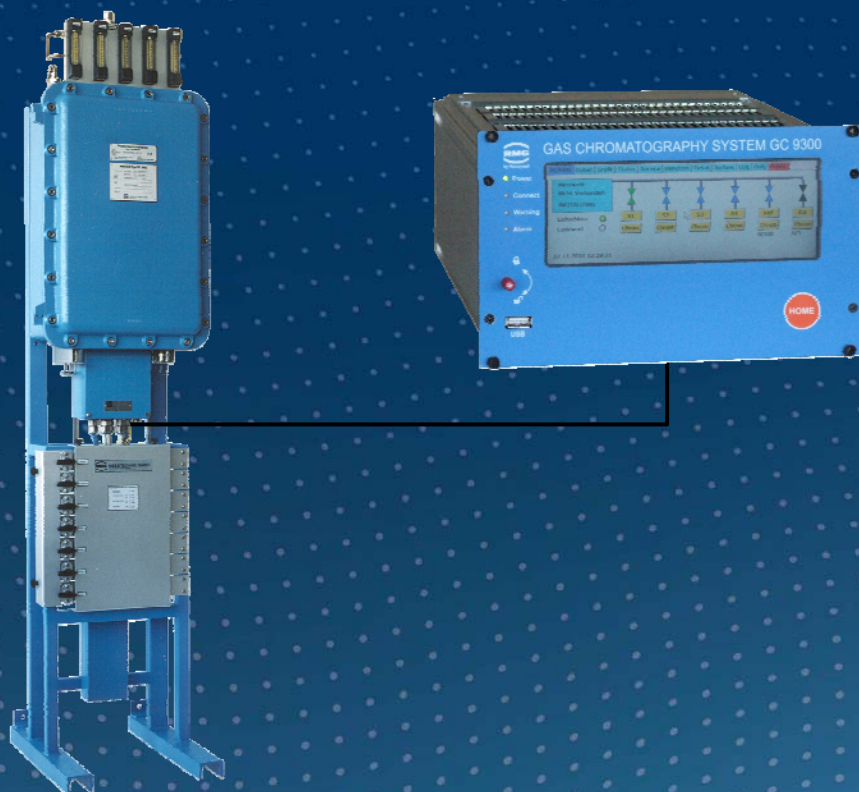


# Process Gas Chromatograph PGC 9300



## MAINTENANCE LOGBOOK

## Reliable Measurement of Gas

STATUS MAY 2016



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**Note:**

Information on the device can be found in the operating instructions for the meter and analyser. The latest version of these manuals can be downloaded from our website, **[www.rmg.com](http://www.rmg.com)**.

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# PGC 930 Maintenance Logbook

No.

## Commissioning

PGC manufacturer number	
PGC year of manufacture	
Meter serial number	

GC 9300 manufacturer number	
GC 9300 year of manufacture	
GC 9300 software version	

Approved for	Calorific value <input type="checkbox"/>	Gas quality <input type="checkbox"/>
--------------	--	--------------------------------------

Operator	
Station	
Commissioning	

	Type / carrier gas	Column temperature [°C]	Column pressure [kPa]	Flushing time [s]
Column A				
Column B				
Column C				

Date	
Signature	

---

# PGC 930 Maintenance Logbook

## Repair / Component exchange

PGC manufacturer number	
PGC year of manufacture	
Meter serial number	

GC 9300 manufacturer number	
GC 9300 year of manufacture	
GC 9300 software version	

Approved for	Calorific value <input type="checkbox"/>	Gas quality <input type="checkbox"/>
--------------	--	--------------------------------------

Operator	
Station	
Commissioning	

	Type / carrier gas	Column temperature [°C]	Column pressure [kPa]	Flushing time [s]
Column A				
Column B				
Column C				

Date	
Signature	

---

<b>INSTRUCTIONS FOR KEEPING THE MAINTENANCE LOGBOOK .....</b>	<b>1</b>
<b>Inspection.....</b>	<b>1</b>
Operating parameters on the GC 9300 .....	1
Cylinder pressures.....	2
Carrier gas filters.....	2
<b>Maintenance by service technicians .....</b>	<b>2</b>
<b>MANUFACTURER'S REQUIREMENTS .....</b>	<b>3</b>
<b>Annual maintenance of the process gas chromatograph.....</b>	<b>3</b>
<b>Metrological check / (re)calibration .....</b>	<b>3</b>
<b>TABLE SECTION 1 .....</b>	<b>4</b>
Cylinder pressures .....	4
Carrier gas filter .....	4
<b>TABLE SECTION 2 .....</b>	<b>11</b>
Maintenance measures, general .....	11
<b>TABLE SECTION 3 .....</b>	<b>22</b>
Annual routine maintenance .....	22
<b>TABLE SECTION 4 .....</b>	<b>31</b>
Test gas analyses.....	31

# Instructions for Keeping the Maintenance Logbook

The maintenance logbook is part of the design approval and is used to monitor the operation of the device. It is therefore mandatory that this maintenance logbook should be kept. When a service callout is required, the original maintenance logbook, or a copy, should be sent to the manufacturer.

The information on the first page and the relevant data in the table are entered by the testing laboratory before the device is delivered. This documents the condition of the device on delivery.

The device is to be inspected by the operator every **8 weeks** until the **first annual routine maintenance check/recalibration** (inspections). **After the first annual routine maintenance check/recalibration**, it is sufficient for the operator to perform an inspection **every three months**. The values listed in Table Section 1 of this maintenance logbook must be documented during every inspection. This particularly applies to the Visual inspection of the status of all filter indicators of PGCs with molecular sieve column. Routine maintenance should be performed once a year by qualified personnel according to the manufacturer's instructions and should be documented in Table Section 3 in the maintenance logbook. All PGCs with molecular sieve column are to be baked out once a year in the course of the routine maintenance. For PGCs of type PGC 9301 the bake-out is recommended in the course of the routine maintenance. The carrying out of routine maintenance is also prerequisite but not part of the calibration, which has to be performed afterwards. Results of the calibration are to be documented in Table Section 4.

## Inspection

### Operating parameters on the GC 9300

The setpoints for the operating parameters are entered on the first page of this book by the test laboratory during commissioning and shall remain unchanged during operation, unless altered by an RMG service technician.

The actual values of the operating parameters can be checked at any time on the GC 9300 analyser under the Status->Meter tab or using RMGViewGC. Because these values are constantly monitored by the controller and because divergences are officially recorded as "faults", these parameters do not have to be documented in the maintenance logbook. It is therefore necessary to check whether active or inactive faults or warnings are displayed on the GC 9300 at every visit to the station.

### Cylinder pressures

The pressure in the gas cylinders is checked directly at the high pressure gauges of the relevant pressure reducing unit at regular intervals, in other words at every maintenance check, and the information is then documented in the relevant table in Table Section 1 of this logbook. If a cylinder has been changed or switched, this should also be documented in the relevant column. If the PGC is found to be malfunctioning, this fact should also be recorded.

The pressures should be checked for:

- Carrier gas 1
- Carrier gas 2 (if applicable)
- Internal calibration gas

### Carrier gas filters

All PGCs with molecular sieve column include carrier gas filters, which may be equipped with indicators. In each inspection, the statuses of the indicators are to be checked and documented. In case of partial or complete discoloration of an indicator the carrier gas cylinder must be changed immediately and all external filters of the PGC have to be replaced by new ones. It is recommended to let the concerned PGC be checked by the service promptly, to prevent possible damage. It is also recommended to examine the causative carrier gas cylinder for moisture.

### Maintenance by service technicians

This section records all changes and measures carried out by service technicians. This encompasses routine maintenance tasks, software updates and service activities in the event of a malfunction. In the event of a malfunction, the operator or service technician should enter a brief description of the problem in the appropriate place.

It should be noted that this maintenance logbook is linked to a meter. In the event of a serious malfunction that requires the meter to be replaced, a new maintenance logbook must be started. This will be supplied with the new meter. **The old maintenance logbook, either a copy or the original, should be sent to the manufacturer for analysis.**

# Manufacturer's requirements

## Annual maintenance of the process gas chromatograph

The annual inspection of the PGC 930x must be carried out on the basis of the checklist (Table Section 4) by persons who have received appropriate training from RMG to provide such maintenance.

## Metrological check / (re)calibration

Once the maintenance activities described in Section 2 are complete, the device will subsequently undergo routine recalibration. A representative of the responsible calibration authorities must be on hand for this purpose. The design approval and the relevant guidelines and standards it contains are key to the technical calibration of the system.

Recalibration entails:

- Checking the area around the existing power outputs
- Basic calibration for device types PGC 9301, PGC 9302 and PGC 9303 with internal calibration gas
- Normal calibration for device type PGC 9304 with internal calibration gas
- Verification with external calibration gasses with chromatogram
- Verification of power transmission and/or bus transmission of mandatory calibration values
- Logging of all the work carried out, entries in the maintenance logbook

Following the verification of the official parameters to be set in the GC 9300 (tab: *Detail*), metrological check begins with the opening of the calibration lock and the implementation of a basic/normal calibration (select tab: *Detail->01-GC 9300->Mode->Basic/Normal Calibration*). Following basic calibration, the new **response factors** (tab: *Detail->09 Calibration Results->RFZ*) and **retention times** (tab: *Detail->09 Calibration Results->RTZ*) are noted down in Table Section 4. If the device is calibrated using the “new mathematics”, the **GLKs** (tab: *Detail->11 Component Parameters/ [component]->GLK*) are to be noted down instead of the **RFZs**. For the PGC 9304 the RFs are to be entered instead of the RFZs/GLKs and the RTs instead of the RTZs. In addition, the chromatograms for the calibration gas are compared with the sample chromatograms shown in the design approval. The chromatograms can be analysed using the RMGViewGC software or on the basis of the chromatogram displays in GC 9300 (tab: *Graph->Chroms*).

The metrological check of the device takes place subsequently. The test gases defined in the design approval are analysed in succession. At least three analyses are required for each gas. The result of the third analysis is to be used for the verification. The results of these analyses are to be found in the GC 9300 (tab: *Archives*) and **should be fully recorded in the table provided for this purpose**. The key parameters for the official verification (according to the design approval) are indicated in the table. The setpoints can be found in the certificates for the test gasses used and should also be noted. It is recommended that the chromatograms of the test gasses should be checked.



# Table Section 1

Cylinder pressures

Carrier gas filter

**To be performed at:**

- Every inspection
- Every maintenance

**Entries made by:**

- Operator
- RMG Service













## Table Section 2

### Maintenance measures, general

**To be performed at:**

- Annual routine maintenance
- Software update
- Metrological check
- (Re)calibration
- Repair

**Entries made by:**

- Trained personnel
- RMG Service



**Maintenance measure**

Measures performed	
Routine maintenance	Table 3
Software update	
Metrological check	Table 4
(Re)calibration	Table 4
Defect	See below

12

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---

Description of problem	Measure

Performed <b>by</b>	
Performed <b>on</b>	

<b>Signature</b>	
------------------	--

**Maintenance measure**

Measures performed	
Routine maintenance	Table 3
Software update	
Metrological check	Table 4
(Re)calibration	Table 4
Defect	See below

13

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Description of problem	Measure

Performed <b>by</b>	
Performed <b>on</b>	

<b>Signature</b>	
------------------	--

**Maintenance measure**

Measures performed	
Routine maintenance	Table 3
Software update	
Metrological check	Table 4
(Re)calibration	Table 4
Defect	See below

14

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Description of problem	Measure

Performed <b>by</b>	
Performed <b>on</b>	

<b>Signature</b>	
------------------	--

**Maintenance measure**

Measures performed	
Routine maintenance	Table 3
Software update	
Metrological check	Table 4
(Re)calibration	Table 4
Defect	See below

15

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Description of problem	Measure

Performed <b>by</b>	
Performed <b>on</b>	

<b>Signature</b>	
------------------	--

**Maintenance measure**

<b>Measures performed</b>	
Routine maintenance	Table 3
Software update	
Metrological check	Table 4
(Re)calibration	Table 4
Defect	See below

16

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<b>Description of problem</b>	<b>Measure</b>

<b>Performed by</b>	
<b>Performed on</b>	

<b>Signature</b>	
------------------	--

**Maintenance measure**

Measures performed	
Routine maintenance	Table 3
Software update	
Metrological check	Table 4
(Re)calibration	Table 4
Defect	See below

17

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---

Description of problem	Measure

Performed <b>by</b>	
Performed <b>on</b>	

<b>Signature</b>	
------------------	--

**Maintenance measure**

Measures performed	
Routine maintenance	Table 3
Software update	
Metrological check	Table 4
(Re)calibration	Table 4
Defect	See below

18

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Description of problem	Measure

Performed <b>by</b>	
Performed <b>on</b>	

<b>Signature</b>	
------------------	--

**Maintenance measure**

Measures performed	
Routine maintenance	Table 3
Software update	
Metrological check	Table 4
(Re)calibration	Table 4
Defect	See below

19

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Description of problem	Measure

Performed <b>by</b>	
Performed <b>on</b>	

<b>Signature</b>	
------------------	--



**Maintenance measure**

Measures performed	
Routine maintenance	Table 3
Software update	
Metrological check	Table 4
(Re)calibration	Table 4
Defect	See below

20

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---

Description of problem	Measure

Performed <b>by</b>	
Performed <b>on</b>	

<b>Signature</b>	
------------------	--

**Maintenance measure**

Measures performed	
Routine maintenance	Table 3
Software update	
Metrological check	Table 4
(Re)calibration	Table 4
Defect	See below

21

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Description of problem	Measure

Performed <b>by</b>	
Performed <b>on</b>	

<b>Signature</b>	
------------------	--

# Table Section 3

## Annual routine maintenance

**To be performed at:**

- Annual routine maintenance

**Entries made by:**

- Trained personnel
- RMG Service

Tested:	OK	n. OK	None
---------	----	-------	------

<b>Checklist for HP reduction type DRS</b>			
Functional check of regulator			
Leak check			
Functional check of analysis gas heating (if any)			
Functional check of HP reduction heating (if any)			

<b>Checklist for cylinder rack</b>			
Check and documentation of all cylinder pressures			
Functional test of cylinder heating			
Functional check of HP regulator			
Verification of contact gauge			
Functional check of 2 <sup>nd</sup> pressure regulation level (porter regulator, if any)			
Leak check			

<b>Checklist for measuring element and GC 9300</b>			
Verification of the prefilters on the gas connector unit (change of filter as necessary)			
Leak check			
Verification of the initial pressures for carrier gas/gases, measuring gas, internal and external calibration gas			
Functional check of solenoid valve control			
Functional check of housing heating in measuring element			
Verification of all significant operating parameters (see Section 1 Operating parameters)			
Evaluation of the documented automatic calibrations			
Verification of the "method" by means of special service software			
Verification of retention times			
Evaluation of the chromatograms			

<b>Measures for PGCs with molecular sieve column</b>			
Bake-out overnight (1000 min)			
Exchange of filter at PGC			
Exchange of both filters at cylinder rack (if any)			

<b>Date</b>	
<b>Signature</b>	

Tested:	OK	n. OK	None
---------	----	-------	------

<b>Checklist for HP reduction type DRS</b>			
Functional check of regulator			
Leak check			
Functional check of analysis gas heating (if any)			
Functional check of HP reduction heating (if any)			

<b>Checklist for cylinder rack</b>			
Check and documentation of all cylinder pressures			
Functional test of cylinder heating			
Functional check of HP regulator			
Verification of contact gauge			
Functional check of 2 <sup>nd</sup> pressure regulation level (porter regulator, if any)			
Leak check			

<b>Checklist for measuring element and GC 9300</b>			
Verification of the prefilters on the gas connector unit (change of filter as necessary)			
Leak check			
Verification of the initial pressures for carrier gas/gases, measuring gas, internal and external calibration gas			
Functional check of solenoid valve control			
Functional check of housing heating in measuring element			
Verification of all significant operating parameters (see Section 1 Operating parameters)			
Evaluation of the documented automatic calibrations			
Verification of the "method" by means of special service software			
Verification of retention times			
Evaluation of the chromatograms			

<b>Measures for PGCs with molecular sieve column</b>			
Bake-out overnight (1000 min)			
Exchange of filter at PGC			
Exchange of both filters at cylinder rack (if any)			

<b>Date</b>	
<b>Signature</b>	

Tested:	OK	n. OK	None
---------	----	-------	------

<b>Checklist for HP reduction type DRS</b>			
Functional check of regulator			
Leak check			
Functional check of analysis gas heating (if any)			
Functional check of HP reduction heating (if any)			

<b>Checklist for cylinder rack</b>			
Check and documentation of all cylinder pressures			
Functional test of cylinder heating			
Functional check of HP regulator			
Verification of contact gauge			
Functional check of 2 <sup>nd</sup> pressure regulation level (porter regulator, if any)			
Leak check			

<b>Checklist for measuring element and GC 9300</b>			
Verification of the prefilters on the gas connector unit (change of filter as necessary)			
Leak check			
Verification of the initial pressures for carrier gas/gases, measuring gas, internal and external calibration gas			
Functional check of solenoid valve control			
Functional check of housing heating in measuring element			
Verification of all significant operating parameters (see Section 1 Operating parameters)			
Evaluation of the documented automatic calibrations			
Verification of the "method" by means of special service software			
Verification of retention times			
Evaluation of the chromatograms			

<b>Measures for PGCs with molecular sieve column</b>			
Bake-out overnight (1000 min)			
Exchange of filter at PGC			
Exchange of both filters at cylinder rack (if any)			

<b>Date</b>	
<b>Signature</b>	

Tested:	OK	n. OK	None
---------	----	-------	------

<b>Checklist for HP reduction type DRS</b>			
Functional check of regulator			
Leak check			
Functional check of analysis gas heating (if any)			
Functional check of HP reduction heating (if any)			

<b>Checklist for cylinder rack</b>			
Check and documentation of all cylinder pressures			
Functional test of cylinder heating			
Functional check of HP regulator			
Verification of contact gauge			
Functional check of 2 <sup>nd</sup> pressure regulation level (porter regulator, if any)			
Leak check			

<b>Checklist for measuring element and GC 9300</b>			
Verification of the prefilters on the gas connector unit (change of filter as necessary)			
Leak check			
Verification of the initial pressures for carrier gas/gases, measuring gas, internal and external calibration gas			
Functional check of solenoid valve control			
Functional check of housing heating in measuring element			
Verification of all significant operating parameters (see Section 1 Operating parameters)			
Evaluation of the documented automatic calibrations			
Verification of the "method" by means of special service software			
Verification of retention times			
Evaluation of the chromatograms			

<b>Measures for PGCs with molecular sieve column</b>			
Bake-out overnight (1000 min)			
Exchange of filter at PGC			
Exchange of both filters at cylinder rack (if any)			

<b>Date</b>	
<b>Signature</b>	

Tested:	OK	n. OK	None
---------	----	-------	------

<b>Checklist for HP reduction type DRS</b>			
Functional check of regulator			
Leak check			
Functional check of analysis gas heating (if any)			
Functional check of HP reduction heating (if any)			

<b>Checklist for cylinder rack</b>			
Check and documentation of all cylinder pressures			
Functional test of cylinder heating			
Functional check of HP regulator			
Verification of contact gauge			
Functional check of 2 <sup>nd</sup> pressure regulation level (porter regulator, if any)			
Leak check			

<b>Checklist for measuring element and GC 9300</b>			
Verification of the prefilters on the gas connector unit (change of filter as necessary)			
Leak check			
Verification of the initial pressures for carrier gas/gases, measuring gas, internal and external calibration gas			
Functional check of solenoid valve control			
Functional check of housing heating in measuring element			
Verification of all significant operating parameters (see Section 1 Operating parameters)			
Evaluation of the documented automatic calibrations			
Verification of the "method" by means of special service software			
Verification of retention times			
Evaluation of the chromatograms			

<b>Measures for PGCs with molecular sieve column</b>			
Bake-out overnight (1000 min)			
Exchange of filter at PGC			
Exchange of both filters at cylinder rack (if any)			

<b>Date</b>	
<b>Signature</b>	



Tested:	OK	n. OK	None
---------	----	-------	------

<b>Checklist for HP reduction type DRS</b>			
Functional check of regulator			
Leak check			
Functional check of analysis gas heating (if any)			
Functional check of HP reduction heating (if any)			

<b>Checklist for cylinder rack</b>			
Check and documentation of all cylinder pressures			
Functional test of cylinder heating			
Functional check of HP regulator			
Verification of contact gauge			
Functional check of 2 <sup>nd</sup> pressure regulation level (porter regulator, if any)			
Leak check			

<b>Checklist for measuring element and GC 9300</b>			
Verification of the prefilters on the gas connector unit (change of filter as necessary)			
Leak check			
Verification of the initial pressures for carrier gas/gases, measuring gas, internal and external calibration gas			
Functional check of solenoid valve control			
Functional check of housing heating in measuring element			
Verification of all significant operating parameters (see Section 1 Operating parameters)			
Evaluation of the documented automatic calibrations			
Verification of the "method" by means of special service software			
Verification of retention times			
Evaluation of the chromatograms			

<b>Measures for PGCs with molecular sieve column</b>			
Bake-out overnight (1000 min)			
Exchange of filter at PGC			
Exchange of both filters at cylinder rack (if any)			

<b>Date</b>	
<b>Signature</b>	

Tested:	OK	n. OK	None
---------	----	-------	------

<b>Checklist for HP reduction type DRS</b>			
Functional check of regulator			
Leak check			
Functional check of analysis gas heating (if any)			
Functional check of HP reduction heating (if any)			

<b>Checklist for cylinder rack</b>			
Check and documentation of all cylinder pressures			
Functional test of cylinder heating			
Functional check of HP regulator			
Verification of contact gauge			
Functional check of 2 <sup>nd</sup> pressure regulation level (porter regulator, if any)			
Leak check			

<b>Checklist for measuring element and GC 9300</b>			
Verification of the prefilters on the gas connector unit (change of filter as necessary)			
Leak check			
Verification of the initial pressures for carrier gas/gases, measuring gas, internal and external calibration gas			
Functional check of solenoid valve control			
Functional check of housing heating in measuring element			
Verification of all significant operating parameters (see Section 1 Operating parameters)			
Evaluation of the documented automatic calibrations			
Verification of the "method" by means of special service software			
Verification of retention times			
Evaluation of the chromatograms			

<b>Measures for PGCs with molecular sieve column</b>			
Bake-out overnight (1000 min)			
Exchange of filter at PGC			
Exchange of both filters at cylinder rack (if any)			

<b>Date</b>	
<b>Signature</b>	

Tested:	OK	n. OK	None
---------	----	-------	------

<b>Checklist for HP reduction type DRS</b>			
Functional check of regulator			
Leak check			
Functional check of analysis gas heating (if any)			
Functional check of HP reduction heating (if any)			

<b>Checklist for cylinder rack</b>			
Check and documentation of all cylinder pressures			
Functional test of cylinder heating			
Functional check of HP regulator			
Verification of contact gauge			
Functional check of 2 <sup>nd</sup> pressure regulation level (porter regulator, if any)			
Leak check			

<b>Checklist for measuring element and GC 9300</b>			
Verification of the prefilters on the gas connector unit (change of filter as necessary)			
Leak check			
Verification of the initial pressures for carrier gas/gases, measuring gas, internal and external calibration gas			
Functional check of solenoid valve control			
Functional check of housing heating in measuring element			
Verification of all significant operating parameters (see Section 1 Operating parameters)			
Evaluation of the documented automatic calibrations			
Verification of the "method" by means of special service software			
Verification of retention times			
Evaluation of the chromatograms			

<b>Measures for PGCs with molecular sieve column</b>			
Bake-out overnight (1000 min)			
Exchange of filter at PGC			
Exchange of both filters at cylinder rack (if any)			

<b>Date</b>	
<b>Signature</b>	

# Table Section 4

## Test gas analyses

**To be performed at:**

- Metrological check
- (Re)calibration

**Entries made by:**

- Trained personnel
- RMG Service

Note: The handwritten entry is not required if a clearly labeled printout of the values is filed in the maintenance book.

**Procedure for metrological check / (re)calibration**

1. Performance of a basic calibration (PGC 9301, PGC 9302, PGC 9303) or a normal calibration (PGC 9304) with logging of the
  - retention times (RTZ or RT)
  - response factors (RFZ / GLK or RF)
2. Analysis of the test gases
3. Verification of the chromatograms / data transmission  
 Current outputs only need to be checked if they are used for official transmission of fiscal metering readings.
4. Verification of software CRC
5. Entry of notes, as necessary

	Basic calibration		Normal calibration	
	RTZ / s	RFZ / GLK	RT / s	RF
Nitrogen				
Methane				
Carbon dioxide				
Ethane				
Propane				
Isobutane				
N-butane				
Neopentane				
Isopentane				
N-pentane				
Hexane (C6+)				
Heptane				
Octane				
Nonane				
Oxygen				
Helium				
Hydrogen				

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 3			Test gas 4		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 5			Test gas 6		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						



	OK?
Verification of the chromatogram of the internal calibration gas	
Verification of the chromatogram of test gas 1	
Verification of the chromatogram of test gas 2	
Verification of the chromatogram of test gas 3	
Verification of the chromatogram of test gas 4	
Verification of the chromatogram of test gas 5	
Verification of the chromatogram of test gas 6	
Checking the range of the current outputs	
Verification of the fiscal metering values transmitted at the outputs	
Verification of the software and kernel CRCs	
Are all results correctly logged?	

Remarks

<b>Date</b>	
<b>Signatures</b>	
Service	
Authority	

The signatures relate to the entire metrological check / recalibration, i.e. including the entries on pages 32 to 35.

**Procedure for metrological check / (re)calibration**

1. Performance of a basic calibration (PGC 9301, PGC 9302, PGC 9303) or a normal calibration (PGC 9304) with logging of the
  - retention times (RTZ or RT)
  - response factors (RFZ / GLK or RF)
2. Analysis of the test gases
3. Verification of the chromatograms / data transmission  
 Current outputs only need to be checked if they are used for official transmission of fiscal metering readings.
4. Verification of software CRC
5. Entry of notes, as necessary

	Basic calibration		Normal calibration	
	RTZ / s	RFZ / GLK	RT / s	RF
Nitrogen				
Methane				
Carbon dioxide				
Ethane				
Propane				
Isobutane				
N-butane				
Neopentane				
Isopentane				
N-pentane				
Hexane (C6+)				
Heptane				
Octane				
Nonane				
Oxygen				
Helium				
Hydrogen				

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 3			Test gas 4		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 5			Test gas 6		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

	OK?
Verification of the chromatogram of the internal calibration gas	
Verification of the chromatogram of test gas 1	
Verification of the chromatogram of test gas 2	
Verification of the chromatogram of test gas 3	
Verification of the chromatogram of test gas 4	
Verification of the chromatogram of test gas 5	
Verification of the chromatogram of test gas 6	
Checking the range of the current outputs	
Verification of the fiscal metering values transmitted at the outputs	
Verification of the software and kernel CRCs	
Are all results correctly logged?	

Remarks

<b>Date</b>	
<b>Signatures</b>	
Service	
Authority	

The signatures relate to the entire metrological check / recalibration, i.e. including the entries on pages 37 to 40.

**Procedure for metrological check / (re)calibration**

1. Performance of a basic calibration (PGC 9301, PGC 9302, PGC 9303) or a normal calibration (PGC 9304) with logging of the
  - retention times (RTZ or RT)
  - response factors (RFZ / GLK or RF)
2. Analysis of the test gases
3. Verification of the chromatograms / data transmission  
 Current outputs only need to be checked if they are used for official transmission of fiscal metering readings.
4. Verification of software CRC
5. Entry of notes, as necessary

	Basic calibration		Normal calibration	
	RTZ / s	RFZ / GLK	RT / s	RF
Nitrogen				
Methane				
Carbon dioxide				
Ethane				
Propane				
Isobutane				
N-butane				
Neopentane				
Isopentane				
N-pentane				
Hexane (C6+)				
Heptane				
Octane				
Nonane				
Oxygen				
Helium				
Hydrogen				

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						



Relevant for calibration?	Test gas 3			Test gas 4		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 5			Test gas 6		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

	OK?
Verification of the chromatogram of the internal calibration gas	
Verification of the chromatogram of test gas 1	
Verification of the chromatogram of test gas 2	
Verification of the chromatogram of test gas 3	
Verification of the chromatogram of test gas 4	
Verification of the chromatogram of test gas 5	
Verification of the chromatogram of test gas 6	
Checking the range of the current outputs	
Verification of the fiscal metering values transmitted at the outputs	
Verification of the software and kernel CRCs	
Are all results correctly logged?	

Remarks

<b>Date</b>	
<b>Signatures</b>	
Service	
Authority	

The signatures relate to the entire metrological check / recalibration, i.e. including the entries on pages 42 to 45.

**Procedure for metrological check / (re)calibration**

1. Performance of a basic calibration (PGC 9301, PGC 9302, PGC 9303) or a normal calibration (PGC 9304) with logging of the
  - retention times (RTZ or RT)
  - response factors (RFZ / GLK or RF)
2. Analysis of the test gases
3. Verification of the chromatograms / data transmission  
 Current outputs only need to be checked if they are used for official transmission of fiscal metering readings.
4. Verification of software CRC
5. Entry of notes, as necessary

	Basic calibration		Normal calibration	
	RTZ / s	RFZ / GLK	RT / s	RF
Nitrogen				
Methane				
Carbon dioxide				
Ethane				
Propane				
Isobutane				
N-butane				
Neopentane				
Isopentane				
N-pentane				
Hexane (C6+)				
Heptane				
Octane				
Nonane				
Oxygen				
Helium				
Hydrogen				

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 3			Test gas 4		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 5			Test gas 6		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

	OK?
Verification of the chromatogram of the internal calibration gas	
Verification of the chromatogram of test gas 1	
Verification of the chromatogram of test gas 2	
Verification of the chromatogram of test gas 3	
Verification of the chromatogram of test gas 4	
Verification of the chromatogram of test gas 5	
Verification of the chromatogram of test gas 6	
Checking the range of the current outputs	
Verification of the fiscal metering values transmitted at the outputs	
Verification of the software and kernel CRCs	
Are all results correctly logged?	

Remarks

<b>Date</b>	
<b>Signatures</b>	
Service	
Authority	

The signatures relate to the entire metrological check / recalibration, i.e. including the entries on pages 47 to 50.



**Procedure for metrological check / (re)calibration**

1. Performance of a basic calibration (PGC 9301, PGC 9302, PGC 9303) or a normal calibration (PGC 9304) with logging of the
  - retention times (RTZ or RT)
  - response factors (RFZ / GLK or RF)
2. Analysis of the test gases
3. Verification of the chromatograms / data transmission  
 Current outputs only need to be checked if they are used for official transmission of fiscal metering readings.
4. Verification of software CRC
5. Entry of notes, as necessary

	Basic calibration		Normal calibration	
	RTZ / s	RFZ / GLK	RT / s	RF
Nitrogen				
Methane				
Carbon dioxide				
Ethane				
Propane				
Isobutane				
N-butane				
Neopentane				
Isopentane				
N-pentane				
Hexane (C6+)				
Heptane				
Octane				
Nonane				
Oxygen				
Helium				
Hydrogen				

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 3			Test gas 4		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 5			Test gas 6		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

	OK?
Verification of the chromatogram of the internal calibration gas	
Verification of the chromatogram of test gas 1	
Verification of the chromatogram of test gas 2	
Verification of the chromatogram of test gas 3	
Verification of the chromatogram of test gas 4	
Verification of the chromatogram of test gas 5	
Verification of the chromatogram of test gas 6	
Checking the range of the current outputs	
Verification of the fiscal metering values transmitted at the outputs	
Verification of the software and kernel CRCs	
Are all results correctly logged?	

Remarks

<b>Date</b>	
<b>Signatures</b>	
Service	
Authority	

The signatures relate to the entire metrological check / recalibration, i.e. including the entries on pages 52 to 55.

**Procedure for metrological check / (re)calibration**

1. Performance of a basic calibration (PGC 9301, PGC 9302, PGC 9303) or a normal calibration (PGC 9304) with logging of the
  - retention times (RTZ or RT)
  - response factors (RFZ / GLK or RF)
2. Analysis of the test gases
3. Verification of the chromatograms / data transmission  
 Current outputs only need to be checked if they are used for official transmission of fiscal metering readings.
4. Verification of software CRC
5. Entry of notes, as necessary

	Basic calibration		Normal calibration	
	RTZ / s	RFZ / GLK	RT / s	RF
Nitrogen				
Methane				
Carbon dioxide				
Ethane				
Propane				
Isobutane				
N-butane				
Neopentane				
Isopentane				
N-pentane				
Hexane (C6+)				
Heptane				
Octane				
Nonane				
Oxygen				
Helium				
Hydrogen				

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 3			Test gas 4		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						



Relevant for calibration?	Test gas 5			Test gas 6		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

	OK?
Verification of the chromatogram of the internal calibration gas	
Verification of the chromatogram of test gas 1	
Verification of the chromatogram of test gas 2	
Verification of the chromatogram of test gas 3	
Verification of the chromatogram of test gas 4	
Verification of the chromatogram of test gas 5	
Verification of the chromatogram of test gas 6	
Checking the range of the current outputs	
Verification of the fiscal metering values transmitted at the outputs	
Verification of the software and kernel CRCs	
Are all results correctly logged?	

Remarks

<b>Date</b>	
<b>Signatures</b>	
Service	
Authority	

The signatures relate to the entire metrological check / recalibration, i.e. including the entries on pages 57 to 60.

**Procedure for metrological check / (re)calibration**

1. Performance of a basic calibration (PGC 9301, PGC 9302, PGC 9303) or a normal calibration (PGC 9304) with logging of the
  - retention times (RTZ or RT)
  - response factors (RFZ / GLK or RF)
2. Analysis of the test gases
3. Verification of the chromatograms / data transmission  
 Current outputs only need to be checked if they are used for official transmission of fiscal metering readings.
4. Verification of software CRC
5. Entry of notes, as necessary

	Basic calibration		Normal calibration	
	RTZ / s	RFZ / GLK	RT / s	RF
Nitrogen				
Methane				
Carbon dioxide				
Ethane				
Propane				
Isobutane				
N-butane				
Neopentane				
Isopentane				
N-pentane				
Hexane (C6+)				
Heptane				
Octane				
Nonane				
Oxygen				
Helium				
Hydrogen				

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 3			Test gas 4		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 5			Test gas 6		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

	OK?
Verification of the chromatogram of the internal calibration gas	
Verification of the chromatogram of test gas 1	
Verification of the chromatogram of test gas 2	
Verification of the chromatogram of test gas 3	
Verification of the chromatogram of test gas 4	
Verification of the chromatogram of test gas 5	
Verification of the chromatogram of test gas 6	
Checking the range of the current outputs	
Verification of the fiscal metering values transmitted at the outputs	
Verification of the software and kernel CRCs	
Are all results correctly logged?	

Remarks

<b>Date</b>	
<b>Signatures</b>	
Service	
Authority	

The signatures relate to the entire metrological check / recalibration, i.e. including the entries on pages 62 to 65.

**Procedure for metrological check / (re)calibration**

1. Performance of a basic calibration (PGC 9301, PGC 9302, PGC 9303) or a normal calibration (PGC 9304) with logging of the
  - retention times (RTZ or RT)
  - response factors (RFZ / GLK or RF)
2. Analysis of the test gases
3. Verification of the chromatograms / data transmission  
 Current outputs only need to be checked if they are used for official transmission of fiscal metering readings.
4. Verification of software CRC
5. Entry of notes, as necessary

	Basic calibration		Normal calibration	
	RTZ / s	RFZ / GLK	RT / s	RF
Nitrogen				
Methane				
Carbon dioxide				
Ethane				
Propane				
Isobutane				
N-butane				
Neopentane				
Isopentane				
N-pentane				
Hexane (C6+)				
Heptane				
Octane				
Nonane				
Oxygen				
Helium				
Hydrogen				



Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 3			Test gas 4		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 5			Test gas 6		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

	OK?
Verification of the chromatogram of the internal calibration gas	
Verification of the chromatogram of test gas 1	
Verification of the chromatogram of test gas 2	
Verification of the chromatogram of test gas 3	
Verification of the chromatogram of test gas 4	
Verification of the chromatogram of test gas 5	
Verification of the chromatogram of test gas 6	
Checking the range of the current outputs	
Verification of the fiscal metering values transmitted at the outputs	
Verification of the software and kernel CRCs	
Are all results correctly logged?	

Remarks

<b>Date</b>	
<b>Signatures</b>	
Service	
Authority	

The signatures relate to the entire metrological check / recalibration, i.e. including the entries on pages 67 to 70.