

Testing Unit

PVGD



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SOLUTIONS FOR GASES

Testing Unit

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Preamble

With your Testing Unit PVGD you have purchased a quality product.

Please read through this user manual carefully before installing and using your Testing Unit. Its purpose is to enable you to use the gas supply system safely and properly.

The German version of this user manual is deemed to be the original.

Transport

Transport and handling has to be done carefully by qualified staff with appropriate equipment. Storage of work equipment (temporary) has to be at a temperature of +5°C to +35°C and has to be kept free from dust and moisture.

Please check the goods for transport damage upon receipt. It is not approved for use with damaged components.

Function

The testing unit PVGD is for the annual testing of flashback arrestors as per EN730-1, EN730-2/ DIN EN ISO 5175-1; DIN EN ISO 5175-2.

The function of the following safety features can be tested:

- gas non-return valve
- pressure sensitive cut-off valve

Additionally, a flow rate comparison (old/new) can be made. The unit is capable of testing flashback arrestors with a maximum flow rate of 20m³/h at a inlet pressure of 0.15 MPa (1.5 bar) (free flow)

The testing unit can accommodate flashback arrestors with a maximum length of 200 mm and a diameter up to 50 mm. For larger sizes, special adapters are needed.

**User's Technical knowledge
and instruction**

Safety devices are only to be used by people over the age of 18, who are physically qualified, have required knowledge and were instructed by a qualified person. Documented training instruction is recommended to be done at periodical intervals, at least once a year.

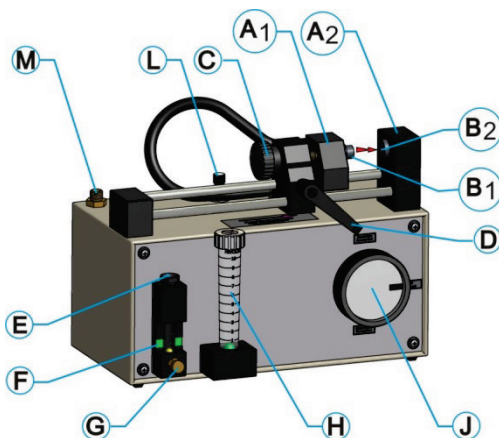


WARNING

Authorised persons are persons who have the required specialist knowledge for testing the working materials through their professional training, their professional experience and their contemporary professional occupation.
(Germany Operational Safety Ordinance (TRBS 1203))

Type designation

Operating elements



Position:

- A1 Adjustable clamping device
- A2 Fixed clamping device
- B1 Connection for test adapters (Inlet)
- B2 Connection for test adapters (Outlet)
- C Adjusting wheel
- D Locking Lever
- E Funnel
- F Reverse flow scale
- G Drain screw
- H Flowmeter
- J Handwheel
- L Throttle valve
- M Connection Test Medium

Safety information

This Testing Unit is in correspondence with the current state-of-the-art and accepted technical rules as well as with requirements of current standards and regulations.



WARNING

No modifications are allowed to be done without manufacturer's authorisation.

Intended use

This testing unit is just for the testing of the safety elements of flashback arrestors. Only distilled water is to be used with the equipment as well as 100 µ filtered, dry and oil-free Compressed Air or Nitrogen (N₂) as testing medium.

The equipment may only be utilised for this stated purpose.

An intended use also includes the observance of all information in this user manual, the adherence to recurring tests and the observance of the type plates and the data sheets.

Non-intended use

Every use which goes beyond the intended use:

- e. g. use with other pressure, other media and fuel gas- Oxygen/air mixtures.
- Use with gases in liquid phase is prohibited.
- Use at temperatures below -20° C° and above +70° C

Explanation of safety alert signals

Any information which is marked with a safety notice warns of danger and has to be followed in order to avoid injuries and damages.

Safety alert signals



DANGER

Imminent danger!
Death or severe injuries can result from non-observance.



WARNING

A possibly dangerous situation!
Death or severe injuries can result from non-observance.



CAUTION

A dangerous situation!
Death or severe injuries can result from non-observance.



NOTICE

Notice for proper handling.
Device error can result from non-observance

General Safety Instructions



WARNING

The local legislation has to be considered.
Regarding the (Germany) Betr.SichV, part 2, §12 the operator has to display the user manual



WARNUNG

Regarding the (Germany) DGUV rule 100-500 paragraph 2.33 it is only allowed for skilled people to operate gas manifold systems.
Skilled people are instructed in:
Knowledge of handling dangerous gases
Knowledge of handling the instruction manual
Knowledge of the safety instructions
Knowledge of first aid
Knowledge of how to use the personal protective equipment

The date of the user's instruction has to be documented in writing.
The user has to confirm his instruction by signature.

Instructions

Please follow the local national instructions, standards and laws (for Germany as follows):

2014/34/9/EU	Equipment and protective systems intended for use in potentially explosive atmospheres (recast) (ATEX-Directive)
2006/42/EG	Machinery Directive
2014/68/EU	Pressure Equipment Directive
2014/30/EU	Electromagnetic compatibility

DGUV

(German Employers' Liability Insurance Association Rules and Regulations)	
Rule 100-500, Chap.2.26	Welding, cutting and related processes
Rule 100-500, Chap.2.33	Gases

Standards

DIN EN ISO 3821	Rubber hoses
DIN EN 560	Hose connections
DIN EN 561	Quick-action couplings
DIN EN ISO 5171	Pressure gauge
DIN EN ISO 5175-1	Safety devices incorporating a flame (flashback) arrestor
DIN EN 730-2	Safety devices not incorporating a flame (flashback) arrestor
DIN EN ISO 5175-2	Safety devices not incorporating a flame (flashback) arrestor
DIN EN ISO 2503	Pressure regulator for gas cylinders up to 300 bar
EN ISO 14114	Acetylene cylinders - Manifolds
DIN EN ISO 9090	Gas tightness
DIN EN ISO 9539	Materials

Laws

ProdSG	Product Safety Act
BetrSichV	Ordinance on Industrial Safety and Health
GefStoffV	Ordinance of Hazardous Substances
BImSchG	German Federal Emissions Protection Law

Technical regulations

TRG	Technical regulations pressure gases
DVS-Data-Sheet	DVS 0221, DVS 2307, DVS 2314, DVS 2304, DVS 2312 etc.

Individual safety instructions



DANGER

- Risk of explosion: All components on the flame spray systems are to be kept free of oil, grease and other contaminants.
- Do not wear clothing that has been contaminated with oil or grease. Be sure your hands are clean. Do not use ointments or gels.
- No access for unauthorised persons!



WARNING

- Check screw connections for leak tightness at the prescribed intervals.
- The tested sealing materials in the valves and system parts may not be replaced with other materials or products from other manufacturers without being tested again.

Installation

The Testing Unit is supplied ready for installation.

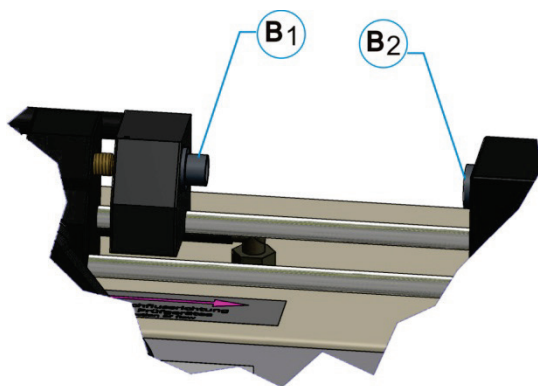
Ensure that the test unit is on a flat, sturdy surface.

Only the following test media are to be used:

- distilled water
 - 100 µ filtered, dry and oil-free Compressed Air
- or Nitrogen N₂
- with an inlet pressure between 0,4 and
0,7 MPa
(4
and 7 bar)

Operating instruction

- Fill distilled water into the plastic bottle that is delivered with the spare parts kit.
- Turn the hand wheel (**Item J**) to position „off“.
- Connect the test item with suitable adapters (**Item M**).
- Fill distilled water into the funnel tube (**Item E**) at the top of the glass tube scale for reverse flow (**Item F**). Excess water level can be released by the brass tap (**Item G**) at the bottom of the glass tube.
- Fit the plastic adapter (**Pos. 410 - 412**) to the connector (**Item B1**) and the rubber adapter (**Pos. 420**) to the connector (**Item B2**) of the clamping device (**Item A1 and A2**)



Setup Operation

Each time before commissioning, a functional test must be carried out.

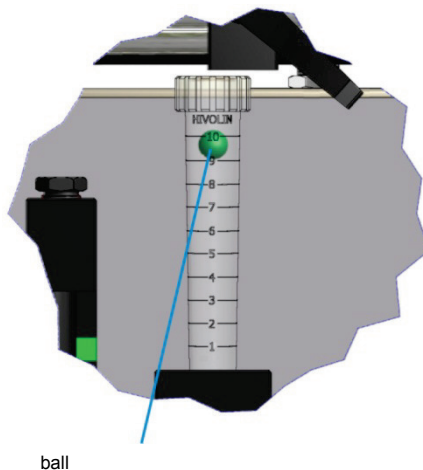
The connections and test adapters must be checked for damages and gas tightness. The leak test must be done with a suitable leak detector spray.

Tests before starting operation

Operational check of the flow test:

- Push the clamping device (**Item A1 and Item A2**) together when having the adapters fitted but without having a test item connected.
- Secure with the locking lever (**Item D**) and slightly close (short-circuit) the adjusting wheel (**Item C**).
- Set the handwheel (**Item J**) on the front panel to the "gas flow" position.
- Adjust the knurled screw of the throttle valve (**Item L**) on the upper side of the device until the ball of the flow meter (**Item H**) is suspended with the lower edge at the height of the scale graduation "9". If the ball is not in the above-mentioned position, the device must be checked by the manufacturer.

The verification of the function for the flow test and for the pressure-sensitive cut-off valve test is complete.



Operational check of the gas reverse flow test:

- Set the handwheel (**Item J**) to the "CLOSED" position.
- Loosen the clamping device (**Item A1 and Item A2**) via the adjusting wheel (**Item C**) until a gap of 1 to 2 mm is set between the connecting adapters (**Item B**).
- Set the handwheel (**Item J**) to the "REVERSE FLOW" position.
- Check the water level of the gas reverse flow scale (**Item F**). The upper edge of the float is at the height of the lower edge of the recessed green marking. If the water level is too low, fill with distilled water using the funnel (**Item E**). If the water level is too high, drain the excess water via the drain screw (**Item G**).
- Now reduce the gap between the connecting adapters (**Item B**) via the adjusting wheel (**Item C**) until the water level rises on the gas reverse flow scale (**Item F**).

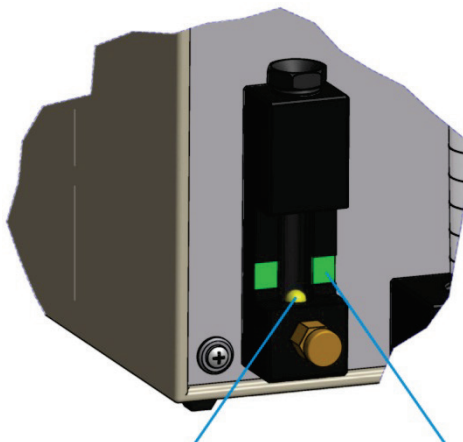


NOTE

Attention! Do not close the gap between the adapters completely because otherwise a water loss will occur owing to rising bubbles.

The correct functioning is given if it is possible to exceed the green marking in approx. 5 seconds.

- Set the handwheel (**Item J**) to "CLOSED" position to complete the function test



Float

„Green“ Marking





Operation

The safety devices have to be tested by a qualified and authorized person at regulator intervals according to country specific regulations. They have to be tested for gas tightness and gas return at least once a year. The test results have to be recorded.

Preparations for testing

Test pieces of up to approx. 200 mm length and 50 mm diameter can be tested by means of the test adaptors (**Item B1 and B2**).

Samples of test adaptors:

Inlet (Item B1)	Test piece	Outlet (Item B2)
Adapter Pos.-No.	 <i>Direction of flow</i>	Adapter Pos.-No.
410 - 412	DGN 	420
420	GG 	410 - 412
410 - 412	DGNDK 	440 - 451

(For the Pos.-Nos. please see section „Accessories–Standard accessories“)

For bigger test pieces, adapter with pair of hoses and coupling (**Pos.465**) can be connected to the clamping device (**Item A1 and A2**). Once it is connected, fix it with the locking lever (**Item D**).

Fit the test pieces by means of the pairs of connectors Pos.-No. 482 - 487 which are to be connected to the hose couplings.

For special designs, individual connectors are available, Pos.-No. 471-481.



NOTICE

Observe the flow direction!

The test piece is clamped in directly or via test adapter so that its flow direction conforms with that of the test device.



NOTICE

Only 100 μ filtered, dry, oil-free compressed air or Nitrogen (N₂), with an input pressure of between 0,4 and 0,7 MPa (4 and 7 bar), may be used as the test medium.

Use distilled water.

Test time

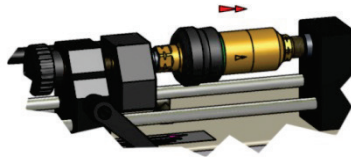
The following test times are to be considered when testing the gas return:

Nominal diameter	Thread size	Test time	Model
≤ DN15	bis G1/2	30 sec	DGN; DG; DGNK; DGNDK; DS1000; DG-U; DG-U-DK GG, GT, TT, NKST, NKSG, DKST, DKSG, SRT, SR, SHT; DG91N; DG91; DG91UA; DS2000;
> DN15 ≤ DN32	G1/2 bis G1 1/4	15 sec.	DEMAX; SIMAX; ESF-N; ESF; GRS; GRV
> DN32 ≤ DN50	G1 1/2 bis G2	10 sec.	SIMAX4-20; GRS; GRV; ESF

The gas return test has passed if the ball inside the glass tube does not go beyond the green marking during the given test time.

Test for gas reverse flow

- Set the handwheel (**Item J**) to the "CLOSED" position.
- Connect the test piece to the clamping device (**Item A1 and Item A2**) directly or via a test adapter. Please ensure that the flow direction of the test piece and the testing equipment is the same.
- Push the clamping device (**Item A1 and Item A2**) together, secure with the locking lever (**Item D**) and turn the adjusting wheel (**Item C**) until the test piece is tightly clamped.



Now start the test:

- Set the handwheel (**Item J**) to "GAS REVERSE FLOW".
- Read the test result on the gas reverse flow scale (**Item F**):

No gas reverse flow or permitted gas reverse flow

has occurred if the "green" marking of the reverse flow scale (**Item F**) is **not** exceeded by the water level set to the lower edge. Please see the table „test time“ for the test times applicable for the individual models.

Gas reverse flow

has occurred if the upper edge of the marking is reached within a time period stated in the table.

Flow rate limits:

The limits specified here for the individual types are guidelines.
The test pieces should indicate a flow rate that is greater than or equal to the limit.

Series	Model	Limit*
100	DGN, DG, DGNK, DGNDK, DS1000, DG-U, DG-U-DK	ca. 5,0
200	GG, GT, TT, NKST, NKSG, DKST, DKSG, SRT, SR, SHT	ca. 4,5
300	DG91N, DG91, DG91UA , DS2000	ca. 6,5
	GRS, GRV, ESF, ESF-N, DEMAX, SIMAX, SIMAX4-20	No test for gas flow

* The value is read at the lower edge of the ball on the flow meter.

Test for flow rate

- Set the handwheel (**Item J**) to "THROUGH FLOW".
- The flow rate value can now be read on the flow meter (**Item H**).

The limits for too low flow rates depend on the type of test piece and are listed in the above table.

The specifications relate to the lower edge of the float.

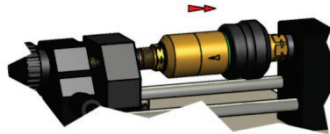
Complete test:

- Set the handwheel (**Item J**) to "CLOSED"
- Loosen the adjusting wheel (**Item C**) until the test piece can be removed.

Testing Unit

Test of the pressure-sensitive cut-off valve

- Insert the test piece (DS2000/DS1000) into the clamping device (**Item A1 and Item A2**) **opposite** to the flow arrow.
- Push the clamping device (**Item A1 and Item A2**) together, secure with the locking lever (**Item D**) and turn the adjusting wheel (**Item C**) until the test piece is tightly clamped.



Now start the test:

- Set the handwheel (**Item J**) to "THROUGH FLOW".
The pressure set in the PVGD increases to 0.12 MPa (1.2 bar) and the safety device comes into operation.

Complete test:

- Set the handwheel (**Item J**) to the "CLOSED" position.
- Turn the adjusting wheel (**Item C**) until the test piece can be removed.

Test results

Test for gas reverse flow has not been passed:

The safety device has to be exchanged.

Test of the pressure sensitive shut-off valve has not been passed:

The safety device has to be exchanged.

Flow test – Flow rate is not sufficient:

The safety device has to be exchanged.

All tests passed:

The safety device can still be used



NOTE

Before commissioning the tested safety devices, they must be checked for tightness.

- This tightness check must be carried out when installed and with maximum operating pressure.
- The safety device is sprayed with leak detector spray. No bubbles must form.

Switch off

End of working day

1. Set the handwheel (**Item J**) to the "CLOSED" position
2. Close the supply of the test medium (nitrogen/compressed air). Release the pressure and loosen the connection to the test equipment (**Item M**).
3. Drain the distilled water via the drain screw (**Item G**) of the gas reverse flow scale (**Item F**).

Maintenance

The testing unit PVGD is maintenance-free.

However, the way of testing, as well as the extent and the test period, which is applicable to the work equipment or to systems requiring inspections, must comply with the operator's risk assessment or safety evaluation.

(For Germany the BetrSichV and TRBS1201 are applicable)

The test adapters must be checked for damages and gas tightness before starting operation.

Troubleshooting

- **No functional test is possible**
The test equipment is not operational:
Check the connection and the adapter of the test medium.
There is no water in the gas reverse flow scale.
The handwheel is in the "CLOSED" position.

Testing Unit

Repair



WARNING

No modifications are allowed to be done without manufacturer's authorisation.



WARNING

A correct functioning and safety is only ensured with the use of original replacement parts.

Shutdown

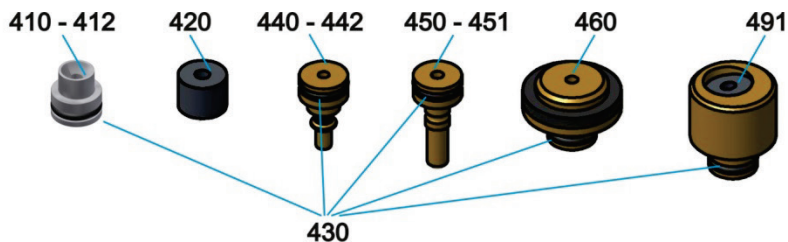
End of working day

1. Set the handwheel (**Item J**) to the "CLOSED" position
2. Close the supply of the test medium (nitrogen/compressed air). Release the pressure and loosen the connection to the test equipment (**Item M**).
3. Drain the distilled water via the drain screw (**Item G**) of the gas reverse flow scale (**Item F**).

Disposal

For appropriate disposal the local official restrictions must be considered.

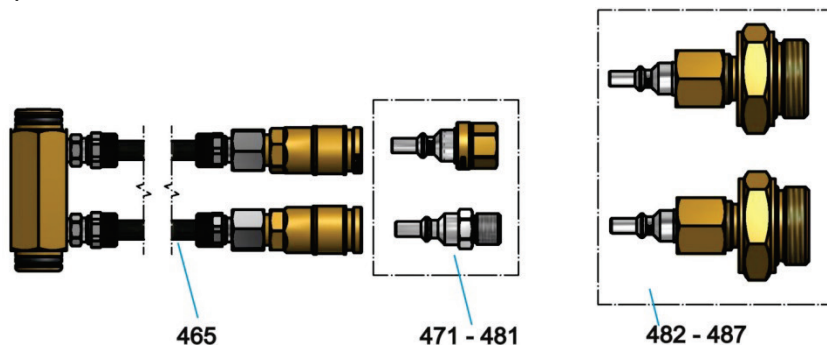
Accessories



Pos.	Piece	Description	Ref.- No.
	Standard-Accessories consisting of: :		0380-0003
410	1	Connection for PVGD G3/8 kpl.	0151-0111
411	1	Connection for PVGD UNF-1/4	0151-0112
412	1	Connection for PVGD 1/2-5/8"BSP	0151-0113
420	1	Rubber adapter Dm20	0151-0016
440	1	Adapter for Coupling-O2	0151-0124
441	1	Adapter for Coupling-F.	0151-0125
442	1	Adapter for Coupling-N kpl.	0151-0126
450	1	Adapter for Coupling-F kpl.	0151-0127
451	1	Adapter for Coupling-O2 kpl.	0151-0128
430	4	O-ring 14 x 3 NBR 70	7440-0151
	1	Left out turner size 2	0380-0033
	1	Left out turner size 4	0380-0034
	1	Plastic Squeeze Bottle	7650-0002
	Accessories optional:		
460		Adapter for PVGD kpl. for G1" IG	0044-0141
491		Adapter for asymmetric connections	0151-0035

Testing Unit

Special accessories



Pos.	Piece	Description	Ref.- No.
		Special accessories:	
465	1	Connection block with hoses and quick couplers	0044-0290
471	1	Adapter set G1/4RH M/F	0069-1215
472	1	Adapter set G3/8LH M/F	0069-1216
473	1	Adapter set G3/8RH M/F	0069-1217
474	1	Adapter set UNF5/8LH M/F	0069-1218
475	1	Adapter set UNF5/8RH M/F	0069-1219
476	1	Adapter set G1/2LH M/F	0069-1220
477	1	Adapter set G1/2RH M/F	0069-1221
478	1	Adapter set G3/4LH M/F	0069-1222
479	1	Adapter set G3/4RH M/F	0069-1223
480	1	Adapter set G1LH M/F	0069-1224
481	1	Adapter set G1RH M/F	0069-1225
482	1	Adapter set G3/4RH M für	0069-1228
483		Adapter set G1RH M für	0069-1229
484		Adapter set G1 1/4RH M für	0069-1230
485		Adapter set G1 1/2RH M für	0069-1231
486		Adapter set G2RH M für	0069-1232
487		Adapter set G1/2RH M für	0069-1233

Legal notice

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Testing Unit

Attachment

Spare parts list

Manufacturer's declaration



SOLUTIONS FOR GASES

Testing Unit

Spare parts list

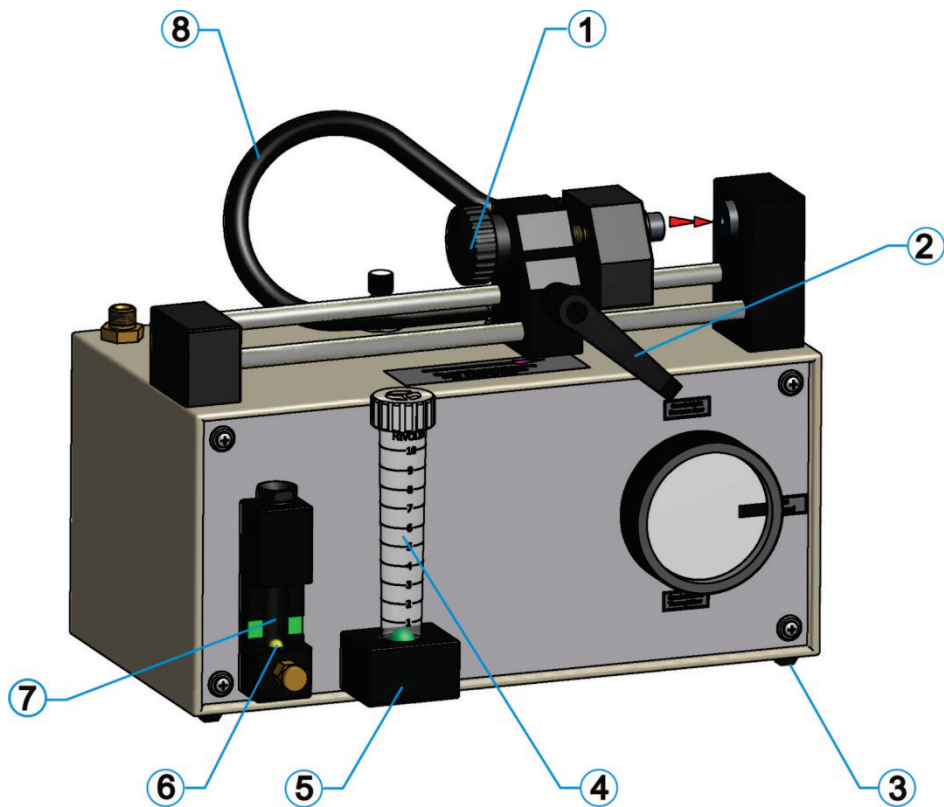
Testing Unit

PVGD

02/16/04

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und Gastechnik GmbH & Co. KG**

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Testing Unit

Position	Piece	Description	Ref.-No.
1	1	Adjusting wheel	7012-0100
2	1	Locking Lever	7012-0103
3	4	Rubber foot	7440-0153
4	1	Flowmeter Tube 08-F	6440-0047
5	1	Spring (Flowmeter)	0068-0463
6	1	Float (Reverse flow scale)	0044-0173
7	1	Glass Tube (Reverse flow scale)	0044-0174
8	1	Rubber Hose 8x2 0,5 m	3003-2050
8.1	1	Rubber Hose 4x1,5 0,5m (Inside the PVGD)	3003-2047
8.2	1	Rubber Hose 8x2 2,4 m (Inside the PVGD)	3003-2048

Manufacturer's Declaration

For the following designated product:

Product: Testing equipment
Type: Testing unit
Model: PVGD

manufactured by

IBEDA Sicherheitsgeräte und Gastechnik GmbH & Co. KG
Bahnhofstr. 27, 53577 Neustadt (Wied)

it is herewith declared that it **is not subject** to the European Regulation below:

2014/68/EU Pressure Equipment Directive

It does not pose a significant risk due to pressure.

Description:

The test equipment is intended for the annual testing of safety equipment manufactured compliant with DIN EN ISO 5175-1 and DIN EN ISO 5175-2.

Gas reserve flow and pressure-sensitive cut-off valves are tested. A flow comparison may also be carried out.

Test are conducted compliant with DGUV (German Institute for Occupational Safety and Health) Rule 100-500 Chapter 2.26, Section 3.27.1.4 "Betreiben von Arbeitsmitteln, Teil 2 [Operating work equipment, Part 2], Chapter 2.26 "Schweißen, Schneiden u. verwandte Verfahren" [Welding, cutting and related processes] Section 3.27.1.4 "Prüfungen" [Tests].

Test based on:

ISO 5175-1 and
ISO 730-2
Abs. 5.2.2,
ISO 5175-1
Abs. 5.7

Gas welding equipment- Safety devices- Part 1: Devices incorporating a flame (flashback) arrestor, Part 2: Devices not incorporating a flame (flashback) arrestor Para. 5.2.2 „Internal Gas tightness“,

Para 5.7 „Flame arrestor with pressure-sensitive cut-off valve“

Tests according to:

ISO 5175-1 und
ISO 5175-2
Abs. 6.2

Gas welding equipment- Safety devices- Part 1: Devices incorporating a flame (flashback) arrestor, Part 2: Devices not incorporating a flame (flashback) arrestor Para 6.2. „Accuracy of pressure and flow measurements“

Gas reverse flow:

A throttle valve is used to adjust the gas flow in such a way, that if an inadmissible reserve flow occurs, the water level exceeds the green range of the scale within the test period.

The threshold value is set to $40 \text{ cm}^3/\text{h} + 5 \text{ cm}^3/\text{h}$.

A leak calibrator, make ATEQ model 163.00, is used to set the limit value

Pressure-sensitive cut-off valve

A built-in pressure controller checks the trigger pressure of $\leq 1200 \text{ mbar}$. The controller's pressure setting is fixed to $1100 \text{ mbar} + 50 \text{ mbar}$. An analogue pressure gauge is used to set the pressure controller make Preiss, type: spring gauge 0 -2.5 bar, class 1.0

Flow rate test:

The flow test is a comparison measurement using a brand-new device.

The manufacturer of these products is neither allowed to issue an EU-conformity declaration nor to provide CE marking.

The test equipment was designed and tested according to the good engineering practice.

Declared and signed on behalf of the manufacturer:

Michael Runkel

Head of design department

Neustadt 02.05.2018

Place Date


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Sitz Neustadt

Amtsgericht Neuwied · HR A 11086

USt-ID-Nr. DE811281623 · Steuer Nr. 32/205/0673/2

Geschäftsführende Gesellschafter:

IBEDA Sicherheitsgeräte und Gastechnik Verwaltungs- und Beteiligungs-GmbH

Sitz Neustadt · Amtsgericht Neuwied HR B 12869 · Geschäftsführer: Gerd Weissenfels

