interferent H ₂ 0 with 21 mmol/mol	≤	10 nmol/mol (Zero)	-0.600	U _{H2O}	-0.36	0.1332	
oa	8a Interferent H ₂ 0 with 21 mmol/mol	vi	10 nmol/mol (Span)	-0.070				-
8b	Interferent CO ₂ with 500 µmol/mol	ч	5.0 nmol/mol (Zero)	1.470	U _{int,pos}			
00		≤	5.0 nmol/mol (Span)	-1.300	or	1.00	1.0063	
8c	Interferent NH ₃ mit 200 nmol/mol	s .	5.0 nmol/mol (Zero)	0.830				
_		≤	5.0 nmol/mol (Span)	0.970	U _{int, neg}			-
9	Averaging effect	≤	7.0% of measured value	-3.720	Uav	-2.25	5.0469	
10	Reproducibility standard deviation under field conditions	≤	5.0% of average over 3 months	3.830	U _{r,f}	4.01	16.0495	S
11	Long term drift at zero level	≤	5.0 nmol/mol	1.150	U _{d,I,z}	0.66	0.4408	
12	Long term drift at span level	S	5.0% of max. of certification range	-0.760	U _{d,l,lh}	-0.46	0.2107	
18	Difference sample/calibration port	≤	1.0%	-0.130	$u_{\Delta sc}$	-0.14	0.0185	
21	Converter efficiency	≥	98	99.400	UEC	0.63	0.3939	
23	Uncertainty of test gas	S	3.0%	2.000	Ucg	1.05	1.0941	
			Combined	standard u	ncertainty	Uc	5.7950	nmol/mo
				xpanded u		U	11.5899	nmol/mo
				xpanded u	,	W	11.08	%
			Maximum allowed e	xpanded u	ncertainty	Wreq	15	%