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# Centrifugal Gas Separator

**ZGA**

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## Operating Manual



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## Foreword

### I. Transport, delivery, storage

#### **Storage and transportation:**

Equipment shall be protected from moisture, humidity, contamination, shock and damage.

#### **Check of delivery:**

The shipment is to be checked for completeness upon receipt. The data of the device are to be compared with the data of the delivery note and the order documents.

Any transport damage must be reported immediately after delivery. Damage reported later cannot be accepted.

### II. Warranty

The scope and period of a warranty can be found in the contractual delivery conditions.

A warranty claim presupposes professional assembly and commissioning in accordance with the operating instructions valid for the device. The necessary assembly, commissioning and maintenance work may only be carried out by competent and authorized persons.



### III. General safety instructions

1. The centrifugal gas separator may only be used in accordance with its field of application (chapter 2). The pressure and temperature limits indicated on the type plate, as well as the other technical data of the units and safety instructions must be observed during installation, commissioning and operation of the units.
2. National and international regulations for the operation of pressurized devices and systems must be observed.

3. Before installation, the operator must ensure that the pressurized parts have not been damaged during transport.
4. The equipment must be installed, operated and maintained by qualified personnel. The operator is responsible for ensuring that the personnel are adequately and appropriately qualified. In the case of doubts, the manufacturer must be consulted.
5. Only liquids to which the materials used for the pressure-bearing elements are resistant may be measured.
6. Flanges or connections for venting or draining shall only be loosened in a depressurised state.
7. When replacing components, only use the original spare parts specified by the manufacturer. Failure to comply will invalidate the warranty.
8. The seals or sealing elements must be selected with care in accordance with the specifications in the operating instructions (5.3).
9. The tightening torques for the screw connections, cover housing lower part as well as for the flange connections in pipelines are available on request.

## IV. Basic safety information

Description of symbols:

	<p><b>IMPORTANT NOTES!</b></p> <p>Please consider these notes carefully to achieve a reliable functional system. The accompanying text contains important information about the product, handling the product or about a section of the document that is of particular importance.</p>
	<p><b>WARNING!</b></p> <p>Failure to take the prescribed precautions could result in death, severe bodily injury, or substantial material / product damage.</p>

## V. Intended User

The intended user is not a general purpose user.



The intended user is not allowed to open, manipulate or dismantle the device.

The device may be maintained, serviced or opened only by dedicated and qualified service personnel.

## 1. Identification

Manufacturer: Bopp & Reuther Messtechnik  
Am Neuen Rheinhafen 4  
67346 Speyer, Germany  
Phone : +49 6232 657-0  
Fax: +49 6232 657-505

Product type: Centrifugal gas separator with float deaerator and sight  
glas

Product name: Centrifugal gas separator Type ZGA

Versions-No.: A-DE-03661-00E

## 2. Range of application

In order to prevent measuring errors caused by free air or gas when using volumetric meters to measure liquid quantity, gas separators are installed in front of the meter (forward flow) for liquids with a dynamic viscosity of < 20 mPa.s (at 20°C).

Measuring systems used in legal transactions must have devices to prevent air or gas from being measured. Here, the Bopp & Reuther Messtechnik GmbH gas separator type ZGA for media up to 20 mPa.s guarantees a precise and optimal solution.

Centrifugal gas separators from Bopp & Reuther Messtechnik meet the regulations for custody transfer for measuring systems in Germany and other European countries. They are integrated in type examination certificates according to the MID directive and also have an OIML certificate and evaluation certificate.

### 3. System design

The gas separator is made of a welded pressure vessel with an integrated automatic float deaeration device. For liquid gas measuring systems, it is also possible to use gas separators with an orifice plate installed between 2 valves in the degassing or return pipe (to the storage tank). The orifice plate is designed to allow a backflow of max. 5%. The valves are sealed in an open position. The liquid enters tangentially at the upper port, resulting in a swirling flow inside the gas separator. This swirling motion is sustained by the tangential outgoing liquid at the outlet port.

The distribution of pressure in the swirling flow causes any air or gas to escape via the ventilating valve.

The direction of flow is indicated by an arrow on the inlet port. The sight glass is used to monitor the float and the liquid.

A sign attached to the gas separator specifically indicates two important points:

- The maximum flow rate permitted by the German Board of Weights and Measures
- Only draw liquid when it is visible in the sight glass. Throttle if foam forms.

Furthermore, there is a lead seal on the information plate for recording the calibration mark when calibrating the measuring system.

The gas separator can also be optionally equipped with a level limit switch or a level indicator.

### 4. Technical data

#### 4.1 Operating temperature

Standard: +10°C up to max. +100°C

Version for low temperature (-140°C up to -10°C) on request

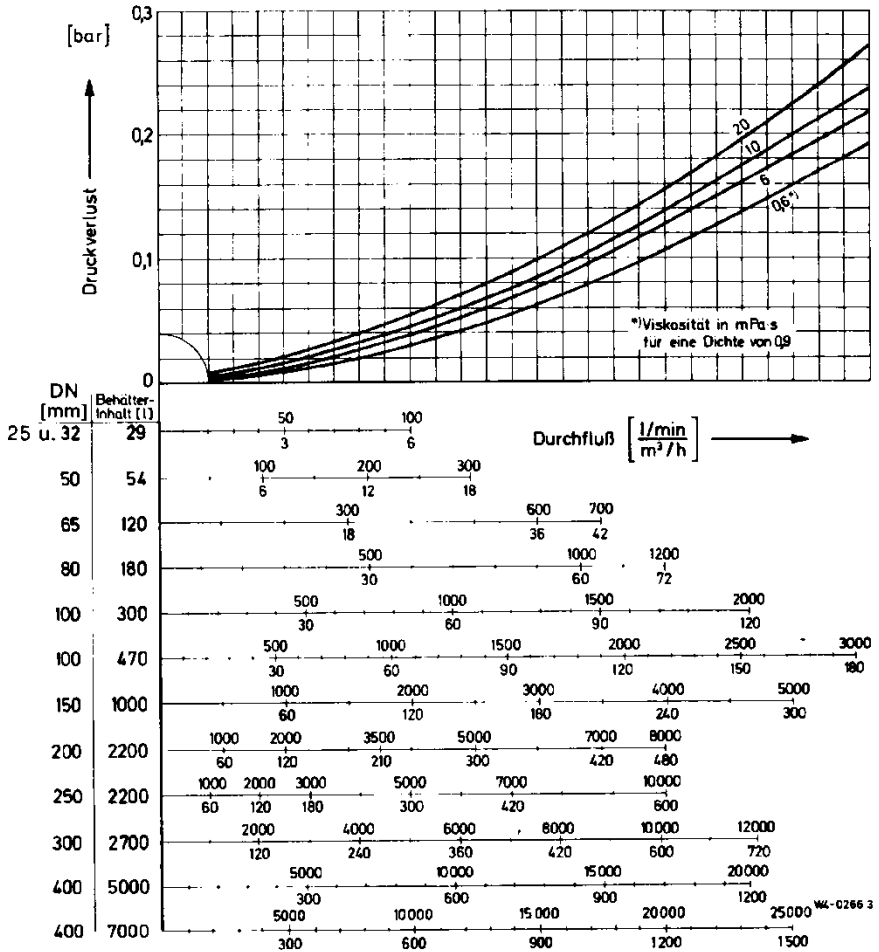


### 4.2 Nominal pressure

PN10, 16, 25 and 40  
 PN63 and 100 on request

### 4.3 Pressure loss

Pressure loss and throughput



Pressure losses of the centrifugal gas separators depending on the flow rate and the viscosity of the liquid

## 5. Constructive Design

### 5.1 Model / Dimensions

DN	Inch	Container capacity [l]	Effective volume [l]	Max. permissible flow rate Q [l / min]	Dimensions and installation dimensions														
					Dimensions in mm													Draining port DN	
					A	B	C	D	E	F	G	H	J	K	L	M	mm	Inch	
25	1"	29	10	100	75	200	460	219	±50	665	~985	~1300	13	198	480	20	-	ISO 228-G ½	
32	1 1/4"																	(or ½ - 14 NPT)	
50	2"	54	25	300	90	220	645	273	±50	900	~1180	~1500	13	220	540	20	-		
65	2 1/2"	120	60	700	120	290	840	368	±80	1100	~1385	~1600	13	280	650	20	-		
80	3"	180	95	1200	150	350	1030	419	±50	1330	~1625	~1900	20	360	750	0	32	1 1/4"	
100	4"	180	95	1200	130	380	1060	419	±50	1360	~1655	~1930	20	360	750	-	32	1 1/4"	
100	4"	300	180	2000	170	400	1250	500	±70	1520	~1885	~2200	20	440	850	-	32	1 1/4"	
100	4"	470	295	3000	200	400	1530	559	±60	1780	~2100	~2400	20	440	850	-	32	1 1/4"	
150	6"	470	295	3000	180	420	1530	559	±60	1780	~2100	~2400	20	440	850	-	32	1 1/4"	
150	6"	1000	675	5000	285	600	1800	800	±135	2125	~2500	~2800	35	660	1150	-	40	1 1/2"	
200	8"	1000	675	5000	260	600	1800	800	±135	2125	~2500	~2800	35	660	1200	-	40	1 1/2"	
250	10"	1000	675	5000	235	600	1800	800	±135	2125	~2500	~2800	35	660	1300	-	40	1 1/2"	
200	8"	2200	1500	10000	385	750	2250	1050	±170	2725	~3180	~3500	35	880	1500	-	50	2"	
250	10"	2200	1500	10000	325	750	2250	1050	±170	2725	~3180	~3500	35	880	1500	-	50	2"	
300	12"	2200	1500	10000	300	750	2250	1050	±170	2725	~3180	~3500	35	880	1600	-	50	2"	
300	12"	2700	1900	12000	360	865	2465	1150	±200	2785	~3325	~3700	35	860	1700	-	50	2"	
300	12"	5000	2800	20000	500	900	2600	1500	±240	2965	~3670	~3990	35	1140	1900	-	80	3"	
400	16"	5000	2800	20000	450	950	2650	1500	±240	2965	~3670	~3990	35	1140	1900	-	80	3"	
300	12"	7000	5000	25000	550	1000	3200	1600	±250	4580	~5300	5700	35	1250	2200	-	100	4"	
400	16"	7000	5000	25000	500	1000	3200	1600	±250	4580	~5300	5700	75	1250	2200	-	100	4"	

This table contains our standard dimensions. Others on request.

DN 25 - DN 65

1) Draining port ISO 228 – G 1/2 (or 1/2

14 NPT)

2) Deaeration connection ISO 228 – G 1 A (or 1 – 11 1/2 NPT)

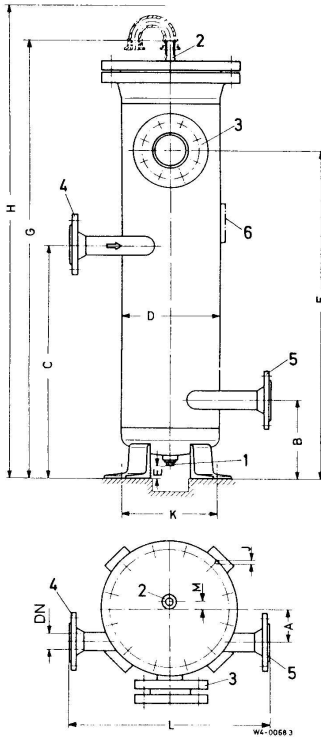
3) Sight glass

4) Inlet port

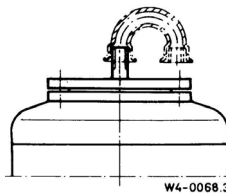
5) Outlet port

6) Manufacturer's and information plate  
Custody transfer data and calibration seal

H) Valve expansion height

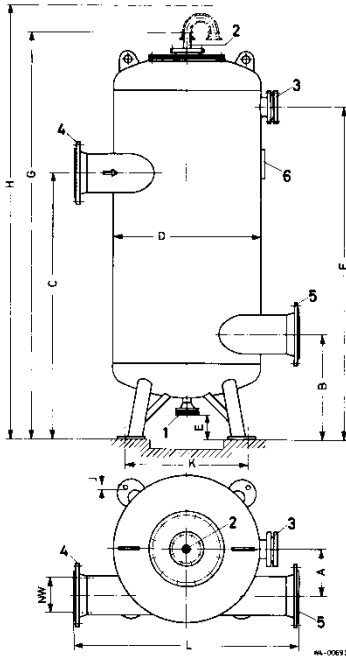


Port and sight glass position, sketch of model a 1 (see 5.4)



Cover design for DN65  
With deaeration device

## DN 80 - DN 400



- 1) Draining port
- 2) Deaeration connection ISO 228 – G 1 A (or 1 – 11 ½ NPT)
- 3) Sight glass
- 4) Inlet port
- 5) Outlet port
- 6) Manufacturer's and information Plate custody transfer data and calibration seal
- H) Valve expansion height

Port and sight glass position, sketch of model a 1 (see 5.4)

## 5.2 Weights

Nominal size DN	Container capacity [l]	effective volume [l]	max. permissible Flow rate Q [l/min]	Weight [kg]			
				PN10	PN16	PN25	PN40
25	29	10	100	78	78	100	100
32	29	10	100	78	78	100	100
50	45	25	300	120	120	160	160
65	120	60	700	145	145	170	170
80	180	95	1200	165	165	210	210
100	180	95	1200	170	170	220	220
100	300	180	2000	220	220	260	300
100	470	295	3000	250	250	360	520
150	470	295	3000	250	250	360	520
150	1000	675	5000	420	520	730	860
200	1000	675	5000	420	520	730	860
250	1000	675	5000	420	520	730	860
200	2200	1500	10000	850	1100	1450	2280
250	2200	1500	10000	850	1100	1450	2280
300	2200	1500	10000	850	1100	1450	2280
300	2700	1900	12000	1080	1375	1880	2900
300	5000	2800	20000 <sup>1)</sup>	1800	2200	2700	4300
400	5000	2800	20000 <sup>1)</sup>	1800	2200	2700	4300
300	7000	5000	25000 <sup>1)</sup>	2400	3050	3500	6050
400	7000	5000	25000 <sup>1)</sup>	2400	3050	3500	6050

<sup>1)</sup>with 2 deaeration devices

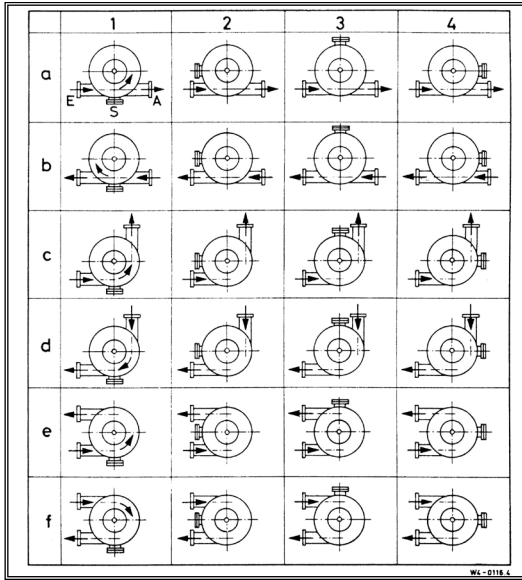
### 5.3 Materials

Material	Version A	Version F
Casting:	P265 GH(HII)	-
Wear allowance:	C2 = 1 mm (for wall thickness < 30 mm)	1.4571 <sup>1)</sup>
Floor:	P265 GH (HII)	1.4571 <sup>1)</sup>
Ports:	P235 GH (ST 35.8 I)	1.4571 <sup>1)</sup>
Flanges:	according to DIN C 22.8 <sup>1)</sup> according to ANSI C 21 (A105 <sup>1)</sup> )	1.4571 <sup>1)</sup>
Cover and welding flange:	P265 GH (HII)	1.4571 <sup>1)</sup>
Bolts:	C 35 E according to DIN 931 resp. 938	1.4571 <sup>1)</sup> according to DIN 931 resp. 938
Nuts:	C 35 according to DIN EN 24032	1.4571 <sup>1)</sup> according to DIN EN 24032
Gaskets:	Novapress-Multi / Viton	Teflon
Welding:	Electrofusion welding	Electro fusion welding
Welding process	Root run 141 (WIG) Filler run: 111 (TIG/GTAW), 135 (MAG)  Final run: 111 (TIG/GTAW)	Root run: 141 (WIG) Filler run: 111 (TIG/GTAW), 135 (MAG) 141 (WIG) Final run: 111 (TIG/GTAW)
Welding consumables	141 (WIG) EN 1668 – W2Mo 111 (TIG/GTAW) DIN EN 499 – E420RR12 135 (MAG) EN 440 – G46 2 C G4 Si 1	141 (WIG) prEN 12072 – W19 12 3 L Si 111 (TIG/GTAW) EN 1600 – E 19 12 3 LR 32 135 (MAG) 9rEN 12072 – E 19 12 3 L Si
Deaeration device	Cast brass / steel and chrome nickel steel 1.4571	Chrome nickel steel 1.4408 und 14571

<sup>1)</sup> Acceptance test certificate 3.1 B according to DIN EN 10204

Deviations to normal A and F version as well as devices calculated and tested according to other construction regulations: on request.

### 5.4 Port and sight glass positions



Port and sight glass positions of the centrifugal gas separator DN 25 - 400

E Inlet port

A Outlet port

S sight glass

The arrows indicate the direction of flow. The inlet port E is always at the top, the outlet port A at the bottom.

### 6. Certificates and approvals

Certificate according to MID directive LNE-18071 Rev.1 2020 designed and manufactured according to the pressure equipment directives 2014/68/EG

## 7. Order information

Please state the following when ordering:

- Product data
- Especially weight
- Temperature
- Pressure
- Viscosity
- Material
- Connection size
- Measuring range
- Desired accessories
- Required approvals
- Certificates and material certificates

## 8. Standards and directives

- Designed and manufactured according to AD 2000 directives
- **Ex-protection:**

Manufacturer's declaration by Bopp & Reuther Messtechnik regarding use in hazardous areas. The device complies with the standards EN 1127-1 and EN ISO 80079-36.

The operator must comply with the relevant regulations when installing and connecting the device in the Ex area.

- **Pressure Equipment Directive 2014/68/EG:**

The centrifugal gas separators of the ZGA series are suitable for group 1 liquids.

Classification generally within category IV, with individual acceptance according to module G of the Pressure Equipment Directive.



## 9. Commissioning and operation

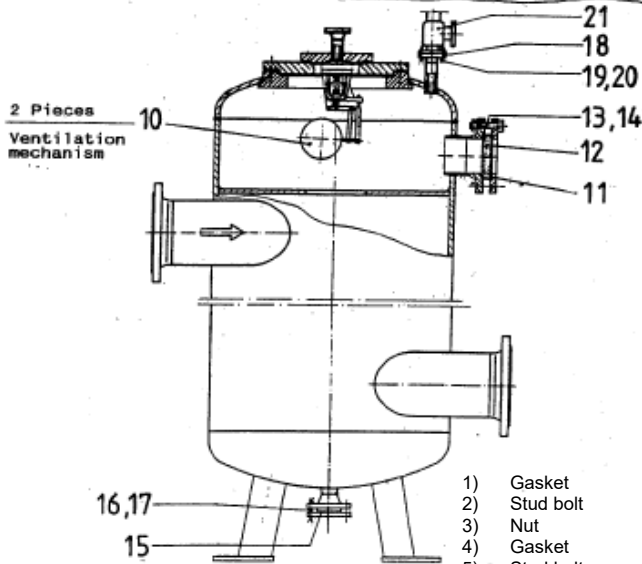
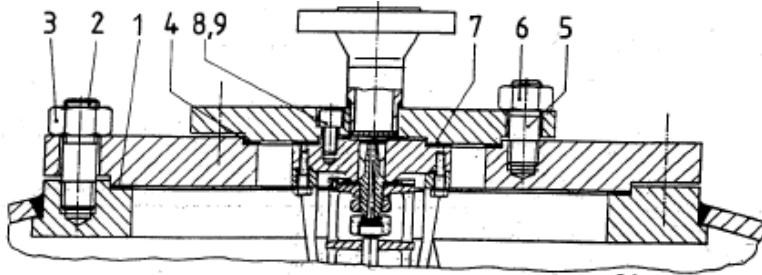
The gas separator must be connected to the process via the flanges (observe flow direction!!). Depending on the application, proceed in the same way with the connections for venting and draining. The gas separator must be earthed via an earthing lug on a stand. This includes it in the potential equalisation of the system.

### **Attention!**

**The gas separator's float venting device, which is located in the upper part of the gas separator, is supplied in the locked position (transport position).**

**Before commissioning, release the transport lock on the float ball:**

- **To do this, remove the housing cover with the apparatus by turning the knobs shown in removing the nuts marked 6 in the sketch below**
- **remove the float device from the unit. (These nuts are not secured on delivery).**
- **Loosen the float ball by separating the transport clamps.**
- **Put the mechanism back into the unit and tighten the nuts. Tighten the nuts. Then carefully screw it back in place.**



2 Pieces  
Ventilation  
mechanism

- 1) Gasket
- 2) Stud bolt
- 3) Nut
- 4) Gasket
- 5) Stud bolt
- 6) Nut
- 7) Gasket
- 8 / 9) Allen screw
- 10) Float ball with lever
- 11) Gasket
- 12) Sight glass
- 13 / 14) Screws with nuts
- 15) Gasket
- 16 / 17) Screws with nuts
- 18 / 19 / 20 / 21) Level control (optional)


During start-up, the entire measuring system and pipeline is vented via the vent valve of the gas separator.

## 10. Type plates

1. The units must be installed, operated and maintained by qualified personnel. The operator is responsible for ensuring that the personnel are sufficiently and appropriately qualified. In case of doubt, consult the manufacturer.
2. Only liquids may be measured against which the materials the materials used for the pressure-bearing elements are resistant to


The used abbreviations have the following meaning

Serial number:	Clear identification number
Year:	Year of manufacture
PS:	Permissible operating pressure
PT:	Applied test pressure and test date
DN:	Nominal size
Capacity:	Filter Capacity in litres
TS:	Permissible operating temperature
S/N	Serial number



0036

**Bopp & Reuther**  
**Messtechnik**  
 D-67346 Speyer



### Zentrifugal-Gasabscheider

⊕ Fabrik-Nr.

Baujahr

PS zul. Betr.-  
Oberdruck  bar

PT aufgebr.  
Prüfdruck  bar

DN

Inhalt  l

TS zul. Betr.-  
Temp.  °C

PT Prüf-  
Datum

1-43-6976-550/-

## Appendix

### A. Maintenance

The centrifugal gas separator is maintenance-free.

### B. Repairs

This device has been designed, produced and tested with the utmost care. In the unlikely event that a fault should occur, please contact our service department:

Bopp & Reuther Messtechnik GmbH Service Am Neuen Rheinhafen 4 67346 Speyer, Deutschland Tel.: +49 6232 657-420 Mobil-No.: +49 15115233023 Fax: +49 6232 657 561 Email: <a href="mailto:service@bopp-reuther.com">service@bopp-reuther.com</a>
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### C. Disposal an decommissioning

Disposal or decommissioning must only be carried out by specialists. Product residues must be disposed of in accordance with legal regulations.

## D. Declaration on decontamination

<p><b>Bopp &amp; Reuther Messtechnik GmbH</b>                  Am Neuen Rheinhafen 4                  67346 Speyer                  Germany</p>	<p><b>BOPP &amp; REUTHER                  MESSTECHNIK</b> </p> <p>Telephone: +49 (0) 6232 / 657 420                  Fax: +49 (0) 6232 / 657 561                  Mail: <a href="mailto:service@bopp-reuther.com">service@bopp-reuther.com</a>                  Web: <a href="http://www.bopp-reuther.com">www.bopp-reuther.com</a></p>	
ERA number: <input style="width: 250px;" type="text"/>		
<b>DECLARATION ON DECONTAMINATION OF METERS AND COMPONENTS</b>		
<p>Please complete this form and return in advance by email or by Fax to +49(0)6232 / 657 561 in order to receive an Equipment Return Authorisation (ERA) number (not necessarily required). No action to repair or examine the meter will be done, until a valid declaration of decontamination has been received.</p>		
<b>Contact information</b>		
Company Name: <input style="width: 150px;" type="text"/>	Contact Person: <input style="width: 150px;" type="text"/>	
Company Address: <input style="width: 150px;" type="text"/>	Name: <input style="width: 150px;" type="text"/>	
	Phone: <input style="width: 150px;" type="text"/>	
	Email: <input style="width: 150px;" type="text"/>	
<b>Meter information</b>		
Type: <input style="width: 150px;" type="text"/>	Serial no.: <input style="width: 150px;" type="text"/>	
Id. no.: <input style="width: 150px;" type="text"/>		
Reason for return (e.g. calibration, repair). Please describe in detail. <input style="width: 100%; height: 30px;" type="text"/>		
<b>Contamination information</b>		
The meter was contaminated with: <input style="width: 500px;" type="text"/>		
<input type="checkbox"/> poisonous  <input type="checkbox"/> hazardous  <input type="checkbox"/> explosive	<input type="checkbox"/> corrosive, irritant  <input type="checkbox"/> oxidizing  <input type="checkbox"/> environmental hazardous	<input type="checkbox"/> flammable  <input type="checkbox"/> cancer-causing, harmful  <input type="checkbox"/> other: <input style="width: 100px;" type="text"/>
The meter was cleaned with: <input style="width: 500px;" type="text"/>		
<b>Packaging and shipping Instructions</b>		
<ul style="list-style-type: none"> <li>• Remove all cables, connectors, separate filters and mounting materials</li> <li>• Please pack each item in two suitable sealed protective foil bags</li> <li>• Transport in suitable shipping package (e.g. original Bopp &amp; Reuther Messtechnik shipping package)</li> <li>• Include a copy of this declaration form along with the shipping documents on the outside</li> </ul>		
<p>By signing this form, you are accepting the full responsibility for its contents and confirming that appropriate decontamination has taken place in accordance with legal regulations.</p>		
Print name: <input style="width: 150px;" type="text"/>	Date: <input style="width: 150px;" type="text"/>	
Legally valid signature: <input style="width: 500px;" type="text"/>		

## E. Certificates

### E.1 Declaration of the manufacturer regarding Ex-protection

BOPP & REUTHER  
MESSTECHNIK 

**Herstellereklärung zum Explosionsschutz**  
**Declaration of the manufacturer regarding Ex-protection**  
**Déclaration du fabricant concernant la protection Ex**

Hiermit erklärt der Hersteller in alleiniger Verantwortung, dass die nachfolgend bezeichnete Baueinheit keine potentielle Zündquelle enthält und daher nicht in den Anwendungsbereich der ATEX-Richtlinie 2014/34/EU fällt. Bei nicht mit uns abgestimmten Änderungen verliert diese Erklärung ihre Gültigkeit.

*The manufacturer herewith declares under sole responsibility that the unit mentioned below doesn't have potential ignition sources and therefore doesn't fall under the scope of the ATEX Directive 2014/34/EU. This declaration is no longer valid if the unit is modified without our agreement.*

Par la présente, le fabricant déclare que les appareils décrits ci-dessous ne présentent pas de source d'inflammation et ne sont donc pas soumis au cadre d'application de la directive ATEX 2014/34/UE. Toute modification des appareils sans notre accord entraîne la perte de validité de cette déclaration de conformité

<b>Hersteller</b> Manufacture Fabricant	Bopp & Reuther Messtechnik GmbH Am Neuen Rheinhafen 4 D-67346 Speyer
<b>Bezeichnung</b> Description Description	Zentrifugal Gasabscheider Centrifugal Air Separator Dégazeur à action centrifuge
<b>Typ, Modell</b> Type, model Type, modèle	ZGA
<b>Normen und normative Dokumente</b> Standards and normative documents Normes et documents normatifs	EN 1127-1 EN ISO 80079-36

Da bei der Bewertung der Zündgefahr keine potenzielle Zündquelle identifiziert wurde, ist die Verwendung in explosionsgefährdeten Bereichen möglich, die Betriebsmittel der Kategorie 2 oder 3 erfordern. Die Baueinheit enthält keine eigene Energiequelle. Somit ist für die Oberflächentemperatur die Mediumtemperatur maßgebend.

*As no ignition sources were identified by the ignition risk assessment, the use in hazardous environments requiring equipment of category 2 or 3 is possible. The unit doesn't have own energy sources. Therefore the surface temperature is mainly the medium temperature.*

L'évaluation des risques n'ayant pas identifié de source d'inflammation, l'emploi dans des zones dangereuses requérant des équipements de catégorie 2 ou 3 est possible. L'appareil ne contient pas de propre source d'énergie. La température de surface est donc essentiellement celle du liquide.

Ort, Datum / Place, Date / Lieu, Date:

Speyer, 2018-07-04

  
Dr. J. Ph. Herzog  
Geschäftsführer / Managing director / Gérant

  
I. A. B. Bähr  
QS Leiter / QA Manager / Responsable qualité

Bopp & Reuther Messtechnik GmbH, Am Neuen Rheinhafen 4, D-67346 Speyer  
Telefon: +49(0)6232 657-0, Telefax: +49(0)6232 657-505, Email: [info@bopp-reuther.de](mailto:info@bopp-reuther.de), Internet: [www.bopp-reuther.de](http://www.bopp-reuther.de)

Z-ML-HE ZGA-mech-Ex-V2 2018-07-04

**Notes:**

**Our product portfolio:****Volume flowmeter:**

- Oval wheel meter
- Turbine meter
- Electromagnetic flowmeter

**Mass flowmeter:**

- Vortex meter
- Compact orifice
- Coriolis mass flowmeter

**Density and concentration meter (Measuring and testing equipment)****Dosing measurement technology**

- Electromagnetic flowmeter
- Coriolis mass flowmeter
- Oval wheel meter
- Dosing control system

**Measurement Accessories**

- Processing electronics
- Mechanical indicator
- Pulse pick-ups
- Components

**Measuring and testing equipment****Conformity assessment according to MID Directive 2014/32/EU****After Sales Service**

Bopp & Reuther Messtechnik GmbH  
Am Neuen Rheinhafen 4  
67346 Speyer, Deutschland  
Tel.: +49 6232 657-0  
Fax: +49 6232 657- 505  
Email: [info@bopp-reuther.com](mailto:info@bopp-reuther.com)  
<https://www.bopp-reuther.com>

**BOPP & REUTHER**  
**MESSTECHNIK**

