1st Committee draft OIML R 99-3

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TITLE OF THE CD (English):

OIML R 99
Instruments for measuring vehicle exhaust emissions
Part 3: Report format for type evaluation

TITLE OF THE CD (French):

OIML R 99
Instruments de mesure des gaz d'échappement des véhicules
Partie 3: Format de rapport pour l'examen de type

Original version in: English

Explanatory note

(Temporary section to be removed after finalization of the document)

See also the explanatory note to Part 1 / Part 2.

In 1999, the secretary of OIML TC16/SC1 started the work to draft a Report Format for OIML R 99 *"provisional OIML issue pending the definitive ISO/OIML joint publication"*, published in 1998.

After the formal publication of the joint ISO/OIML publication in 2000, the secretary of OIML TC16/SC1 finalized a first Working Draft for this Report Format, now based on the edition 2000 of this Standard / Recommendation.
During the preparation of this draft, the secretary identified 2 problems with this edition that should be solved before it would make sense finalizing the work for the Report Format:

1) Test A.8 could be interpreted in 2 different ways;
2) There was contradiction between clause 5.7 (Response time) and test A.18.2.

Nevertheless, 6 December 2000, the first Working Draft for a Report Format has been distributed to the members of OIML TC 16/SC1 and the secretary of ISO TC22/SC5. The covering letter indicated the two problems and asked for opinions.
By the deadline 15 April 2001, the secretary of OIML TC16/SC1 received opinions about the 2 problems and remarks on the draft from: Australia, Brazil, P.R. China, Czech Republic, Germany, France, Poland, Romania, Russian Federation, Switzerland, USA, and Yugoslavia.

Based on this input, the secretary of OIML TC16/SC1, together with the secretary of ISO TC22/SC5 initiated an amendment in order to solve the 2 problems. This was dealt with by correspondence within OIML TC16/SC1 and discussed in the meeting of ISO TC22/SC5 on 7-8 June 2001 in Lyon. This lead to an agreement about the text of the amendment in both the Subcommittees of ISO and OIML.
But due a somewhat confusing situation caused by the different procedures in ISO and OIML for acceptance and publication of their Standards/Recommendations, the editing by ISO lead to a different (and technically slightly modified) text of the amendment published by ISO.
Finally, this new text of the amendment was approved by CIML in its 38th meeting (Kyoto November 2003), and published by ISO in 2004.

So now, in principle, the work on the Report Format could be continued.
But in the meantime, a lot of standards being referred to in ISO 3930 / OIML R 99 were revised or replaced. And a new edition of OIML D 11 *"General requirements for electronic measuring instruments"* was finalized and published in 2004.
This lead to the decision to interrupt the work on the Report Format and first revise ISO 3930 / OIML R 99.
But due to unforeseen circumstances at the side of the secretary of OIML TC16/SC1, it took until October 2006 until a 1WD could be distributed. In the meantime, a joint ISO/OIML Working Group was formed. Based on the remarks, a 2 WD was distributed in May 2007. This 2 WD was discussed in the meeting of the Working Group on 14 September 2007 in Delft.
There it was decided that in parallel to the work on the requirements and the tests, the time had come now to continue the work on the Report Format. And in this meeting, it was concluded too that this Format, being very important in the OIML Certificate System, is not that important for ISO. So this work will be continued as Draft OIML R 99-2 (later renumbered as Part 3). And, if appropriate, ISO can decide about acceptance in a later stage.

The remarks on the 1WD from 2000 have been carefully reviewed by the secretary and implemented as far as appropriate in the 2 WD, distributed in November 2007 to the WG and the members of the Subcommittees. The remarks resulted in the present 1 CD.

Concerning the set-up of this draft, it must be kept in mind that this in fact a document (the TRF itself with clauses A-F) within a document (with clauses 1-4), each having their own table of contents. Also refer to the 2nd last paragraph of the Introduction.

Contents of this publication

Foreword

The International Organization of Legal Metrology (OIML) is a worldwide, intergovernmental organization whose primary aim is to harmonize the regulations and metrological controls applied by the national metrological services, or related organizations, of its Member States.

The main categories of OIML publications are:

- **International Recommendations (OIML R),** which are model regulations that establish the metrological characteristics required of certain measuring instruments and which specify methods and equipment for checking their conformity. OIML Member States shall implement these Recommendations to the greatest possible extent;
- **International Documents (OIML D),** which are informative in nature and which are intended to harmonize and improve work in the field of legal metrology;
- **International Guides (OIML G),** which are also informative in nature and which are intended to give guidelines for the application of certain requirements to legal metrology; and
- **International Basic Publications (OIML B),** which define the operating rules of the various OIML structures and systems.

OIML Draft Recommendations, Documents and Guides are developed by Technical Committees or Subcommittees which comprise representatives from the Member States. Certain international and regional institutions also participate on a consultation basis.

Cooperative agreements have been established between the OIML and certain institutions, such as ISO and the IEC, with the objective of avoiding contradictory requirements. Consequently, manufacturers and users of measuring instruments, test laboratories, etc. may simultaneously apply OIML publications and those of other institutions.

International Recommendations, Documents, Guides and Basic Publications are published in English (E) and translated into French (F) and are subject to periodic revision. Additionally, the OIML publishes or participates in the publication of **Vocabularies (OIML V)** and periodically commissions legal metrology experts to write **Expert Reports (OIML E)**. Expert Reports are intended to provide information and advice, and are written solely from the viewpoint of their author, without the involvement of a Technical Committee or Subcommittee, nor that of the CIML. Thus, they do not necessarily represent the views of the OIML.

This publication - reference OIML R 99-2, Edition 200x - was developed by Technical Subcommittee TC 16/SC 1 Air pollution. It was approved for final publication by the International Committee of Legal Metrology in 200x.

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OIML R 99, PART 3
Report Format for type evaluation
Instruments for measuring vehicle exhaust emissions

1 Introduction

Note concerning the references: All references are to ISO 3930 / OIML R 99 (200x), in the text of this Report Format referred to as "R 99".

This Report Format applies for any kind of instrument for measuring vehicle exhaust emissions (independent of its technology). It presents a standardized format for the results of the various tests and examinations, described in Part 2 of R 99 (200x), to which a type of an instrument for measuring vehicle exhaust emissions shall be submitted with a view to its approval based this OIML Recommendation.

It is recommended that all metrology services or laboratories evaluating and/or testing types of instruments for measuring vehicle exhaust emissions according to OIML R 99, or to national or regional regulations based on R 99, use thist Report Format, directly or after translation into a language other than English or French. In case of a translation, it is highly recommended to leave the structure and the numbers of the clauses unchanged: in this case most of the contents is also understandable for those who can not read the language of the translation.

It is also recommended that this Report Format in English or in French (or in both languages) be transmitted by the country performing the tests to the relevant authorities of another country, when requested for issuing a national or regional type-approval.

In the practical application of the Report Format, it is not necessary to include the Foreword and clauses 1, 2, and 3 (pages 1-6). They can be replaced by a cover page by the Issuing Authority and/or in accordance with national custom or legislation. So only the clauses A - F shall be included.

2 Applicability of this Report format

In the framework of the *OIML Certificate System for Measuring Instruments*, and the OIML *Mutual Acceptance Arrangement* (MAA) applicable to instruments for measuring vehicle exhaust emissions in conformity with R 99, use of this report format is mandatory, in French and/or in English with translation into the national languages of the countries issuing such certificates, if appropriate.

Implementation of this Report Format is informative with regard to the implementation of OIML Recommendation R 99-1 in national regulations.

3 Guidance for the application of this Report format

Key to the symbols and expressions used in the following pages:

The "summary of the results" and the "results of the tests" shall be completed according to the following examples:

	Class 00	Class 0	Class I	No	
Passed for	x				passed for class 00
Passed for		x	x		passed for class 0 and I
Passed for				x	failed for all classes
Passed for	/	/	/	/	test is not applicable for this instrument

Unless prescribed otherwise, "Date" in the reports refers to the date of testing.

Note (1) Instead of the prescribed volume fractions in % vol, test gasses with the same fractions in % mol can be used as well.

Note (2) The name(s) or symbol(s) of the unit(s) used to express the test results shall be specified in each form.

In case a prescribed test is not relevant for the type of instrument to be tested, the reason why the test is omitted shall be clearly stated in the field "Remarks" (for instance surge tests on signal lines shorter than 30 m, tests related to AC mains supply in case of an instrument only powered by batteries, or partial testing after modification of a previously tested type).

The number of the report and the page numbers shall be completed in the heading.

Pages 1 - 5 of this Report format may be replaced by a cover page by the Issuing authority.

The user is free to change the length of the cells (for instance "Remarks") as required in a specific case.

4 The Evaluation Report

The format for the Report is given on the following pages.

Cover page by the issuing authority

Contents of the Report

A Authority, responsible for this report

Name	
Address	
Report number	
Application number	
Period of tests	
Date of issuing this Report	
Name and signature of the responsible person	
Stamp(s) (if applicable)	

B Synopsis of the results of the examinations and tests and

(To be completed by the Issuing Authority)

The tested specimen fulfils ALL the applicable requirements in OIML R 99-1 (200x) for: ☐ Class 00 ☐ Class 0 ☐ Class I ☐ No
Remarks:

C Summary of the results of the examination and tests

(To be completed by the Issuing Authority)

C.1 Examinations

(Refer to clauses in of R 99-1)

For details, refer to the examination: clause E of this Report as indicated in the last column.

Clause(s) in R 99-1	General requirements	Complies		details in
		Yes	No	
5.1	Indication of the measured result			E.1
5.2	Measuring range			E.1
5.3	Resolution of indication			E.1
5.4	Durable recording of measuring results			E.2
5.11	Lambda calculation			E.3
6.1.1	Materials			E.4
6.1.2	Sampling probe			E.5
6.1.3.1	Filter			E.6
6.1.4.2	Water separator			E.7
6.1.5	Ambient air / Charcoal filter			E.8
6.1.6	Pump			E.9
6.1.9	Interface / Data printer			E.10
6.2.1, -2	Adjustment facilities			E.11
6.2.3	Cross-influence of adjustment			E.12
6.2.4	Negative indications			E.13
6.3.1, -2, -3, -4, -5	Checking facilities			E.14
6.3.6, -7, -8	No measurements when not adjusted			E.15
6.3.9	Sealing			E.16
6.3.10	Software			E.17
6.3.11	No influence by remote devices			E.18
7.1	Inscriptions			D.4
7.2	Operating instructions			E.19
8.1.1	Documentation for the type approval			E.20

C.2 Performance tests

(Refer to Annex A of OIML R 99-1)

For details, refer to the tests: clause F of this Report as indicated in the last column.

Clause R 99-1	Performance tests	Complies with R 99-2				Details in
		Class 00	Class 0	Class I	No	
A.2	Error curve					F.1
A.3	Stability with time or drift					F.2
A.4	Repeatability					F.3
A.5	Dry heat					F.4
A.6	Cold					F.5
A.7	Damp heat, steady state					F.6
A.8	Atmospheric pressure					F.7
A.9	Voltage and frequency variation					F.8
A.10	Cross sensitivity					F.9
A.11	Mechanical shock					F.10
A.11	Vibrations					F.11
A.12	AC voltage dips, short interruptions and voltage variations					F.12
A.13	Burst (transients)					F.13
A.14	Electrical transient conduction (road vehicle battery)					F.14
A.15	Electrostatic discharge					F.15
A.16	Surges on data, control and power lines					F.16
A.17	Radio frequency immunity					F.17
A.18	Mains frequency magnetic fields					F.18
A.19	Warm-up time					F.19
A.20	Response time					F.20
A.21	Low flow					F.21
A.22	Leakage					F.22
A.23	HC residue					F.23
A.24	Filter unit					F.24
A.25	Water separator					F.25
A.26	Propane/hexane equivalency factor (PEF)					F.26

D General Information

D.1 Manufacturer

Company	
Address	

D.2 Applicant

Company	
Representative	
Address	
Reference	
Date of application	

Remarks:

D.3 Testing laboratories involved in the tests
(This table to be completed for each test laboratory)

Name			
Address			
Application number			
Tests by this laboratory			
Date/period of tests			
Name(s) of test engineer(s)			
Accredited by		Number:	Expires (date):
Accreditation includes R 99	☐ Yes		☐ No
Details of relevant peer assessment or assessment by other means			
In case tests have been performed on an other location than the premises of this laboratory, give details here			
Name of the responsible person			
Date of signature			
Stamp (if applicable) and signature of the responsible person			

Remarks:

D.4 General information concerning the type
and the sample(s) supplied for the tests
(as stated on the instrument / provided by the manufacturer)

Information, indicated on the instrument *(ref. R 99-1, clause 7.1)*				
Manufacturer's trade mark				
Year of manufacture				
Accuracy class				
Type designation				
Model number *(if applicable)*				
Serial number(s) of the sample(s)				
Instrument is pressure compensated			☐ Yes	☐ No
Type description of the main transducer				
Serial number of the measuring transducer				
Type of the oxygen fuel cell				
Type(s) of other oxygen fuel cell(s)				
Serial number of the oxygen fuel cell				
Minimum flow rate				
Nominal flow rate				
Electrical power				
Propane/hexane equivalency factor	single value			
	200 ppm vol C_3H_8			
	2000 ppm vol C_3H_8			
	4000 ppm vol C_3H_8			
Identification of software	Version number			
	Checksum/identification code			
CO	Maximum measured value:	% vol	Resolution of indication:	% vol
CO_2	Maximum measured value:	% vol	Resolution of indication:	% vol
HC	Maximum measured value:	ppm vol	Resolution of indication:	ppm vol
O_2	Maximum measured value:	% vol	Resolution of indication:	% vol

Remarks:

D.5 Accessories, supplied by the applicant

Battery (if applicable)	type	
	nominal voltage	
	number required	
Operating instructions		
Data printer (if applicable)		
Cables		
Sampling probe		
Ancillary facilities		
Other accessories:		

D.6 Selection of sample(s) tested

In case the tests and examination are valid for more versions, give full details of the types, versions, measuring ranges etc.:
Justification of the selection of the sample(s):

D.7 Adjustments and modifications

Adjustments, modifications, and repairs made to the samples during the testing:

D.8 Additional information concerning the type

Additional remarks and/or information (connection equipment, interfaces, etc.):

D.9 Documentation supplied by the applicant

See E.20

Remarks:

D.10 Information concerning the test equipment used for the type evaluation
(including details of simulations)

If applicable, the laboratory is free to provide this information, instead of a complete overview here, in the appropriate chapter F.x in an extra field below the 1st table (with "Date & Time" etc.). *In that case a statement shall be made in this field.*

E Examination

(To be completed by the Examining Authority)

E.1 Indication, measuring range, units and resolution *(5.1, 5.2, 5.3)*

Date:	**Observer:**	**Serial number:**

Simultaneous indication of the gas components *(5.1)*:	☐ Yes	☐ No

	Indication *(5.1)*	Measuring range *(5.2)*	Resolution *(5.3)*	
CO		% vol		% vol
CO_2		% vol		% vol
O_2		% vol	$O_2 \leq$ 4% vol	% vol
			$O_2 >$ 4% vol	% vol
HC		ppm vol		ppm vol
Remarks:				

Passed for	Class 00	Class 0	Class I	No

E.2 Durable recording of results *(5.4)*

Date:	**Observer:**	**Serial number:**

The instrument is provided with:	Internal	External	No
printing device			
memory device			

Printer fulfils requirements	Yes	No
a) Clarity of print		
b) Resolution		
c) Size of figures		
d) Printed units		
e) Data transmission for external printer: See E.10		
Remarks:		

Passed for	Class 00	Class 0	Class I	No

E.3 Lambda calculation *(5.11)*

Date:	Observer:	Serial number:

	Yes	No
The instrument is provided with a lambda calculation		
Formula for lambda calculation as in Annex D of OIML R 99		
Maximum permissible error in the lambda calculation according to *5.11*		
Indication of the lambda value according to *5.11*		
Other applied formula:		
Remarks		

Passed for	Class 00	Class 0	Class I	No

E.4 Materials used *(6.1.1)*

Date:	Observer:	Serial number:

	Fulfils requirements	
	Yes	No
Gas handling system		
Sampling probe		
Risk of influence on gas samples		
Pipe		
Remarks:		

Passed for	Class 00	Class 0	Class I	No

E.5 Size of sampling probe *(6.1.2)*

Date:	Observer:	Serial number:

		Fulfils requirements	
		Yes	No
Length of probe:	cm		
Retaining device			
Remarks:			

Passed for	Class 00	Class 0	Class I	No

E.6 Filter *(6.1.3.1)*

Date:	Observer:	Serial number:

		Fulfils requirements	
		Yes	No
Size of filter (particles)	µm		
Contamination observable			
Replaceable without special tools			
Remarks:			

Passed for	Class 00	Class 0	Class I	No

E.7 Water separator *(6.1.4.2)*

Date:	Observer:	Serial number:

Requirement	Fulfils requirements	
	Yes	No
The instrument has a water separator		
Empties automatically in case of saturation		
Measurement operation automatically stopped in case of saturation		
Remarks:		

Passed for	Class 00	Class 0	Class I	No

E.8 Port for ambient air / Charcoal filter *(6.1.5)*

Date:	Observer:	Serial number:

	Present				Fulfils requirements	
	Yes	No	Upstream	Downstream	Yes	No
HC channel						
Port for ambient air						
Charcoal filter						
Port for reference gas						
Means to maintain pressure						
Remarks:						

Passed for	Class 00	Class 0	Class I	No

E.9 Pump *(6.1.6)*

Date:	Observer:	Serial number:

	Fulfils requirements	
	Yes	No
Effect of vibrations on measurements		
Possible to turn on/off separately		
Possibility to make a measurement when pump is off		
Automatic flush with ambient air before pump is switched off ***(not mandatory)***		
Remarks:		

Passed for	Class 00	Class 0	Class I	No

E.10 Interface *(6.1.9)*

Date:	Observer:	Serial number:

	present		Fulfils requirements	
	Yes	No	Yes	No
Interface				
Printer *(see also E.2)*				
Other data storage				
Description of data storage:				
Remarks:				

Passed for	Class 00	Class 0	Class I	No

E.11 Adjustment facilities *(6.2.1, 6.2.2)*

Date:	Observer:	Serial number:

Adjustment facilities	Requirement (*)	Actual (*)			
		No	M	SA	A
Zero setting	A				
Gas calibration	M, SA, or A				
Internal adjustment	A				
(*) M = Manual, SA = Semi-automatic and A = Automatic					
Remarks:					

Passed for	Class 00	Class 0	Class I	No

E.12 Cross-influence of adjustments *(6.2.3)*

Date:	Observer:	Serial number:

Any cross-influence found	Yes	No
If "Yes", give details here:		
Remarks:		

Passed for	Class 00	Class 0	Class I	No

E.13 Negative indications *(6.2.4)*

Date:	Observer:	Serial number:

Negative indication down to	
Remarks:	

Passed for	Class 00	Class 0	Class I	No

E.14 Disturbances / checking facilities *(6.3.1, -2, -3, -4, -5)*

Occurrence of significant faults (6.3.1): for test results, please refer to F.11 - F.18)

Date:	Observer:	Serial number:

			Present		Function [1]	
			Yes	No	P	I
Checking ***facilities*** present		*(6.3.1)*				
Possibility to check the ***facilities***		*(6.3.1)*				
Checking facility HC residue		*(6.3.2, -3)*				
Automatic recognition of ***malfunctioning of*** O_2 sensor		*(6.3.4)*				
Warm up check		*(6.3.5, a)*				
Low flow check		*(6.3.5, b)*				
HC residue check		*(6.3.5, c)*				
Internal reference adjustment check		*(6.3.5, d)*				
Gas adj. check *(6.3.5, e)*	Time interval:	month				
Leak check [2] *(6.3.5, f)*	Time interval:	h				

[1] P = permanent automatic, I = Intermittent automatic

[2] For test results of leak check, refer to F.22

Remarks:

Passed for	Class 00	Class 0	Class I	No

E.15 Measurements when not adjusted *(6.3.6, 6.3.7, 6.3.8)*

Date:	Observer:	Serial number:

Adjustment facility	Automatic	Semi automatic

Adjustment facility	Possibility / warning		Meets requirement	
	Yes	No	Yes	No
Possibility to make a measurement when adjustment is not completed *(6.3.6)*				
Possibility to make a measurement when adjustment is required *(6.3.7)*				
Warning for required adjustment *(6.3.8)*				
Remarks:				

Passed for	Class 00	Class 0	Class I	No

E.16 Sealing *(6.3.9)*

Date:	Observer:	Serial number:

Effective sealing / other protection of:	**Yes**	**No**
Adjustment means		
Software integrity		
Disposable oxygen fuel cell		
Others:		
Remarks:		

Passed for	Class 00	Class 0	Class I	No

E.17 Software *(6.3.10)*

Date:	Observer:	Serial number:
Version of software:	Identification code:	

	Yes	No
Software protected by sealing		
Automatic change of identification code		
Fixed version number		
Remarks:		

Passed for	Class 00	Class 0	Class I	No

E.18 Influence by remote devices *(6.3.11)*

Date:	Observer:	Serial number:

	Yes	No
Possible influence by remote devices		
Remarks:		

Passed for	Class 00	Class 0	Class I	No

E.19 Operating instructions *(7.2)*

Date:		Observer:	
Language(s):			
Version:			

		Yes	No	N/A	Remarks
Operating instructions available	*(7.2.1)*				
Time intervals for adjustment	*(7.2.2.a)*				
Adjustment procedures	*(7.2.2.a)*				
Time intervals for maintenance	*(7.2.2.a)*				
Maintenance procedures	*(7.2.2.a)*				
Time interval of leak test	*(7.2.2.a)*				
Leakage test procedure	*(7.2.2.b)*				
HC-residue check instruction	*(7.2.2.c)*				
Storage temperature	*(7.2.2.d)*				
Specifications of portable generator	*(7.2.2.e)*				
Rated operating conditions etc.	*(7.2.2.f)*				
Formula of lambda calculation	*(7.2.2.g)*				
Replacement of oxygen fuel cell	*(7.2.2.h)*				
External power converter	*(7.2.2.i)*				
Compatibility ancillary equipment	*(7.2.2.j)*				
Temperature range	*(7.2.2.k)*				
Specific conditions	*(7.2.2.l)*				*Give details below in "remarks"*
Specifications of battery	*(7.2.2.m)*				
Remarks:					

Passed for	Class 00	Class 0	Class I	No

E.20 Documentation for type approval *(8.1.1)*

	Yes	No	Remarks
a) Description of the general principle of measurement			
b) List of essential components + details			
b) Characteristics of the essential components, drawings, diagrams, etc			
c) Description of the essential components with drawings and diagrams			
d) General information of the software *(also refer to 6.3.10)*			
e) Description of the formula for lambda calculation *(also refer to E.3)*			
f) Operating instructions *(also refer to E.19)*			*For details, see E.19*
Information supporting the manufacturer's assumption of compliance			

Other relevant **information pertaining to identification of the instrument**, diagrams, results of previous tests etc.: (attach photograph(s) and/or outline-drawing(s) here if available):

Remarks:

Passed for	Class 00	Class 0	Class I	No

F Performance tests

F.1 Error curve *(9.1, A.2)*

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure:	hPa
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Concentration (mixtures E, F, G and/or H)			Error	Maximum permissible error
Recommended reference value	Actual reference value	Indicated value		
% vol CO	% vol CO	% vol CO	% vol CO	% vol CO
(0)				
0,5				
1,0				
3,5 / 5				
< 0,3				
% vol CO_2	% vol CO_2	% vol CO_2	% vol CO_2	% vol CO_2
(0)				
6				
10				
14				
ppm vol HC	ppm vol HC	ppm vol HC	ppm vol HC	ppm vol HC
(0)				
100				
300				
1 000				
< 50				
% vol O_2	% vol O_2	% vol O_2	% vol O_2	% vol O_2
(0)				
0,5				
10				
20,9				
Remarks:				

Passed for	Class 00	Class 0	Class I	No

F.2 Stability with time or drift *(9.2, A.3)*

It is suggested (but not mandatory) to combine this test with Test A.19 (see F.19)

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure: hPa	
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Test gas A	% vol CO	% vol CO_2	ppm vol HC	ppm vol C_3H_8	% vol O_2
Recommended	0,5	14	100		0,5
Actual					

Warm-up time: ..... h, ... min at reference conditions

Time following the warm-up time	Indication			
	% vol CO	% vol CO_2	ppm vol HC	% vol O_2
0 min.				
2 min. (*)				
5 min. (*)				
15 min. (*)				
½ h				
1 h				
1½ h				
2 h				
2½ h				
3 h				
3½ h				
4 h				
Maximum error				
MPE				

(*) *Only applicable when this test is combined with the test for the warm-up time in F.19*

Remarks:

Passed for	Class 00	Class 0	Class I	No

F.3 Repeatability *(9.3, A.4)*

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure: hPa	
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Test gas A	% vol CO	% vol CO_2	ppm vol HC	ppm vol C_3H_8	% vol O_2
Recommended	0,5	14	100		0,5
Actual					

Indication No.	% vol CO		% vol CO_2		ppm vol HC		% vol O_2	
	air	test gas	air	test gas	air	test gas	air	test gas
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
σ [(1)]								
criterion [(2)]								

Notes:
[(1)] *Here, σ is the experimental standard deviation according to clause 5.13 of R 99*
[(2)] *The criterion is one third of the modulus of the maximum permissible error on initial verification*

Remarks:

Passed for	Class 00	Class 0	Class I	No

F.4 Dry heat (40 °C) *(9.4.1,a, A.5)*

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure:	hPa
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Test gasses A, C		% vol CO	% vol CO_2	ppm HC	ppm vol C_3H_8	% vol O_2
Recommended		0,5 / 3,5	14	100 / 1000		0,5
Actual	Gas A					
	Gas C					

Heating time		Temperature (40°C)	Relative Humidity (< 50 %)
h	min	°C	%

Time after heating up	Gas	Indication			
		% vol CO	% vol CO_2	ppm vol HC	% vol O_2
0 min.	A				
	C				
½ h	A				
	C				
1 h	A				
	C				
1½ h	A				
	C				
2 h	A				
	C				
Maximum error					
MPE					

Remarks:

Passed for	Class 00	Class 0	Class I	No

F.5 Cold (5 °C) *(9.4.1,b A.6)*

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure:	hPa
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Test gasses A, C		% vol CO	% vol CO_2	ppm HC	ppm vol C_3H_8	% vol O_2
Recommended		0,5 / 3,5	14	100 / 1000		0,5
Actual	Gas A					
	Gas C					

Cooling-down time		Temperature (5 °C)
h	min	°C

Time after heating up	Gas	Indication			
		% vol CO	% vol CO_2	ppm vol HC	% vol O_2
0 min.	A				
	C				
½ h	A				
	C				
1 h	A				
	C				
1½ h	A				
	C				
2 h	A				
	C				
Maximum error					
MPE					

Remarks:

Passed for	Class 00	Class 0	Class I	No

F.6 Damp heat, steady state (30 °C, 85 % R.H.) *(9.4.1.c, A.7)*

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure:	hPa
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Test gasses A, C		% vol CO	% vol CO_2	ppm HC	ppm vol C_3H_8	% vol O_2
Recommended		0,5 / 3,5	14	100 / 1000		0,5
Actual	Gas A					
	Gas C					

Heating time		Temperature (30°C)	Relative Humidity (85 %)
h	min	°C	%

Time after heating up	Gas	Indication			
		% vol CO	% vol CO_2	ppm vol HC	% vol O_2
1 day	A				
	C				
2 days	A				
	C				
Maximum error					
MPE					

Remarks:

Passed for	Class 00	Class 0	Class I	No

F.7 Atmospheric pressure *(9.4.1.d, A.8)*

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure:	hPa
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Test gases A, C		% vol CO	% vol CO_2	ppm HC	ppm vol C_3H_8	% vol O_2
Recommended		0,5 / 3,5	14	100 / 1000		0,5
Actual	Gas A					
	Gas C					

Pressure	Gas	Indication			
		% vol CO	% vol CO_2	ppm vol HC	% vol O_2
Ambient: hPa	A				
	C				
High: hPa	A				
	C				
Low: hPa	A				
	C				
Ambient: hPa	A				
	C				
Maximum error					
MPE					

Remarks:

Passed for	Class 00	Class 0	Class I	No

F.8 Voltage and frequency variations *(9.4.1.e, A.9)*

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure: hPa	
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Test gas A	% vol CO	% vol CO_2	ppm HC	ppm vol C_3H_8	% vol O_2
Recommended	0,5	14	100		0,5
Actual					

F.8.1 Mains (AC) Voltage and frequency variations *(A.9.1)*

Mains voltage f = Hz	Indication			
	% vol CO	% vol CO_2	ppm vol HC	% vol O_2
U_{nom} = V				
+ 10 %: V				
- 15 %: V				
Maximum error				
MPE				

Mains frequency U = V	Indication			
	% vol CO	% vol CO_2	ppm vol HC	% vol O_2
f_{nom} = Hz				
+ 2 %: Hz				
- 2 %: Hz				
Maximum error				
MPE				

F.8.2 Battery voltage variation *(A.9.2 and A.9.3)*

Battery voltage		Indication			
		% vol CO	% vol CO_2	ppm vol HC	% vol O_2
U_{nom}	V DC				
Upper limit	V DC				
Lower limit	V DC				
Maximum error					
MPE					

Remarks:

Passed for	Class 00	Class 0	Class I	No

F.9 Cross sensitivity *(9.4.2, A.10)*

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure: hPa	
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Test F.9.1.1 *(A.10.1.1)* Gas mixture in N_2				Indication			
Recom-mended		Actual	Unit	% vol CO	% vol CO_2	ppm vol HC	% vol O_2
a)	pure		N_2, dry				
b)	16		% vol CO_2				
	6		% vol CO				
	10		% vol O_2				
	5		% vol H_2				
	0,3		% vol NO				
	2000		ppm vol C_6H_{14}				
	N_2, water saturated						
Maximum influence on zero indication							
Remarks:							

Test F.9.1.2 *(A.10.1.2)* All measurands in N_2 Gasses J, K		Indication					
		% vol CO	% vol CO_2	ppm vol HC	Standard Water	Gas J % O_2	Gas K % H_2
Recommended reference value		3,5	14	1 000	saturation	10 %	5 %
a) Measurands in pure N_2	Actual reference value						
	Indicated value single gas						
	Error						
b) All measurands together in N_2	Actual reference value						
	Indicated values combined gas						
	Error						
Difference between the errors							
Maximum permissible difference							
Remarks:							

Passed for	Class 00	Class 0	Class I	No

F.10 Mechanical shock *(free fall, 9.5.a, A.11.1)*
(one fall over 25 mm on each bottom edge)

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure:	hPa
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Test gas A	% vol CO	% vol CO_2	ppm HC	ppm vol C_3H_8	% vol O_2
Recommended	0,5	14	100		0,5
Actual					

	Indication			
	% vol CO	% vol CO_2	ppm vol HC	% vol O_2
Before shocks				
After shocks				
Maximum fault				
Remarks:				

Passed for	Class 00	Class 0	Class I	No

F.11 Vibrations *(9.5.a, A.11.2)*
(only applicable for hand-held instruments)

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure:	hPa
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Test gas A	% vol CO	% vol CO_2	ppm HC	ppm vol C_3H_8	% vol O_2
Recommended	0,5	14	100		0,5
Actual					

	Indication			
	% vol CO	% vol CO_2	ppm vol HC	% vol O_2
before vibration				
after vibration				
Maximum fault				
Remarks:				

Passed for	Class 00	Class 0	Class I	No

F.12 AC voltage dips, short interruptions and voltage variations *(9.5.b, A.12)*

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure: hPa	
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Test gas A	% vol CO	% vol CO_2	ppm vol HC	ppm vol C_3H_8	% vol O_2
Recommended	0,5	14	100		0,5
Actual					

f_n = Hz	Reduction to	Duration [cycles]	Indication			
Test			% vol CO	% vol CO_2	ppm vol HC	% vol O_2
Without reduction	-	-				
Dips a	V					
	%					
Dips b	V					
	%					
Dips c	V					
	%					
Short interruptions	V					
	%					
Maximum fault						

Remarks:

Passed for	Class 00	Class 0	Class I	No

F.13 Voltage bursts *(9.5.c, A.13)*

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure: hPa	
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Test gas A	% vol CO	% vol CO_2	ppm vol HC	ppm vol C_3H_8	% vol O_2
Recommended	0,5	14	100		0,5
Actual					

Burst		Indication			
		% vol CO	% vol CO_2	ppm vol HC	% vol O_2
Without bursts					
Phase	+ kV				
	- kV				
Without bursts					
Neutral	+ kV				
	- kV				
Without bursts					
Protective earth	+ kV				
	- kV				
Without bursts					
Port 1 (*)	+ kV				
	- kV				
Without bursts					
Port 2 (*)	+ kV				
	- kV				
Without bursts					
Port 3 (*)	+ kV				
	- kV				
Without bursts					
Port 4 (*)	+ kV				
	- kV				
Without bursts					
Port 5 (*)	+ kV				
	- kV				
Without bursts					
Maximum fault					

(*) Description of the Ports:
Port 1:
Port 2:
Port 3:
Port 4:
Port 5:

Remarks:

Passed for	Class 00	Class 0	Class I	No

F.14 Transient conduction *(road vehicle battery: 9.5.d, A.14)*

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure: hPa	
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Test gas A	% vol CO	% vol CO_2	ppm vol HC	ppm vol C_3H_8	% vol O_2
Recommended	0,5	14	100		0,5
Actual					

Un = V		Indication			
Transient (*)		% vol CO	% vol CO_2	ppm vol HC	% vol O_2
Without transients					
Pulse 2a	+ V				
	- V				
Without transients					
Pulse 2b	+ V				
	- V				
Without transients					
Pulse 3a	+ V				
	- V				
Without transients					
Pulse 3b	+ V				
	- V				
Without transients					
Pulse 4	+ V				
	- V				
Without pulses					
Maximum fault					

(*) Pulses according to ISO 7637-2

Remarks:

Passed for	Class 00	Class 0	Class I	No

F.15 Electrostatic discharge *(9.5.e, A.15)*

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure: hPa	
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Test gas A	% vol CO	% vol CO_2	ppm vol HC	ppm vol C_3H_8	% vol O_2
Recommended	0,5	14	100		0,5
Actual					

F.15.1 Direct application on the instrument

F.15.1.1 Contact mode (6 kV) for instrument with ground terminal

Discharge	Indication			
	% vol CO	% vol CO_2	ppm vol HC	% vol O_2
without discharge				
+ 2 kV				
+ 4 kV				
+ 6 kV				
without discharge				
- 2 kV				
- 4 kV				
- 6 kV				
without discharge				
Maximum fault				

In case the instrument fails this test, indicate the test point(s):

Remarks:

Passed for	Class 00	Class 0	Class I	No

F.15.1.2 Air mode (8 kV) for instrument without ground terminal				
Discharge	Indication			
	% vol CO	% vol CO_2	ppm vol HC	% vol O_2
without discharge				
+ 2 kV				
+ 4 kV				
+ 6 kV				
+ 8 kV				
without discharge				
- 2 kV				
- 4 kV				
- 6 kV				
- 8 kV				
without discharge				
Maximum fault				
In case the instrument fails this test, indicate the test point(s):				
Remarks:				

Passed for	Class 00	Class 0	Class I	No

F.15.2 Indirect application on object (plane) near the instrument: contact mode (6 kV)

F.15.2.1 Horizontal plane under the instrument				
Discharge	indication			
	% vol CO	% vol CO_2	ppm vol HC	% vol O_2
without discharge				
+ 2 kV				
+ 4 kV				
+ 6 kV				
without discharge				
- 2 kV				
- 4 kV				
- 6 kV				
without discharge				
Maximum fault				
In case the instrument fails this test, indicate the test point(s):				
Remarks:				

Passed for	Class 00	Class 0	Class I	No

F.15.2.2 Vertical plane on 0,1 m distance				
Discharge	indication			
	% vol CO	% vol CO_2	ppm vol HC	% vol O_2
without discharge				
+ 2 kV				
+ 4 kV				
+ 6 kV				
without discharge				
- 2 kV				
- 4 kV				
- 6 kV				
without discharge				
Maximum fault				
In case the instrument fails this test, indicate the test point(s) and the orientation(s) of the plane:				
Remarks:				

Passed for	Class 00	Class 0	Class I	No

F.16 Surges *(9.5.f, A.16)*

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure: hPa	
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Test gas A	% vol CO	% vol CO_2	ppm vol HC	ppm vol C_3H_8	% vol O_2
Recommended	0,5	14	100		0,5
Actual					

F.16.1 On AC mains power lines *(A.16)*

	Angle	Voltage and Polarity	Number of surges	Indication			
				% vol CO	% vol CO_2	ppm vol HC	% vol O_2
Without surges							
Line to line	0 °						
	90 °						
	180 °						
	270 °						
Line to earth	0 °						
	90 °						
	180 °						
	270 °						
Maximum fault							
Action of checking facility:							
Remarks:							

Passed for	Class 00	Class 0	Class I	No

F.16.2 On signal, data and control lines *(A.16)*
(including connections for external batteries)

Surge applied on	Voltage and Polarity	Number of surges	Indication			
			% vol CO	% vol CO_2	ppm vol HC	% vol O_2
Without surges						
Line 1 (*)						
Line 2 (*)						
Line 3 (*)						
Line 4 (*)						
Line 5 (*)						
Maximum fault						

(*) Description of the Ports:
Line 1:
Line 2:
Line 3:
Line 4:
Line 5:

Action of checking facility:

Remarks:

Passed for	Class 00	Class 0	Class I	No

F.17 Radio frequency immunity *(9.5.g, A.17)*

F.17.1 Radiated fields *(A.17.1)*

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure: hPa	
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Test gas A	% vol CO	% vol CO_2	ppm vol HC	ppm vol C_3H_8	% vol O_2
Recommended	0,5	14	100		0,5
Actual					

80 MHz to 2 GHz, 10 V/m, 80 % AM, 1 kHz sine wave		Indication			
Polarization	Facing EUT	% vol CO	% vol CO_2	ppm vol HC	% vol O_2
Without field					
Vertical	Front				
	Right				
	Left				
	Rear				
Horizontal	Front				
	Right				
	Left				
	Rear				
Maximum fault					

Remarks:

Passed for	Class 00	Class 0	Class I	No

F.17.2 Conducted fields *(9.5.h, A.17.2)*

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure: hPa	
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Test gas A	% vol CO	% vol CO_2	ppm vol HC	ppm vol C_3H_8	% vol O_2
Recommended	0,5	14	100		0,5
Actual					

0,15 MHz to 80 MHz, 10 V/m 80 % AM, 1 kHz sine wave	Indication			
	% vol CO	% vol CO_2	ppm vol HC	% vol O_2
Without field				
Port:				
Port:				
Port:				
Port:				
Port:				
Port:				
Port:				
Maximum fault				

Remarks:

Passed for	Class 00	Class 0	Class I	No

F.18 Mains frequency magnetic fields *(9.5.h, A.18)*

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure: hPa	
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Test gas A	% vol CO	% vol CO_2	ppm vol HC	ppm vol C_3H_8	% vol O_2
Recommended	0,5	14	100		0,5
Actual					

30 A/m *f* = Hz	Indication			
	% vol CO	% vol CO_2	ppm vol HC	% vol O_2
Without field				
With field (direction with maximum effect)				
Maximum fault				
Direction of field with maximum effect				

Remarks:

Passed for	Class 00	Class 0	Class I	No

F.19 Warm-up time *(9.6.a, A.19)*

It is suggested (but not mandatory) to combine this test with Test A.3 (see F.2)

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure: hPa	
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Warm-up time, prescribed by manufacturer:
The instrument has an automatic warm-up lockout: ☐ Yes ☐ No

Test gas A	% vol CO	% vol CO_2	ppm vol HC	ppm vol C_3H_8	% vol O_2
Recommended	0,5	14	100		0,5
Actual					

		Indication			
		% vol CO	% vol CO_2	ppm vol HC	% vol O_2
Reference conditions *(not necessary if combined with test A.3)*	after 0 min				
	after 2 min				
	after 5 min				
	after 15 min				
	Max. difference				
5 °C	after 0 min				
	after 2 min				
	after 5 min				
	after 15 min				
	Max. difference				

Remarks:

Passed for	Class 00	Class 0	Class I	No

F.20 Response time *(9.6.b, A.20)*

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure: hPa	
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Test gas B	% vol CO	% vol CO_2	ppm vol HC	ppm vol C_3H_8	% vol O_2
Recommended	0,5	14	100		0
Actual					

	Indicated / calculated value			
	% vol CO	% vol CO_2	ppm vol HC	% vol O_2
Air				
Final value				
95 % of final value				N/A
Final value + 0,1 %	N/A	N/A	N/A	

	Time after switch from air to test gas			
	CO	CO_2	HC	O_2
Time until 95 % of final value				N/A
Time until final value + 0,1 %	N/A	N/A	N/A	
Criterion	15 s	15 s	15 s	60 s

Remarks:

Passed for	Class 00	Class 0	Class I	No

F.21 Low flow *(9.5.2.c, A.21)*

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure: hPa	
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Test gas A	% vol CO	% vol CO_2	ppm vol HC	ppm vol C_3H_8	% vol O_2
Recommended	0,5	14	100		0,5
Actual					

Flow	l/min	Indication			
		% vol CO	% vol CO_2	ppm vol HC	% vol O_2
Nominal					
Low (*)					
(*) Low flow indication:					

Remarks:

Passed for	Class 00	Class 0	Class I	No

F.22 Leakage *(9.6.d, A.22)*

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure: hPa	
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Test gas B	% vol CO	% vol CO_2	ppm vol HC	ppm vol C_3H_8	% vol O_2
Recommended	0,5	14	100		0
Actual					

Position of the artificial adjustable leakage:

Leakage	Indication			
	% vol CO	% vol CO_2	ppm vol HC	% vol O_2
Leak closed				
With leakage				
Difference				
Criterion				
Remarks:				

Passed for	Class 00	Class 0	Class I	No

F.23 HC residue *(9.6.e, A.23)*

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure: hPa	
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Test gas I	% vol CO	ppm vol HC
Recommended	3,5	1 000
Actual		

Details of the specially adjusted engine:

Exhaust gas:	% vol CO	% vol CO_2	ppm vol HC	ppm vol C_3H_8	% vol O_2
Recommended	> 5		> 800		
Actual (measured)					

Time	Temp °C	Measurand	Indication			
			% vol CO	% vol CO_2	ppm vol HC	% vol O_2
		Ambient air				
		Exhaust gas (> 5 min.)				
		HC residue check	N / A	N / A	N / A	N / A
		Test gas				
Error						
MPE						

Error message during HC residue check routine?	☐ Yes	☐ No
Measurements possible during HC residue check routine?	☐ Yes	☐ No

Remarks:

Passed for	Class 00	Class 0	Class I	No

F.24 Filter unit *(9.6.f, A.24)*

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure: hPa	
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Test gas D	% vol CO	% vol CO_2	ppm vol HC	ppm vol C_3H_8	% vol O_2
Recommended	3,5	14	1000		0
Actual					

Time	Measurand	Indication			
		% vol CO	% vol CO_2	ppm vol HC	% vol O_2
	Ambient air				
	Exhaust gas (> 30 min.)				
	HC residue check	N / A	N / A	N / A	N / A
	Test gas				
Error (last measurement):					
MPE					
Response time during test:					
Remarks:					

Passed for	Class 00	Class 0	Class I	No

F.25 Water separator *(9.6.g, A.25)*

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure: hPa	
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Test gas D	% vol CO	% vol CO_2	ppm vol HC	ppm vol C_3H_8	% vol O_2
Recommended	0,5	14	1000		0
Actual					

F.25.1 High temperature (40 °C) with wet gas: water saturated N_2 / ambient air *(A.25.1)*

	Indication			
Temperature: °C	% vol CO	% vol CO_2	ppm vol HC	% vol O_2
Test gas				
30 minutes wet gas				
Test gas				
Error				
MPE				

Response time after 30 min. wet gas:

	Indicated / calculated value *(oxygen-free gas)*			
	% vol CO	% vol CO_2	ppm vol HC	% vol O_2
Air				
Final value				
95 % of final value				N/A
Final value + 0,1 %	N/A	N/A	N/A	

	Time after switch from air to test gas			
	CO	CO_2	HC	O_2
Time until 95 % of final value				N/A
Time until final value + 0,1 %	N/A	N/A	N/A	

Remarks:

Passed for	Class 00	Class 0	Class I	No

Continued on next page

F.25.2 Low ambient temperature with exhaust gas *(A.25.2)*

	Indication			
Temperature: °C	% vol CO	% vol CO_2	ppm vol HC	% vol O_2
Test gas				
30 minutes exhaust gas				
Test gas				
Error				
MPE				

Response time after 30 min. wet gas:

	indicated / calculated value **(oxygen-free gas)**			
	% vol CO	% vol CO_2	ppm vol HC	% vol O_2
Air				
Final value				
95 % of final value				N/A
Final value + 0,1 %	N/A	N/A	N/A	

	Time after switch from air to test gas			
	CO	CO_2	HC	O_2
Time until 95 % of final value				N/A
Time until final value + 0,1 %	N/A	N/A	N/A	

Remarks:

Passed for	Class 00	Class 0	Class I	No

F.26 Propane/Hexane factor (PEF) *(9.6.h A.26)*

Date & Time	Start :	Observer :	
	Finish :	PEF :	
Ambient temperature: °C		Ambient pressure: hPa	
Serial No.:	Instrument:	Transducer.:	O_2 fuel cell:

Test gas	ppm vol propane [a]		ppm vol n-hexane [c]	
Recommended	200	2 000	100	1 000
Actual				
Actual as HC [b]				
Indication as HC				
Error (HC) [b] + [d]				
MPE [*]				
1/2 MPE [*]				
Difference errors [e]	200 ppm propane / 100 ppm vol n-hexane			
	2000 ppm propane / 1000 ppm vol n-hexane			
Formula for the calculation of PEF:				
Calculated PEF for high concentration:				
Calculated PEF for low concentration:				
Calculated mean value of PEF				

Notes: [a], [b], [c], [d], and [e] refer to steps in A.26
[*] whatever is applicable

Remarks:

Passed for	Class 00	Class 0	Class I	No